



National Park Service
US Department of the Interior

National Park Service

DIVING MANAGEMENT

FIELD MANUAL – 4

2019

Law Enforcement, Security, and
Emergency Services

FM-4

This Diving Safety and Operations Manual (FM-4) contains all required elements of NPS Diving Management Reference Manual 4 (RM-4), a standalone NPS document, as well as information specific to FM-4.

Elements of RM-4 appear in *Italic* and contain RM-4 in the section number. Per NPS policy, RM-4 is controlled and issued by signature of the Associate Director, Visitor and Resource Protection.

Elements of FM-4 appear without RM-4 in the section number. Per NPS policy, FM-4 elements are controlled and issued by the NPS National Dive Control Board.

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RM-4, 1.1 **Introduction**

- A. *The National Park Service (NPS) manages many areas that require underwater diving operations and utilizes diving as a tool to conduct a wide variety of management functions. These operations are essential to the management and use of recreational, natural, and cultural resources, as well as resource and visitor protection.*
- B. *NPS dive operations are conducted for many purposes, including those related to science, public service / safety, and maintenance and infrastructure. It is therefore necessary to provide standards and guidance to park superintendents and program managers, and NPS divers in order to standardize safe diving practices. This document, Diving Management, Reference Manual 4 (RM-4), and the NPS Diving Safety and Operations Manual, Field Manual 4 (FM-4) provides those standards and guidance. Together these documents (RM-4 and FM-4) supply a uniform approach to policies, standards, and procedures to be followed in order to achieve the desired service-wide goal of conducting safe diving operations.*
 - i. *RM-4 addresses information related to applicable standards, authorities, scope, implementation, operational control, and administrative procedures.*
 - ii. *FM-4 addresses information related to NPS diver training and certification, diving operations, equipment, and support materials (appendices) specific to the NPS Dive Program. It also provides a standard approach to commonly encountered NPS diving operations.*

RM-4, 1.2 **Applicable Standards**

- A. *All dives performed as part of employment are regulated by OSHA Commercial Diving Regulations, 29 CFR Part 1910 Subpart T. These standards include certain exemptions which are set out in 29 CFR 1910.401(a). NPS diving operations that do not meet the criteria for these exemptions are managed as commercial dives.*
- B. *NPS Dive Classifications and Authorities:*
 - i. *Maintenance Diving – Will be conducted in accordance with 29 CFR Part 1910, Subpart T, and community standards for OSHA compliant commercial dives (i.e. the current Association of Dive Contractor [ADC] standards) as reviewed and approved by the NPS National Dive Control Board.*
 - ii. *Public Safety Diving – Is exempt under 29 CFR 1910.401(a)(2)(ii) and will be conducted in accordance with community standards for Public Safety Diving as reviewed and approved by the NPS National Dive Control Board.*
 - iii. *Scientific Diving – Is exempt under 29 CFR 1910.401(a)(2)(iv), and will be conducted in accordance with 29 CFR Part 1910, Subpart T Appendix B, and with community standards for Scientific Diving (i.e. the current American Academy of Underwater Sciences [AAUS] standards) as reviewed and approved by the NPS National Dive Control Board.*

RM-4, 1.3 **Scope**

- A. *This policy (RM-4 and FM-4) covers management of and safe diving practices for Park Service divers, Park Service dive operations, and mixed agency/organizational dive operations.*
- B. *Recreational diving within park areas is beyond the scope of this policy. This use is covered by NPS Management Policies, Chapter 8.2 and regulations applicable to recreational use in 36 CFR, Part 1, cover this use.*
- C. *Concessions or commercial use authorizations (CUA) involving dive operations are beyond the scope of this policy. Visitor-oriented dive operations, such as SCUBA charters or instruction within a park area, may be allowed under those conditions set forth in guidance documents, 36 CFR 5.3 (or other relevant sections), the 1998 Concessions Policy Act, and other applicable authorities. The Park Dive Officer (PDO) and/or Regional Dive Officer (RDO) will be consulted for specific diving use and conditions to be included in the contract, license, or permit regarding identification of hazardous conditions and/or sensitive resources issues.*
- D. *Commercial diving operations that involve private salvage, marine construction, industrial inspection, or private sector commercial diving done to support concessionaire or NPS operations and infrastructure and that are required to be conducted under permit issued by the Superintendent per authority granted in 36 CFR 5.3 are beyond the scope of this policy. The PDO and/or RDO will be consulted for specific diving use and conditions to be included in the permit regarding identification of hazardous conditions and/or sensitive resources issues.*
- E. *Non-NPS divers who are operating independently within NPS waters on a Scientific Research and Collecting Permit are beyond the scope of this document. The PDO and/or RDO will be consulted for specific diving use and conditions to be included in the permit regarding identification of hazardous conditions and/or sensitive resources issues.*

RM-4, 1.4 **Requirements**

- A. *All NPS diving activity will be conducted in accordance with 29 CFR Part 1910, Subpart T, 485 DM 27, Director's Order 4 (DO4), this document (RM-4), and Field Manual 4 (FM-4), which will collectively be referred to as NPS diving policy and standards.*
- B. *To establish/maintain a Dive Program within an NPS Park/Program:*
 - i. *The Superintendent must appoint a Park Dive Officer (PDO). The PDO will meet the requirements of FM-4.*
 - ii. *On an annual basis, at a minimum, the PDO will coordinate the production of a Program Dive Supplement (see FM-4) which has been reviewed by the Regional Dive Officer (RDO) and approved by Park/Program leadership.*

RM-4, 1.5 **Procedures for Change**

- A. *This RM-4 will be reviewed, modified as necessary, and issued by signature of the Associate Director, Visitor and Resource Protection. The National Diving Control Board (NDCB) will make recommendations for change as necessary.*
- B. *Field Manual 4 – Diving Safety and Operations Field Manual (FM-4) will be reviewed periodically with changes issued by the NDCB.*
 - i. *Changes in FM-4 that revise the conduct or management of NPS diving operations will be compared to applicable community standards prior to implementation by the NDCB.*

RM-4, 1.6 **Record of Change**

A record of change of RM/FM-4 shall be distributed electronically to all NPS units with dive programs as changes are implemented.

RM-4, 1.7 **Implementation**

- A. *All NPS diving is managed under a diving safety manual and Diving Safety Control Board model as described in 29 CFR 1910.401(a)(iv).*
- B. *The NDCB as defined in RM-4 will develop, maintain, approve, and issue a field manual (FM-4 Diving Safety and Operations Field Manual).*
- C. *The responsibility for implementing, funding, and maintaining program accountability lies with the Director, Regional Directors, and individual Park Superintendents, as advised by the NDCB. Each program manager must continuously evaluate the scope and consequences of the program, the capabilities of local diving affiliates, workload, and the associated costs. When a superintendent decides to implement a diving program, he/she is mandated to manage it according to RM-4.*

Chapter 2 Operational Control

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RM-4, 2.1 **Organizational Levels and Functions**

RM-4, 2.1.1 **Director and Deputy Director**

The line authority for the NPS Dive Program is established through formal delegations from the Secretary of the Interior, the Director, and the Deputy Director for Operations. They also have the ultimate responsibility to ensure that the NPS Dive Program meets all Department and OSHA standards.

RM-4, 2.1.2 **Associate Director, Visitor and Resource Protection**

The Associate Director, Visitor and Resource Protection, is responsible for signature and release of RM-4, and review, approval/denial, and release of changes to RM-4 put forward for consideration by the National Dive Control Board (NDCB). The Associate Director, Visitor and Resource Protection, is also responsible for providing effective review and oversight of the NPS Dive Program.

RM-4, 2.1.3 **Chief, Law Enforcement, Security, and Emergency Services**

The Chief, Division of Law Enforcement, Security, and Emergency Services is responsible for ensuring that the approved dive policy, procedures, and standards are fully implemented within the NPS.

RM-4, 2.1.4 Park Superintendent or NPS Program Manager

The Park Superintendent or NPS Program Manager has overall responsibility for management of park operations, including management of the dive program. The Park Superintendent or NPS Program Manager exercises control of the park dive program through appointment and oversight of the Park Dive Officer. The Park Superintendent or NPS Program Manager has responsibility for ensuring that dive programs are managed in full compliance with directives, policies, and law.

RM-4, 2.1.5 National Diving Control Board (NDCB)

A. Composition

- i. *The NDCB will be made up of a majority of Active Divers as referenced in FM-4. In order to allow NPS Scientific Diving to comply with the Guidelines for Scientific Diving in 29 CFR Part 1910, Subpart T, Appendix B, the NDCB will consist of a majority of active scientific divers. To ensure the safety of all of the varied classifications of diving performed by the Park Service, and overseen by the NDCB, all diving classifications conducted by NPS will be represented within the NDCB membership.*
- ii. *NPS adheres to the scientific diving community standard (AAUS) and OSHA interpretation for defining a scientific diver: no particular academic credential is required to be defined as a scientific diver. An NPS diver meeting the training requirements listed in FM-4, and who performs scientific diving tasks on a scientific diving operation qualifies as a scientific diver, or scientific diver in training.*

B. Members

- i. *Regional Dive Officers*
- ii. *Dive Program Manager (ex officio, non-voting)*
- iii. *Chief of Risk Management, or designee*
- iv. *Associate Director, Cultural Resources, or designee*
- v. *Associate Director, Natural Resource Stewardship and Science, or designee*
- vi. *Associate Director, Park Planning, Facilities, and Lands, or designee*
- vii. *A rotating at-large member selected from the ranks of active NPS divers*
- viii. *Dive Safety Officer (ex officio, non-voting)*

C. Officers

- i. *The NDCB will have a Chair and a Vice Chair, who will be RDOs.*
- ii. *These officers will serve in two (2)-year elected terms.*

D. Meetings

- i. *The NDCB will meet annually or more often when necessary.*
- ii. *A quorum will consist of five voting board members with a minimum of three RDOs and two other members of the board, or their designees.*

E. Functions

The NDCB:

- i. *Develops, in conjunction with the Dive Safety Officer (DSO), training and safety standards, and dive policy to be implemented nationally and locally.*
- ii. *Advises NPS management on RM-4 dive policy and suggests modifications.*
- iii. *Issues written interpretation of RM-4 and FM-4 dive policy as needed for safe and effective operations, or where questions related to field implementation exist.*
- iv. *Approves and monitors NPS diving programs and projects. The NDCB may delegate review and approval of standard operating procedure diving projects to the regional and/or local level.*
- v. *Reviews NPS Diving Programs with regard to compliance to RM-4, FM-4, and safe diving related practices on an as needed basis.*

- vi. *Develops technical manuals.*
- vii. *Develops/maintains a diving information management system.*
- viii. *At least annually, the NDCB:*
 1. *Develops, reviews, updates, and modifies FM-4 for field implementation.*
 2. *Reviews NPS divers with regard to depth and other relevant certifications/requirements, program compliance or safety issues*
 3. *As necessary takes disciplinary or administrative action for unsafe NPS Diver practices or compliance issues related to NPS dive standards and policies.*
 - a. *Disciplinary or administrative actions include: revocation/restriction of NPS Blue Card, required training/retraining, or similar actions.*
 - b. *Where these diving administrative and/or disciplinary actions have Human Resources (HR) implications for the individual, remediation or mitigation will be done in consultation with the employee's supervisor and in accordance with established NPS HR policies, but in no case will dive safety be compromised.*
 4. *Reviews DSO audits of NPS Diving Programs with regard to compliance to NPS dive standards and policies and safe diving related practices.*
 5. *As necessary takes administrative and/or disciplinary action for unsafe NPS Diving Programs or diving related practices; or Program compliance issues related to NPS dive standards and policies.*
 - a. *Administrative and/or disciplinary actions include: Program Stand-down/Restriction, or similar actions*
- ix. *Reviews NPS Diving Incidents and Near Misses, modifies diving standards accordingly, and disseminates lessons learned.*
- x. *Develops/maintains liaison with other groups.*
- xi. *Adjudicates appeals related to NPS Diving from areas or regions, or divers.*
- xii. *Approves NPS dive instruction personnel.*
- xiii. *Works with the Dive Program Manager and others to secure funding in support of the NPS National Dive Program.*
- xiv. *Establishes criteria for equipment selection and use.*
- xv. *Approves new equipment or techniques.*
- xvi. *Conducts dive program reviews on request from PDOs, RDOs, Superintendents/Program Managers, or as needed.*

RM-4, 2.1.6 Dive Program Manager

- A. *The Deputy Chief of Emergency Services (WASO) is the NPS Dive Program Manager, and will provide leadership and direction to the NPS NDCB in the development of the program's Director's Order and Reference Manual.*
- B. *This individual secures funding for support of the NPS National Dive Program, and works with the NDCB to represent NPS to external organizations.*

RM-4, 2.1.7 Regional Dive Officer (RDO)

- A. *The RDO is an NPS diver who will be appointed in writing by the Regional Director of NPS Regions containing Dive Programs. This individual plans, directs, develops, coordinates, and advises on all phases of the diving program within the region. In doing so, the RDO serves as a technical advisor to the Regional Director, or their designee. For programs deemed National in scope, the designation of the RDO is designated to the NDCB to select the individual active within the NPS Dive Program best qualified to serve in this capacity. The NDCB is authorized to assign temporary RDO oversight authority to a Region where the RDO position is vacant; such assignments will be to a currently serving RDO. It is required*

- that each RDO have successfully completed NPS Dive Leadership Training (See FM-4). The RDO will:*
- i. Annually review park dive programs including Program Dive Supplement (See FM-4), RM/FM-4/OSHA compliance, diver certification review, incident review, and other matters relevant to the safe and efficient operation and management of diving within the region.*
 - ii. Audit NPS Diving Programs within their Region with regard to compliance to FM-4 and safe diving related practices on an as needed basis.*
 - iii. Develop regional diving practices in line with current policy as required.*
 - iv. Reviews and audits record keeping procedures for all diving programs, personnel, and equipment in the region.*
 - v. Certify Divers for NPS Blue Card. (See FM-4)*
 - vi. Collaborate on Service-wide dive training with the NPS DSO, other RDOs and cooperating agencies.*
 - vii. Prioritizes and selects, as necessary, those divers from their region who will attend Service-wide dive training.*
 - viii. Act as the regional reference for large scale emergency response operations with the need for diving resources to identify diving capabilities and personnel qualified to assist.*
 - ix. Suspend Regional diving programs and/or diving operations that are deemed unsafe or out of compliance with NPS diving policy or practices.*
 - x. Review and transmit significant regional diving information to the NDCB.*
 - xi. Provide annual summaries of regional diving activities to the NDCB.*
 - xii. Serve as a member of formal review boards convened for accidents/unsafe incidents involving NPS divers.*
 - xiii. Assure park diver qualifications are entered into the Diving Management System (DMS).*
 - xiv. Act as subject matter expert, where appropriate, to assist PDO in matters of policy, equipment and other forms of expertise.*
 - xv. Review and approve dive program reciprocity agreements with governmental agencies, academia or other organizations. Programs must demonstrate an active program adhering to Scientific, or Public Safety community standards and OSHA compliant dives.*
 - xvi. Designate Dive Examiners (DE).*
 - xvii. Provide park managers information on specialty dive situations.*
 - xviii. Serve as a member of the NDCB.*
 - xix. Additional duties and responsibilities as assigned by the NDCB.*
- B. In situations where the same individual holds the positions of PDO and RDO, review of information and decisions on areas where there is a conflict of interest, or appearance of a conflict of interest, will be made by the NDCB Chair or Vice-Chair. Examples of conflict of interest include: review of a Program Dive Supplement, appeals for Blue Card revocation for divers under the individual's purview as PDO, etc.*

RM-4, 2.1.8 Dive Safety Officer (DSO)

- A. The DSO is an NPS diver, WASO position, who is field-located, and supervised by the Deputy Chief of Emergency Services (WASO). This individual, under the direction of the NDCB, plans and manages a professional, comprehensive, and complex dive safety and training program, and implements multiple aspects of the dive safety program. It is required that the DSO possesses an active nationally recognized SCUBA Instructor credential.*
- B. The DSO:*
- i. Audits NPS Diving Programs at least once every three years for compliance with the NPS dive standards and policies and safe diving related practices.*
 - ii. Implements training and safety standards developed by the NDCB at both a national and*

- local unit scope.*
- iii. *Develops short and long-range plans for supporting dive safety programs including training requirements, policy compliance, program reviews, and equipment standards.*
 - iv. *Plans, coordinates, and conducts training and development workshops, to ensure divers maintain required skills and competencies.*
 - v. *Works closely with the NDCB to ensure compliance with agency and departmental policy in support of field diving operations.*
 - vi. *Works in conjunction with the RDOs to analyze collected data to determine whether the dive program is meeting long-term goals and objectives.*
 - vii. *Maintains awareness of technological developments in diving science and related disciplines.*
 - viii. *Coordinates program activities with various Federal, State, and local government entities/agencies in support of park dive operations.*
 - ix. *Reviews and/or revises annually, written agreements concerning dive management.*
 - x. *Serves on various professional committees devoted to policy and procedural development.*
 - xi. *Evaluates new brands or models of advanced diver life support (and other equipment as designated by the NDCB), documents results, and makes recommendations to the NDCB for approval prior to implementation.*
 - xii. *Exercises emergency authority to prevent or stop imminent danger situations (i.e., unsafe conditions or practices that could be reasonably expected to cause death or serious physical harm).*
 - xiii. *Participates on Serious Accident Investigations (SAI) as a team member or subject matter expert, and serves on Boards of Review for NPS Diving Incidents not rising to the level of a SAI.*
 - xiv. *Act as the national reference for large scale emergency response operations with the need for diving resources to identify diving capabilities and personnel qualified to assist.*

RM-4, 2.1.9 Park Dive Officer (PDO)

- A. *In areas that have diving programs, the Superintendent or Program Manager shall be responsible for its management. The manager shall appoint in writing an NPS employee as PDO to fulfill area obligations in keeping diving records, planning, training, etc. Experience and leadership ability should play an important part in the selection of the PDO. The individual shall be an NPS Diver and will successfully complete NPS Diving Leadership training within two years of appointment. The PDO performance related to DOI and NPS diving policy is subject to review by the RDO, the DSO, and/or NDCB. Failure to comply with DOI or RM/FM-4 standards may result in a letter of non-compliance to the Superintendent or Program Manager from the RDO and/or NDCB.*
- B. Functions and Responsibilities
 - i. *Performs as the Park/Program subject matter expert on diving matters related to overall Park/Program management and goals.*
 - ii. *Prepares/transmits the following to the RDO:*
 - 1. Program Dive Supplement (annually)
 - 2. Blue Card Certification checklist in DMS (annually)
 - 3. Validated Diver Entry requirements
 - 4. Public Safety Diving Operations Plan (annually, for programs with a Public Safety Diving function)
 - iii. *Maintains Park/Program dive equipment inventory and makes equipment assignment to divers.*
 - iv. *Verifies with RDO valid association with reciprocal diving program and approves diver certificates and other policies with RDO concurrence.*

- v. Establishes equipment maintenance schedules using diving industry standards. Records shall be retained by each PDO.
- vi. Ensures that diving medical clearances are current and that a copy of the current medical clearance form ([Appendix II, Form 10-414](#)) is placed in the individual diver's Park based dive folder, and that the date of the current approved medical clearance is recorded to the diver's record in the NPS online DMS.
- vii. Ensures Park/Program divers transmit a copy of their completed medical examination forms (See Appendices I-II) and any relevant or supporting materials to the NPS Medical Standards Program (MSP) Manager located in the Division of Law Enforcement, Security and Emergency Services, WASO.
- viii. Approves the use of personally-owned diving equipment by NPS divers.
- ix. Prepares and submits the Diving Summary and Blue Card Certification Checklist of each unit's activities to the RDO by January 10 of each year. These must be received for renewal of diver certification.
- x. Is responsible for and has authority to continually assess the judgments and skills of divers within their program and place restrictions on diving activities.
- xi. If qualified and designated, serves as an NPS Dive Examiner.
 1. A PDO not designated as a Dive Examiner must work with an NPS Dive Examiner when conducting checkout dives with incoming divers
 2. A PDO not designated as a Dive Examiner must work with an NPS Dive Examiner when supervising and evaluating specific blue-card skills
- xii. Develops, and submits to RDO for approval, dive program reciprocity agreements with governmental agencies, academia or other organizations not addressed by NPS blanket reciprocity ([See Section 3.4](#)). Programs must demonstrate an active program adhering to Scientific, or Public Safety community standards and OSHA compliant dives.

2.1.10 NPS Course Director (CD)

- A. A CD must have successfully completed NPS Dive Leadership Training and been reviewed and approved by the NDCB.
- B. A CD is qualified to organize and conduct specialized NPS Dive Trainings approved by the NDCB.
- C. A CD must be recommended by the RDO with concurrence of the NDCB. An NPS CD qualifies as an NPS Dive Examiner.
- D. An NPS Course Director must:
 - i. Be employed by the National Park Service
 - ii. Maintain an active Blue Card certification
 - iii. Participate as core staff of NPS national or regional dive training every three years
 - iv. Be reviewed annually by the NDCB

2.1.11 Dive Supervisor (DS)

- A. For each dive, one individual shall be designated as the dive supervisor. He/she shall be at the dive location during the diving operation. The DS must have experience and training in the conduct of the assigned diving operations.
- B. The DS is responsible for ensuring the following items are addressed prior to and during each diving operation they are supervising:
 - i. Coordination
 1. Diving shall be coordinated with other known activities in the vicinity that are likely to interfere with diving operations.
 - ii. Briefing
 1. The dive team members shall be briefed on the following:
 - a. Dive objectives.

- b. Unusual hazards or environmental conditions likely to affect the safety of the diving operation.
- c. Modifications to diving or emergency procedures necessitated by the specific diving operation.
- d. Reporting any physical problems or adverse physiological effects including symptoms of pressure-related injuries.
- iii. Dive Planning
 - 1. Planning of a diving operation shall include considerations of the safety and health aspects of the following:
 - a. Diving mode.
 - b. Surface and underwater conditions and hazards.
 - c. Breathing gas supply.
 - d. Thermal protection.
 - e. Diving equipment.
 - f. Dive team assignments.
 - g. Residual inert gas status of dive team members.
 - h. Decompression schedules and altitude corrections.
 - i. Emergency and emergency medical response.
 - j. Manning requirements for vessels.

2.1.12 Dive Examiner (DE)

- A. A DE must have successfully completed NPS Dive Leadership Training with a recommendation for Dive Examiner designation; and be approved by the RDO.
- B. A DE:
 - i. Performs Checkout dives with incoming divers
 - ii. Is responsible for supervising and evaluating specific blue-card skills
 - iii. Is responsible for and has authority to continually assess the judgments and skills of divers within their program and make recommendation to the PDO on placing restrictions on diving activities.

2.1.13 NPS Diver

- A. A diver meeting and maintaining all NPS Blue Card requirements outlined in [Section 4.4.2](#) is qualified as an NPS Diver.
- B. NPS divers will be trained for the diving classifications, modes, equipment, and breathing gases used; the tasks they are expected to perform; the diving environments and conditions they are expected to operate in; and the diving related responsibilities they are expected to fulfill.

2.1.14 NPS Lead Diver

- A. A Lead Diver is the dive buddy team leader during a dive.
- B. Any diver in Active Blue Card status can be a Lead Diver.
- C. In situations where a member of the buddy team is obtaining experience for increased depth certification and acting as Lead Diver to fulfill training requirements, the Lead Diver of record will be the diver holding the deeper depth certification. The Lead Diver of record will take control of the dive in the event of poor decision making or inadequate skills demonstrated by the Lead Diver in training.

RM-4, 2.2 **Diver Certification and Continuing Education**

- A. *The Blue Card certification gives an NPS diver authorization to perform diving at a specified level based on training, depth certification and mode of diving while acting within their scope of employment.*
- B. *Recreational dive certifications do not convey NPS Diver certification. NPS Diver certifications and continuing educational requirements are to serve NPS purposes and are independent of recreational training requirements.*
- C. *NPS Diver certifications are defined by the NDCB and are approved by the RDO upon recommendation of the PDO.*
- D. *NPS Diver certifications are reviewed/accepted/rejected by the NDCB annually.*
- E. *Use of federal funds is authorized for initial NPS Diver certifications, recertification, and continuing education.*
- F. *NPS Divers must complete certification and continuing educational requirements established by the NDCB outlined in FM-4. (See Chapter 4)*

RM-4, 2.3 **Dive Program Reviews**

- A. *If the need arises, a Superintendent or Program Manager may initiate an internal review of their Dive Program. The PDO, with possible assistance from the RDO, will lead the review.*
- B. *If the need arises, a Superintendent or Program Manager may initiate an external review of their Dive Program. This review can be conducted by the RDO, DSO, NDCB, or NDCB designee. The formal request for an external review should be sent through the RDO along with a statement of need for the review.*
- C. *At a minimum, all Dive Programs will be audited by the DSO or designee every three (3) years or less, as provided in section 2.1.8 (B)(i).*

2.3.1 **Dive Program Review Details**

Dive program reviews will be conducted in a variety of ways, including, but not limited to:

- A. Individual Dive Program Self Audits
- B. DSO site visits and Formal Program Review
- C. Information audits/reports from the NPS online Dive Management System
- D. RDO site visits

RM-4, 2.4 **Incident/Accident Reporting, Investigation and Review**

RM-4, 2.4.1 **General Incident/Accident Reporting and Recordkeeping Requirements**

- A. *All NPS dive incidents shall be reported to the NDCB and appropriate supervisory authorities per the requirements of this section and in accordance with 29 CFR part 1904 – Recording and Reporting Occupational Injuries and Illnesses.*
- B. *All on duty dive-related incidents are subject to the reporting and recordkeeping requirements specified in NPS Reference Manual 50B – Occupational Safety and Health Program (RM-50B). The purpose of this requirement is to ensure appropriate documentation for OSHA recordkeeping purposes and workers compensation claims. The following types of injuries and occupational illness are considered recordable and in all cases must be reported via the DOI Safety Management Information System (SMIS) at <http://www.smis.doi.gov>:*
 - i. *Medical treatment beyond first-aid,*
 - ii. *Loss of consciousness, and*
 - iii. *Injuries/illnesses requiring days away from work, restricted work activity, or job transfer*

- iv. *Incidents that result in property damage, or operating loss of \$2,500 or more.*
- C. *In addition to SMIS reporting requirements, dive incidents requiring recompression treatment, or resulting in moderate or serious injury, or death shall be reported to the NDCB.*
- D. *If pressure-related injuries are suspected, or if symptoms are evident, the following additional information shall be recorded and retained by the Park where the incident occurred, with the record of the dive, for a period of 5 years:*
 - i. *Complete Incident Report*
 - ii. *Written descriptive report to include:*
 - 1. *Name, address, phone numbers of the principal parties involved*
 - 2. *Summary statements from all involved personnel*
 - 3. *Summary of experience of divers involved*
 - 4. *Location, description of dive site, and conditions that led up to the incident*
 - 5. *Description of symptoms, including depth and time of onset*
 - 6. *Description and results of treatment*
 - 7. *Disposition of case*
 - 8. *Recommendations to avoid repetition of incident*

RM-4, 2.4.2 Incident/Accident Investigation

- A. *Dive incidents will be investigated and reported in accordance with procedures established by the NPS NDCB. Investigative reports will specify the circumstances of the incident and the extent of any injuries or illnesses.*
- B. *Dive incidents involving NPS employees, or other Federal, State, or local agency employees under NPS supervision/jurisdiction, and/or contractors and volunteers directly supervised by NPS, that result in any of the following are considered to be serious accidents subject to the Serious Accident Investigation (SAI) and reporting requirements of NPS RM-50B:*
 - i. *One or more work-related fatalities, or imminently fatal injuries or illnesses;*
 - ii. *Hospitalization of three or more employees from a single occurrence;*
 - iii. *Property damage under Departmental/NPS control, and/or operating loss of \$500,000 or more; and/or consequences that the NPS Designated Agency Safety and Health Official (DASHO) or the Regional Designated Safety and Health Official (RDSHO) judges to warrant investigation under serious accident investigation procedures.*
- C. *Serious accidents require immediate notification of the Superintendent/Program Manager and the appropriate Associate Regional Director for Operations (or equivalent management official), the NPS Emergency Incident Coordination Center (EICC), and the NPS DASHO. For work-related fatalities and hospitalization of three or more persons overnight, the nearest OSHA Area Office (800-321-6742) must be notified within 8 hours.*
- D. *In situations where an incident triggers the requirements for an agency-level or regional SAI:*
 - i. *The NPS DSO will be included in the SAI Team as an NPS Dive Subject Matter Expert. In the event there is a conflict of interest, or perceived conflict of interest, with the DSO serving on the SAI Team, a member of the NDCB not directly affiliated with the incident will serve in this capacity.*
 - ii. *Subject matter expert(s) recommended by the NDCB will be included in the SAI Team as appropriate.*
 - iii. *A member of the NDCB not directly affiliated with the incident will be a member of the SAI Board of Review representing the national program manager or as an ad hoc member.*
- E. *In addition to standard SMIS reporting requirements, the PDO must report all serious diving related injuries to their RDO within 24 hours. Upon receipt of a serious diving related injury notification, the RDO will notify the NDCB. Serious diving related injuries are defined as: near drowning, decompression sickness, gas embolism, oxygen toxicity, lung overexpansion, or injuries requiring hospitalization. Documentation of this incident using the Diving Incident*

Report Form (See Appendices in FM-4) must be submitted to the RDO via the NPS Dive Management System or hard/electronic copy within 10 days of incident. In addition, a Dive Incident Review Board as defined in FM-4 will be convened within 20 days of the incident and its findings must be distributed to the RDO within 30 days. The RDO will submit the report with their own causal analysis and recommendation for prevention of future injuries to the chair of the NDCB within 45 days of the incident. This review and examination process does not necessarily replace the SAI process and is not superseded by it; NDCB review of diving incidents and accidents is independent of other required accident reviews.

- F. *In incident reporting and review situations where there is a conflict of interest, or perceived conflict of interest, the NDCB will delegate authority/responsibility for the implementation of the dive incident investigation.*
- G. *A Dive Incident Review Board consisting of the DSO, RDOs, and Chief of Risk Management designee*
- H. *Within 20 days of the diving incident the Dive Incident Review Board will review the submitted incident documentation and determine the appropriate level of additional investigation or action.*
- I. *Documentation submitted to the Dive Incident Review Board will include:*
 - i. [Complete NPS Diving Incident Report Form](#)
 - ii. *Written descriptions from all parties involved to include:*
 - 1. Name, address, phone numbers;
 - 2. Summary statements;
 - 3. Summary of experience of divers involved;
 - 4. Location, description of dive site, and conditions that led up to the incident;
 - 5. Description of symptoms;
 - 6. Description and results of onsite first aid and transport;
 - 7. Description and results of medical treatment beyond first aid;
 - 8. Applicable medical opinion of injury and recommendations;
 - 9. Causal analysis, recommendations, and lessons learned.

[RM-4, 2.4.3](#) *Incident/Accident Review*

- A. *At the minimum, all dive incidents will be reviewed by the responsible PDO, RDO, and DSO.*
- B. *Incidents with the potential for injury that occur during diving operations will be reviewed by the PDO with the Dive Team and other involved parties, and treated as learning opportunities to increase overall program safety. A record of these near miss incidents will be documented by the PDO to aid in identifying areas for improvement in training or operational procedures and forwarded to the NDCB through the RDO for review, potential standards modification, and dissemination. These near misses should be fully and openly shared and negative consequences for involved employees should be minimized, whenever possible and prudent, to facilitate open and honest discussions and sharing of lessons learned.*
- C. *The NDCB shall review the results of serious accident investigations and serious diving related injury reports to determine any necessary changes to NPS diving policies and safety practices.*

[RM-4, 2.5](#) *Deviation from Standards and Policies*

- A. *Deviations are defined as acts, regardless of reason, in which policy, operations, procedures, or standards have been ignored or violated.*
- B. *In general, deviations from NPS Dive policy, operations, procedures or standards are not permitted. Any proposed deviations will be submitted in writing to the NDCB for review and appropriate action.*
- C. *While deviation from standards and policies may be justified under emergency situations, the act of violating NPS Dive Policy may be considered a serious infraction which could result in*

suspension/revocation of diving privileges at the individual or Park/Program level.

- D. In response to a deviation from standards or policies, the NDCB is authorized to suspend or revoke individual or Park/Program diving privileges, or take no action if the review determines the violation was reasonable and justified.*

2.5.1 Criteria for Deviation from Standards Written Report

The written report on deviations from standards and policies will include:

- A. A description of the circumstances surrounding the deviation
- B. Justification for deviation, if applicable
- C. Individuals involved
- D. Suggestions for modification of existing policy, operation, procedure, or standard., if applicable

Chapter 3 Administrative Procedures

- RM-4, 3.1 [Medical Examination](#)
 - 3.1.1 [Medical Examination Requirements](#)
 - RM-4, 3.2 [Hazardous Duty / Environmental Differential Pay](#)
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 - RM-4, 3.5.3 [Special Circumstances](#)
 - RM-4, 3.6 [Dive Equipment](#)
-

RM-4, 3.1 **Medical Examination**

- A. *Every diver shall undergo a diving medical examination, preferably from a physician familiar with diving physiology, before beginning diving, unless an equivalent initial medical evaluation has been given within the preceding 12 months. Medical examinations are required every three years until age 60 and every two years thereafter unless a more frequent interval is required by a licensed physician.*
 - i. If a diver develops a change in medical status between periodic exams, the diver is required to immediately report this change to his/her supervisor and PDO and report it at the time of the next medical exam.
 - ii. Changes in medical status that require reporting are:
 - 1. Injury or illness which may prevent performance of duties related to diving;
 - 2. Conditions contraindicating to diving.
 - iii. Reported changes in medical status for which the individual received medical attention require medical clearance prior to the diver resuming diving. A copy of this medical clearance from the attending provider will be placed in the diver's Google Docs folder.
- B. *Following a diving medical exam and clearance to dive by the examining physician, divers are medically cleared for diving.*
- C. *The Department of the Interior (DOI) Standard Medical History and Examination Form shall be used as the NPS standard. (See Appendices in FM-4)*
- D. *The NPS Medical Standards Program (MSP) located in the Division of Law Enforcement, Security and Emergency Services provides medical standards management to employees in designated positions such as diving. This process is established by Director's Order/Reference Manual-57 (DO/RM-57), the National Park Service Occupational Medical Standards Guidelines.*
- E. *The MSP is the designated site for records management and storage of Medical Examination Forms and associated medical documents related to the NPS Dive Program. Divers shall ensure that a copy of their medical examination and any relevant or supporting materials are sent to the MSP Program Manager at WASO. Only a copy of the Medical Clearance Form should be kept at the Park or Program level. All materials associated with the actual medical examination are governed under the Healthcare Information Portability and Accountability Act (HIPAA). The HIPAA Privacy Rule establishes standards to protect individuals' medical records and other personal health information.*
- F. *After each illness or injury requiring hospitalization of more than 24 hours, or after an episode of unconsciousness related to diving activity, or after treatment in a hyperbaric chamber following a diving accident or other serious illness, certified divers shall submit to a medical interview or*

examination appropriate to the nature and extent of the injury or illness, as determined by the examining physician before resuming diving activities. This necessity will be determined by the PDO or RDO. The PDO and RDO will be informed of all such incidents.

G. *The cost of all required medical examinations will be paid for by the government for employees.*

3.1.1 Medical Examination Requirements

A. Pre-Placement/Baseline/Exit:

- i. Authorization for Disclosure Form
- ii. General Medical History
- iii. General Physical Examination
- iv. Chemistry Panel (including Glucose, Bilirubin (total), Cholesterol, HDL-C, LDL-C, Triglycerides, GGTP, LDH, SGOT, SGPT, Complete Blood Count, and Urinalysis)
- v. Audiometry (include noise exposure history)
- vi. Electrocardiogram
- vii. Spirometry
- viii. Vision Screening (Corrected and Uncorrected Near and Far; Color; Peripheral; Depth Perception)
- ix. (For age 40 and over) Multi Risk Factor Assessment (age lipid profile, blood pressure, diabetic screening)
- x. Chest X-Ray (PA/Lat)
- xi. Blood Type and RH
- xii. Sickle Cell Prep

B. Periodic Re-exam (every three years until age 60 and every two years thereafter):

- i. Authorization for Disclosure Form
- ii. General Medical History
- iii. General Medical Examination
- iv. Chemistry Panel (including Glucose, Bilirubin (total), Cholesterol, HDL-C, LDL-C, Triglycerides, GGTP, LDH, SGOT, SGPT, Complete Blood Count, and Urinalysis)
- v. (For age 40 and over) Multi Risk Factor Assessment (age lipid profile, blood pressure, diabetic screening)
- vi. Audiometry (include noise exposure history)
- vii. Vision (Corrected and Uncorrected Near and Far)
- viii. Chest X-Ray (PA/Lat)
- ix. Electrocardiogram

RM-4, 3.2 Hazardous Duty / Environmental Differential Pay

A. *Any dive completed during official duty is subject to premium pay (hazardous duty dive) under the following conditions (5 CFR 550 or 532) as determined by the Park Dive Officer:*

- i. *At a depth of 20 feet or more below the surface.*
- ii. *Visibility is restricted.*
- iii. *In rapidly flowing or cold water.*
- iv. *Vertical access to the surface is restricted by ice, rock, decompression or, other structure.*
- v. *Testing or working with hardware that presents special hazards.*

B. Pay Scale

- i. For a hazardous duty dive for GS and GL employees, the rate shall be 25 percent of the base pay schedule calculated for all work hours of the day that the dive took place (5 CFR 550 Subpart I, Appendix A).
- ii. For Federal Wage System employees engaged in diving and tending diving duties, tending duties are paid at WG-10/2, diving pay will be based on 175 percent of the local WG-10, Step

2 rate for all payable hours of the shift as stated in NATIONAL PARK SERVICE PERSONNEL MANAGEMENT LETTER NO. 92-6 (532) (532-1) 20 March 1992 and HUMAN RESOURCES BULLETIN NUMBER 12-02, December 23, 2011(5 CFR 532.281)

RM-4, 3.3 **Physical Fitness**

- A. *SCUBA diving is physically demanding. It is imperative that both divers and park managers consciously recognize the need for a continual, aggressive exercise program that exceeds basic health maintenance standards. NPS is responsible for ensuring that adequate fitness levels are established and met. NPS diving policy and standards requires that divers successfully complete both medical examinations and an annual skills refresher that includes a timed swim (See FM-4).*
- B. *Section 7901 (a) of Title 5 of the United States Code provides the following authority: “The head of each agency of the government of the United States may establish, within the limits: of appropriations available, a health service program to promote and maintain the physical and mental fitness of employees under his direction. . .” Blue Card holders are permitted 3 hours per week of government time to help maintain a conditioning level sufficient to pass the physical fitness and health examinations. This does not mean that a diver or DIT has to swim to maintain this level of conditioning. A variety of other exercises, including jogging, cross country skiing, cycling, walking, weight training, etc., are acceptable as conditioning purposes for swimming. The critical point is to maintain sufficient conditioning to provide maximum safety for the individual.*
- C. *The Annual Skills Refresher requires a diver, wearing mask, fins, and snorkel, to swim 900 yards in 18 minutes. This section of the refresher will be considered the Physical Fitness Test for Diving. Ideally, the testing should be conducted just prior to the primary dive season. There is nothing to preclude divers from voluntarily testing themselves more often.*
- D. *There are special individual physiological circumstances when diving shall not be undertaken or when special precautions are needed. Pregnant divers may participate as divers in the diving program with clearance from a physician. This is particularly important in the first trimester when environmental influences can most affect the fetus. For physiological reasons, the obese or heavy-set diver should use special caution. Nitrogen is five times more soluble in fatty tissue than in muscle and, therefore, presents an increased risk of decompression sickness. Reduced no-decompression limits for the obese and heavy-set diver should be considered.*

RM-4, 3.4 **Diving Reciprocity**

- A. *NPS recognizes dive program reciprocity with federal agencies with established diving programs where formal agreements are established or as approved by the NDCB.*
- B. *Reciprocity with non-federal agencies with established diving programs is permitted when established under formal agreement.*

3.4.1 **Reciprocity Details**

- A. *Diving reciprocity allows qualifying non-NPS divers to participate in NPS diving activities, and vice-versa with minimal administrative requirements;*
- B. *NPS is an Organizational Member of the American Academy of Underwater Sciences (AAUS) and extends/receives reciprocity with other AAUS Organizational Members with the exchange of a [Letter Of Reciprocity \(LOR\)](#) to the hosting entity for each participating diver. The use of the LOR indicates the individual is representing their AAUS Home Organization and the Home Organization is responsible for insurance and liability issues associated with the individual diver;*
 - i. *In lieu of an LOR, a diver associated with an AAUS Organizational Member (OM) may supply a Verification Of Training (VOT) letter.*

- ii. A VOT addresses the same information as an LOR but indicates the diver is not representing their AAUS Home Organization and the OM is not providing insurance or liability coverage.
- iii. A diver wishing to dive with NPS on a VOT letter may do so only under a [Temporary Authorization to Dive](#) and must have:
 - 1. Current Diving Fitness Medical Evaluation Report ([Appendix II](#)) or equivalent approved by a licensed physician;
 - 2. Current CPR, First Aid, and Oxygen Administration certifications;
 - 3. And a signed [NPS Liability Acknowledgement & Release \(Diving\)](#).
- C. Divers not under a [Letter Of Reciprocity](#), a [Temporary Authorization to Dive](#), or as a [Special Circumstances](#) diver must meet [NPS Blue Card requirements](#).
- D. Reciprocity Agreements with federal and non-federal organizations are found on [the NPS Dive Policy Google Drive](#) (access from within the NPS VPN required).
- E. Institutional Reciprocity is established with other organizations only after it is determined that their diving standards are compatible with NPS's;
 - i. Agreements with agencies for diving reciprocity, shall consider:
 - 1. Compliance with scientific or public safety community standards.
 - 2. Insurance and Liability issues
 - 3. Reciprocity of diver use and certification.
 - 4. Compatibility of collaborator commitment in terms of numbers and skill levels of divers, kinds and amount of equipment to be shared, etc.
 - 5. Jurisdictional issues and identification of agencies during certain types of diving activity.
 - 6. Cost and funding sources, if appropriate.
 - ii. Agreements may be drafted by a PDO, or RDO and require review and approval by the NDCB.
- F. Divers in good standing with their organizations, who are not employees (e.g., students) and are not covered for medical treatment and Workers Compensation, may be accepted for reciprocity however they are not covered by NPS for injuries that may be sustained as the result of an accident occurring during the scope of the dive project. In such cases an NPS Liability Acknowledgement & Release (Diving) ([See Appendix XIV](#)) must be signed by the participant and submitted to the PDO along with their organizations Letter of Reciprocity prior to the start of diving operations.
- G. Reciprocity is not transferable to other agencies or institutions with which NPS's reciprocity partners have separate reciprocity agreements.
- H. Individual divers not affiliated with an organization with which NPS has an established diving reciprocity agreement may not be extended reciprocity, but may dive with NPS under conditions outlined in [Section 3.5 Specialized Diving Authorizations](#).

3.4.2 Institutional Reciprocity

- A. NPS recognizes dive program reciprocity with [federal agencies with established diving programs](#) (hyperlink requires access from within the NPS VPN).
 - i. In cases where NPS is not familiar with the diving standards, policies, and procedures of the federal agency in question, a review of diving policies and procedures will be conducted by the PDO and the Dive Officer of the agency in question.
 - ii. A valid/complete Letter of Reciprocity ([See Section 3.4.3](#)) from the home organization is necessary.
 - iii. Checkout/orientation dives with reciprocity divers from federal agencies are required.
 - 1. Checkout dives with divers with which the Park/Program has experience may be waived.
 - 2. Checkout dives or waivers of checkout dives will be documented.
- B. Reciprocity with non-federal agencies with established diving programs is permitted.
 - i. In cases where NPS is not familiar with the diving standards, policies, and procedures of the

- non-federal agency in question, a review of diving policies and procedures will be conducted by the PDO and the Dive Officer of the agency in question.
- ii. In cases where divers from agencies or Academia, or non-governmental groups who are organizational members of the American Academy of Underwater Sciences (AAUS), a valid/complete Letter of Reciprocity ([See Section 3.4.3](#)) from the home organization is necessary for employees. Students who are not employees of an AAUS organizational member, and are not covered for medical treatment and Workers Compensation require a valid/complete Letter of Reciprocity ([See Section 3.4.3](#)) from the home organization and a signed NPS Liability Acknowledgement & Release (Diving) ([See Appendix XIV](#)) be submitted to the PDO prior to reciprocity being granted.
 - iii. In cases where divers from agencies, Academia, or non-governmental groups who are not organizational members of AAUS, a diving reciprocity agreement between the organization and NPS must be established.
 1. The NPS project representative is responsible for collaborating with an NPS Agreements Technical Representative (ATR) and the Park/Program PDO in developing reciprocity agreements with organizations not covered by NPS blanket reciprocity.
 2. Areas to be addressed in reciprocity agreements are listed in [RM-4 Section 3.4.C.i](#).
 3. Reciprocity agreements not covered by NPS blanket reciprocity require RDO review and approval.
 - iv. Checkout/orientation dives with reciprocity divers from AAUS organizational members and others diving under reciprocity are required.
 1. Checkout dives with diver with which the Park/Program has experience may be waived.
 2. Checkout dives or waivers of checkout dives will be documented.
- C. Checkout/Orientation Dive Defined - A checkout dive requires the PDO/DE or qualified designee to observe the skills necessary for a diver to perform under certain diving modes or environmental conditions.
- i. Checkout dives are required of all divers new to an NPS Diving Program when NPS is unfamiliar with the skills of the diver in question, and may be required when diving task, diving environment, or diving mode/equipment configuration, is beyond the scope of NPS checkout dives administered in the past, or when required by the PDO.
 - ii. At a minimum, a checkout dive will include: mask clearing, regulator recovery, air sharing, demonstration of proper buoyancy control for the expected conditions, proper buddy skills, use of hand signals, and any additional skills required for the diving operation.
 - iii. An orientation dive does not require the diver to demonstrate specific skills, beyond what is expected during normal diving operations. It is an orientation to the specific environment or dive site provided to a diver whose checkout dive skills are known to NPS.

3.4.3 Letters of Reciprocity

- A. Letters of Reciprocity (LOR) for NPS Divers
 - i. Any NPS diver wanting to dive under reciprocity with a non-NPS organization must request a LOR be sent from the PDO to the DSO of the receiving organization verifying they are an Active NPS Diver.
 - ii. LORs for NPS employees will state the diver is covered under the Federal Employee Compensation Act, for injuries that may be sustained as the result of an accident occurring during the scope of any official diving operation; as well as by the provisions of the Federal Tort Claims Act.
 - iii. LORs only address a diver's credentials and status within the NPS; it is up to the PDO to which the diver belongs to determine if the diver is qualified from a programmatic standpoint for the specific work to be performed with a reciprocity partner.
- B. Letters of Reciprocity for Non-NPS Divers.

- i. Reciprocity divers wanting to dive with NPS must present a signed LOR from their organization's DSO to the appropriate PDO verifying that the diver is current and qualified, and in an active diver status with their organization.
- ii. The LOR must indicate the diver is covered for medical treatment and covered under their organization's Workers Compensation policy, or acknowledge liability and are not covered by NPS for injuries that may be sustained as the result of an accident occurring during the scope of the dive project.
- iii. The LOR must be received from the DSO at an institution with whom NPS currently has reciprocity.

[RM-4, 3.5](#) [Specialized Diving Authorizations](#)

[RM-4, 3.5.1](#) [Volunteers in Parks \(VIP\)](#)

- A. *The use of VIPs for NPS diving operations is approved. The Volunteers in Parks guideline (RM-7) must be referred to for specifics prior to diving.*
- B. *VIP divers will meet the same standards as other NPS divers.*
- C. *VIP divers are Blue Carded NPS divers and are not working under Letters of Reciprocity or Temporary Authorization to Dive.*

[RM-4, 3.5.2](#) [Temporary Authorization to Dive](#)

- A. *Non-NPS divers whose participation is beneficial to the NPS may be given temporary permission to dive for specific projects or events in accordance with standards established by the NDCB in FM-4.*
- B. Temporary Authorization to Dive FM-4 Standards:
 - i. *Temporary Authorization to Dive is not Diver Reciprocity ([See Section 3.4](#)) or NPS VIP ([See Section 3.5.1](#)). It is special diving authorization designed for limited use of divers deemed useful to a specific diving operation where diver reciprocity or NPS Blue Carding is impractical and not essential.*
 - ii. *Temporary permission to dive for specific projects or events will not exceed two consecutive weeks, and must be granted by the RDO in the region in which diving is to occur. In the event diving is to occur in a Region with no RDO, temporary permission to dive will be granted by the requesting Park/Program's home RDO.*
 - iii. *Temporary permission will minimally include:*
 1. *Superintendent/Program Manager concurrence from the sponsoring Park/Program*
 2. *Current Diving Fitness Medical Evaluation Report ([Appendix II](#)) or equivalent approved by a licensed physician. Medical examinations are required every three years until age 60 and every two years thereafter unless a more frequent interval is required by a licensed physician.*
 3. *Dive log review by RDO or designee.*
 4. *Presentation of nationally or internationally recognized diving certification.*
 5. *In-water dive evaluation with PDO, DE, or qualified designee.*
 6. *Completion of any other requirements deemed necessary by RDO, PDO, or qualified designee, for specific conditions.*
 7. *A signed NPS Liability Acknowledgement & Release (Diving) ([See Appendix XIV](#)).*

[RM-4, 3.5.3](#) [Special Circumstances](#)

- A. *When it is deemed to be in the interest and benefit of NPS or a specific NPS Park/Program, dignitaries and/or official visitors who are not NPS divers may be introduced to NPS underwater resources using scuba by NPS personnel trained and qualified to conduct and directly supervise these individuals in the specific environment. Under these special circumstances dives may be*

conducted in accordance with standards established by the NDCB in FM-4.

- B. A Special Circumstances diver is an observer, not a Blue Carded diver or a diver performing work.
- C. Special Circumstances requirements will minimally include:
 - i. Superintendent concurrence in the park where diving is occurring.
 - ii. Current Diving Fitness Medical Evaluation Report ([Appendix II](#)) or equivalent approved by a licensed physician. Medical examinations are required every three years until age 60 and every two years thereafter unless a more frequent interval is required by a licensed physician.
 - iii. Dive log review by RDO or designee.
 - iv. RDO approval in the region in which the diving will occur. In the event diving is to occur in a Region with no RDO, approval to dive will be granted by the NDCB Chair or Vice Chair.
 - v. Non-diver requirements:
 - 1. A non-diver requires orientation by and direct supervision of an NDCB approved individual.
 - 2. Orientation to non-diver to include:
 - a. The importance of equalization; demonstration of equalization techniques
 - b. Equipment to be used; proper fit and function
 - c. Simple underwater signals and/or communication techniques
 - d. Environmental conditions, and potential hazards and mitigations
 - e. Use of the buddy system
 - f. Briefing on specific dive plan
 - g. Demonstration by and evaluation of participant to:
 - 1) Equalize the pressure in the mask, ears/sinuus, and other air spaces as appropriate for equipment configuration
 - 2) Locate, recover, and purge a regulator second stage and resume breathing
 - 3) Clear a mask that is filled with water
 - 4) Inflate and deflate the BCD, inflation will be demonstrated using the power inflator and orally
 - 5) Comfortably breathe from the scuba unit underwater
 - 6) Respond appropriately to underwater signals/communications
 - 7) Breathe from scuba unit without face mask
 - 8) Share air/gas from an alternate air source as donor and recipient
 - 9) Maintain buoyancy control sufficient for planned diving activity
 - 10) Monitor submersible pressure gauge and communicate as directed
 - 11) Monitor depth gauge
 - 12) Monitor timing device (if so equipped)
 - 13) Surface normally breathing from scuba unit
 - 14) Establish surface flotation
 - 15) Water entries and exits appropriate for planned environment
 - vi. Certified diver requirements:
 - 1. Dignitaries and/or official visitors who are certified divers may escorted by the PDO or NPS Dive Examiner (DE)
 - 2. Orientation by the PDO or DE to include:
 - a. Review of basic diving techniques
 - b. Review of underwater signals and/or communication techniques
 - c. Environmental conditions, and potential hazards and mitigations
 - d. Orientation to specific equipment to be used, as appropriate
 - e. Use of the buddy system
 - f. Briefing on specific dive plan
 - g. Demonstration by and evaluation of participant to:
 - 1) Equalize the pressure in the mask, ears/sinuus, and other air spaces as appropriate for equipment configuration

- 2) Locate, recover, and purge a regulator second stage and resume breathing
- 3) Clear a mask that is filled with water
- 4) Inflate and deflate the BCD, inflation will be demonstrated using the power inflator and orally
- 5) Comfortably breathe from the scuba unit underwater
- 6) Respond appropriately to underwater signals/communications
- 7) Breathe from scuba unit without face mask
- 8) Share air/gas from an alternate air source as donor and recipient
- 9) Maintain buoyancy control sufficient for planned diving activity
- 10) Monitor submersible pressure gauge and communicate as directed
- 11) Monitor depth gauge
- 12) Monitor timing device (if so equipped)
- 13) Surface normally breathing from scuba unit
- 14) Establish surface flotation

RM-4, 3.6 **Dive Equipment**

- A. *Purchase of diving equipment is the responsibility of the government. The advice of the RDO or PDO should be sought. Because of the critical nature of diving, it is essential that equipment meet OSHA and industry standards. Budgetary considerations should be secondary to safety and quality.*
- B. *Introduction of new brands or models of diver life support, or physiological monitoring equipment will be evaluated by the DSO with the results documented, and recommendations made by the DSO to the NDCB for approval prior to implementation. DSO evaluation methods may include:*
 - i. *Use of outside contractors/consultants,*
 - ii. *Field testing by the DSO and/or designees within the NPS Dive Program,*
 - iii. *Review of testing/evaluations conducted by other agencies or organizations independent of the manufacturer, or*
 - iv. *Combination of these methods.*
- C. *Divers may use personally-owned equipment if it is approved by either the PDO or RDO and it meets the criteria established by RM-50B, Occupational Safety and Health Program.*
- D. *Government equipment may be used on off-duty time for skills maintenance.*
- E. *The diver is accountable for all assigned equipment.*
- F. *The PDO is responsible for ensuring that all diving equipment with a required maintenance cycle is performed and that the maintenance is logged. Equipment service logs will be maintained in Park/Program dive files or on the DMS (as appropriate by online availability)*

Chapter 4 Training and Certification Requirements

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		4.11	Compressor Operation and Cylinder Filling

4.1 **Scope**

- A. This chapter covers training and certification requirements common to all NPS divers.
- B. Training and certification requirements for specific diving modes, breathing gases, specialized environments, and specialized diving equipment are addressed in relevant sections.

4.2 **Waiver of Requirements**

- A. The NPS NDCB allows the RDO to waive requirements specific to training, depth certification, and minimum activity to maintain certification under circumstances where the individual whose requirements are to be waived demonstrates sufficient experience, and/or documented training to justify the waiver. Medical requirements cannot be waived. Waivers must be documented and logged in the NPS online Dive Management System (DMS) and the diver's Park/Program based dive file, and be included in the annual report submitted to the NDCB.
- B. Inadequate funding or travel restrictions are not adequate justification for waiver of training or other requirements.

4.3 **Training Provisions**

- A. All NPS Dive training will be documented with an after action report to include a student roster, course outline/description, and any other supporting documentation. Records of successful completion will be placed in the individual diver's Park based diver file and/or be recorded in the DMS, as appropriate.
- B. Submission of documents and participation in aptitude examinations does not automatically result in NPS certification /qualification. The diver must convince the RDO, through the PDO, that they possess the appropriate knowledge, skills, judgment and proficiency to ensure the safety of the

- diver and dive buddy.
- C. Events or drills that alter equipment configurations (buddy breathing, ditch and don, entanglement, etc) will be followed immediately by a systematic buddy check in all cases to ensure that equipment is returned to its original, operational configuration.
 - D. Because there is a potential for the exchange of saliva between buddies, it is important that the diving community recognize the potential, however minimal, for the spread of infectious diseases. It is recommended that if divers know they may have a communicable disease, they notify their dive partners and take all precautions to minimize the risk of transfer.
 - E. In all cases, trainers shall be qualified for the type of instruction to be provided.
 - F. Prior to the start of training, the PDO will notify the RDO of dive training conducted by non-NPS agencies or instructors of NPS divers within their program.
 - G. A copy of the diver's [Emergency Medical Information Card](#) must be readily accessible at the training location or the individual may not participate in training activities.

4.4 NPS Blue Card Certification

Individuals who have successfully completed NPS diver certification requirements, documented by the PDO to the RDO, will be NPS Blue Carded. Verification of Blue Card currency is found in the NPS online Dive Management System and/or in the individual's Park/Program maintained diver file.

4.4.1 Pre-NPS Certification Requirements

- A. The administrative procedures for divers entering the NPS dive program are as follows:
 - i. The prospective candidates identify their interest to the PDO with written concurrence from their supervisor.
 - ii. Successful completion of an open-water or scientific diving program, or their equivalent, through a recognized national or international certifying agency, or governmental equivalent, approved by the NDCB.
 - iii. Submission of dive experience log.
 - iv. Current medical examination and approval by examining physician. ([See Section 3.1](#))
- B. Current [NPS Dive medical](#) clearance to dive is required before any use of scuba or compressed gas.
- C. Confined water skills and fitness elements listed on the Entry Level and Annual Blue Card Requirements Worksheet ([See Appendix III](#)).
 - i. Non-compressed gas elements listed on the Entry and Annual Refresher Worksheet may be conducted at initial intake prior to the completion of a full NPS Dive medical examination ([See Section 3.1](#)) with written approval for physical exercise from a personal physician issued within one year of the [Appendix III](#) Part A Pool or Confined Water Skills and the 900 yard mask, fins and snorkel swim in 18 minutes evaluation.
 - ii. Compressed gas elements and Annual Certification Requirements of [Appendix III](#), administered after completion of initial diver intake require an approved [NPS Dive medical](#).
- D. Confined water is defined as a pool of 10 to 25 feet in depth when used to conduct Blue Card scuba skills, or area of water where the water conditions are pool like.

4.4.2 Requirements for NPS Blue Card Certification

- A. [Medical examination and clearance](#).
- B. Dive experience log.
- C. At a minimum, NPS Divers must successfully complete and remain current in Adult CPR/AED, First Aid, and Oxygen Administration. Further emergency medical services training/certification in dive-related subjects is encouraged.

- D. Successful completion of the NPS swim/physical fitness test as per [Appendix III \(Entry Level and Annual Blue Card Requirements Worksheet\)](#). Both Entry Level and Annual Refresher requirements will be met the first year, and Annual Refresher requirements will be met every year thereafter.
- E. Successful completion of high pressure cylinder handling training (Available from NPS DSO).
- F. Successful completion (80 %) of [NPS Blue Card Written Examination](#) (Available to PDOs and RDOs for download. Must be inside the NPS VPN to access).
- G. Submission of documents and participation of aptitude examinations does not automatically result in certification. The applicant must convince the PDO that they are sufficiently skilled and proficient to be certified by the RDO. Any applicant who does not possess the necessary judgment under diving conditions for the safety of the diver and their partner will be denied NPS certification, and NPS diving certification can be revoked at any time for cause by the PDO, RDO, or NDCB.
- H. The PDO compiles the necessary information as required and transmits it to the RDO through the DMS.
- I. NPS Blue Card certification is granted by the RDO and reviewed annually by the NDCB.

4.4.3 Annual Re-certification

- A. Following are requirements for annual re-certification:
 - i. 12 dives a year. During any 12-month period, at least 12 dives are needed in order to retain certification. No 6-month period is to pass without making at least one dive. Each diver must log all NPS Maintenance, NPS Public Safety, NPS Scientific, NPS Training, and Proficiency dives. Recreational dives may be logged with NPS but will not count toward NPS diving requirements. Logging of Recreational dives is not required. All divers are encouraged to make at least one dive per month to ensure proficiency. If the PDO determines that this is impossible because of heavy ice, sickness, or other problems, then adjustment may be made on a case-by-case basis.
 - ii. Successful completion of Annual Certification Requirements. ([Appendix III- Annual](#)).
 - iii. Currency in First Aid, Adult CPR/AED, and oxygen administration.
 - iv. Current medical clearance for compressed gas diving.
 - v. RDO approved 8-hour training.
 - vi. Submittal of Blue Card Certification Checklist from the PDO to the RDO through the NPS Dive Management System (DMS).
 - vii. Currency with 40-hour NPS Core Dive Training requirement ([See Section 4.4.4.A](#)).
- B. Failure of the diver to complete one or more of these skills will result in the diver being placed on Restricted or Inactive Status until a RDO approved compliance plan is achieved.
- C. The diving records of each diver shall be reviewed by the PDO and transmitted to the RDO through use of the DMS. The PDO will evaluate the depth certification and other qualifications based on the individual's past year activities and this Reference Manual. The PDO will certify to the RDO that all annual requirements are met. ([See Appendix III - Annual](#))
- D. Divers in parks or regions without active dive programs may be assimilated into neighboring regional dive programs if NPS deems their certification retention worthwhile. The NDCB will handle these requests on a case-by-case basis when no alternative can be found.

4.4.4 Periodic Training Requirements

- A. NPS 40-Hour Core Dive Training
 - i. Diving skills must be maintained with periodic training opportunities. This is essential to keep contemporary with diving technology and to ensure standardization of emergency procedures. Divers must successfully complete the NDCB approved 40-hour NPS Core Dive

Training within 3 years from the date of initial issuance of Blue Card and every 3 years thereafter ([See Appendix IV](#)). Before attendance at any NPS-sponsored training, candidates shall successfully complete medical requirements ([See Section 3.1](#)) and have a [Diving Fitness Medical Evaluation Report \(Appendix II\)](#) on file with the PDO, and should meet criteria given in [Appendix III \(Entry Level/Annual Blue Card Requirements Worksheet\)](#).

- ii. Successful completion of training criteria:
 1. Attendance and participation in the full 40 Hours of training
 2. Minimum of 80% score on 40 Hour Training written exam
 3. Participation as a diver is subject to the individual's current physical condition and ability to dive. Individuals with a condition that limits their ability to participate in diving activities (i.e. pregnancy, inability to equalize, etc.) may receive full credit for the 40 Hour Training requirements without diving. These situations will be reviewed by the course instructional staff, PDO and/or RDO on a case by case basis to determine if there are any diving requirements that must be made up.
 4. Participants must demonstrate skills performance at an acceptable level as evaluated by instructional staff.
 5. Participants must demonstrate safe diving practices and proper buddy skills at an acceptable level as evaluated by instructional staff.
 6. Participants must demonstrate the ability to work in a team effort at an acceptable level as evaluated by instructional staff.
- iii. Available training options may be area-based, region, or Service-wide.
- iv. Adult CPR, First Aid, and oxygen administration, do not count toward 40-Hour Core Training requirements.

B. Annual Continuing Education Requirement (8hr RDO Approved Training)

- i. In addition to the 40-hour NPS Core Dive Training, NPS Divers are required to successfully complete a minimum of 8 hours of continuing education/training annually. This RDO approved training must be deemed applicable to diving, or the knowledge, skills and abilities associated with maintaining a safe and productive dive program, and may be acquired through the following sources:
 1. Area-Based Training
 - a. It shall be the primary responsibility of the PDO to initiate Area Based Training efforts. It consists of keeping abreast of diving literature, making open water skills maintenance dives, and pool practice.
 2. Regionally-Sponsored Training
 - a. The RDO will coordinate all regional dive training. Training opportunities will be provided to allow divers to maintain skills required for certification.
 3. Service-wide Training
 - a. This training consists of periodic courses that are coordinated by the DSO with the approval of the NDCB.
 4. Miscellaneous Training
 - a. In certain situations, it may be desirable, or even necessary, for NPS diving personnel to acquire specialized skills not available within the Service. Examples might include search and recovery seminars, maintenance schools, saturation dives, etc. For this training, non-NPS instructors must hold current recognized certification in that area of expertise and need not meet NPS certification requirements during this period of training.
- ii. Adult CPR, First Aid, oxygen administration, and annual Blue Card skills do not count toward 8-hour Annual Continuing Education Requirements.

4.4.5 Types of Certification or Status

- A. The levels of diver certification or status in the NPS are: Diver-In-Training, Active, Restricted, Inactive, and Retired.
- B. In Process – Default wording for the Status field in the NPS online Dive Management System indicating no Status has been processed. Divers may not participate in NPS diving activities until their record has been processed to the point of justifying a Status other than “In Process”.
- C. Diver-In-Training (DIT) – This is the entry level into the NPS Diving Program. The Blue Card will be marked accordingly. Conditions/requirements are:
 - i. Complete the items identified under “Requirements for NPS Blue Card Certification.” ([See Section 4.4.2](#))
 - ii. When diving under NPS auspices a DIT must be accompanied by NPS divers or divers approved by PDO.
 - iii. DITs will not dive deeper than 60 feet and divers must be accompanied by a NPS diver approved by the PDO. The DIT status will be retained until the DIT has made at least 12 NPS dives and the recommendation of the PDO to remove/replace DIT status with Active status is approved by the RDO.
 - iv. The RDO may approve, upon recommendation of the PDO, a bypassing of the DIT status of individuals entering the program where sufficient documented diving experience exists.
- D. Active – Removal of the Diver-In-Training designation constitutes recognition that an individual has successfully completed an apprenticeship program and is now considered a fully certified and Active NPS Diver. To remain an active status diver, the individual must meet all of the Annual Re-certification requirements ([See Section 4.4.3](#))
- E. Restricted Status – NPS Divers who have deficiencies related to Annual Certification Requirements ([Appendix III - Annual](#)) or 40 Hour Core Dive Training requirements will be placed on Restricted Status.
 - i. NPS Divers who remain in Restricted Status for more than one year or allow Medical Examination requirements to lapse ([See Section 3.1](#)) will be placed on Inactive Status and may not dive under NPS auspices. The RDO may extend the time limit for Restricted Status for extenuating circumstances.
 - ii. Divers placed on restricted status may continue to dive under restrictions agreed to by the PDO and RDO.
 - iii. Restricted Status divers may not act as a Lead Diver or Dive Supervisor in any NPS diving operation.
 - iv. A Restricted Status diver may not serve as a diver in Public Safety Diving operations.
 - v. Restricted Status does not affect a PDO or DE’s ability to conduct Blue Card evaluations.
 - vi. A Restricted Status diver that has successfully completed the deficiencies that placed them in Restricted Status will have their Active Status reinstated automatically with the PDO update of their record in the DMS.
- F. Inactive Status – Divers placed on Inactive Status and may not dive under NPS auspices. In cases of lapsed medical Inactive Status will remain in place until an approved diving medical exam and clearance to dive by the examining physician is obtained. In addition a diver may be placed on Inactive Status at anytime for cause as determined by the RDO and NDCB. All RM/FM-4 requirements and any required mitigations imposed by the RDO or NDCB must be met for approval to be reinstated to Active Status.
- G. Retired Status – NPS Divers who have retired from NPS diving will be placed on Retired Status. A record of this individual’s participation in the NPS diving program will be maintained for historical purposes.

4.4.6 Depth Authorization

- A. Depth Authorization is not considered an indication of diving expertise, but will reflect the need of a particular diving operation. A given Depth Authorization indicates the diver has demonstrated the skills and abilities necessary to manage the task loading associated with performing work underwater at that depth, as well as performing the tasks associated with safe individual diving skills, buddymanship and perform as a Lead Diver; not the diver's ability to achieve and return from a particular depth. Depth Authorization will authorize the holder to dive to the depth indicated on the Blue Card. The RDO will authorize depth certifications.
- B. NPS Depth Authorization criteria are:
- i. Depth increments are 30, 60, 100, 130, 150 feet.
 - ii. Divers will progress from shallower to deeper depth authorizations on an as needed basis dictated by the needs of the specific Park/Program.
 - iii. Divers may exceed their authorization depth by one step providing they are accompanied by a NPS diver certified to at least that next step. This provision does not exist for Proficiency Dives ([See Section 5.3.5](#)).
 - iv. Authorization for the 30-foot depth may be made by RDO based on PDO recommendation following a minimum of 12 training dives in water depths 30 feet or shallower.
 - v. Authorization for the 60-foot depth by a diver who has been authorized to 30 feet may be made by the RDO following a minimum of 12 logged, supervised dives to depths between 31 and 60 feet for a CUMULATIVE of 4 hours
 - vi. Authorization for the 100-foot depth by a diver who has been authorized to 60 feet may be made by the RDO following a minimum of six logged, supervised dives to depths over 90 feet.
 - vii. Authorization for the 130-foot depth by a diver who has been authorized to 100 feet may be made by the RDO following six logged, supervised dives to depths of over 120 feet.
 - viii. Authorization for the 150-foot depth by a diver who has been authorized to 130 feet may be made by the RDO following a minimum of six logged, supervised dives to depths between 130 and 150 feet. The diver also must demonstrate knowledge of the special problems of deep diving, and of special safety requirements.
 - ix. Authorization for depths beyond 150-foot require the use of mixed gas and NDCB review and approval. Specific depth authorizations beyond 150-foot will be based on resource and operational needs with an NDCB approved depth progression plan based on the AAUS depth progression schedule.
 - x. In order to maintain authorization, the diver must dive to within 10ft to their Blue Carded depth each 6-month period. Divers failing to meet depth authorization maintenance requirements will revert to the next shallower depth increment and must participate in PDO or RDO approved workup dives to reacquire their deeper depth authorization.
 - xi. It is recommended that divers have depth experience greater than the depth that the diver will normally be expected to work. For example, a diver who will often be working at 50 or 60 feet should have depth exposure from 75 to 90 feet.
 - xii. Divers whose depth authorization has lapsed due to lack of activity may be re-qualified by performing a series of RDO approved workup dives to the depth limit formerly held.
 - xiii. The RDO may approve, upon recommendation of the PDO, bypassing Depth Authorization levels where a diver demonstrates sufficient experience, and/or documented training. Documentation must be noted in the DMS and the diver's Park/Program based dive file.
 - xiv. For specific training purposes (i.e. mixed gas diving, etc.) Depth Authorization may be exceeded. Under these circumstances the Depth Authorization progression does not have to be adhered to. However, if Depth Authorization progression is not adhered to during a specific training cycle, the diver must proceed through the required Depth Authorization progression prior to being authorized to a given depth.

4.4.7 Revocation of Blue Card

- A. A Blue Card may be revoked/restricted for cause by the RDO or PDO. Cause for revocation or restriction of a diver's Blue Card will be documented and transmitted to the diver. The PDO's decision must receive RDO concurrence as soon as possible. The diver shall have an opportunity to appeal this revocation to the NDCB through the RDO.
- B. After a period of 1 year, a diver may reapply for certification. Individuals applying for Blue Card Certification after revocation must meet NPS Certification Requirements [4.4.1](#) and [4.4.3](#).

4.5 NPS Dive Leadership

4.5.1 NPS Dive Leadership Training

- A. NPS Dive Leadership Training is required of NPS Divers to serve as a DE, PDO, RDO, or NPS Course Director (CD). This training combines the diving skills, diver skill evaluation techniques, and knowledge necessary to administer a National Park Service Dive Program. Successful participants meet the training requirements to serve as a PDO or RDO. Participants who successfully and consistently demonstrate the knowledge, skills, and abilities associated with an NPS Dive Examiner will receive recommendation for DE designation.
- B. This curriculum reviewed and approved by the NDCB, is designed to orient the diver in NPS Dive policy and the operational procedures, and to validate the skills necessary to serve as an NPS PDO, RDO or DE.

4.6 Dive Classification Training Requirements

4.6.1 Maintenance Diving

- A. All NPS divers participating in maintenance diving will meet the requirements for NPS Certification ([See Section 4.4](#)) and complete "OSHA 29 CFR part 1910 Subpart T and NPS Diving" course work (Currently available through the DSO) or receive on-the-job training which has been reviewed and approved by the NDCB.
- B. Divers must also complete practical training in maintenance diving specific to the tasks to be performed at the individual Park level; or demonstrate to the RDO, through the PDO, knowledge in maintenance diving methods and techniques specific to the required tasks through previous training or experience.
- C. Training will be documented in accordance with [Section 4.3](#).

4.6.2 Public Safety Diving

- A. All NPS divers participating in Public Safety Diving will meet the requirements for NPS Certification ([See Section 4.4](#)) and complete "NPS Public Safety Diving" course work or receive on-the-job training which has been reviewed and approved by the NDCB.
- B. Divers must also complete practical training in Public Safety Diving specific to the tasks to be performed at the individual Park level; or demonstrate to the RDO, through the PDO, knowledge in Public Safety Diving methods and techniques specific to the required tasks through previous training or experience.
- C. Training will be documented in accordance with [Section 4.3](#).

4.6.3 Scientific Diving

- A. All NPS divers participating in Scientific Diving will meet the requirements for NPS Certification ([See Section 4.4](#)) and complete “NPS Scientific Diving” course work, hold documentation of Scientific Diving Certification from the American Academy of Underwater Sciences (AAUS), or receive on-the-job training which has been reviewed and approved by the NDCB.
- B. Divers must also complete practical training in scientific diving specific to the tasks to be performed at the individual Park level; or demonstrate to the RDO, through the PDO, knowledge in scientific diving methods, data gathering, and techniques specific to the required tasks through previous training/certification. NPS Blue Card Certification ([See Section 4.4](#)) requirements and scientific diving specific training will total a minimum cumulative 100 hours.
- C. Training will be documented in accordance with [Section 4.3](#).

4.7 Dive Mode Training

- A. All NPS divers will meet the requirements for NPS Certification ([See Section 4.4](#)) and complete course work specific to the diving mode being employed.
- B. Divers will complete practical training using a particular diving mode specific to the tasks to be performed at the individual Park level; or demonstrate to the RDO, through the PDO, knowledge in specific diving mode methods and techniques specific to the required tasks through previous training or experience.
- C. Training will be documented in accordance with [Section 4.3](#).

4.7.1 Open Circuit Scuba

- A. Definition – [See Section 5.4.2.A](#)
- B. Open circuit scuba is the baseline diving mode used by NPS Divers.
- C. Certification in its use from a nationally recognized scuba certification organization, or government equivalent, is required of all individuals prior to becoming an NPS Diver.

4.7.2 Rebreather

- A. Definition – [See Section 5.4.3.A](#)
- B. Prerequisites – Park /Program
 - i. Parks/Programs desiring to include rebreathers as part of their diving operations shall submit a proposal to the NDCB outlining the make/model of rebreather to be used; proposed training and operational parameters; and other justification deemed necessary to allow for evaluation of the proposal.
 - ii. The NDCB and RDO must approve these proposals before a Park/Program can proceed with NPS sponsored training or operations involving rebreathers.
 - iii. Parks/Programs with established rebreather programs may add additional rebreather divers with RDO notification and acknowledgement without resubmitting a rebreather program authorization proposal.
 - iv. Parks/Programs wishing to change rebreather platforms to a system not already for use by the NDCB must submit the specifications for the new rebreather platform to the NDCB for approval.
- C. Prerequisites – Diver
 - i. Active status NPS Blue Card
 - ii. Completion of a minimum of 50 openwater dives on Open Circuit Scuba
 - iii. A minimum 100 foot NPS depth certification is required prior to Semi-Closed Rebreather (SCR) or Closed Circuit Rebreather (CCR) training, unless a lesser depth certification is approved by the RDO. Justification for approval of a depth certification of less than 100 feet will be based solely on the expected depth range use of the unit; for example, a diver holding

a 60 foot depth certification expecting to use a rebreather in 60 feet of water or less may be approved for training.

- iv. Nitrox training is required, unless this training is included in the rebreather training.

D. Rebreather Training

- i. Rebreather Instructors must be authorized by the NDCB. A list of approved instructors is available from the DSO or NDCB Chair.
- ii. Maximum Student/Instructor Ratio: 4 to 1. This ratio is to be reduced as required by environmental conditions or operational constraints.
- iii. Training requirements specific to a given rebreather type/model will be met. Training shall include manufacturer required subject matter in the form of an approved course, and NPS practical training requirements ([See Section 4.7.2.D.vii, Supervised Rebreather Dives](#))
- iv. Initial rebreather certification will qualify the diver in the use of nitrogen/oxygen diluent with the unit on which the diver has been trained.
- v. Initial rebreather certification will qualify the diver to the depth limit in accordance with the diver’s rebreather training with the unit on which the diver has been trained and as approved by the RDO. If the diver holds a deeper open circuit depth certification, the diver must complete depth certification progression requirements ([See Section 4.4.7](#)) using the rebreather to advance to the deeper depth certification.
- vi. After initial rebreather certification and successful completion of NPS practical training requirements ([See Section 4.7.2.C.x, Supervised Rebreather Dives](#)), divers will be qualified to incur a decompression ceiling on their unit’s onboard dive computer not to exceed a time to surface (TTS) of ten minutes when carrying air as their off-board bailout or ten minutes when carrying a nitrox off-board bailout with a maximum operating depth (MOD) that has a ppO₂ between 1.3 and 1.6 at the planned maximum depth of the dive. Sufficient volume of open circuit bailout for the planned dive will be carried by each diver.
- vii. Successful completion of training does not in itself authorize the diver to use rebreathers. The diver must demonstrate to the NDCB through the PDO and RDO that the diver possesses the proper attitude, judgment, and discipline to safely conduct rebreather diving in the context of planned operations.
- viii. Supervised Rebreather Dives
 - 1. Upon successful completion of open water training dives, the diver is authorized to conduct a series of supervised rebreather dives, during which the diver gains additional experience and proficiency.
 - 2. Supervisor for these dives should be experienced in diving with the make/model of rebreather being used and approved by the NDCB or its designee.
 - 3. Dives at this level will be targeted to activities associated with the planned science diving application.
 - 4. Maximum ratio of divers per designated dive supervisor is 4:1. The supervisor may dive as part of the planned operations.
- ix. Entry Level Training

Rebreather Entry Level Training Requirements			
Key: X = include, IA = If Applicable, ISE = If So Equipped			
	O ₂	SCR	CCR
Depth Limit For Initial Training	20 fsw	130 fsw	130 fsw
Single Decompression Stop Maximum Time Limit	N/A	10 min	10 min
Required Training Topic			
Academic			

History of technology	X	X	X
Medical & physiological aspects of:			
Oxygen toxicity	X	X	X
Chemical burns & caustic cocktail	X	X	X
Hypoxia – insufficient O ₂	X	X	X
Hypercapnia – excessive CO ₂	X	X	X
Arterial gas embolism	X	X	X
Middle Ear Oxygen Absorption Syndrome (oxygen ear)	X	X	X
Hygienic concerns	X	X	X
Nitrogen absorption & decompression sickness		X	X
CO ₂ retention	X	X	X
Hyperoxia-induced myopia	X	X	X
System design, assembly, and operation, including:			
Layout and design	X	X	X
Oxygen control systems	X	X	X
Diluent control systems		ISE	ISE
Use of checklists	X	X	X
Complete assembly and disassembly of the unit	X	X	X
Canister design & proper packing and handling of chemical absorbent	X	X	X
Decompression management and applicable tracking methods		ISE	X
Oxygen and high pressure gas handling and safety	X	X	X
Fire triangle	X	X	X
Filling of cylinders	X	X	X
Pre-dive testing & trouble shooting	X	X	X
Post-dive break-down and maintenance	X	X	X
Trouble shooting and manufacturer authorized field repairs	X	X	X
Required maintenance and intervals	X	X	X
Manufacturer supported additional items (ADV, temp stick, CO ₂ monitor, etc.)	ISE	ISE	ISE
Dive planning:			
Operational planning	X	X	X
Gas requirements	X	X	X
Oxygen exposure and management	X	X	X
Gas density calculations		X	X
Oxygen metabolizing calculations	X	X	X
Scrubber limitations	X	X	X
Mixed mode diving (buddies using different dive modes)	X	X	X
Mixed platform diving (buddies using different rebreather platforms)	X	X	X
Problem Recognition & Emergency Procedures:			
Applicable open circuit emergency procedures for common gear elements	X	X	X
Loss of electronics	ISE	ISE	X
Partially flooded loop	X	X	X
Fully flooded loop	X	X	X
Cell warnings		ISE	X
Battery warnings	ISE	ISE	X
High O ₂ warning	ISE	ISE	X

Low O ₂ warning	ISE	ISE	X
High CO ₂ warning	ISE	ISE	ISE
Recognizing issues as indicated by onboard scrubber monitors	ISE	ISE	ISE
Recognizing hypercapnia signs and symptoms in self or buddy	X	X	X
Excluded O ₂ cell(s)	ISE	ISE	ISE
Loss of Heads Up Display (HUD)	ISE	ISE	ISE
Loss of buoyancy	X	X	X
Diluent manual add button not functioning		ISE	ISE
O ₂ manual add button not functioning	ISE	ISE	ISE
Exhausted oxygen supply	X	X	X
Exhausted diluent supply		ISE	ISE
Lost or exhausted bailout	ISE	ISE	ISE
Handset not functioning	ISE	ISE	ISE
Solenoid stuck open	ISE	ISE	ISE
Solenoid stuck closed	ISE	ISE	ISE
ADV stuck open	ISE	ISE	ISE
ADV stuck closed	ISE	ISE	ISE
Isolator valve(s) not functioning	ISE	ISE	ISE
Oxygen sensor validation	ISE	ISE	X
CO ₂ sensor validation	IA	IA	IA
Gas sharing	X	X	X
Diver assist and diver rescue	X	X	X
Other problem recognition and emergency procedures specific to the particular unit, environment, or diving conditions	X	X	X
Practical Training and Evaluations			
Demonstrated skills must include, at a minimum:			
Use of checklists	X	X	X
Carbon dioxide absorbent canister packing	X	X	X
Supply gas cylinder analysis and pressure check	X	X	X
Test of one-way valves	X	X	X
System assembly and breathing loop leak testing	X	X	X
Oxygen control system calibration	ISE	ISE	X
Proper pre-breathe procedure	X	X	X
In-water bubble check	X	X	X
Proper buoyancy control during descent, dive operations, and ascent	X	X	X
System monitoring & control during descent, dive operations, and ascent	X	X	X
Proper interpretation and operation of system instrumentation	X	X	X
Proper buddy contact and communication	X	X	X
Use of a line reel or spool to deploy an SMB from planned dive depth and while controlling buoyancy in the water column	X	X	X
Proper management of line reel or spool, and SMB during ascents and safety or required stops	X	X	X
Unit removal and replacement on the surface	X	X	X
Bailout and emergency procedures for self and buddy, including:			
System malfunction recognition and solution	X	X	X
Manual system control	ISE	ISE	ISE

Flooded breathing loop recovery	IA	IA	IA
Absorbent canister failure	X	X	X
Alternate bailout options	X	X	X
Manipulation of onboard and off board cylinder valves	X	X	X
Manipulation of bailout cylinders (removal, replacement, passing and receiving while maintaining buoyancy control)	ISE	ISE	ISE
Manipulation of quick disconnects, isolator valves, and manual controls specific to the unit and gear configuration	ISE	ISE	ISE
Proper system maintenance, including:			
Breathing loop disassembly and disinfection	X	X	X
Oxygen sensor replacement	ISE	ISE	ISE
Battery removal and replacement or recharging	ISE	ISE	ISE
Other tasks as required by specific rebreather models	X	X	X
Written Evaluation	X	X	X
Supervised Rebreather Dives	X	X	X
Entry Level Training – Minimum Underwater Requirements			
	Pool/Confined Water	Open water	Supervised Dives
O2	1 Dive, 90 – 120 minutes	4 dives, 120 minute cumulative	2 Dives, 120 minute cumulative
SCR	1 Dive, 90 – 120 minutes	4 dives, 120 minute cumulative	4 dives, 120 minute cumulative
CCR	1 Dive, 90 – 120 minutes	8 dives, 380 minute cumulative	4 dives, 240 minute cumulative

- x. Rebreather Required Decompression, Normoxic, and Hypoxic Diluent Training
1. Rebreather dives requiring staged decompression, or using diluents containing inert gases other than nitrogen are subject to additional training requirements, as determined by the NDCB.
 2. Required Decompression and Normoxic Training may be taught separately or combined.
 3. Prerequisites:
 - a. Required Decompression: 25 rebreather dives for a minimum cumulative dive time of 25 hours, with at least 10 rebreather dives in the 60 fsw to 150 fsw range.
 - b. Mixed Gas:
 - i. Normoxic Mixes – 25 rebreather dives for a minimum cumulative dive time of 25 hours.
 - ii. Hypoxic Mixes – Rebreather Required Decompression Certification and Normoxic Certification and 25 decompression dives for a minimum cumulative dive time of 40 hours on rebreather dives requiring decompression.
 4. Rebreather Required Decompression and/or Normoxic and/or Hypoxic Instructors must be authorized by the NDCB. A list of approved instructors is available from the DSO or NDCB Chair.
 5. The Maximum Student/Instructor Ratio: 2 to 1. This ratio is to be reduced as required by environmental conditions or operational constraints.

Rebreather Required Decompression, Normoxic & Hypoxic Mix Training Requirements			
Key: X = include, IA = If Applicable, ISE = If So Equipped			
	Deco	Normoxic	Hypoxic Mixes
Required Training Topic			

Academic			
Review of applicable subject matter from previous training	X	X	X
Medical & physiological aspects of:			
Hypercapnia, hypoxia, hyperoxia	X	X	X
Oxygen limitations	X	X	X
Nitrogen limitations	X	X	X
Helium absorption and elimination		X	X
High Pressure Nervous Syndrome (HPNS)			X
System design, assembly, and operation, including:			
Gear considerations and rigging	X	X	X
Gas switching	X	X	X
Dive planning:			
Decompression calculation	X	X	X
Gradient Factors	X	X	X
Scrubber duration and the effects of depth on scrubber function	X	X	X
Gas requirements including bailout scenarios	X	X	X
Bailout gas management – individual vs team bailout	X	X	X
Gas density calculations	X	X	X
Operational Planning	X	X	X
Equivalent narcosis depth theory		X	X
Gas selection, gas mixing and gas formulas		X	X
Problem Recognition & Emergency Procedures:			
Applicable open circuit emergency procedures for common gear	X	X	X
Flooded loop	X	X	X
Cell warnings	X	X	X
Battery warnings	X	X	X
Hypercapnia, hypoxia, hyperoxia	X	X	X
Practical Training and Evaluations			
Demonstrated skills must include, at a minimum:			
Proper demonstration of applicable skills from previous training	X	X	X
Proper manipulation of DSV and/or BOV	X	X	X
Proper descent and bubble check procedures	X	X	X
Proper monitoring of setpoint switching and pO2 levels	X	X	X
Proper interpretation and operation of system instrumentation	X	X	X
System monitoring & control during descent, dive operations, and ascent	X	X	X
Demonstrate the ability to manually change setpoint and electronics settings during the dive	ISE	ISE	ISE
Demonstrate buoyancy control; ability to hover at fixed position in water column without moving hands or feet	X	X	X
Demonstrate controlled ascent with an incapacitated diver including surface tow at least 30 meters / 100 feet with equipment removal on surface, in water too deep to stand	X	X	X
Onboard and off board valve manipulation for proper use, and reduction of gas loss	X	X	X

Diagnosis of and proper reactions for a flooded absorbent canister	X	X	X
Diagnosis of and proper reactions for CO2 breakthrough	X	X	X
Diagnosis of and proper response to Cell Errors	X	X	X
Diagnosis of and proper reactions for Low oxygen drills	X	X	X
Diagnosis of and proper reactions for Flooded Loop	X	X	X
Diagnosis of and proper reactions for High Oxygen Drills	X	X	X
Diagnosis of and proper reactions for electronics and battery failure	X	X	X
Operation in semi-closed mode	X	X	X
Properly execute the ascent procedures for an incapacitated dive buddy	X	X	X
Proper buddy contact and communication	X	X	X
Use of a line reel or spool to deploy an SMB from planned dive depth and while controlling buoyancy in the water column	X	X	X
Proper management of line reel or spool, and SMB during ascents and safety or required stops	X	X	X
Demonstrate the ability to maintain minimum loop volume	X	X	X
Demonstrate comfort swimming on surface and at depth carrying a single bailout/decompression cylinder/bailout rebreather	X		
Demonstrate ability to pass and retrieve a single bailout/decompression cylinder or bailout rebreather while maintaining position in the water column	X		
Demonstrate ability to pass and receive multiple bailout/decompression cylinders or bailout rebreather while maintaining position in the water column	IA	X	X
Demonstration of the ability to perform simulated decompression stops at pre-determined depths for scheduled times	X	X	X
Demonstration of the ability to perform decompression stops at pre-determined depths for scheduled times	X	X	X
Demonstrate competence managing multiple bailout cylinders, including drop and recovery while maintaining position in the water column	IA	X	X
Demonstrate appropriate reaction to simulated free-flowing deco regulator	X	X	X
Gas share of deco gas for at least 1 minute	X	X	X
Demonstrate oxygen rebreather mode at appropriate stop depth		X	X
Complete bailout scenarios from depth to include decompression obligation on open circuit	X	X	X
Written Evaluation	X	X	X
Supervised Rebreather Dives	X	X	X
Minimum Underwater Requirements			

	Pool/Confined	Openwater	Supervised Dives**
Deco	1 Dive / 60 min	7 Dives / 420 min	4 Dives / 240 min.
Normoxic	1 Dive / 60 min	7 Dives / 420 min	4 Dives / 240 min.
Deco/Normoxic Combined	1 Dive / 60 min	7 Dives / 420 min 3 Normoxic Dives / 180 min	4 Dives / 240 min.
Hypoxic Mixes		7 Dives / 420 min	4 Dives / 240 min.
**A minimum of three supervised dives should comply with authorization parameters			

E. Rebreather Crossover Training

- a. Crossover training to a new rebreather platform requires a minimum of 4 training dives for a minimum cumulative dive time of 240 minutes.
- b. Advanced level certification (Required Decompression, Normoxic, and Hypoxic) on a new platform may be awarded upon successful demonstration of required skills using the new platform.
- c. Rebreather Crossover Instructors must be authorized by the NDCB. A list of approved instructors is available from the DSO or NDCB Chair.
- d. The Student/Instructor Ratio for Crossover Training will conform to the required skill level demonstration: Standard Crossover – 4 to 1. Advanced Level Skills – 2 to 1.

4.7.3 Hookah

A. Definition – [See Section 5.4.4.A](#)

B. Hookah training minimum course work will include, but is not limited to:

- i. Equipment orientation and rigging considerations
- ii. Proper use
- iii. Safety considerations and emergency procedures
- iv. Dive planning modifications, as appropriate
- v. Operational procedures
- vi. Modifications to buddy skills, as appropriate
- vii. Dry land drills, as appropriate
- viii. Confined water drills and practice, as appropriate including composure skills, task loading, and problem solving
- ix. A minimum of two openwater checkout dives employing the equipment in the intended work environment; the initial openwater dive will be a workup dive where the diver demonstrates proper use of the equipment with minimal task loading; on the subsequent dive(s) the diver must demonstrate proper use of the equipment while performing, or simulating, the anticipated working tasks

4.7.4 Surface Supplied

A. Definition – [See Section 5.4.5.A](#)

B. Surface supplied training will include, but is not limited to:

- i. History of surface supplied diving
- ii. Equipment orientation
- iii. Dive team makeup, manning requirements and responsibilities
- iv. Pre-dive procedures and checklists
- v. Diving procedures
- vi. Communications and line pull signals
- vii. Emergency procedures

- viii. Line and hose tending
- ix. Dry land drills, as appropriate
- x. Confined water dives stressing equipment familiarization, composure skills, and problem solving
- xi. A minimum of two openwater checkout dives in the intended work environment; the initial openwater dive will be a workup dive where the diver demonstrates proper techniques and procedures with minimal task loading; on the subsequent dive(s) the diver must demonstrate proper techniques and procedures while performing, or simulating, the anticipated working tasks

4.8 Specialty Breathing Gas Training

- A. All NPS divers will be trained in the use the breathing gas(es) being employed for a given diving operation. Divers will complete practical training in the use of a particular breathing gas specific to the tasks to be performed at the individual Park level; or demonstrate to the RDO, through the PDO, knowledge in the use of a particular breathing gas through previous training or experience.
- B. Training will be documented in accordance with [Section 4.3](#).

4.8.1 Oxygen

- A. Training to use Oxygen as a breathing gas will include, but is not limited to:
 - i. A review of applicable physics and physiology
 - ii. Gas analysis
 - iii. Equipment markings
 - iv. Operational and emergency procedures
 - v. Decompression calculation procedures and considerations
 - vi. Maximum operating depth
 - vii. Review of O₂ toxicity signs and symptoms, and emergency procedures

4.8.2 Nitrox

- A. Academic Instruction
 - i. Topics should include, but are not limited to: review of previous training; physical gas laws pertaining to nitrox; partial pressure calculations and limits; equivalent air depth (EAD) concept and calculations; oxygen physiology and oxygen toxicity; calculation of oxygen exposure and maximum safe operating depth (MOD); determination of decompression schedules (both by EAD method using approved air dive tables, and using approved nitrox dive tables); dive planning and emergency procedures; mixing procedures and calculations; gas analysis; personnel requirements; equipment marking and maintenance requirements; dive station requirements.

- ii. The PDO through the RDO may choose to limit standard nitrox diver training to procedures applicable to diving, and subsequently reserve training such as nitrox production methods, oxygen cleaning, and dive station topics to divers requiring specialized authorization in these areas.
- B. Practical Training
- i. The practical training portion will consist of a review of scuba skills, with additional training as follows:
 1. Oxygen analysis of nitrox mixtures
 2. Determination of MOD, oxygen partial pressure exposure, and oxygen toxicity time limits, for various nitrox mixtures at various depths
 3. Determination of nitrogen-based dive limits status by EAD method using air dive tables, and/or using nitrox dive tables, as approved by the NDCB.
 4. Nitrox dive computer use and use of PC based decompression software may be included, as approved by the NDCB.
- C. Written Examination (based on academic instruction and practical training)
- i. Before authorization, the trainee should successfully pass a written examination demonstrating knowledge of at least the following:
 1. Function, care, use, and maintenance of equipment cleaned for nitrox use.
 2. Physical and physiological considerations of nitrox diving (ex.: O₂ and CO₂ toxicity).
 3. Diving regulations and procedures as related to nitrox diving, either scuba or surface-supplied (depending on intended mode)
 4. Given the proper information, calculation of:
 - a. Equivalent air depth (EAD) for a given fO₂ and actual depth;
 - b. pO₂ exposure for a given fO₂ and depth;
 - c. Optimal nitrox mixture for a given pO₂ exposure limit and planned depth;
 - d. Maximum operational depth (MOD) for a given mix and pO₂ exposure limit;
 - e. For nitrox production purposes, percentages/psi of oxygen present in a given mixture, and psi of each gas required to produce a fO₂ by partial pressure mixing.
 5. Dive table and dive computer selection and usage;
 6. Nitrox production methods and considerations
 7. Oxygen analysis
 8. Nitrox operational guidelines, dive planning, and dive station components.
- D. Openwater Dives
- i. A minimum of two supervised openwater dives using nitrox is required for authorization.
 - ii. The mode used in the dives should correspond to the intended application.
 - iii. If the MOD for the mix being used can be exceeded at the training location, direct, in-water supervision is required.

4.8.3 Mixed Gas

For NPS purposes mixed gas is defined as gas mixtures containing greater than 1% by volume of an inert gas component other than nitrogen.

A. Prerequisites:

- i. Parks/Programs desiring to include mixed gas as part of their diving operations shall submit a proposal to the NDCB outlining proposed training and operational parameters; and other justification deemed necessary to allow for evaluation of the proposal
- ii. The NDCB and RDO must approve these proposals before a Park/Program can proceed with NPS sponsored training or operations involving mixed gas
- iii. NDCB approved mixed gas training is conducted under the direct supervision of a qualified and NDCB approved instructor following their dive certification agency standards and procedures and is exempt from NDCB operational use approval requirements listed in [section](#)

- [5.5.4.B.](#)
- iv. Parks/Programs with established mixed gas programs may add additional mixed gas divers with RDO notification and acknowledgement without resubmitting a mixed gas program authorization proposal
 - v. Nitrox certification and authorization ([See Section 4.8.2](#))
 - vi. Required Decompression certification and authorization ([See Section 4.9.1](#))
 - vii. Divers shall demonstrate to the RDO through the PDO satisfactory skills, knowledge, and attitude appropriate for training in the safe use of mixed gases
- B. Classroom training including:
- i. Review of topics and issues previously outlined in nitrox and required decompression diving training as pertinent to the planned operations.
 - ii. The use of helium or other inert gases, and the use of multiple decompression gases.
 - iii. Equipment configurations
 - iv. Mixed gas decompression planning
 - v. Gas management planning
 - vi. Thermal considerations
 - vii. END determination
 - viii. Mission planning and logistics
 - ix. Emergency procedures
 - x. Mixed gas production methods
 - xi. Methods of gas handling and cylinder filling
 - xii. Oxygen exposure management
 - xiii. Gas analysis
 - xiv. Mixed gas physics and physiology
- C. Practical Training:
- i. Confined water session(s) in which divers demonstrate proficiency in required skills and techniques for proposed diving operations.
 - ii. A minimum of 6 open water training dives.
 - iii. At least one initial dive shall be in 130 feet or less to practice equipment handling and emergency procedures.
 - iv. Subsequent dives will gradually increase in depth, with a majority of the training dives being conducted between 130 feet and the planned operational depth.
 - v. Planned operational depth for initial training dives shall not exceed 260 feet.
 - vi. Diving operations beyond 260 feet requires additional training dives.

4.9 Specialized Diving Environments Training

- A. Specialized diving environments include, but are not limited to: Required Decompression, Overhead (Cavern, Cave, Mines, Shipwrecks, etc), Ice, Altitude, Saturation, Rivers or Strong Currents, and Other Specialized Diving Environments as defined by the RDO or NDCB
- B. All NPS divers diving in Specialized Environments will meet the requirements for NPS Certification ([See Section 4.4](#)) and complete course work specific to the given environment. Divers must also complete practical training specific to the tasks to be performed at the individual Park level for the specialized environment; or demonstrate to the RDO, through the PDO, knowledge in methods and techniques specific to the particular diving environment through previous training or experience. Training will be documented in accordance with [Section 4.3](#).

4.9.1 Required Decompression

- A. Prerequisites
 - i. NPS Diver qualification ([See Section 4.4](#))

- ii. Minimum of 100 logged dives.
- iii. Demonstration of the ability to safely plan and conduct dives deeper than 100 feet.
- iv. Nitrox certification/authorization recommended.
- v. RDO notification and approval

B. Training

- i. Training shall be appropriate for the conditions in which dive operations are to be conducted.
- ii. Minimum Training shall include the following:
 1. A minimum of 6 hours of classroom training to ensure theoretical knowledge to include:
 - a. Physics and physiology of decompression
 - b. Decompression planning and procedures
 - c. Gas management
 - d. Equipment configurations
 - e. Decompression method
 - f. Emergency procedures
 - g. It is recommended that at least one training session be conducted in a pool or sheltered water setting, to cover equipment handling and familiarization, swimming and buoyancy control, to estimate gas consumption rates, and to practice emergency procedures.
 2. At least 6 open-water training dives simulating/requiring decompression shall be conducted, emphasizing planning and execution of required decompression dives, and including practice of emergency procedures
- iii. Progression to greater depths shall be by 6-dive increments at depth intervals as specified in [Section 4.4.7](#).
- iv. No training dives requiring decompression shall be conducted until the diver has demonstrated acceptable skills under simulated conditions.
- v. The following are the minimum skills the diver must demonstrate proficiently during dives simulating and requiring decompression:
 1. Buoyancy control
 2. Proper ascent rate
 3. Proper depth control
 4. Equipment manipulation
 5. Stage/decompression bottle use as pertinent to planned diving operation
 6. Buddy skills
 7. Gas management
 8. Time management
 9. Task loading
 10. Emergency skills
- vi. Divers shall demonstrate to the satisfaction of the RDO through the PDO or designee (third party trainer) proficiency in planning and executing required decompression dives appropriate to the conditions in which diving operations are to be conducted.
- vii. Upon completion of training, the diver shall be authorized to conduct required decompression dives with RDO approval.

[4.9.2](#) Cave and Overhead Diving

- A. Definition – [See Section 5.6.2](#)
- B. Certification based on the National Speleological Society Cave Diving Section (NSSCDS) Cave Diving Manual or equivalent, may be used as the baseline/starting point for NPS Cavern or Cave Diving authorization, but will not be deemed a replacement for the training and experience necessary to qualify the individual to work in these environments.

C. Prerequisites

Prerequisites	Cavern: OC or Rebreather	Cave	Rebreather Cave
The individual shall have met NPS Blue Card requirements (See Section 4.4), and be authorized in the dive mode being employed	X	X	X
Completion of a minimum of 25 dives with the desired mode	X		
Cavern Diver Authorization		X	X

D. Training

Training	Cavern: OC or Rebreather	Cave OC	Rebreather Cave
Key: X = include, R = Review, IA = If Applicable, OC = Open Circuit			
Trainers must be qualified for the type of instruction to be provided. Training must be conducted by agencies or instructors approved by the DCB or their designee	X	X	X
Academic			
Policy for diving overhead environments	X	X	X
Environment and environmental hazards	X	X	X
Accident analysis	X	X	X
Psychological considerations	X	X	X
Required equipment and equipment configuration			
Single cylinder with H or Y Valve	IA	IA	
Doubles with Isolation Manifold	IA	IA	
Side Mount		IA	IA
No Mount		IA	IA
Stage Cylinder(s)		IA	IA
Off-board Bailout	IA		X
Communications	X	X	X
Diving techniques			
Body control	X	X	X
Navigation and guidelines	X	X	X
Entry and Exit Protocols (Right of Way)	X	R	R
Use of line arrows and cookies	X	X	X
Line Systems Applicable to the Area and/or Cave System	X	R	R
Line Jumps		X	X
Circuits		X	X
Dive planning			
Rule of Sixths	X	R	R
Rule of Thirds	X	R	R
Gas Matching	IA	X	X
Decompression Theory	R	R	R
Dive Tables	R	R	R
Mixed Mode Diving	IA	IA	IA
Cave geology	X	R	R

Cave hydrology	X	R	R
Cave biology	X	X	X
Emergency procedures	X	X	X
Practical Training and Evaluation			
Land Drills			
Line Reel Use	X	R	R
Techniques and Considerations for Laying a Guideline	X	X	X
Guideline Following	X	R	R
Buddy Communication	X	R	R
Team Positioning for Normal Entry and Exit	X	X	X
Zero Visibility Drills			
Line Reel Use	X	R	R
Line and Line Arrow Identification and Following	X	R	R
Bump and Go (Skills description)		X	X
Emergency Procedures			
How Far Can You Go Out Of Gas?(Skills description)	X	X	X
Team Positioning for Emergency Situations	X	X	X
In-Water			
Demonstrated skills must include, at a minimum:			
A minimum of four (4) cavern dives, preferably to be conducted in a minimum of two (2) different caverns	X		
A minimum of twelve (12) cave dives, preferably to be conducted in a minimum of four (4) different cave sites with differing conditions		X	X
Safety drill (S-drill) – Performed on every dive			
Review of Dive Plan and Turn Pressures	X	X	X
Essential Gear Identification, Positioning, and Function Check	X	X	X
Proper Valve Position Check	X	X	X
Bubble Check	X	X	X
Proper Buoyancy Compensator Use	X	X	X
Proper Trim and Body Positioning	X	X	X
Hovering and Buoyancy With Hand Tasks	X	X	X
Specialized Propulsion Techniques and Anti-Silting Techniques (modified flutter kick, modified frog kick, pull and glide, ceiling walk or shuffle)	X	X	X
Proper Light and Hand Signal Use	X	R	R
Proper Reel and Guideline Use	X	X	X
Ability to Deploy a Primary Reel and Tie Into a Main Line Under Different Conditions (Flow, Visibility, Bottom/Silt, etc.)	X	X	X
Proper Line Placement and Etiquette	X	X	X
Proper Use of Safety Reel		X	X
Proper Use of Jump/Gap Reel(s)		X	X
Use of Drop/Stage Cylinders			
Proper Placement and Retrieval of Cylinder(s) With Minimal Disturbance of Environment and Visibility		IA	IA
Ability to Deploy and Retrieve Cylinders With Minimal Loss of Forward Progress		IA	IA
Surveying	IA	IA	IA
Ability to Properly Critique Their Dives and Performance	X	X	X

Zero Visibility Drills	IA	X	X
Line Reel Use	X	R	R
Buddy Communication	X		
Line and Line Arrow Identification and Following	X	R	R
Bump and Go (Skills Description)		X	X
Emergency Procedures			
Team Positioning for Emergency Situations	X	X	X
Lost Line (Skills Description)		X	X
Lost Buddy	X	X	X
Gas Sharing While Following Guideline (Conducted with and without visibility, As Donor and Receiver)	X	X	X
Gas Sharing in a Minor Restriction Using a Single File Method As Donor and Receiver		X	X
Valve Manipulation	X	X	X
Proper Attitude, Judgment, and Discipline To Safely Conduct Dives In An Overhead Environment	X	X	X
Written Examination			
A written evaluation approved by the DCB with a predetermined passing score, covering concepts of both classroom and practical training	X	X	X

4.9.3 Shipwreck Penetration

- A. Shipwreck Penetration minimum course work will include, but is not limited to:
- i. Environmental orientation
 - ii. Equipment selection and rigging
 - iii. Use of a line reel and line arrows
 - iv. Buoyancy control and specialized fining techniques
 - v. Operational and emergency procedures
 - vi. Dive Planning
 - vii. Confined water drills and practice, as appropriate including composure skills, task loading, and problem solving
 - viii. A minimum of two checkout dives in the intended work environment; the initial dive will be a workup dive where the diver demonstrates proper techniques with minimal task loading; on the subsequent dive(s) the diver must demonstrate proper techniques while performing, or simulating, the anticipated working tasks

4.9.4 Ice Diving

- A. Ice Diving minimum course work will include, but is not limited to:
- i. Environmental orientation
 - ii. Equipment selection and rigging
 - iii. Operational and emergency procedures
 - iv. Line tending and tethered diving
 - v. Site preparation
 - vi. Buoyancy control and weighting
 - vii. Drysuit techniques review
 - viii. Thermal considerations
 - ix. Dive Planning
 - x. Regulator freeze-up and out of gas situations

- xi. Full face mask techniques review (as applicable)
- xii. A minimum of two checkout dives in the intended work environment; the initial dive will be a workup dive where the diver demonstrates proper techniques with minimal task loading; on the subsequent dive(s) the diver must demonstrate proper techniques while performing, or simulating, the anticipated working tasks

4.9.5 Altitude Diving

- A. Altitude diving minimum course work will include, but is not limited to:
 - i. Physics and physiology review
 - ii. Decompression calculation (dive table review, use of air tables with “Cross Correction”, use of dive computers)
 - iii. Defining when altitude correction is needed
 - iv. Altitude correction procedures
 - v. Depth measurement at altitude
 - vi. Equilibration at altitude
 - vii. Acclimatization to altitude
 - viii. Repetitive dives
 - ix. Ascent to altitude after diving and flying after diving
 - x. A minimum of two checkout dives the diver demonstrates proper dive planning and adherence to policies and procedures for diving at altitude, and/or ascending to altitude after diving.

4.9.6 Diving In Current

- A. Minimum course work will include, but is not limited to:
 - i. Environment orientation
 - ii. Special equipment and rigging considerations
 - iii. Safety considerations and emergency procedures
 - iv. Dive planning modifications, as appropriate
 - v. Operational procedures
 - vi. Modifications to buddy skills, as appropriate
 - vii. Dry land drill, as appropriate
 - viii. A minimum of two openwater checkout dives in the intended work environment; the initial openwater dive will be a workup dive where the diver demonstrates proper techniques and procedures with minimal task loading; on the subsequent dive(s) the diver must demonstrate proper techniques and procedures while performing, or simulating, the anticipated working tasks

4.9.7 Other Specialized Environments

Additional specialized diving environments such as very limited or zero visibility, saturation, contaminated water, etc. require specific training and operational procedures. NPS Parks/Programs conducting dives in environments not addressed in this standard will have training protocols reviewed and approved by the RDO and NDCB.

4.10 Specialized Diving Equipment Training

- A. All NPS divers using specialized diving equipment will meet the requirements for NPS Certification ([See Section 4.4](#)) and complete course work specific to the equipment to be used. Divers must also complete practical training employing the specialized diving equipment specific to the tasks to be performed at the individual Park level; or demonstrate to the RDO, through the PDO, the knowledge and skills in the use of the particular piece(s) of equipment specific to the required tasks through previous training or experience. Training will be documented in accordance with [Section 4.3](#).
- B. Examples of specialized diving equipment include, but are not limited to:
 - i. Drysuit
 - ii. Doubles
 - iii. Full Face Masks
 - iv. Bailout Bottles
 - v. Helmets
 - vi. Lift Bags
 - vii. Line Reels
 - viii. Diver Propulsion Vehicles (DPV)
 - ix. Specialized tools or equipment used for specific tasks at the Park/Program level
 - x. Other Specialized Diving Equipment as defined by the RDO or NDCB
- C. Minimum course work will include, but is not limited to:
 - i. Equipment orientation and rigging considerations
 - ii. Proper use
 - iii. Safety considerations and emergency procedures
 - iv. Dive planning modifications, as appropriate
 - v. Operational procedures
 - vi. Modifications to buddy skills, as appropriate
 - vii. Dry land drill, as appropriate
 - viii. Confined water drills and practice, as appropriate including composure skills, task loading, and problem solving
 - ix. A minimum of two openwater checkout dives employing the equipment in the intended work environment; the initial openwater dive will be a workup dive where the diver demonstrates proper use of the equipment with minimal task loading; on the subsequent dive(s) the diver must demonstrate proper use of the equipment while performing, or simulating, the anticipated working tasks

4.11 Compressor Operation and Cylinder Filling

- A. In addition to completing high pressure cylinder handling training ([See Section 4.4.2.E](#)) personnel involved with high pressure compressor operation and filling of scuba cylinders will receive training specific to the compressor(s) and fill station(s) to be used.
- B. Minimum course work will include, but is not limited to:
 - i. Compressor and fill station orientation
 - ii. Review of cylinder markings, visual inspection program (VIP) sticker, and special cylinder

- sticker meanings and requirements
 - iii. Pre-operation maintenance checks
 - iv. Proper operation
 - v. Safety considerations and emergency procedures
 - vi. Cylinder fill rates
 - vii. Gas testing requirements and posting of test results
 - viii. Logging requirements
- C. Training will be documented in accordance with [Section 4.3](#).

Chapter 5 Diving Operations

- 5.1 [Program Dive Supplement](#)
- 5.2 [Required Equipment and Diving Procedures for All NPS Diving Operations](#)
 - 5.2.1 [Personal Safety](#)
 - 5.2.2 [Buddy System](#)
 - 5.2.3 [Ascent Procedures and Decompression Calculations](#)
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- 5.3 [Dive Classifications](#)
 - 5.3.1 [Maintenance Diving](#)
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- 5.4 [Diving Modes](#)
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- 5.6 [Specialized Diving Environments](#)
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 - 5.6.6 [Diving In Current](#)
 - 5.6.7 [Additional Specialized Diving Environments](#)
- 5.7 [Specialized Diving Equipment](#)

5.1 Program Dive Supplement

- A. Parks or Programs having a diving program shall develop and maintain a Program Dive Supplement to FM-4. This park/program-specific document consisting of a definition of the Park's Dive Team Capacities, Safe Practices Worksheets, and Dive Emergency Evacuation Plan(s) addresses operational safe practices for specific occupational diving activities conducted under the auspices of that Park or Program.

- B. Park's Dive Team Capacities
 - i. This document must contain the following information, at a minimum:
 - 1. Definition of Dive Team capabilities
 - a. Define Park Dive Classification capabilities
 - 1) Maintenance Diving
 - 2) Scientific Diving
 - 3) Public Safety Diving
 - b. Define general tasks performed within specific dive classification (Example: Maintenance Diving – Buoy installation, inspection and removal, etc.)
 - c. Define equipment maintenance capabilities and general procedure
 - d. List compressor system(s) and define gas filling capabilities (air, nitrox, mixed gas)
 - 2. Define individual diver capabilities and qualifications
 - a. Names and NPS Blue Card Working Qualifications (depth certification, approved diving modes, breathing gases, specialized diving environments, and dive task classifications)
 - b. Approved assignments and responsibilities (Diver, Diving Supervisor, Dive Tender, Dive Examiner, Stand-by Diver, Lead Diver, Fill Station Operator, etc.)
 - 3. Equipment procedures and checklists for specialized equipment or procedures used during diving operations not addressed in RM-4
 - 4. Procedures for adverse environmental conditions not addressed in RM-4
 - ii. Completed NPS Safe Practices Worksheets for specific tasks performed by the dive team ([See Appendix XIII](#))
 - iii. Dive Emergency Evacuation Plan ([See Appendix XII](#))

5.2 Requirements and Diving Procedures for All NPS Diving Operations

- A. NPS Diving Operations include the Dive Classifications of Maintenance, Public Safety, and Scientific Diving.
- B. NPS divers will be trained in:
 - i. The use of tools, equipment and systems relevant to assigned tasks;
 - ii. The procedures and methods for conducting applicable scientific diving tasks;
 - iii. The procedures and methods for conducting applicable public safety diving tasks and investigations;
 - iv. The procedures and methods for conducting applicable maintenance diving tasks;
 - v. The proper use of the breathing gas(s) employed for a given diving operation;
 - vi. Techniques and procedures of the assigned diving mode; and
 - vii. Diving operations and emergency procedures.
- C. NPS diving operations require the submission and approval of an NPS Dive Project Plan ([See Appendix XI](#)) prior to the start of diving operations.
 - i. The concepts conveyed in NPS Operational Leadership (or current organizational risk management program) training will be incorporated into dive planning and diving operations.
 - ii. Dive Project Plans are submitted to and approved by the PDO, or designee.
 - iii. Public Safety diving operations covered in an NPS Public Safety Diving Operations Plan (EDOP) are exempt from this requirement. Training dives associated with Public Safety Diving require submission and approval of a Dive Project Plan.
 - iv. In an instance where an NPS Dive Team is performing dive operations in other than their home Park, the Park Superintendent, Chief Ranger, and PDO (if applicable) in which the dive operation is being performed will be notified of the operation prior to the start of diving. Notification will minimally include dates, dive team and tasks.
- D. The following must be available at each dive site:
 - i. A copy of RM-4 and OSHA regulations 29 CFR part 1910, Subpart T
 - ii. A copy of the current US Navy Dive Tables ([See Appendix IX](#))

- iii. A copy of the Park's Program Dive Supplement
- iv. An emergency oxygen kit
- v. First Aid Kit appropriate for the diving operation (AED if available)
- vi. These supplies must include an American Red Cross standard first aid handbook or equivalent, and a bag-type manual resuscitator with transparent mask and tubing.
- vii. Functional communication device (radio, sat phone, cellular phone, etc)
- viii. Drinking water
- ix. Dive flag
 1. The standard "diver down" flag (red with white diagonal stripe) will be displayed at the site during diving operations. The blue and white alpha flag will be flown during maintenance/inspection dive operations and in situations when the surface support craft cannot be maneuvered and/or in international waters.
 2. At night, the flags will be illuminated in such a manner and to such a degree to provide sufficient notice of underwater activity.
- x. A practical means for entering and exiting the water capable of supporting the diver
- xi. A means to assist an injured diver from the water
- xii. NPS Operational Dive Log
 1. The following information shall be recorded and maintained with the PDO for each diving operation. An example diving operations log form is provided in [Appendix XV](#):
 - a. Date, time and location of a dive
 - b. General nature of work performed
 - c. Approximate underwater and surface conditions (sea state wind speed/direction, air and water temperature, current speed in knots, visibility)
 - d. Non-NPS diver information: Cooperator or Others Diving with NPS (if applicable)
 - e. Assignments
 - f. Names of dive team members including the Dive Supervisor
 - g. Assignment during a particular dive
 - h. Dive Task
 - i. Dive plan
 - j. NPS dive classification
 - k. Diving mode
 - l. Decompression method
 - m. Starting dive tables residual nitrogen designation (if applicable, decompression method dependent)
 - n. Planned maximum depth
 - o. Planned bottom time
 - p. Planned turn or surfacing breathing gas pressure
 - q. Dive information for each diver
 - r. Breathing gas, gas type, pressure at beginning of dive, and pressure at end of dive
 - s. Reserve gas/Bailout (if applicable), gas type, pressure at beginning of dive, and pressure at end of dive
 - t. Starting time of the dive
 - u. Ending time of the dive
 - v. Maximum depth
 - w. Bottom time
 - x. Dive time (surface to surface time)
 - y. Ending dive tables residual nitrogen designation (if applicable, decompression method dependent)

- xi. Individual Diver Pertinent Emergency Medical Information Card ([See Appendix XVII](#))
 - 1. Which includes at a minimum:
 - a. Divers Name
 - b. DOB
 - c. SSN
 - d. Address
 - e. Emergency contact name and phone numbers
 - f. Pertinent medical history
 - g. Personal physician and contact information
 - h. Allergies
 - i. Medications
 - j. Previous diving injuries
 - 2. It is the responsibility of the individual diver to assemble this information and ensure this information is at the dive location.
 - E. After the completion of a dive, each diver must report any physical problems, symptoms of decompression sickness, or equipment malfunctions to the Dive Supervisor, PDO, RDO, DSO, and/or NDCB.

5.2.1 Personal Safety

- A. Refusal to Dive
 - i. Individual divers are responsible for their own safety. Any diver may refuse to dive, if in the diver's judgment, conditions are unsafe or unfavorable; if unprepared mentally or physically; or if diving violates the dictates of training or RM-4.
 - ii. It is the diver's responsibility to remain current in subjects initially learned in the basic certification program. This includes such things as diver hand signals, signs and symptoms of diver injuries and illnesses, and decompression limits and problems.
- B. Termination of the Dive
 - i. It is the responsibility of the diver to terminate the dive, without fear of penalty, whenever he/she feels it is unsafe to continue the dive, unless it compromises the safety of another diver already in the water.
 - ii. The dive shall be terminated while there is still sufficient tank pressure to permit the diver to safely reach the surface, including decompression time, or to safely reach an additional air (gas) source at the decompression station.
- C. Each diver shall, on every dive, possess the capability of attaining and maintaining positive buoyancy
- D. A diver using a drysuit will be equipped with a separate buoyancy compensator.
- E. Dive configurations without ditchable weight (ie- double steel cylinders, etc.) will require a system with redundant buoyancy (ie - dry suit & BCD of sufficient lift to support the diver and the diving system, OR redundant BCD's each with sufficient lift).
- F. Inert gas leaves the body slowly post dive. It is recommended that heavy physical exertion and exercise will be avoided for at least 4 hour after diving.
- G. Minimum required equipment for a given diving mode will be inspected and function tested by the user prior to each use.
- H. Tools and equipment supplied with power from the surface must be de-energized before being placed into or retrieved from the water.
- I. Hand power tools must not be supplied with power from the dive location until requested by the diver.

5.2.2 Buddy System

- A. All diving shall be planned and executed in such a manner as to ensure that every diver maintains constant, effective communication with at least one other appropriately equipped diver in the water. This buddy system is based upon mutual assistance, especially in the case of an emergency. Dives should be planned around the competency of the least experienced diver. The buddy range may vary depending on time, depth, and other conditions. It should never be a greater distance than that which is necessary for one diver to render immediate aid to another diver.
 - i. It is recognized that there are instances, on Public Safety, and Maintenance diving operations where tethered diving may be standard operating procedure. Under these circumstances the in-water buddy requirement does not apply.
 - ii. Tethered diving may also be appropriate during Scientific Diving operations where a buddy may actually present a major safety problem to the diver(s) (swift water, cramped locations, zero visibility/entanglement, or combinations of these where the presence of another individual may actually complicate the situation sufficiently to be unsafe). In these cases the diver will be tethered. A plan will be agreed upon prior to the single diver entering the water. Where an enclosed or confined space is not large enough for two divers, a diver shall be stationed at the underwater point of entry and an orientation (tether) line shall be used. For most Scientific Diving operations the buddy system must be used.
 - iii. Under extreme situations where it is deemed by the personnel on site that a life could be saved, a single un-tethered diver may respond. This extreme response may only be invoked during a limited window of opportunity where there is a chance of recovering and reviving the victim, while not placing the rescuer at undue risk.
- B. If loss of effective communication occurs within a buddy team, all divers will surface and reestablish contact (except as specified in surface tended divers). This requirement may be met by a standby diver in surface supplied operations.

5.2.3 Ascent Procedures and Decompression Calculations

- A. Ascent time must be 30 feet per minute or slower.
- B. All dives exceeding 30 feet will require a 3-5 minute safety stop at approximately 20 feet. This safety time will not be added to the total bottom time or to surface interval.
- C. Oxygen may be used for in-water safety stops by divers trained in its use for diving.
- D. For all dives, bottom time is defined as time in minutes from the surface to the start of the ascent to the surface or safety stop.
- E. NDCB approved dive computer or current U.S. Navy decompression and diving tables ([Appendix IX](#)) will be used to manage hyperbaric exposure, unless another procedure is authorized by the RDO or NDCB. Any U.S. Navy table format layout providing No-Decompression Limits, Group Designations, Surface Interval Time, Residual Nitrogen Times and Repetitive Group Designation information can be used.
 - i. It is recommended that the diver will choose the next greater depth or time to compensate for aggravating conditions, i.e., cold, exertion, etc.
 - ii. Dive computers and PC Based Decompression software may be used upon approval of the RDO through the PDO. Specific knowledge must be demonstrated to the PDO. Backup plans will be included in the Program Dive Supplement for Diving.
 - iii. If a diving computer is used, there must be a computer equivalent back-up system; either a second computer on the same profile or a watch, depth gauge, and printed tables.
 - iv. If a dive computer is used, the diver must use the same computer for repetitive dives.
- F. Altitude conversions will follow Cross correction procedures ([US Navy Tables Revision 7 Table 9-4](#) or equivalent) or use of a diving computer with an approved altitude algorithm.

5.2.4 Flying After Diving or Altitude Increase of Greater Than 1000 Feet

- A. After all dives greater than 30ft, or any repetitive dives divers will meet appropriate minimum surface intervals before ascent to altitude.
- B. Flying After Diving:
 - i. For single no decompression dive: minimum preflight surface interval of 12 hours.
 - ii. For multiple dives per day or multiple days of diving: minimum preflight surface interval of 18 hours.
 - iii. For dives requiring decompression stops: minimum preflight surface interval of 24 hours.
 - iv. Time to fly after dives where the diver is controlling the partial pressure of absorbed nitrogen, or other inert gas, with the gas being breathed (i.e. high ppO₂ exposures capable when using a closed circuit rebreather) may be adjusted in accordance with an approved dive computer/decompression algorithm.
 - v. Flights not to exceed 1000 feet elevation increase from the dive site may be made without extended surface interval.
- C. Altitude Increase of Greater Than 1000 Feet
 - i. Before incurring an altitude increase of 1000 feet or more, divers should follow the appropriate guideline for preflight surface intervals unless the decompression procedure used has accounted for the increase in elevation.
 - ii. Altitude conversions will follow Cross correction procedures ([US Navy Tables Revision 7 Table 9-4](#) or equivalent) or use of a diving computer with an approved altitude algorithm

5.2.5 Mixed Equipment Configurations

- A. It is recognized that dive buddies use dissimilar diving modes or gear configurations for a variety of reasons (previous training, dive objectives, dive task assignments, etc.) The use of dissimilar diving modes or gear configurations on a given dive is permitted within NPS dive operations. However, it is recognized that the use of dissimilar gear configurations carries with it the potential for confusion in an emergency. To address this issue, divers are to thoroughly brief dive buddies and others involved with the dive operation on specifics associated with their particular gear configuration and/or diving mode. This briefing will include, but is not limited to:
 - i. Placement and function of alternate gas sources for buddy access in an emergency
 - ii. Placement of and access to diver carried cutting implements
 - iii. Function of buoyancy control device(s)
 - iv. Interpretation of information displayed on any diver carried electronics or gauges pertinent to decompression management, gas management, ppO₂ display, or other dive related information
 - v. Recognition and interpretation of any alerts/alarms produced by dive related electronics or gauges
 - vi. Expected buddy response to any alerts/alarms produced by dive related electronics or gauges
 - vii. Specialized hand signals
 - viii. Basic problem recognition and response associated with dissimilar gear configuration
 - ix. Placement and function of clips, valves, mouthpieces, buttons, hoses, etc. associated with dissimilar gear configuration
 - x. How to remove the diver from the equipment if necessary
 - xi. Placement of diver carried weight
 - xii. Actions required to remove diver carried weight

5.2.6 Procedures for Adverse Environmental Conditions

- A. Environmental conditions such as weather, sea state, currents, and visibility can impact diving operations. Environmental conditions will be assessed prior to the start of diving operations to determine if it is appropriate to deploy divers in both current and expected future conditions. Environmental conditions will be monitored throughout the diving operation. If environmental conditions adversely change to the point where, in the opinion of personnel on site a significant threat exists to the diver, or other personnel onsite, diving operations will be terminated, unless the abrupt termination of the dive poses a comparable, or more significant threat to the health and safety of the diver (example: missed required decompression).
- B. Sea State
 - i. Dive operations will not be initiated under conditions where the sea state poses an undue risk to the recovery of the diver to shore or the dive platform (whichever is being used).
 - ii. Conditions effecting sea state are highly local/area dependent. Specific “No Go” limits based on the characteristics of area waters will be defined in Dive Project Plans.
 - iii. Dive operations being conducted in unfamiliar waters will seek local knowledge with regard to sea state characteristics and how they tend to change.
- C. Currents
 - i. In ocean or large lake areas where strong currents can normally be expected, all divers will be equipped with a line reel and surface marker buoy (liftbag) which can be deployed from depth to mark the location of the diver during ascent and safety stops, or required decompression.
 - ii. In ocean or large lake areas where strong currents can normally be expected, all divers will be equipped with a personal diver location device (epirb or other electronic location transmitter) designed to be diver carried, or housed in a waterproof case rated for the planned working depth (at a minimum). A combination personal location device/VHF radio is preferred.
 - iii. In ocean or large lake areas where strong currents can normally be expected, all divers will be equipped with a signaling mirror, or other visual signaling devise (diver carried flares, dye markers, etc.)
 - iv. In ocean or large lake areas where strong currents can normally be expected, all divers should consider including a sonic device capable of producing sound at levels greater than the required whistle. Contingency planning should consider that these devices require gas be delivered from the diver’s regulator and will not function if the diver’s cylinder is empty.
 - v. In drift diving operations or conditions where surface tracking of divers is considered an issue, but line entanglement is not, the dive team should consider towing a surface float.
- D. Visibility
 - i. Dive teams will modify their in-water procedures to adjust for limited visibility to assure effective buddy contact and emergency recognition and response for the conditions.
 - ii. Divers finding visibility conditions for which they are not prepared or comfortable will terminate diving operations

5.2.7 Emergency Procedures for Coping with Medical Illness or Injury of Divers

- A. At a minimum NPS divers are trained and required to be current in First Aid, CPR, and Oxygen Administration. A percentage of the NPS divers possess advanced emergency medical training (First Responder, EMT, Paramedic, etc.).
- B. NPS divers responding to a medical illness or injury of a diver will respond to their level of emergency medical training.
- C. NPS divers possessing an NPS White Card will respond to a medical illness or injury of a diver in accordance with the applicable protocol in the NPS EMS Field Manual, in accordance with their level of training.
- D. Emergency procedures:
 - i. Remove victim from water or hazardous environment as appropriate

- ii. Initiate diver recall of others in the water
- iii. Evaluate diver's condition, respond to life threatening conditions to level of training
- iv. Administer oxygen, if indicated by victim's condition/symptoms, in accordance with responder's level of training
- v. Activate Park specific Dive Emergency Evacuation Plan
- vi. Evaluate victim for dive injury as appropriate to suspected mechanism of injury/circumstances
- vii. For suspected Decompression Illness (DCI) (symptoms of DCS or AGE):
 1. Place the victim in oxygen
 2. Contact the Diver's Alert Network (DAN) emergency line (919-684-9111)
 3. Keep the victim on oxygen until the supply is exhausted or until advised to discontinue by DAN or the attending physician.
- viii. Document dive related information necessary for transport with victim to advanced medical treatment
- ix. Coordinate evacuation procedures with appropriate authority
- x. Send victim's pertinent medical history, emergency contact information, and documented dive related information to medical facility with injured diver
- xi. Sequester diver's dive equipment; establish, document, and preserve the chain of custody
- xii. Initiate Dive Incident Reporting Protocol and required notifications
- xiii. Follow-up

5.2.8 Emergency Procedures for Fire

- A. Auxiliary equipment such as pumps, generators, compressors, etc, or equipment using/containing high concentrations of oxygen (>40%) will be supplied with a fire extinguisher of sufficient type and capacity, and staged appropriately. This extinguisher will be in addition to any firefighting equipment specific to the platform. All project personnel will be trained in its use and briefed on its location.
- B. From any dive platform any sources causing or fueling a fire should be jettisoned immediately if at all possible.

5.2.9 Emergency Deviation from Diving Regulations and/or Policy

- A. Divers may deviate from the requirements of this standard to the extent necessary to prevent or minimize a situation which is likely to cause death, serious physical harm, or major environmental damage, provided:
 - i. The PDO, RDO, and DSO are notified in writing within 48 hours after the onset of the emergency situation indicating the nature of the emergency and extent of the deviation from the described standard.

5.3 Dive Classifications

- A. All dives performed as part of employment are regulated by OSHA Commercial Diving Regulations, 29 CFR part 1910 Subpart T. These regulations include exemptions to Commercial Diving Standards 29 CFR part 1910.401 Subpart T (a). Dives not meeting the criteria for exemptions are managed as Commercial Dives. OSHA exemptions to the commercial diving standard include "Scientific", "Public Safety", "Instructional" (AKA "Recreational"), and "Human Subjects" Dives.
- B. NPS conducts Commercial, Scientific, and Public Safety diving operations, and tracks a variety of dive purposes useful to the agency for internal reporting purposes. Sections [5.3.1](#) – [5.3.6](#) define the relationship between NPS diving purposes and OSHA Commercial Diving Regulations or an

associated exemption, and define minimal NPS operational requirements for a given classification.

5.3.1 Maintenance Diving

- A. NPS Maintenance Diving will be conducted in accordance with 29 CFR part 1910 Subpart T and community standard for OSHA compliant Commercial Dives as reviewed and approved by the NPS National Dive Control Board. NPS Dive Purposes defined as Maintenance Diving are:
 - i. Maintenance/Inspection Diving – Dives involving inspections, construction, and repair (boats, docks, buoys, water intakes, anchors, etc.)
 - ii. Property/Recovery – Light salvage of property at marinas, docks, etc. for park needs.
- B. NPS dives involving inspections, construction, repair removal and salvage (boats, docks, buoys, water intakes, and anchors) will be conducted in accordance with the commercial diving standards detailed in 29 CFR part 1910 Subpart T.
- C. Operational Requirements:
 - i. See Section 5.2
 - ii. NPS Maintenance Dives using scuba as the diving mode SHALL NOT be conducted:
 - 1. At depths deeper than 130 fsw;
 - 2. At depths deeper than 100 fsw or outside the no-decompression limits unless a decompression chamber is ready for use;
 - 3. Against currents exceeding one (1) knot unless line-tended; or
 - 4. In enclosed or physically confining spaces unless line-tended
 - 5. Using breathing gases other than air unless a decompression chamber is within five minutes of the dive site and ready for use.
 - iii. NPS Maintenance Dives using scuba as the diving mode requires:
 - 1. A standby diver shall be available while a diver is in the water.
 - 2. A diver to be line-tended from the surface or accompanied by another diver in the water in continuous visual contact during the diving operation.
 - 3. A diver to be stationed at the underwater point of entry when diving is conducted in enclosed or physically confining spaces.
 - 4. A diver-carried reserve breathing gas supply consisting of a manual reserve; or an independent reserve cylinder with a separate regulator and SPG connected to the underwater breathing apparatus.
 - a. The diver carried reserve gas supply will be in the off position at the beginning of the dive.
 - b. The reserve gas supply will meet the emergency air volume requirements for the dive profile.
 - c. The use of Spare Air® is not authorized.
 - iv. The diver's buoyancy compensator must have an inflation source separate from the breathing gas supply.
 - 1. It is the interpretation of the NDCB that this requirement can be met by:
 - a. Equipping each diver with an independent, dedicated cylinder for buoyancy gas and regulator to feed the BCD.
 - b. Feeding the BCD from the reserve gas supply.
 - c. Feeding the BCD from the primary gas supply with the ability to use the reserve gas supply as both a backup breathing and buoyancy gas source if needed.
 - 2. Note: If an independent, dedicated cylinder is employed, an over pressure relief valve should be incorporated into the system to avoid the possibility of hose failure due to first stage intermediate pressure creep.
 - v. The minimum dive team for performing NPS Maintenance Dives using scuba is three people:
 - 1. A Dive Supervisor
 - 2. A line tended diver

3. A tender/standby diver
- vi. When a buddy team is deployed, the minimum dive team for performing NPS Maintenance Dives is four people:
 1. A Dive Supervisor
 2. Two divers in the water
 3. A standby diver
 - a. In the event the backup diver needs to be deployed, the Dive Supervisor would assume the role of tender
 - b. On dives where the current is greater than one knot and divers are working against the current, the backup diver can also act as tender
 4. The Dive Supervisor can be a standby diver or a diver that participates in the diving operation if another dive team member trained and capable of performing the necessary functions of the Dive Supervisor's duties is available at the dive location.
- vii. Maintenance diving using surface supply
 1. Currently no NPS programs are employing surface supply to conduct Maintenance Diving operations.
 2. If a program wishes to use surface supply for Maintenance Diving purposes, dives will be conducted in accordance with 29 CFR part 1910.425.

5.3.2 Public Safety Diving

- A. NPS Public Safety Diving will be conducted in accordance with the Public Safety Diving Exemption 29 CFR part 1910.401(a)(2)(ii) and community standard for Public Safety Diving as reviewed and approved by the NPS National Dive Control Board. NPS Dive Purposes defined as Public Safety Diving are:
 - i. Search, Rescue, and Recovery – Dives involving searches for submerged victims or conveyances.
 - ii. Law Enforcement – Dives involving investigation, violation, or enforcement.
- B. Public safety diving as defined by 29 CFR 1910.401 is diving performed solely for search, rescue, or related public safety purposes by or under the control of a governmental agency.
- C. Public Safety Diving Operations Plan
 - i. This document may be maintained as a separate diving operational document or can be incorporated into a Park Emergency Operations Plan. The plan must address emergency organization and response logistics at the park level to any underwater emergency. This document defines the Park response to underwater emergencies involving park divers, AND the dive team's Public Safety Diving (as appropriate per dive team training and capability) response to underwater emergencies (i.e. visitor drowning or dive incident, etc.). This response plan is to be developed in coordination with the Chief Ranger and existing emergency response protocols. The Incident Command System will be used. The following elements must be addressed in the plan:
 1. Description of emergency response call-out procedures to be followed by emergency personnel.
 2. Description of emergency response organization and incident management roles and responsibilities.
 3. Description of various emergency conditions that will require specialized skills, or equipment, or will necessitate the evaluative judgment of terminating the emergency action.
- D. Operational Requirements: [See Section 5.2](#)

5.3.3 Scientific Diving

- A. NPS Scientific Diving will be conducted in accordance with the Scientific Diving Exemption 29 CFR 1910.401(a)(2)(iv), and 29 CFR part 1910 Subpart T, Appendix B, and community standard for Scientific Diving as reviewed and approved by the NPS National Dive Control Board. NPS Dive Purposes defined as Scientific Diving are:
 - i. Natural Resource Management – Dives involving the protection, monitoring, inventorying, documentation, and survey of natural resources.
 - ii. Cultural Resources Management – Dives involving the protection, monitoring, inventorying, documentation, and survey of cultural resources.
 - iii. Interpretation – Dives for the primary purposes of visitor-related activities and education.
- B. Scientific Diving as defined by 29 CFR 1910.402 is diving performed solely as a necessary part of a scientific, research, or educational activity by employees whose sole purpose for diving is to perform scientific research tasks. As mandated by DOI 485 DM 27 all NPS Scientific Diving operations will adhere to the exemption for scientific diving from commercial diving regulations under Appendix B of 29 CFR part 1910 Subpart T which state:
 - i. The Diving Control Board consists of a majority of active scientific divers and has autonomous and absolute authority over the scientific diving program's operations.
 - ii. The purpose of the project using scientific diving is the advancement of science; therefore, information and data resulting from the project are non-proprietary.
 - iii. The tasks of a scientific diver are those of an observer and data gatherer. Construction and trouble-shooting tasks traditionally associated with commercial diving are not included within scientific diving.
 - iv. Scientific divers, based on the nature of their activities, must use scientific expertise in studying the underwater environment and, therefore, are scientists or scientists in training.
- C. NPS adheres to the scientific diving community standard and OSHA interpretation for defining a scientific diver: no particular credential is required. An NPS diver meeting the training requirements listed in [Section 4.6.3](#), performing scientific diving tasks on a Scientific Diving operation qualifies as a scientific diver.
- D. NPS adheres to the scientific diving community standard and OSHA interpretation that dives conducted to train for scientific diving and related tasks fall under the scientific diving exemption to OSHA commercial diving regulations.
- E. Operational Requirements: [See Section 5.2](#)

5.3.4 Training Dives

- A. NPS Training Dives are on the clock activities, planned and performed with goals and objectives designed to meet specific NPS purposes. Dive Training activities will be documented in accordance with [Section 4.3](#).
- B. Training dives will be conducted in accordance with the specific diving regulations and equipment configurations related to the intended parent diving classification (Maintenance, Scientific, or Public Safety).

5.3.5 Proficiency Dives

- A. Proficiency Dives are off duty dives, without work related tasks, using government issued/authorized equipment, where the benefit to the government is proficiency of diving skills.
- B. To use government issued dive equipment off-duty, divers must sign and file the user agreement and liability release ([Appendix V](#)) with their PDO. Divers do not have to sign the documents, but if they do not, they may not use NPS dive equipment during off-duty time. PDO/RDOs wishing to use NPS dive equipment during off-duty time must complete the agreement and release and

- file it with their RDO or the NPS DSO.
- C. Proficiency dives may not exceed Blue Card certification depth and must adhere to the requirements of [Section 4.4.7](#).
 - D. Proficiency dives may be logged to meet annual recertification requirements ([See Section 4.4.3](#)).
 - E. Divers relying on Proficiency Dives to meet the majority of their annual logged dives requirement will be reevaluated with regard to NPS active diver status.
 - i. Divers may only use dive equipment configurations for which they have been trained
 - ii. A dive buddy is required (in the event the diver is working on tethered, single diver down diving skills, a minimum line tender/back up diver is required)
 - iii. The PDO must be notified of all proficiency dives, prior to the dive being conducted.
 - iv. OSHA regulations do not apply to NPS proficiency dives.

5.3.6 Recreational Dives

- A. Recreational Dives are defined as any dives made by NPS Divers for non-NPS purposes. They may not be counted as Training or Proficiency toward the diver's NPS Blue Card requirements, and do not have to conform to any limitations related to the diver's NPS diving certificate. Government issued equipment may not be used.
- B. Recreational Dives may be logged with NPS to provide a complete diving history, but they will not count toward a diver's annual recertification requirements ([See Section 4.4.3](#)).

5.4 Diving Modes

5.4.1 Equipment Required for All Diving Modes

- A. Mask or diving helmet
- B. Fins (Optional for surface supply, with approved Dive Project Plan)
- C. Exposure protection
- D. Buoyancy Compensator (BC or BCD) (Surface Supplied dives are exempt from the BCD requirement)
- E. Depth gauge and/or dive computer (Surface Supplied systems equipped with a working pneumatic pressure gauge are exempt from the diver carried depth gauge requirement)
- F. Timing device and/or dive computer
- G. Cutting tool
- H. Audible Surface Signaling Device (whistle, etc.)
- I. A Snorkel is recommended for all dives, with the exception of dives employing Surface Supply or helmet, and may be required based on local adverse condition protocol
- J. A compass is recommended for all dives and may be required based on local adverse condition protocol

5.4.2 Open Circuit Scuba

- A. Definitions and General Information
 - i. Open circuit scuba is a diver carried self contained underwater breathing apparatus system where a cylinder containing a compressed gas controlled by a cylinder mounted regulator is used to deliver breathing gas to a diver. The gas breathed from the cylinder is expelled into the water column and not reused by the diver.
- B. Operational Requirements: [See Section 5.2](#)
- C. Maintenance of Proficiency: [See Section 4.4.3](#)
- D. Minimum Required Equipment:
 - i. [See Section 5.4.1 Equipment Required for All Diving Modes, items A-J](#)
 - ii. Regulator

1. The standard open circuit regulator consists of a first stage, primary second stage, redundant second stage (octopus or air integrated second stage/inflator), submersible pressure gauge (SPG), and low pressure inflator hose.
- E. Emergency Procedures for Equipment Failure at Depth
- i. Out of Air
 1. Avoidance:
 - a. Proper gas planning
 - 1) Pre-dive Planning will include identification of a turn pressure based on the ability to supporting both divers to the surface, including deco obligations / safety stop, on either divers remaining gas supply at any point during the dive.
 - 2) Examples of acceptable gas management methods:
 - a) Reserve 1000psi down to 50', plus 200psi per additional 10' of planned depth
 - b) Rule of Thirds
 - c) Carry Pony/Bailout Redundant Air Source of sufficient volume for planned dive
 - d) Other PDO approved alternate protocol
 - b. Adherence to gas planning method
 - c. Monitor breathing gas regularly
 - d. Proper buddy skills / communication
 2. Actions to Take (Listed in order of preference):
 - a. Self Rescue
 - 1) Pony Bottle / Redundant Air Source
 - 2) Terminate dive
 - b. Share Air
 - 1) Pony Bottle / Redundant Air Source
 - 2) Octopus / Safe second
 - 3) Buddy breathe
 - 4) In all gas sharing situations, terminate dive
 - c. Emergency Swimming Ascent
 - d. Emergency Buoyant Ascent
 - ii. Free-flowing Regulator – Primary
 1. Troubleshoot mechanical issues as appropriate
 2. No redundant gas source available
 - a. Share air with buddy, turn air off to free flowing regulator, terminate dive
 - 1) If cold water induced: When above thermocline, turn air back on to see if regulator functioning correctly
 - b. Continue to breathe from free-flowing regulator, and terminate dive
 - c. Follow 'Out of Air' procedure as appropriate
 3. Redundant gas source available
 - a. Switch to redundant breathing gas source, have buddy close valve on primary air source.
 - b. Terminate dive.
 - iii. Free-flowing Regulator – Octopus
 1. Reposition mouthpiece to increase ambient pressure to stop free-flow
 2. Troubleshoot mechanical issues as appropriate
 3. No redundant gas source available
 - a. Share air with buddy, turn air off to free flowing regulator, terminate dive
 - b. If cold water induced: When above thermocline, turn air back on to see if regulator functioning correctly
 - c. Switch from Primary to Octopus, continue to breathe from free-flowing regulator, and terminate dive
 - d. Follow 'Out of Air' procedure as appropriate
 4. Redundant gas source available

- a. Switch to redundant breathing gas source, have buddy close valve on primary air source.
- b. Terminate dive.
- iv. Failed burst disc / tank o-ring / high volume first stage leaks
 1. Terminate dive.
 2. Follow out of air procedures as appropriate.
- v. Valve – DIN leak upon turning on reserve gas supply
 1. Actions to take:
 - a. If upon opening valve, leak between DIN and valve occurs. Close valve, purge regulator, tighten DIN, repressurize. If no leak – continue. If leak – terminate dive.
 - b. If appropriate cycle valve on and off to breathe from redundant gas supply.
 - c. See ‘Out of Air’ procedure as appropriate
- vi. SPG Malfunction
 1. Check what you can check, if unable to rectify terminate dive
 - a. Check that valve to which pressure gauge is attached is turned on
 - b. Check that isolator valve if so equipped is open.
 - c. Consider bailing out to redundant gas supply if available, terminate dive
 - d. See ‘Out of air’
- vii. Depth Gauge / Computer / Timer Malfunction
 1. Avoidance: Use of redundant depth gauge / computer / timer
 2. Action to take:
 - a. Switch to redundant depth/ timer/ computer, or
 - b. Terminate dive. Conservatively estimate max depth and time based on dive buddy’s depth / time information. Ascend using dive buddy’s depth / time information to adhere to appropriate ascent rate and decompression / safety stop schedule
- viii. Loss of Mask
 1. Use back up mask if available
 2. Obtain help from Dive Buddy to recover mask
 3. If unable to recover or replace mask terminate dive
- ix. Broken Mask Strap
 1. Use back up mask if available, or
 2. Terminate dive
- x. Loss of fin, or Broken Fin Strap
 1. Recover or repair fin if possible
 2. Obtain help from Dive Buddy to recover or repair fin
 3. If unable to recover or replace mask terminate dive
- xi. Out of control ascent
 1. Reduce buoyancy
 - a. Activate vent on drysuit, if so configured
 - b. Activate deflator or vent on BC
 - c. Consider purging neck seal of dry suit, if so configured
 2. Flare to slow ascent
 3. Diver should be monitored for DCI and AGE.
- xii. Failure of auto inflator on BC (either doesn’t inflate or doesn’t stop inflating)
 1. Doesn’t Stop Inflating
 - a. Disconnect L.P. inflator hose
 - b. Get buoyancy under control
 - c. Orally inflate as necessary
 2. Doesn’t Inflate
 - a. Check security and proper connection of L.P. inflator hose. Try again
 - b. If using an alternate gas source for buoyancy, check to see that valve is on
 - c. If still no inflation, orally inflate.

- xiii. BC – Dump Valve Stuck Open
 - 1. Modify body position to place dump valve low so BC can retain air. Terminate dive
 - 2. Reduce/ditch weight as appropriate to obtain neutral/positive buoyancy. Terminate dive, be prepared for uncontrolled ascent
- xiv. BC – Loss of buoyancy
 - 1. Avoidance:
 - a. Divers using a single BCD and wetsuit must be configured in such a way that ditching weights will result in positive buoyancy. Loss of integrity of BC will result in termination of dive.
 - b. Dive configurations not requiring additional weight (ie- double steel cylinders) will require a system with redundant buoyancy (ie - dry suit & BCD of sufficient lift to support system, OR redundant BCD's each with sufficient lift). Loss of any one aspect of your buoyancy control will result in termination of your dive.
 - 2. Actions to Take:
 - a. Switch to redundant buoyancy system or jettison weights if possible.
 - b. Notify Dive Buddy of problem, obtain assistance as necessary
 - c. Terminate dive
- xv. Drysuit – Inverted Ascent
 - 1. Kick downward against ascent
 - 2. Tuck and roll into head up position
 - 3. Adjust buoyancy
 - 4. Refer to 'Out of Control Ascent' as necessary.
- xvi. Drysuit Inflator stuck open (inflating)
 - 1. Disconnect L.P. dry suit inflator hose, and control buoyancy
 - 2. Use BC for buoyancy needs.
 - 3. Evaluate for termination of dive based on ability to manage suit squeeze and requirement for redundant buoyancy (see 'Loss of Buoyancy')
- xvii. Drysuit Dump Valve Stuck Open
 - 1. Modify body position to place dump valve low so drysuit can retain air to reduce suit squeeze. Control buoyancy with BC. Terminate dive as appropriate
 - 2. Reduce/ditch weight as appropriate to obtain neutral/positive buoyancy. Terminate dive
- xiii. Flooded Drysuit
 - 1. Avoidance:
 - a. Proper maintenance
 - b. Good buddy checks
 - 2. Actions to Take:
 - a. Monitor personal thermal condition, and terminate dive as appropriate.
- xiv. Lost weights/weight belt
 - 1. Avoidance:
 - a. Monitor position/security of weight
 - b. Adjust/re-secure as needed
 - 2. Actions to Take:
 - a. Recover/replace weight if possible
 - b. Obtain help from Dive Buddy if possible
 - c. See 'Out of control ascent'

5.4.3 Rebreathers

A. Definitions and General Information

- i. Rebreathers are defined as any device that recycles some or all of the exhaled gas in the breathing loop and returns it to the diver. Rebreathers maintain levels of oxygen and carbon dioxide that support life by metered injection of oxygen and chemical removal of carbon dioxide. These characteristics fundamentally distinguish rebreathers from open-circuit life support systems, in that the breathing gas composition is dynamic rather than fixed.
 1. Advantages of rebreathers may include increased gas utilization efficiencies that are often independent of depth, extended no-decompression bottom times and greater decompression efficiency, and reduction or elimination of exhaust bubbles that may disturb aquatic life or sensitive environments.
 2. An increased level of discipline and attention to rebreather system status by the diver is required for safe operation, with a greater need for self-reliance. Rebreather system design and operation varies significantly between make and model. For these reasons when evaluating any dive plan incorporating rebreathers, risk-management emphasis should be placed on the individual qualifications of the diver on the specific rebreather make and model to be used, in addition to specific equipment requirements and associated operational protocols.
- ii. Oxygen Rebreathers. Oxygen rebreathers recycle breathing gas, consisting of pure oxygen, replenishing the oxygen metabolized by the diver. Oxygen rebreathers are generally the least complicated design, but are normally limited to a maximum operation depth of 20fsw due to the risk of unsafe hyperoxic exposure.
- iii. Semi-Closed Circuit Rebreathers. Semi-closed circuit rebreathers (SCR) recycle the majority of exhaled breathing gas, venting a portion into the water and replenishing it with a constant or variable amount of a single oxygen-enriched gas mixture. Gas addition and venting is balanced against diver metabolism to maintain safe oxygen levels by means which differ between SCR models, but the mechanism usually provides a semi-constant fraction of oxygen (FO_2) in the breathing loop at all depths, similar to open-circuit SCUBA.
- iv. Closed-Circuit Mixed Gas Rebreathers. Closed-circuit mixed gas rebreathers (CCR) recycle all of the exhaled gas and replace metabolized oxygen via an electronically controlled valve, governed by electronic oxygen sensors. Manual oxygen addition may be available as a diver override, in case of electronic system failure. A separate inert gas source (diluent), usually containing primarily air, heliox, or trimix, is used to maintain oxygen levels at safe levels when diving below 20fsw. CCR systems operate to maintain a constant oxygen partial pressure (PPO_2) during the dive, regardless of depth.

B. Operational Requirements

- i. General
 1. Only those models of rebreathers specifically approved by the NDCB shall be used.
 2. No NPS Dive Program shall conduct operations using rebreathers without prior review and approval of the NDCB.
 3. In order to engrain muscle memory and other skills and operational expertise required of rebreather divers, all Park/Program Divers adopting rebreathers as a diving mode will adhere to a “rebreather diving only” policy for a minimum of one year. Variance from this policy requires approval of the RDO, and the RDO can extend the time requirement if it is deemed that divers have not logged sufficient experience.
 4. All dives involving rebreathers must comply with operational requirements listed in [Section 5.2](#).
 5. No rebreather system should be used in situations beyond the manufacturer's stated design limits (dive depth, duration, water temperature, etc).
 6. Modifications to rebreather systems should be in compliance with manufacturer's recommendations.

7. Rebreather maintenance should be in compliance with manufacturer's recommendations including sanitizing, replacement of consumables (sensors, CO₂ absorbent, gas, batteries, etc) and periodic maintenance.
8. A diver whose buddy is diving with a rebreather shall be briefed in basic rebreather operation, hazard identification, system messages and alerts/alarms, and assist/rescue procedures for a rebreather diver.
9. If the buddy of a rebreather diver is using open-circuit scuba, the rebreather diver must be equipped with a means to provide the open-circuit scuba diver with a sufficient supply of open-circuit breathing gas to allow both divers to return safely to the surface.
10. For rebreather dives that also involve staged decompression and/or mixed gas diving, all requirements for each of the relevant diving modes shall be met. The NDCB reserves the authority to review each application of all specialized diving modes, and include any further requirements deemed necessary beyond those listed here on a case-by-case basis.
11. In addition to standard dive plan components, at a minimum all dive plans that include the use of rebreathers must include:
 - a. Information about the specific rebreather model(s) to be used
 - b. Type of CO₂ absorbent material
 - c. Composition and volume(s) of supply gasses
 - d. Bailout procedures
12. Particular attention should be paid to using rebreathers under conditions where vibration or pulsating water movement could affect electronics or control switches and systems.
13. Particular attention should be paid to using rebreathers under conditions where heavy physical exertion is anticipated.
14. Respired gas densities should be less than 5 g·L⁻¹, and should not exceed 6 g·L⁻¹ under normal circumstances.
15. Diver carried off-board bailout is not required under conditions where the onboard reserves are adequate to return the diver to the surface while meeting proper ascent rate and stop requirements, and the system is configured to allow access to onboard gas. These calculations must take into consideration mixed mode operations where an open circuit diver could require assistance in an out of gas situation.
16. Platform specific Build, Pre-Dive, and Post-Dive checklists will be used.
 - ii. Oxygen Rebreathers
 1. Oxygen rebreathers shall not be used at depths greater than 20 feet.
 2. Breathing loop and diver's lungs must be adequately flushed with pure oxygen prior to entering the water on each dive. Once done, the diver must breathe continuously and solely from the intact loop, or re-flushing is required.
 3. Breathing loop shall be flushed with fresh oxygen prior to ascending to avoid hypoxia due to inert gas in the loop.
 - iii. Semi-Closed Circuit Rebreathers
 1. The composition of the injection gas supply of a semi-closed rebreather shall be chosen such that the partial pressure of oxygen in the breathing loop will not drop below 0.2 ata, even at maximum exertion at the surface.
 2. The gas addition rate of active addition SCR (e.g., Drager Dolphin and similar units) shall be checked before every dive, to ensure it is balanced against expected workload and supply gas FO₂.
 3. The intermediate pressure of supply gas delivery in active-addition SCR shall be checked periodically, in compliance with manufacturer's recommendations.
 4. Maximum operating depth shall be based upon the FO₂ in the active supply cylinder.
 5. Prior to ascent to the surface the diver shall flush the breathing loop with fresh gas or switch to an open-circuit system to avoid hypoxia. The flush should be at a depth of approximately

- 30 fsw during ascent on dives deeper than 30 fsw, and at bottom depth on dives 30 fsw and shallower.
- iv. Closed-Circuit Rebreathers
 1. The use of a hypoxic diluent gas supply presents diver safety issues in bailout, loop flush, or ADV free flow situations at shallow depths. The use of a hypoxic breathing mixture for off-board bailout presents similar safety issues. Specialized rebreather system configuration and/or operational and emergency procedures will be employed to manage the risks associated with the use of hypoxic gas supplies.
 2. To allow for effective breathing loop flush, diluents should be selected so that the PO₂ of the gas is lower than the rebreather setpoint at the maximum operating depth.
 3. Divers shall monitor both primary and secondary oxygen display systems at regular intervals throughout the dive, to verify that readings are within limits, that redundant displays are providing similar values, and whether readings are dynamic or static (as an indicator of sensor failure).
 - v. Oxygen Exposures
 1. The planned ppO₂ setpoint for CCR shall not be lower than 0.4 ata.
 2. The planned ppO₂ setpoint for CCR and the planned oxygen ppO₂ in the breathing loop should not exceed 1.4 ata at depths greater than 30 feet, or 1.6 for depths less than 30 feet.
 3. Setpoint/oxygen exposure at depth should be planned to manage oxygen toxicity in accordance with the [NOAA Oxygen Exposure Limits](#). Both CNS and Oxygen Tolerance Units (OTUs) should be tracked for each diver.
 - vi. Decompression Management
 1. Decompression management can be achieved by a variety of methods, depending on the type and model of rebreather to be used.
 2. The PDO through the RDO shall review and approve the method of decompression management selected for a given diving application and project.
 - vii. Maintenance Logs, CO₂ Scrubber Logs, Battery Logs, and Dive Checklists
 1. Logs and checklists will be developed for rebreather use. Pre-dive rebreather checklists will be used before each dive. No rebreather shall be dived that is found not to be operating in accordance with manufacturer's specifications. At a minimum Pre-dive checklists shall include:
 - a. Cylinder volumes and contents verified
 - b. Carbon dioxide absorbent canister properly packed and assembled
 - c. Remaining duration of canister life verified
 - d. Adequate power supply verified
 - e. Inspection of harness, BCD, Breathing Loop, and other system components for damage, wear, and proper assembly
 - f. Positive and negative pressure leak checks performed
 - g. Manual and/or Automatic gas addition system functioning within manufacturers specifications
 - h. Oxygen sensors calibrated
 - i. System Pre-breathe performed
 - j. Other procedures specific to the model of rebreather used
 - k. Bail-out life support volumes and contents verified, properly assembled, and functioning
 - l. Unit specific items related to proper build-up and function (example: hose routing, DSV/BOV function, mushroom valve function, etc.)
 - viii. Alternate Life Support System
 1. The diver shall have reliable access to an alternate life support system designed to safely return the diver to the surface at normal ascent rates, including any required decompression in the event of primary rebreather failure. The complexity and extent of such systems are directly related to the depth/time profiles of the mission. Examples of such systems include,

- but are not limited to:
- a. Open-circuit bailout cylinders or sets of cylinders, either carried or pre-positioned
 - b. Redundant rebreather
 - c. Pre-positioned life support equipment with topside support
2. The diver shall carry alternate life support capability (open-circuit bail-out or redundant rebreather) sufficient to allow the solution of minor problems and allow reliable access to a pre-planned alternate life support system. Configuration of the bailout system, whether onboard or off-board, is dependent upon dive and buddy support requirements. Bailout should be configured for self and dive buddy bailout.
- ix. CO₂ Absorbent Material
1. CO₂ absorption canister should be filled in accordance with the manufacturer's specifications.
 2. CO₂ absorbent material should be used in accordance with the manufacturer's specifications for expected duration.
 3. If CO₂ absorbent canister is not exhausted and storage between dives is planned, the canister should be stored sealed and protected from ambient air, to ensure the absorbent retains its activity for subsequent dives.
 4. Long-term storage of carbon dioxide absorbents shall be in a cool, dry location in a sealed container. Field storage must be adequate to maintain viability of material until use.
- x. Consumables (e.g., batteries, oxygen sensors, etc.)
1. Other consumables (e.g., batteries, oxygen sensors, etc.) shall be maintained, tested, and replaced in accordance with the manufacturer's specifications at a minimum, unless otherwise specified.
 2. Oxygen sensors must be no older than eighteen months from the date of manufacture to be eligible for installation in an NPS rebreather system.
 3. From the date of installation, an oxygen sensor must be replaced within twelve months or when the sensor reaches its eighteen month shelf life limit from the sensor's date of manufacture, whichever comes first
 4. The diver will verify:
 - a. The age of the oxygen sensors within the rebreather being used;
 - b. That the individual sensors are within the annual replacement/shelf life cycle;
 - c. Oxygen sensors deemed to not be responding normally during the annual use cycle will be replaced on an as needed basis.
- xi. Unit Disinfection
1. The entire breathing loop, including mouthpiece, hoses, counterlungs, and CO₂ canister, should be disinfected periodically according to manufacturer's specifications.
 2. The rebreather must be disinfected between each use of the same rebreather by different divers.
- C. Maintenance of Proficiency
- i. To maintain authorization to dive with rebreathers, a diver shall log a minimum of 24 dives and 18 hours of dive time, or participate in PDO approved workup dives specific to any proposed diving operation prior to engaging in rebreather diving. It is recommended that no 3-month period pass without making a rebreather dive.
 - ii. PDO approved workup dive(s) specific to the proposed diving operation are recommended for all rebreather diving operations and are required for dives involving extended range, stage decompression or mixed-gas, practice of decompression and emergency protocols are required.
- D. Minimum Required Equipment:
- i. [See Section 5.4.1 Equipment Required for All Diving Modes, items A-J](#)
 - ii. Rebreather unit, approved CO₂ absorbent and other consumables
 - iii. Open circuit bailout
- E. Emergency Procedures for Equipment Failure at Depth

- i. Applicable Open Circuit Emergency Procedures for Equipment Failure at Depth related to common gear elements apply
- ii. Bailing out to open circuit is always an option for a rebreather diver
- iii. The decision of bailing out to open circuit or troubleshooting a problem while on the breathing loop is dependent on the individual diver's training, experience, and comfort level
- iv. Fundamental skills of a rebreather diver include opening the Dive Surface Valve (DSV), or Bailout Valve (BOV) if so equipped, to allow the diver to breathe from the loop; and closing the DSV, or BOV if so equipped, prior to removing the breathing loop from the mouth. This fundamental procedure is mentioned here and will not be repeated under the individual equipment failure topics.
- v. Flooded Loop
 1. Bailout to open circuit
 2. Terminate Dive
- vi. Partially Flooded Loop
 1. Monitor breathing resistance and water volume in loop
 2. Be prepared to bailout to open circuit
 3. Terminate dive as appropriate to conditions
- vii. Electronics Failure
 1. Bailout to open circuit, or
 2. Operate the unit in semi-closed mode if trained to do so and diving conditions dictate
 3. Terminate dive
- viii. Loss of Heads Up Display (HUD)
 1. Check Handset
 2. If Handset is operating correctly:
 - a. Monitor system and dive information using Handset
 - b. Terminate the dive as appropriate to diver comfort level and diving conditions
 3. If Handset is not operating correctly: See "Electronics Failure"
- ix. Diluent Manual Add Button Not Functioning
 1. Check that feed hose is connected, reconnect as necessary
 2. Check SPG for feed gas supply
 3. Check valve position for feed gas supply, open if valve is closed
 4. Connect to off board diluent/bailout gas supply if rigged to do so, ensure cylinder valve is open, recheck manual add
 5. If diluent exhausted and no backup supply is available:
 - a. Terminate the dive
 - b. Be prepared to manually adjust buoyancy as necessary
 - c. Monitor ppO₂ level, bailout to open circuit if high ppO₂ condition is present and water depth/ascent protocol so indicates
- x. O₂ Manual Add Button Not Functioning
 1. Check that feed hose is connected, reconnect as necessary
 2. Check SPG for feed gas supply
 3. Check valve position for feed gas supply, open if valve is closed
 4. Connect to off board oxygen gas supply if rigged to do so, ensure cylinder valve is open, recheck manual add function
 5. If oxygen exhausted and no backup supply is available:
 - a. Bailout to open circuit
 - b. Terminate the dive
- xi. Loss of Handset
 1. Monitor available system information using HUD
 2. If HUD not operating correctly
 - a. See "Electronics Failure"

3. Terminate the dive as appropriate to diver comfort level and diving conditions
- xii. Solenoid Stuck Open
 1. Control buoyancy
 2. Close oxygen cylinder valve or O₂ isolator valve (if so equipped)
 3. Check Handset
 4. Perform a diluent flush to bring breathing loop ppO₂ to desired range
 5. Operate oxygen cylinder valve or isolator valve manually
1. Terminate the dive, or
6. Bailout to open circuit and terminate the dive
- xiii. Solenoid Stuck Closed
 - a. Check O₂ SPG to assure oxygen is available
 - b. Check Handset
 - c. Manually inject oxygen using O₂ Manual Add
 - d. Manually maintain setpoint in the desired range
 - e. Terminate the dive as appropriate to diver comfort level and diving conditions
- xiv. ADV Stuck Open
 1. Control buoyancy
 2. Close isolator valve, if so equipped
 - a. If not equipped, close diluent cylinder valve
 3. Manually control breathing loop volume using diluent manual add button
 4. Terminate the dive as appropriate to diver comfort level and diving conditions
 5. See “Out of control ascent”
- xv. ADV Stuck Closed
 1. Control buoyancy
 2. Check diluent SPG to ensure gas is available
 3. Check position of diluent cylinder valve and isolator valve (is so equipped)
 - a. Open valves as necessary
 4. Manually control breathing loop volume using diluent manual add button
 5. Terminate the dive as appropriate to diver comfort level and diving conditions
- xvi. Loss of Onboard O₂ Supply
 1. Avoidance:
 - a. Monitor oxygen SPG during the dive
 2. Actions to take:
 - a. Check Handset
 - b. Perform a diluent flush as necessary to ensure the gas in the breathing loop has sufficient O₂ level to maintain consciousness
 - c. Check position of oxygen cylinder valve to ensure it is in the open position
 - d. Connect off board oxygen supply if so equipped
 - e. If unit is configured to feed off board oxygen to the solenoid, allow unit electronics to maintain setpoint, if not;
 - f. Manually inject oxygen into the breathing loop to maintain the desired setpoint
 - g. Terminate the dive as appropriate to diver comfort level and diving conditions
 - h. If additional oxygen is not available:
 - 1) Bailout to open circuit, or
 - 2) Operate the unit in semi-closed mode if trained to do so and diving conditions dictate
 - 3) Terminate dive
- xvii. Excluded O₂ Cell (If unit electronics equipped to detect)
 1. Depending of the electronics of the rebreather being used, the system may have the ability to detect a non-reactive oxygen sensor. Units with this ability will exclude a non-reactive cell from ppO₂ calculation functions and provide feedback to the diver.
 2. Three O₂ cell system, single cell excluded:

3. Terminate the dive as appropriate to diver comfort level and diving conditions
4. Three O₂ cell system, two cells excluded:
 - a. Terminate the dive as appropriate to diver comfort level and diving conditions
5. Three O₂ cell system, three cells excluded:
 - a. Bailout to open circuit
 - b. Terminate the dive
- xviii. Excessive O₂ Cell Variation (Cell Warning)
 1. Cell Warnings may indicate a problem with a cell or cells in the system, or a Cell Warning may be transitory in nature resulting from moisture on a cell face or other condition making a cell slower to react than others in the system
 2. Useful Practice:
 - a. Check function of oxygen cells in shallow water (approximately 20 fsw) to ensure cells are reactive and system electronics can produce High O₂ and Low O₂ alarms
 - 1) Perform an O₂ flush sufficient to produce a High O₂ alarm followed by a diluent flush to produce a Low O₂ alarm, or
 - 2) Perform a Cell Check to compare what cell readings should be for O₂ and diluent flushes should be at the given depth
 - b. Cell Warning at depth:
 - 1) If in doubt of the ppO₂ in the breathing loop, perform a diluent flush to ensure a gas capable of maintaining diver consciousness (assumes use of a non-hypoxic diluent or use of hypoxic diluent at the proper depth)
 - 2) Perform a Cell Check to determine expected readings for diluent and O₂ flushes at the given depth
 - a) Add O₂ sufficient to produce a High O₂ alarm followed by a diluent flush to produce a Low O₂ alarm
 - b) If a diver determines a full O₂ flush of the breathing loop is required at a depth greater 20 feet, the diver will be off of the breathing loop, breathing from open circuit
 - 3) If the results of the Cell Check indicate a multi cell problem:
 - a) Bailout to open circuit
 - b) Terminate the dive
 - 4) If the results of the Cell Check indicate a single cell problem, or erodes diver confidence in Cell performance:
 - a) Terminate the dive as appropriate to diver training, comfort level, and diving conditions
 - xix. Scrubber Channeling
 1. Units employing a temp stick and/or CO₂ monitor can provide indications to the diver that their CO₂ scrubber is not working properly
 2. If Channeling is indicated or high levels of CO₂ are indicated:
 - a. Bailout to open circuit
 - b. Terminate the dive
 - xx. Scrubber Failure
 1. Bailout to open circuit
 2. Terminate the dive

5.4.4 Hookah

A. Definitions and General Information

- i. A mode of diving where the diver is supplied breathing gas from the surface from a small compressor or cylinder via a lightweight supply hose equipped with a standard scuba second stage with mouthpiece. Hookah differs from Surface Supplied in that the gas supply can be free floating and does not require a line tender.

B. Hookah divers shall comply with all SCUBA diving procedures in FM-4. Individuals authorized

- to use hookah, may do so within their NPS depth authorization, or the manufacturers recommended depth limit for the system being employed, whichever is shallowest.
- C. The air supply hose must be rated for a minimum operating pressure of 130psi.
 - D. Hookah supply systems must be capable of supplying all divers breathing from the system with sufficient gas for comfortable breathing for the planned depth and workload.
 - E. The Hookah system second stage should be capable of being attached to the diver in a way to avoid pulling stress on the second stage mouthpiece and affords easy release if the diver must jettison the regulator and hose.
 - F. Divers using the Hookah mode shall be equipped with a diver carried independent reserve breathing gas supply at depths greater than 20 fsw.
 - G. The reserve breathing gas supply shall be sufficient to safely terminate the dive, including safety stop.
 - H. Hookah systems will include a downstream particulate filter capable of removing particles greater than 5 microns.
 - I. Air supplied to the diver must meet the air quality standards in [section 5.5.1](#)
 - J. Emergency Procedures for Equipment Failure at Depth
 - i. Currently no NPS Diving Program is utilizing Hookah as a diving mode. Prior to Hookah being incorporated as a diving mode in an NPS Diving Program, emergency procedures for equipment failure at depth will be developed and included in this standard.

5.4.5 Surface Supplied Diving

- A. Definitions and General Information
 - a. A mode of diving where the diver is supplied breathing gas from the surface via an umbilical hose. The umbilical generally consists of a gas supply hose, strength member, pneumofathometer hose, and communication line. The umbilical supplies a helmet or full-face mask, often with voice communications.
- B. Surface supplied divers shall comply with all diving procedures in [Section 5.2](#) except for those provisions covered in Buddy System ([See Section 5.2.2](#)).
- C. The minimum number of personnel comprising a surface supplied dive team is three. They consist of: a Designated Person-In-Charge (DPIC) aka a Dive Supervisor (DS), a Diver, and a Tender/Standby Diver. Additional dive team members are required when a diving operation or dive site is considered complex, or when the task loading of a dive team member is deemed excessive by the PDO, or the DPIC/Dive Supervisor.
- D. The DPIC/Dive Supervisor must be at the dive location during surface supplied diving operations
- E. The DPIC/Dive Supervisor may participate in diving operations as a diver/standby diver.
- F. Divers using the surface supplied mode shall maintain voice or line communication with the surface tender.
- G. Each surface supplied diver shall be hose tended by a separate dive team member while in the water.
- H. Divers using the surface supplied mode shall be equipped with a diver carried independent reserve breathing gas supply of sufficient volume to ascend from depth, make safety stop or required decompression stops, and with adequate reserve to deal with potential problems at depth.
- I. The diver will wear a positive buckling device on the safety harness to which the umbilical hose will be secured. The attachment must be of sufficient strength to prevent any strain on the helmet/full face mask hose connections and equipment must be configured to allow retrieval of the diver by the surface tender without interrupting air supply to the diver.
- J. The surface supply system will be plumbed with a reserve breathing gas supply (independent cylinder(s) or volume tank) sufficient to safely terminate the dive, including decompression.
- K. Air supply systems will include a downstream particulate filter capable of removing particles greater than 5 microns.

- L. The surface supply system will be equipped with a diver carried manifold block for attachment of the surface supply hose, bailout gas supply and mask or helmet
- M. Full face masks or helmets must have:
 - a. A non-return valve at the attachment point between the mask/helmet and hose which must close readily and positively; and shall be checked for proper function prior to the start of each diving day.
 - b. An exhaust valve.
 - c. Surface-supplied masks and helmets must have a minimum ventilation rate capacity of 4.5 actual cubic feet per minute (acfm) at any depth at which they are operated or the capability of maintaining the diver's inspired carbon dioxide partial pressure below 0.02 atmospheres absolute (ata) when the diver is producing carbon dioxide at a rate of 1.6 standard liters per minute.
 - d. Helmets or masks connected directly to the drysuit or other buoyancy-changing equipment must be equipped with an exhaust valve.
- N. Air supplied to the diver must meet the air quality standards in [section 5.5.1](#)
- O. Emergency Procedures for Equipment Failure at Depth
 - i. Applicable Open Circuit Emergency Procedures for Equipment Failure at Depth related to common gear elements apply
 - ii. Manifold block found open:
 - 1. Notify surface of problem
 - 2. Terminate the dive
 - iii. Loss of primary gas supply:
 - 1. Diver notify surface of problem if possible
 - 2. Diver bailout to backup gas supply
 - 3. If surface notified:
 - a. Surface personnel checks the position of valves controlling the diver's gas supply to assure open positioning on an available gas source
 - a. If found closed, surface personnel opens valve
 - b. If gas source found to be empty, or not supplying gas (compressor malfunction), surface personnel switch to backup gas supply
 - c. Diver directed to close bailout and return to surface supply, or terminate the dive as appropriate
 - 4. Surface not notified:
 - a. Terminate the dive
 - iv. Loss of voice communication (if so equipped)
 - 1. Initiate line pull signals if appropriate for planned operation, or
 - 2. Terminate the dive

5.5 Breathing Gases

5.5.1 Air

- A. Air is the baseline breathing gas for NPS diving. All NPS Divers are trained and certified in the use of air as a breathing gas from a nationally recognized scuba certification organization, or government equivalent prior to becoming an NPS Diver.
- B. Gas Purity
 - i. Breathing air for SCUBA shall be Compressed Gas Association (CGA) Grade E or better:

Carbon dioxide	1000 ppm/v
Carbon monoxide	10 ppm/v
Oder	None

Oil (condensed)	5 mg/m ³
Percent oxygen	20-22 %/v
Total hydrocarbon content (as methane)	25 ppm/v
Water vapor	(See note below)

Note: For breathing air used in conjunction with a self-contained breathing apparatus in extreme cold where moisture can condense and freeze causing breathing apparatus to malfunction, a dew point not to exceed -65°F (24 ppm v/v) or 10°F lower than the coldest temperature expected in the area is required.”

- ii. Air supplied to NPS divers from compressors not controlled by NPS will be verified as CGA Grade E or better.
- C. Minimum Activity to Maintain Authorization – [See Section 4.4.3](#)
- D. Exposure Limits
 - i. NPS divers will not use air as the breathing gas below 150 fsw.
- E. Dive Tables – [See Section 5.2.3](#)

5.5.2 Oxygen

- A. For the purposes of this section, oxygen is defined as a 100% breathing mixture used for safety stops; as a required decompression gas; or as a primary breathing gas for special applications in shallow water within approved exposure limits.
- B. Gas Purity
 - i. Oxygen used as a breathing gas will meet the purity levels for “Medical Grade” (U.S.P.) or “Aviator Grade” standards
- C. Exposure Limits and Operational Requirements
 - i. Operational exposure limit for the use of oxygen is 1.6 ppO₂ (approximately 20 fsw).
 - ii. When using oxygen as a breathing gas for safety stops:
 - 1. It is strongly recommended that a trapeze or other fixed line technique be used to allow the diver to maintain position in the water column. A fixed depth visual reference is also acceptable for conditions where a trapeze or other fixed line technique would be inappropriate (i.e. drifting decompression).
 - 2. Diver carried open circuit oxygen cylinders will be properly marked for contents and maximum operating depth. Regulators on these cylinders will be identifiable by divers both visually and tactilely.
 - 3. The current *NOAA Diving Manual* “[Oxygen Exposure Limits](#)” for Maximum Single Exposure and Maximum Exposure per 24 hour period will be considered when planning dives using oxygen as a breathing gas.
 - iii. Oxygen cylinders will be analyzed for oxygen content prior to being used:
 - 1. It is the responsibility of the Diving Supervisor, or Lead Diver to analyze boat or surface based oxygen supply systems for oxygen content prior to their use to supply oxygen to divers in the water, and to notify all divers on site of the analyzation results.
 - 2. It is the responsibility of each diver to analyze, prior to the dive, the oxygen content of his/her diver carried oxygen cylinder.
 - iv. Divers decompressing on high-oxygen concentration mixtures shall closely monitor one another for signs of acute oxygen toxicity
- D. Equipment Requirements
 - i. Cylinders, valves, high pressure hoses, SPG, and first stage regulators, for use with oxygen mixtures greater than 40% will be dedicated, cleaned, marked, and maintained for Oxygen Service. Oxygen compatible o-rings, soft components (high pressure seats, diaphragms, shims, etc.), and lubricants will be used.

- ii. Compressors, booster pumps, valves, supply lines and other fill station components will be designed for oxygen service, dedicated for oxygen service, marked and cleaned/maintained for oxygen service.
- iii. Individuals operating oxygen fill stations will be trained in the specific filling technique(s) being used.
- iv. Scuba cylinders filled with oxygen shall not be filled beyond the working pressure of the cylinder. Regardless of cylinder rated working pressure, fill pressures will not exceed 3000 psi.
- v. Individuals performing cleaning and maintenance on oxygen scuba equipment, and oxygen fill station components will be trained in the specific maintenance and cleaning techniques being used.

5.5.3 Nitrox

- A. Nitrox is defined for this document as breathing mixtures composed predominately of nitrogen and oxygen, most commonly produced by the addition of oxygen or the removal of nitrogen from air. Nitrox is not considered a mixed gas for Scientific Diving or Public Safety Diving operations.
- B. Prerequisites
After documentation of approved training/certification by the RDO through the PDO, individuals diving under NPS auspices may be authorized to use nitrox within their NPS depth authorization.
- C. Minimum Activity to Maintain Authorization
The diver should log at least one nitrox dive per year. Failure to meet the minimum activity level may be cause for restriction or revocation of nitrox authorization.
- D. Dive Personnel Requirements
 - i. Nitrox Diver In Training – An NPS Diver-In-Training, who has completed the training and authorization sections of these guidelines, may be authorized by the RDO through the PDO to use nitrox under the direct supervision of an NPS Diver who also holds nitrox authorization. Dive depths should be restricted to those specified in the diver's authorization.
 - ii. Nitrox Diver – An NPS Diver who has completed the nitrox training and authorization sections of this standard, may be authorized by the RDO through the PDO to use nitrox. Depth authorization to use nitrox should be the same as those specified in the diver's current Blue Card authorization.

E. Pre-dive Procedures

- i. It is the responsibility of each diver to analyze prior to the dive the oxygen content of his/her scuba cylinder and acknowledge in writing the following information for each cylinder: fO_2 , MOD, cylinder pressure, date of analysis, and user's name
- ii. The Diving Supervisor, as part of the dive planning process, must verify that all divers using nitrox on a dive are properly qualified and authorized.
- iii. Members of the dive team must confirm the gas mixture each diver is using, and establish dive team maximum depth and time limits.
- iv. The maximum allowable pO_2 exposure limit for the dive team should be reduced if on-site conditions so indicate.

F. Oxygen Exposure Limits

- i. The inspired oxygen partial pressure experienced at depth should not exceed 1.6 ATA. All dives performed using nitrox breathing mixtures should comply with the current *NOAA Diving Manual* "[Oxygen Exposure Limits](#)"
- ii. The maximum allowable exposure limit should be reduced in cases where cold or strenuous dive conditions, or extended exposure times are expected.
- iii. If using the equivalent air depth (EAD) method, the maximum depth of a dive should be based on the oxygen partial pressure for the specific nitrox breathing mix to be used.

G. Bottom Time Limits

- i. Maximum bottom time should be based on the depth of the dive and the nitrox mixture being used.
- ii. Bottom time for a single dive should not exceed the NOAA maximum allowable "Single Exposure Limit" for a given oxygen partial pressure, as listed in the current NOAA Diving Manual.

H. Dive Tables and Gases

- i. A set of approved nitrox dive tables will be available at the dive site.
- ii. When using the equivalent air depth (EAD) method, dives should be conducted using air dive tables.
- iii. If nitrox is used to increase the safety margin of air-based dive tables, the MOD and oxygen exposure and time limits for the nitrox mixture being dived should not be exceeded
- iv. Breathing mixtures used while performing in-water decompression, or for bail-out purposes, should contain the same or greater oxygen content as that being used during the dive, within the confines of depth limitations and oxygen partial pressure limits for the mixture.

I. Nitrox Dive Computers

- i. Dive computers may be used to compute decompression status during nitrox dives. Manufacturers' guidelines and operations instructions should be followed.
- ii. Nitrox dive computer users should demonstrate a clear understanding of the display, operations, and manipulation of the unit being used for nitrox diving prior to using the computer, to the satisfaction of the RDO through the PDO.
- iii. If nitrox is used to increase the safety margin of an air-based dive computer, the MOD and oxygen exposure and time limits for the nitrox mixture being dived should not be exceeded.
- iv. Dive computers capable of pO_2 limit and fO_2 adjustment should be checked by the diver prior to the start each dive to assure compatibility with the mix being used.

J. Repetitive Diving

- i. Repetitive dives using nitrox mixtures should be performed in compliance with procedures required of the specific dive tables used.
- ii. Residual nitrogen time should be based on the EAD for the specific nitrox mixture to be used on the repetitive dive, and not that of the previous dive.
- iii. The total cumulative exposure (bottom time) to a partial pressure of oxygen in a given 24 hour period should not exceed the current *NOAA Diving Manual* 24-hour Oxygen Partial Pressure Limits for "Normal" Exposures.

- iv. When repetitive dives expose divers to different oxygen partial pressures from dive to dive, divers should account for accumulated oxygen exposure from previous dives when determining acceptable exposures for repetitive dives. Both acute (CNS) and chronic (pulmonary) oxygen toxicity concerns should be addressed.

K. Oxygen Parameters

- i. Authorized Mixtures – Any nitrox mixture is authorized for use as long as the inspired oxygen partial pressure experienced at depth will not exceed 1.6 ATA, and as long as a dive/decompression schedule can be computed by RDO approved dive table, dive computer, or PC based decompression software.
- ii. Purity - Oxygen used for mixing nitrox-breathing gas will meet the purity levels for “Medical Grade” (U.S.P.) or “Aviator Grade” standards. In addition to the NPS Air Purity Guidelines ([See Section 5.5.1](#)), the following standard should be met for breathing air that is either:
 - 1. Placed in contact with oxygen concentrations greater than 40%.
 - 2. Used in nitrox production by the partial pressure mixing method with gas mixtures containing greater than 40% oxygen as the enriching agent.

Air Purity:	CGA Grade E (See Section 5.5.1)
Condensed Hydrocarbons	5mg/m ³
Hydrocarbon Contaminants	No greater than 0.1 mg/m ³

L. Gas Mixing and Analysis

- i. Individuals responsible for producing and/or analyzing nitrox mixtures should be knowledgeable and experienced in all aspects of the technique.
- ii. Only those individuals approved by the PDO and/or RDO should be responsible for mixing and/or analyzing nitrox mixtures.
- iii. Production Methods – Partial Pressure Blending, Continuous Blending, and Nitrogen Separating Membrane methods are authorized for producing nitrox. NPS divers blending nitrox will have their training for the employed blending method documented in their Dive Google Docs folder.

M. Analysis Verification by User

- i. It is the responsibility of each diver to analyze prior to the dive the oxygen content of his/her scuba cylinder and acknowledge in writing the following information for each cylinder: fO₂, MOD, cylinder pressure, date of analysis, and user’s name.
- ii. Individual dive log reporting forms should report fO₂ of nitrox used, if different than 21%.

N. Nitrox Diving Equipment

- i. All of the designated equipment and stated requirements regarding scuba equipment required in the FM-4 apply to nitrox scuba operations. Additional minimal equipment necessary for nitrox diving operations includes:
 - 1. Labeled SCUBA Cylinders
 - 2. Oxygen Analyzers
- ii. All diver and support equipment should be suitable for the fO₂ being used
 - 1. Oxygen Cleaning and Maintenance Requirements: [See Section 6.3.15](#)
 - 2. Scuba Cylinder Identification Marking: [See Section 6.3.16](#)
 - 3. Regulators: [See Section 6.3.1](#) & [Section 6.3.16](#)
 - 4. Compressor system: [See Section 6.3.13](#) & [Section 6.3.16](#)
 - 5. Fill Station Components: [See Section 6.3.11](#) & [Section 6.3.16](#)

5.5.4 Mixed Gas

- A. Mixed gas diving is defined as dives done while breathing gas mixes other than air containing proportions greater than 1% by volume of an inert gas. Nitrox is not considered a mixed gas for NPS Scientific Diving or Public Safety Diving operations.
- B. Operational use of mixed gas, other than Nitrox by NPS divers, requires approval of the NDCB. A modified Program Dive Supplement specific to the project, Dive Project Plan, Safe Practices Worksheet(s) and Dive Emergency Evacuation Plan(s) will be submitted to the NDCB Chair 30 days prior to the commencement of diving operations (except in emergency situations when the 30 day review period can be reduced). The NDCB chair will be responsible for distributing to board members, and other experts for technical review, safety practices, and compliance with RM/FM-4. NDCB will review all comments and request revision, approve, or reject. NDCB mixed gas training for mixed gas training are exempt from these operational use approval requirements ([see section 4.8.3.A.iii](#))
- C. For cooperative projects involving non-NPS divers, the NDCB will accept or reject technical diving plans following a review as above.
- D. Equipment and Gas Quality Requirements
 - i. Equipment requirements for the use of mixed gas will conform to the requirements for the applied diving mode and/or specialized environment requirements listed elsewhere in this document.
 - ii. The quality of inert gases used to produce breathing mixtures shall be of an acceptable grade for human consumption.
- E. Minimum Operational Requirements
 - i. Mixed gas diving operations shall be approved by the NDCB on a case-by-case basis.
 - ii. A project specific Safe Practices, and Dive Emergency Evacuation Plan.
 - iii. All applicable operational requirements for normal NPS diving procedures, nitrox and decompression dives shall be met.
 - iv. The maximum pO₂ to be used for planning required decompression dives using open circuit as the diving mode is 1.6. It is recommended that a pO₂ of less than 1.6 be used during bottom exposure.
 - v. The maximum pO₂ to be used for planning required decompression dives using closed circuit rebreathers as the diving mode shall not exceed 1.4 ata at depth greater than 30 feet, or 1.6 ata for depths less than 30 feet. It is recommended that a pO₂ of less than 1.4 be used during bottom exposure.
 - vi. Maximum planned Oxygen Toxicity Units (OTU) will be considered based on mission duration.
 - vii. Divers decompressing on high-oxygen concentration mixtures shall closely monitor one another for signs of acute oxygen toxicity.
 - viii. All mixed gas diving projects require a series of progressive work up dives, unless a period of less than six months has elapsed since the last approved mix gas project.

5.6 Specialized Diving Environments

Certification to dive in any specialized diving environment indicates the diver has demonstrated the skills and abilities necessary to manage the task loading associated with performing work underwater in these environments, as well as performing the tasks associated with safe individual diving skills and buddymanship; not the diver's ability to enter and return from these environments, as would be the goal in a recreational dive.

5.6.1 Required Decompression

- A. An NPS diver participating in required decompression diving will meet the requirements for NPS Certification ([See Section 4.4](#)) and practical training in required decompression diving; or

demonstrate to the RDO, through the PDO, knowledge in required decompression diving methods, techniques, and skills specific to the proposed diving tasks through previous training/certification. A modified Program Dive Supplement specific to the project, Dive Project Plan, Safe Practices Worksheet(s) and Dive Emergency Evacuation Plan(s) will be submitted to the RDO prior to the commencement of projects requiring decompression (except in emergency situations). The RDO will review all comments and request revision, approve, or reject.

- B. Required Decompression diving shall be defined as any diving during which the diver cannot perform a direct return to the surface without performing a mandatory decompression stop to allow the release of inert gas from the diver's body. "Required" safety stops for dives deeper than 30 feet do not count as a required decompression dive.
- C. Minimum Equipment Requirements
- i. Valve and regulator systems for primary (bottom) gas supplies shall be configured in a redundant manner that allows continuous breathing gas delivery in the event of failure of any one component of the regulator/valve system.
 - ii. Cylinders with volume and configuration adequate for planned diving operations.
 - iii. When training using an open circuit gear configuration as the primary diving mode, one of the second stages on the primary gas supply shall be configured with a hose of adequate length to facilitate effective emergency gas sharing in the intended environment.
 - iv. Minimum dive equipment shall include:
 1. Snorkel is optional, as determined by the conditions and environment.
 2. Diver location devices adequate for the planned diving operations and environment
 3. Compass, as appropriate for the diving conditions and planned tasks
 - v. Redundancy in the following components is required:
 1. Decompression Schedules
 2. Dive Timing Devices
 3. Depth gauges
 4. Buoyancy Control Devices
 5. Cutting devices
 6. Lift bags and line reels (as appropriate for the diving conditions and local diving protocols)
- D. Minimum Operational Requirements
- i. Dives involving planned Required Decompression requires PDO approval on a case-by-case basis.
 - ii. When using an open circuit gear configuration as the primary diving mode, the maximum pO₂ to be used for planning Required Decompression dives is 1.6. It is recommended that a pO₂ of less than 1.6 be used during bottom exposure.
 - iii. A diver's gas supplies shall be adequate to meet planned operational requirements and foreseeable emergency situations.
 - iv. Decompression dives may be planned using dive tables, dive computers, and/or PC software approved by the RDO or NDCB.
 - v. Breathing gases used while performing in-water decompression shall contain the same or greater oxygen content as that used during the bottom phase of the dive.
 - vi. Prior to each dive the dive team shall review emergency procedures appropriate for the planned dive.
 - vii. If breathing gas mixtures other than air are used for required decompression, their use shall be in accordance with those regulations set forth in the appropriate sections of this standard.
 - viii. The maximum depth for required decompression using air as the bottom gas shall be 150 feet.
 - ix. Use of additional nitrox and/or high-oxygen fraction decompression mixtures as travel and decompression gases to decrease decompression obligations is encouraged.
 - x. Use of alternate inert gas mixtures to limit narcosis is required for depths greater than 150 feet.
 - xi. If a period of more than 6 months has elapsed since the last required decompression dive, a

- series of progressive workup dives to return the diver(s) to proficiency status prior to the start of project diving operations are required.
- xii. Mission specific workup dives are recommended.
 - xiv. Omitted Decompression:
 - 1. Divers who have missed or omitted less than 15 minutes of decompression are to remain out of the water, rest, and breathe pure O₂ for at least 30 minutes. If the diver is symptom-free, monitor the diver on the surface for a 12-hour period. No diving or exposure to altitude should be allowed for 24 hours
 - 2. Divers who have missed more than 15 minutes of decompression are to be administered O₂ and transported to a chamber.
 - xv. After 3 days of decompression diving, a 24-hour out gassing and rest period will be observed

5.6.2 Cavern, Caves, Flooded Mines, and General Overhead Environments

- A. Definition and General Information: A dive team must be considered to be cave or cavern diving if at any time during the dive they find themselves in a position where they cannot complete a direct, unobstructed ascent to the surface because of rock formations. In addition to blocking direct access to surfacing, underwater caves have additional environmental hazards including but not limited to:
 - i. The absence of natural light.
 - ii. Current or flow that vary in strength and direction. Of particular note is a condition known as siphoning. Siphoning caves have flow or current directed into the cave. This can cause poor visibility as a result of mud and silt being drawn into the cave entrance.
 - iii. The presences of silt, sand, mud, clay, etc. that can cause visibility to be reduced to nothing in a very short time.
 - iv. Restrictions – Any passage through which two divers cannot easily pass side by side while sharing air make air sharing difficult.
 - v. Cave-Ins – Cave-Ins are a normal part of cave evolution; however experiencing a cave-in during diving operations is extremely unlikely.
- B. Application of this standard is in addition to pertinent requirements of all other sections of this Manual.
- C. For cavern or cave dives that also involve staged decompression, rebreathers, and/or mixed gas diving, all requirements for each of the relevant diving techniques, modes, or gases must be met.
- D. If a conflict exists between this section and other sections in this standard, the information set forth in this section only takes precedence when the diving being conducted takes place wholly or partly within an underwater cave or cavern environment.
- E. No NPS diver shall engage in cave or cavern diving unless that person holds a recognized certificate/authorization issued pursuant to the provisions of this manual.
- F. The diver must demonstrate to the RDO, through the PDO that the diver possesses the proper attitude, judgment, and discipline to safely conduct cave and cavern diving in the context of planned operations.

G. Equipment Requirements

- i. Equipment used in cave or cavern diving is based on the concept of redundancy. Redundant SCUBA equipment shall be carried whenever the planned penetration distances are such that an emergency swimming ascent is not theoretically possible.

Minimum Equipment	Cavern OC	Rebreather Cavern	Cave OC	Rebreather Cave
Key: X = include, R = Review, IA = If Applicable, OC = Open Circuit				
At a minimum, a single cylinder with adequate volume and configured to allow divers to exit from farthest/deepest penetration while supporting self and dive buddy equipped with a “K” valve; standard OC regulator configuration (Section 3.20); and BCD	X			
At minimum, a single cylinder equipped with an “H” or “Y” valve Or an alternate gas supply with adequate volume and configured to allow divers to exit from farthest/deepest penetration while supporting self and dive buddy			IA	
Off-board/bailout gas supply of sufficient volume and configured to allow diver to exit from farthest/deepest penetration	IA	X		X
A BCD capable of being inflated from the cylinder	X	X	X	X
Slate and pencil	X	X	X	X
A functioning primary light with sufficient burn time for the planned dive			X	X
Two functioning battery powered secondary lights	X	X	X	X
Two cutting devices	X	X	X	X
One primary reel of at least 350 feet (106 m) for each team	X	X	X	X
Safety reel with at least 150 feet (45.6 m) of line			X	X
Directional Line Markers			X	X
Cylinders with dual orifice isolation valve manifold Or independent SCUBA systems* with enough volume for the planned dive plus required reserve			X	
Two completely independent regulators, at least one of each having submersible tank pressure gauge and a low pressure inflator for the BCD			X	
One regulator to be configured with a five foot or longer second stage hose			X	
Rebreather		X		X
Off-board Bailout of sufficient capacity for the diver to exit to the surface		X		X
*Independent SCUBA systems must be configured to allow for monitoring of gas pressures in each cylinder				

H. Operational Requirements and Safety Protocols

Operational Requirements and Safety Protocols	Cavern	Cave
Diving must not be conducted at penetration distance into the overhead environment greater than 200 feet (60 m) from the water's surface, with a depth limit of 100 feet (30 m)	X	
Dive teams must perform a safety drill prior to each dive that includes equipment check, gas management, and dive objectives	X	X
Each team within the overhead zone must utilize a continuous guideline appropriate for the environment leading to a point from which an uninterrupted ascent to the surface may be made	X	X
Gas management must be appropriate for the planned dive with special considerations made for; DPV's, siphon diving, rebreathers, etc.	X	X
The entire dive team is to immediately terminate the dive whenever any dive team member calls (terminates) the dive	X	X

5.6.3 Shipwreck Penetration

- A. Divers demonstrating successful completion of Shipwreck Penetration Diving training from a nationally recognized scuba certification organization, or equivalent (cavern/cave training may be deemed equivalent), may be approved by the RDO to penetrate shipwrecks under NPS auspices.
- B. Penetration into hulls of intact vessels that preclude direct ascent to the surface or areas where exhalations hit an overhead environment will only be done by NPS divers demonstrating successful completion of Shipwreck Penetration Diving training from a nationally recognized scuba certification organization, or government equivalent, AND approved by the RDO to penetrate shipwrecks under NPS auspices.
- C. Required Equipment: See Cavern and Cave Diving Equipment
- D. Operational Requirements
 - i. Shipwreck penetration beyond the point of the ambient light zone provided by an entrance/exit requires the use of a continuous guideline appropriate for the environment and requires adherence to cave diving protocols such as backup lights, rule of thirds, etc.
 - ii. The guideline will start at a point from which an uninterrupted ascent to the surface may be made.

5.6.4 Ice Diving

- A. Divers demonstrating successful completion of Ice Diving training from a nationally recognized scuba certification organization, or equivalent, may be approved by the RDO to Ice Dive under NPS auspices.
- B. Required Equipment in addition to required equipment for a given dive mode
 - i. Thermal protection suitable for the expected exposure
 - ii. Minimum weight necessary for equipment configuration and expected conditions
 - iii. Open Circuit
 - 1. Cylinders of sufficient volume for the intended diving operation
 - a. Single cylinders will be configured with a 'Y' or 'H' valve with independent regulators, or the diver will carry an independent bailout
 - iv. Rebreathers

1. Sufficient CO₂ scrubber duration for the planned diving operation
 2. Redundant Rebreather, or Open Circuit bailout sufficient for planned diving operation
 - v. Regulators will be suitable for ice diving conditions
 - vi. Safety Harness – Diver worn, adjustable chest harness made of nylon webbing, used to attach safety line to the diver
 - vii. Safety Line(s)
 1. 1/4 to 3/8 inch diameter
 2. 150' in length maximum (for diver, standby/safety diver rope length 50% longer)
 3. Lines will be marked at regular increments
 4. Diver's line – non floating, brightly colored
 5. Standby/safety diver's line – floating, brightly colored, of a different color than diver's line
 - viii. Locking carabineers for attaching lines to safety harnesses
- C. Minimal Procedures for Ice Diving
- i. Ice conditions will be evaluated and found to be of sufficient thickness to support the dive team and all necessary equipment, or operations will be conducted from land or other suitable platform
 - ii. Ice holes will be large enough to accommodate two divers and a safety diver at the same time
 - iii. Ice holes will be constructed to allow diver egress from the water, or an egress method (steps, ladder, etc.) will be provided
 - iv. Each diver will be independently tethered and line tended
 1. A dive team may be tended by a single tender if a "Y" line is used
 2. A "Y" line is a single tether that branches into a "Y" at the diver's end. Each diver has approximately 6' of line after the branch.
 - v. Line Tenders will be trained for the tending operation and emergency procedures
 - vi. Regardless of other diver to surface communication equipment employed, divers and tenders will be trained and briefed on line pull signals
 - vii. Ice holes will be well marked at the conclusion of diving operations to reduce the risk of accidental fall through

5.6.5 Altitude Diving

- A. Altitude diving is defined as any dive conducted above 1000 feet, or dives deeper than 145 fsw (actual depth) conducted between 300 and 1000 feet.
- B. Operational Requirements and Safety Protocols
 - i. Any dive made within 12 hours of arrival at altitude is effectively a repetitive dive due to residual nitrogen in the diver's body from the lower altitude. Dives using dive tables to compute decompression will be planned using US Navy Diving Manual Table 9-5 (Repetitive Groups Associated with Initial Ascent to Altitude) to determine the diver's Repetitive Group Designation, and other appropriate decompression planning procedures. Dives using dive computers to control decompression exposure will follow the manufacturer's procedures for use of the dive computer at altitude.
 - ii. Altitude conversions will follow Cross correction procedures (US Navy Tables Revision 7 Table 9-4 or equivalent) or use of a diving computer with an altitude algorithm.
 - iii. After all dives greater than 30ft, any repetitive dive series, or before making a change of 1000 feet or greater, divers will follow the appropriate required surface interval before ascent to altitude after diving (US Navy Tables Revision 7 table 9-6 or equivalent) unless the decompression procedure used (altitude correcting dive computer or altitude tables) has accounted for the increased in elevation, or honor a 24-hr surface interval.

5.6.6 Diving In Current

- A. Current Diving is defined as dives conducted in moving water including ocean currents, tides, or river flow.
- B. NPS Programs conducting dives under conditions of strong currents will develop operational procedures for the expected local conditions.

5.6.7 Additional Specialized Environments

Any Specialized Diving Environments not addressed in this standard (i.e. contaminated water diving, etc.) will be presented to the NDCB for review and dive policy/standards development prior to NPS divers participating in the associated dives.

5.7 Specialized Diving Equipment

- A. An NPS Diver using specialized diving equipment will demonstrate to the PDO experience or specific training in use of that equipment.
- B. Specialized diving equipment includes but is not limited to:
 - i. Drysuits
 - ii. Full Face Masks
 - iii. Bailout Bottles
 - iv. Lift Bags/Surface Marker Buoys
 - v. Line Reels
 - vi. Dive Propulsion Vehicles (DPV)
 - vii. Specialized tools or equipment used for specific tasks at the Park/Program level
 - viii. Other Specialized Diving Equipment as defined by the RDO or NDCB
- C. Specialized diving equipment will be used in accordance with the diver's training and documented in DMS.

Chapter 6 Equipment

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6.1 Equipment General

- A. Purchase of diving equipment is the responsibility of the government. The advice of the RDO or PDO should be sought. Because of the critical nature of diving, it is essential that equipment meet OSHA and industry standards. Budgetary considerations should be secondary to safety and quality.
- B. Introduction of new brands or models of diver life support, or physiological monitoring equipment will be evaluated by the DSO with the results documented, and recommendations made by the DSO to the NDCB for approval prior to implementation. DSO evaluation methods may include:
 - i. Use of outside contractors/consultants,
 - ii. Field testing by the DSO and/or designees within the NPS Dive Program,
 - 1. Specific field testing criteria will be established on a case-by-case basis dependent on the intended use of the equipment.
 - iii. Review of testing/evaluations conducted by other agencies or organizations independent of the manufacturer, or
 - iv. Combination of these methods.

- C. Divers may use personally-owned equipment if it is approved by either the PDO or RDO and it meets the criteria established by RM-50B, Occupational Safety and Health Program.
- D. Government equipment may be used on off-duty time for skills maintenance and non-commercial activities ([See Section 5.3.5, Proficiency Diving](#)).
- E. The diver is accountable for all assigned equipment.
- F. The PDO is responsible for ensuring that all diving equipment with a required maintenance cycle is performed and that the maintenance is logged. Equipment service logs will be maintained in Park/Program dive files or on the DMS (as appropriate by online availability).

6.2 Equipment Specifications

6.2.1 Regulators

Regulators will be suitable for the intended diving environment (i.e. depth, water temperature, etc.) and breathing gas being used.

6.2.2 SCUBA Cylinders

Cylinders shall be designed, constructed, and maintained in accordance with the applicable provisions of the Unified Pressure Vessel Safety Orders.

6.2.3 Weight Systems

- A. Divers should use the minimum weight necessary for the gear configuration and diving environment.
- B. Weight systems must be provided with a quick release(s) that can be operated with either hand, allowing for quick jettisoning of sufficient weight to allow the diver to achieve positive buoyancy.

6.2.4 Buoyancy Compensators

- A. Buoyancy compensators or other variable volume buoyancy compensation devices shall be equipped with an exhaust valve and power inflator.
- B. Buoyancy compensators will have sufficient lift for the individual and the gear configuration being used.

6.2.5 Full Face Masks and Helmets

- A. Helmets shall have a non-return valve (check valve) that shall close readily and positively
- B. Full Face Masks being used with Surface Supplied systems shall have a non-return valve (check valve) at the attachment point between the manifold block feeding the mask and the surface supply hose that shall close readily and positively
- C. An exhaust valve
- D. A minimum ventilation rate capable of maintaining the diver at the depth to which he/she is diving

6.2.6 Gas Analyzers

- A. Oxygen Analyzers
 - i. An oxygen analyzer is required when using scuba cylinders containing nitrogen/oxygen mixtures other than air. Two analyzers are recommended to reduce the likelihood of errors

- due to a faulty analyzer.
 - ii. The analyzer should be capable of reading a scale of 0 to 100% oxygen, within 1% accuracy.
- B. Helium Analyzers
- i. A helium analyzer is required when using scuba cylinders containing helium mixtures. Two analyzers are recommended to reduce the likelihood of errors due to a faulty analyzer.
 - ii. The analyzer should be capable of reading a scale of 0 to 100% oxygen, and helium within 1% accuracy.

6.2.7 Oxygen Handling Equipment

- A. SCUBA equipment and compressed gas handling equipment intended for use with pure oxygen or oxygen mixtures greater than 40% must be designated for 'oxygen service' in accordance with 29 CFR 1910.430, 46 CFR 197.452. Equipment used to handle gases with a fraction of oxygen less than or equal to 40% can be treated as though they are handling air.
 - i. SCUBA equipment includes rebreather regulators and cylinders.
 - ii. Compressed gas handling equipment includes compressors, boosters, mixing apparatus, storage cylinders, and high pressure handling hardware.
- B. Equipment designated for oxygen service must be labeled as per its intended use with either a text label or green color-coding system.
- C. Equipment designated for oxygen service must only be used with pure oxygen or gas mixtures where all constituent gases meet or exceed relevant purity standards referenced in CGA G-7.1 and CGA G-4.1.
- D. Oxygen systems over 125 psig shall have slow-opening shut-off valves. This should include the following equipment: scuba cylinders, cylinder valves, scuba and other regulators, cylinder pressure gauges, hoses, diver support equipment, compressors, and fill station components and plumbing.

6.2.8 Rebreathers

- A. Only those models of rebreathers specifically approved by the NDCB shall be used.
- B. Rebreathers should meet the quality control/quality assurance protocols of the International Organization for Standardization (ISO) requirements: ISO 9004: 2009 or the most current version, AND successful completion of CE (Conformité Européenne) or NDCB approved third party testing.
- C. Rebreather modifications (including consumables and operational limits) that deviate from or are not covered by manufacturer documentation should be discussed with the manufacturer and approved by the DCB prior to implementation.

6.2.9 Dive Computers

Dive computers will be suitable for the intended diving environment (i.e. depth, water temperature, sea level vs altitude, etc.), and dive plan (non-required decompression vs required decompression, multi-gas, multi-mode, repetitive dives, and breathing gas being used, etc.). Questions on dive computer suitability will be sent to the NDCB through RDO or DSO.

6.2.10 Compressor Design and Location

- A. Low-pressure compressors used to supply air to the diver shall be equipped with a volume tank with a check valve on the inlet side, a pressure gauge, a relief valve, a drain valve, and a downstream particulate filter (5 micron)
- B. Compressed air systems over 500 psi shall have slow-opening shut-off valves.
- C. All air compressor intakes shall be located away from areas containing exhaust or other

contaminants.

- D. Compressor/filtration systems used for the production of nitrox must produce oil-free air.
- E. An oil-lubricated compressor placed in service for a nitrox system will use synthetic oil.

6.2.11 Handheld Power Tools

Power tools and equipment used underwater must be specifically approved for this purpose.

6.3 Equipment Maintenance

- A. Scuba equipment for NPS use will be maintained in accordance with Manufacturer's maintenance standards, or NPS maintenance standards, whichever is the higher standard.
- B. Maintenance of life support equipment (regulators, or physiological monitoring equipment) will be performed by qualified technicians.
- C. Simple field repairs such as replacement of a regulator mouthpiece; inspection, cleaning, and replacement of a second stage diaphragm; changing of regulator hoses; replacement of cylinder valve/regulator interface o-rings; replacement of batteries; replacement of BCD inflator valves; and other user replacement level repairs are permitted.
- D. Equipment in active service must meet specific maintenance requirements. Equipment that is subjected to extreme usage under adverse conditions may require more frequent testing and maintenance.
- E. Each equipment modification, repair, test, calibration, or maintenance service shall be logged in the DMS, including the date and nature of work performed, serial number of the item (as applicable), and the name of the person performing the work for the following equipment:

6.3.1 Regulators

- A. Regulator maintenance is required every twelve months or in accordance with manufacture service frequency requirements. And Regulator maintenance is required in accordance with manufacture overhaul procedures by a qualified technician.
- B. Regulator maintenance is defined as service or overhaul is defined as disassembly, cleaning, inspection; replacement of worn, damaged or manufacturer specified parts and lubrication; reassembly, function and bench testing; inspection of hoses for cracking and leaks and replacement of hoses as needed.

6.3.2 Submersible Pressure Gauge (SPG)

- A. Submersible Pressure Gauges shall be inspected and tested for proper function before first use and every 12 months thereafter.
- B. SPGs determined to be providing inaccurate information should be repaired or pulled from service.

6.3.3 Depth Gauges

- A. All Depth Gauges will be checked annually, preferably in a pressure chamber, although checking against a measured line is acceptable.
- B. Depth Gauges determined to be providing inaccurate information should be repaired or pulled from service.

6.3.4 Dive Computers

- A. Dive Computers will be checked annually, preferably in a pressure chamber, although checking against a measured line is acceptable.
- B. Dive Computers determined to be providing inaccurate information should be repaired or pulled from service.
- C. Dive Computers will be maintained in accordance with manufacturer recommendations.

6.3.5 SCUBA Cylinders and Valves

- A. SCUBA cylinders must be hydrostatically tested in accordance with DOT standards (five year cycle) by a qualified testing facility. SCUBA cylinders must pass an internal/external visual inspection (VIP) every twelve months in accordance with industry standards/procedures by a qualified technician.
- B. A cylinder VIP must be within its twelve-month effective period for the cylinder to remain in service.
- C. SCUBA cylinder valves must be overhauled on a minimum five-year cycle.
- D. Cylinder and valve service/overhaul is required in accordance with manufacture procedures by a qualified technician.

6.3.6 Buoyancy Compensators

- A. Low-pressure inflators shall be inspected and tested for proper function before first use and every 12 months thereafter. Inflators determined to be leaking or malfunctioning will be repaired or pulled from service
- B. Buoyancy compensators shall be inspected and functionally tested annually.
 - i. Wear and tear that adversely affects function will be repaired or the BC will be pulled from service.
 - ii. The BC function test: Inflate the BC until the overpressure relief valve activates. The BC will remain firm for a minimum of ten minutes. BCs failing this test should be dunk tested to check for leaks. BCs leaking from an internal bladder will have the bladder repaired or replaced or be pulled from service. BCs with no internal bladder, leaking through the fabric will have the fabric bladder repaired or replaced, or be pulled from service. Leaks identified from inflator hoses, inflator valves, or over pressure relief valves will have these items repaired or replaced, or the BC will be pulled from service.

6.3.7 Diving Helmets

Diving Helmets will be maintained in accordance with manufacturer recommendations

6.3.8 Full Face Masks

Full Face Masks will be maintained in accordance with manufacturer recommendations

6.3.9 Rebreathers

- A. Regulators used as part of a Rebreather will be maintained as regulators as defined in this standard ([See Section 6.3.1](#), [6.3.15](#), & [6.3.16](#)).
- B. Rebreather Head – The rebreather head is defined as the onboard electronics controller(s), solenoid, oxygen sensor mounting area, and may contain other elements specific to a particular unit design. Rebreather Head will be serviced annually by the manufacturer, qualified serves center, or qualified technician.
- C. Field serviceable elements of a rebreather may be repaired/replaced by the user in accordance with their level of training.

D. Consumables (e.g., batteries, oxygen sensors, etc.)

- i. Other consumables (e.g., batteries, oxygen sensors, etc.) shall be maintained, tested, and replaced in accordance with the manufacturer's specifications at a minimum, unless otherwise specified.
- ii. Oxygen sensors must be no older than eighteen months from the date of manufacture to be eligible for installation in an NPS rebreather system.
- iii. From the date of installation, an oxygen sensor must be replaced within twelve months or when the sensor reaches its eighteen month shelf life limit from the sensor's date of manufacture, whichever comes first.

6.3.10 Gas Control Panels

Gas Control Panels will be maintained in accordance with manufacturer recommendations

6.3.11 Air Storage Cylinders

Air Storage Cylinders will be hydrostatically tested in accordance with DOT standards (every five years), unless the construction of the cylinder exempts it from testing requirements and the exemption is documented

6.3.12 Air Filtration Systems

Air Filtration Systems will be maintained in accordance with manufacturer recommendations

6.3.13 Drysuits

- A. Drysuits will be inspected and tested for proper function before first use and every 12 months thereafter. Drysuits determined to have leaks due to holes or zipper malfunction will be repaired or replaced or the suit will be pulled from service.
- B. Inflators and dump valves determined to be leaking or malfunctioning will be repaired or replaced or the suit will be pulled from service.
- C. Neck and/or wrist seals determined to be deteriorated from age or damaged replaced or the suit will be pulled from service.

6.3.14 Compressor Operation and Air Test Records

- A. A log shall be maintained showing operation, repair, overhaul, filter maintenance, and gas mixture for each compressor.
- B. Gas analyses and air tests shall be performed on each breathing air compressor at regular intervals of no more than 100 hours of operation or 6 months, whichever occurs first. The results of these tests shall be entered in a formal log and be maintained.
- C. An oil-lubricated compressor placed in service for a nitrox system should be checked for oil and hydrocarbon contamination at least quarterly.
- D. A compressor system subject to partial year/seasonal operation will have a gas analysis and air test performed prior to being placed back in service and will then meet scheduled testing requirements during the time it is in service.
- E. Gas analyses and air tests shall also be performed immediately after any major repair or overhaul of a compressor that may have impact on the quality of the gas provided.
- F. Compressor systems used to fill SCBA cylinders for Fire applications may require differences in air testing frequency or gas quality. Standards for these applications must be checked and complied with prior to use of the compressor system.

6.3.15 Oxygen Handling Equipment

- A. Special procedures for maintenance and servicing of oxygen handling equipment must be conducted in addition to any other required equipment maintenance protocols such as annual service for breathing regulators and visual tank inspections.
- B. All oxygen handling equipment must be maintained in a state of oxygen cleanliness and systems must be comprised of oxygen compatible parts/components.
 - i. 'Oxygen Clean' is defined as the absence of debris, organic material, corrosion products, hydrocarbons, or other flammable materials as referenced in USN MIL-STD-1330D, 29 CFR 1910.430, and 46 CFR 197.452.
 - ii. 'Oxygen Compatible' parts/components are those designed and intended for use with pure oxygen systems, including high-pressure hoses, fittings, lubricants, o-rings, ect.
- C. Any equipment intended for oxygen service must be oxygen clean and oxygen compatible prior to being placed in service, following any repairs, maintenance, and modification, or following any suspected contamination.
- D. All solvents, cleaners, adjuncts, lubricants, repair equipment, and tools used with oxygen handling systems must also be oxygen clean and/or oxygen compatible.
 - i. SCUBA regulators designated for oxygen service must be annually serviced with oxygen compatible parts and all internal surfaces oxygen cleaned in accordance with the manufacturer's recommendations for oxygen service.
 - ii. SCUBA cylinders designated for oxygen service must be clearly labeled for oxygen service and must be oxygen cleaned following required annual inspections, hydrostatic testing, prior to entering oxygen service, or when otherwise necessary due to contamination. Cylinder valves must also be maintained in an oxygen clean state, using oxygen compatible parts. Cleaning procedures should follow relevant CGA, PSI/PCI, and manufacturer specified guidelines.
 - iii. Compressed gas handling systems designated for oxygen service must be maintained, serviced, and repaired with oxygen compatible parts in accordance with manufacturer recommendations.
- E. Fire safety procedures should be adhered to when filling, discharging, and transporting oxygen handling equipment. Specifically, such actions should be done away from combustible materials, in proximity to appropriate fire safety equipment, valves should be opened/closed slowly, fill rates should not exceed 60-100 psi/minutes, and discharging done in such a manner as to avoid open flames, exposure to flammable materials, and clothing saturation.
- F. Oxygen Cleaning and Maintenance Requirements
 - i. All equipment, which during the dive or cylinder filling process is exposed to concentrations greater than 40% oxygen at pressures above 150 psi, should be cleaned and maintained for oxygen service.
 - ii. Equipment used with oxygen or mixtures containing over 40% by volume oxygen shall be designed and maintained for oxygen service.

6.3.16 Nitrox Diving Equipment

- A. Scuba Cylinder Identification Marking
 - i. Scuba cylinders to be used with nitrox mixtures should have the following identification documentation affixed to the cylinder:
 - 1. Cylinders should be marked "NITROX", or "EANx", or "Enriched Air".
 - 2. Nitrox identification color-coding should include a 4-inch wide green band around the cylinder, starting immediately below the shoulder curvature. If the cylinder is not yellow, the green band should be bordered above and below by a 1-inch yellow band.

3. The alternate marking of a yellow cylinder by painting the cylinder crown green and printing the word "NITROX" parallel to the length of the cylinder in green print is acceptable.
 4. Other markings, which identify the cylinder as containing gas mixes other than Air, may be used as the approval of the RDO/NDCB.
 5. A contents label should be affixed, to include the current fO_2 , date of analysis, and MOD.
 6. The cylinder should be labeled to indicate whether the cylinder is prepared for oxygen or nitrox mixtures containing greater than 40% oxygen.
- B. Regulators – Regulators to be used with nitrox mixtures containing greater than 40% oxygen should be cleaned and maintained for oxygen service, and marked in an identifying manner.
- C. Compressor system – See Section [6.2.10](#) & [6.3.14](#)
- D. Fill Station Components – All components of a nitrox fill station that will contact nitrox mixtures containing greater than 40% oxygen should be cleaned and maintained for oxygen service. This includes cylinders, whips, gauges, valves, and connecting lines.

STANDARD MEDICAL HISTORY AND EXAMINATION

The attached DOI Standard Medical History and Examination Form will be the model for diving medical examinations for NPS. This will allow one form and examination to suffice for diving, law enforcement, hazardous waste worker, and other arduous duty disciplines.

In accordance with National Park Service (NPS) Reference Manual (RM)-4 for Diving Management, every diver shall undergo a diving medical examination. Divers shall ensure that a copy of diver Medical Examination Forms and associated medical documents related to the NPS Dive Program must be submitted to the Washington Office for record retention.

All materials associated with the actual medical examination are governed under the Healthcare Information Portability and Accountability Act (HIPAA). All materials being sent to the Washington Office should be sent in accordance with applicable [U.S. Department of the Interior Departmental Privacy Office guidance on Safeguarding Sensitive Personally Identifiable Information \(PII\)](#) and should follow the instructions for Mailing Sensitive PII via external mail. Divers should mark the inter envelope with the divers full legal name, the date of the medical examination, and the words “PII – Diving Medical Exam”.

Individual divers shall ensure that a copy of their medical examination and any relevant or supporting materials are sent to:

**National Park Service
Law Enforcement, Security, and Emergency Services
Emergency Incident Coordination Center (EICC)
230 Zachary Taylor Street
Harpers Ferry WV 25425
Attn: National Dive Program – MSP**

Costs associated with shipment of this information are the responsibility of the home park unit.

Only a copy of the [Medical Clearance Form](#) should be kept at the Park or Program level and should be uploaded to the Diver Record on the Dive Google Drive.

Employee records related to medical surveillance and employee medical folders are covered under the NPS Servicewide Records Schedule N1-79-08-9, Item 10, Management and Accountability.

For additional information, please visit the National Diving Website on Inside NPS at: <https://sites.google.com/a/nps.gov/national-dive-program/>

For additional questions, contact the National Diving Safety Officer, Steven Sellers at 303-969-2901 or Steven_Sellers@nps.gov.

DEPARTMENT OF THE INTERIOR

STANDARD MEDICAL HISTORY AND EXAMINATION FORM (DI-7004)

***** CAUTION *****

WHEN COMPLETED, THIS DOCUMENT CONTAINS CONFIDENTIAL MEDICAL INFORMATION

DOI Occupational Health Services Program Manager: Please: 1) check the box on page 3 to indicate if this is a pre-placement / baseline / exit exam, or a periodic exam, and check all Function and Clearance boxes that apply (page 3); 2) enter the three addresses in the spaces below; 3) indicate by checking the correct box (below) for the one to receive the forms once the exam is complete; and 4) deliver the form to the person who is to receive the examination. Also, if the examinee is a new-hire, and a compensated disabled veteran, he/she is to be informed that the following documents must be attached to this form at the time of the examination, and will become part of this record: copies of a) the Rating Sheet; b) the Medical Exam for Disability Evaluation (VA-21-2545) or Rating Decision (VA-21-6796b) or detailed documentation on the diagnosis, treatment, and evaluation of his/her compensated disability; and c) any disability-related specialist reports. Similarly, if the examinee responds “Yes” to question H. on page 5 (“Have you ever received, is there pending, or have you applied for a pension or compensation for a disability?”), supporting and explanatory documentation of the disability must be provided before a medical clearance determination can be made.

Person to Receive the Examination (Examinee): Please see the Privacy Act Notice on page 2 of this form. and note that your signature is required on pages 2 and 10 or the form cannot be processed further. Prior to your examination appointment, please complete ALL of the shaded portions of the following pages of this form, and take the entire packet directly to the EXAMINING PHYSICIAN/CLINIC at the address noted below on the day of your scheduled examination. All positive entries in the medical history sections of the form should be explained fully, and may require further information from your personal physician(s). Incomplete forms, or those missing information, may result in a delay in clearing you for your assigned functions. This includes question H. on page 5 (“Have you ever received, is there pending, or have you applied for a pension or compensation for a disability?”). If the answer is “Yes,” supporting and explanatory documentation of the disability must be provided before a medical clearance determination can be made. This examination does not substitute for periodic health evaluations conducted by your personal health care provider. It is being conducted for occupational purposes only. It is important, however, that you share all of the results of this examination with your personal physician for ongoing care.

Note #1: If you are a new-hire, and a compensated disabled veteran, you must attach the following documents to this form at the time of the examination: copies of a) the Rating Sheet; b) the Medical Exam for Disability Evaluation (VA-21-2545) or Rating Decision (VA-21-6796b) or detailed documentation on the diagnosis, treatment, and evaluation of your compensated disability; and c) any disability-related specialist reports.

Note #2: You should arrive for your examination in a fasting condition (e.g., no food or drink other than prescribed medications during the 12 hours prior to having your blood drawn at the examination site).

Examining Physician: Please complete all of the double-lined portions of the following form, through page 10. Note: Please provide full explanations or clarifying information for all findings that are not completely normal, and assure that the DOI or agency Medical Review Officer is provided all available information so that he/she can carry out DOI’s occupational health review function. When complete, please return this form and any associated forms and reports to the recipient checked below.

<input type="checkbox"/> DOI OHS PROGRAM MANAGER	<input type="checkbox"/> MEDICAL REVIEW OFFICER	EXAMINING PHYSICIAN/CLINIC
_____	_____	_____
_____	_____	_____
_____	_____	_____

PRIVACY ACT INFORMATION

The information obtained in the completion of this form is used to help determine whether an individual assigned to a job with duties that may be considered arduous or hazardous can carry out those duties in a safe and efficient manner that will not unduly risk aggravation, acceleration, exaggeration, or permanently worsening a pre-existing medical condition(s). The collection and use of this information is consistent with the provisions of 5 USC 552a (the Privacy Act of 1974), 5 USC 3301 (Civil Service examination, certification, and appointment), 5 CFR 339 (Medical Qualification Determinations), and Executive Orders 12107 (authorities for personnel folders) and 12564 (Drug Free Federal Workplace).

This form, along with any attached or associated information, will be placed in your Employee Medical File, and is to be used only for official purposes, as explained and published annually in the Federal Register under OPM/GOVT-10, the Office of Personnel Management system of records notice. Your submission of this information is **voluntary**. If you do not wish to provide the information, you are not required to do so. However, your assignment to perform duties that are considered arduous or hazardous depends on the availability of complete, accurate, and current occupational health records. Failure to complete this form according to instructions, or to have the indicated medical examination, may result in a delay in processing or an inability to assign you to, or continue your assignment in, certain job functions.

REGULATORY AUTHORITY TO REQUEST ADDITIONAL MEDICAL INFORMATION (e.g., from examinee's personal physician)

5 CFR 339.104 Definitions.

For purposes of this part--

Medical documentation or documentation of a medical condition means a statement from a licensed physician or other appropriate practitioner which provides information the agency considers necessary to enable it to make a employment decision. To be acceptable, the diagnosis or clinical impression must be justified according to established diagnostic criteria and the conclusions and recommendations must not be inconsistent with generally accepted professional standards. The determination that the diagnosis meets these criteria is made by or in coordination with a physician or, if appropriate, a practitioner of the same discipline as the one who issued the statement. An acceptable diagnosis must include the following information, or parts identified by the agency a necessary and relevant:

- (a) The history of the medical conditions, including references to findings from previous examinations, treatment, and responses to treatment;
- (b) Clinical findings from the most recent medical evaluation, including any of the following which have been obtained: Findings of physical examination; results of laboratory tests; X-rays; EKG's and other special evaluations or diagnostic procedures; and, in the case of psychiatric evaluation or psychological assessment, the findings of a mental status examination and the results of psychological tests, if appropriate;
- (c) Diagnosis, including the current clinical status;
- (d) Prognosis, including plans for future treatment and an estimate of the expected date of full recovery;
- (e) An explanation of the impact of the medical condition on overall health and activities, including the basis for any conclusion that restrictions or accommodations are or are not warranted, and where they are warranted, an explanation of their therapeutic or risk avoiding value;
- (f) An explanation of the medical basis for any conclusion which indicates the likelihood that the individual is or is not expected to suffer sudden or subtle incapacitation by carrying out, with or without accommodation, the tasks or duties of a specific position;
- (g) Narrative explanation of the medical basis for any conclusion that the medical condition has or has not become static or well stabilized and the likelihood that the individual may experience sudden or subtle incapacitation as a result of the medical condition. In this context, "static or well-stabilized medical condition" means a medical condition which is not likely to change as a consequence of the natural progression of the condition, specifically as a result of the normal aging process, or in response to the work environment or the work itself. "Subtle incapacitation" means gradual, initially imperceptible impairment of physical or mental function whether reversible or not which is likely to result in performance or conduct deficiencies. "Sudden incapacitation" means abrupt onset of loss of control of physical or mental function.

.....
Physician means a licensed Doctor of Medicine or Doctor of Osteopathy, or a physician who is serving on active duty in the uniformed services and is designated by the uniformed service to conduct examinations under this part.

Practitioner means a person providing health services who is not a medical doctor, but who is certified by a national organization and licensed by a State to provide the service in question.

I certify that all of the information I have provided on this form is complete and accurate to the best of my knowledge. I acknowledge that incomplete forms or missing information may result in a delay in processing of my medical clearance to perform my designated work duties. I further acknowledge that submitting information that is incomplete, misleading, or untruthful may result in termination, criminal sanctions, or failure to receive a clearance to perform my job. I authorize the release to my employing agency and authorized agency representatives (e.g., the agency medical review officer) all information contained on this examination form and all other forms or documents generated by or gathered in relation to this examination (e.g., laboratory, spirometry, vision, and audiometry test results, any history forms completed by me, or other information submitted by me or at my request). All such information is to be used strictly for official purposes, as outlined in the Privacy Act Information notice, above.

Examinee's Signature:

Date:

DOI Occupational Health Services Program – Standard Medical History and Examination Form (DI-7004)

The individual to be examined is to complete the shaded medical history portions of this form prior to his/her appointment.

The examining physician/clinic is to attach to this form any hard copies of screening, diagnostic, and/or laboratory tests, and send them as a package to the addressee checked on page 1 of this form.

Name, address, and phone number (including fax) of physician/ health center performing examination:		New Applicants ONLY: Your Current Occupation: Your Current Employer: Time in Current Position (in years/months):
Name of Agency:		
Examinee's Name:	Position/Job Title:	SS#
Address:	Work Location:	Region:
	Home Phone:	Work Phone:
Date of Scheduled Exam:	Date of Birth:	Gender: Male <input type="checkbox"/> Female <input type="checkbox"/>
DOI OHS PROGRAM MANAGER	EXAMINING PHYSICIAN (Please Note - Core Exam Must <i>Always</i> be Completed, Plus All Function-Specific Services Shown on Following Page)	
TYPE OF EXAMINATION <input type="checkbox"/> Pre-placement/Baseline/Exit <input type="checkbox"/> Periodic SPECIFY FUNCTION AND/OR CLEARANCES REQUESTED (Check ALL That Apply) <input type="checkbox"/> Respirator User [requires completion of the <i>Request for Respirator Clearance</i> form] <input type="checkbox"/> Law Enforcement (Note #1: A different form for LE officers may be required. Contact the Office of Occupational Health and Safety if you have questions) (Note #2: If indicated, check the box in the lower right corner of page 7 to request these special assessments.) <input type="checkbox"/> Diver <input type="checkbox"/> Commercial Drivers License <input type="checkbox"/> Hazardous Waste Worker <input type="checkbox"/> Inspector (Off-Shore or Land-Based) <input type="checkbox"/> Tower Climber <input type="checkbox"/> Laboratory Worker <input type="checkbox"/> Other (specify)	PRE-PLACEMENT/BASELINE/EXIT CORE EXAM Required Services: (Check those services completed) <input type="checkbox"/> General Medical History <input type="checkbox"/> General Physical Examination <input type="checkbox"/> Chemistry Panel (including Glucose, Bilirubin (total), Cholesterol, HDL-C, LDL-C, Triglycerides, GGTP, LDH, SGOT, SGPT), Complete Blood Count, and Urinalysis <input type="checkbox"/> Audiometry (including noise exposure history) <input type="checkbox"/> Electrocardiogram <input type="checkbox"/> Spirometry <input type="checkbox"/> Vision Screening (Corrected and Uncorrected Near and Far; Color; Peripheral; Depth Perception) <input type="checkbox"/> Plus other Function or Clearance-required services (see the following page)	PERIODIC CORE EXAM Required Services: (Check those services completed) <input type="checkbox"/> General Medical History <input type="checkbox"/> General Physical Examination <input type="checkbox"/> Chemistry Panel (including Glucose, Bilirubin (total), Cholesterol, HDL-C, LDL-C, Triglycerides, GGTP, LDH, SGOT, SGPT), Complete Blood Count, and Urinalysis <input type="checkbox"/> Plus other Function or Clearance-required services (see the following page) Note: For Respirator User exams (see page 4), the General Physical Examination may be a brief, limited exam or a more extensive exam, depending on the health of the examinee and the judgement of the examiner. Also, laboratory tests (e.g., chemistry panel, blood count, and urinalysis) and procedures (e.g., electrocardiograms) are intended to be at the discretion of the examiner, rather than required services. Refer to the DOI Occupational Health Program Handbook for further guidance. For all Respirator User exams, completion of the DOI <i>Request for Respirator Clearance</i> form must precede this exam and be attached to this exam form when completed.

FUNCTION AND CLEARANCE-SPECIFIC EXAMINATION COMPONENTS

Respirator User

Pre-Placement/Baseline/Exit Core Exam Services, plus:

DOI Request for Respirator Clearance form

(May be a Limited Exam)

(Use above for any Respirator User exam)

Law Enforcement

Pre-Placement/Baseline/Exit Core Exam Services, plus:

Tuberculosis skin test (PPD, Mantoux)

Chest X-Ray – PA or PA/Lat (Baseline and Exit Only)

Blood lead and Zinc protoporphyrin (Firearms Inst. Only)

Periodic Core Exam Services, plus:

Vision (Cor. and Uncor. Near/Far; Color; Peripheral; Depth)

Audiometry (including noise exposure history)

Electrocardiogram (Age 40 and higher, and Exit)

Blood lead and Zinc protoporphyrin (Firearms Inst. Only)

Tower Climber

Pre-Placement/Baseline/Exit Core Exam Services, plus:

Chest X-Ray - PA/Lat

Tuberculosis skin test (PPD, Mantoux)

Tetanus booster (if needed)

Periodic Core Exam Services, plus:

Vision (Cor. and Uncor. Near/Far; Peripheral; Depth)

Audiometry (including noise exposure history)

Diver

Pre-Placement/Baseline Core Exam Services, plus:

Tuberculosis skin test (PPD, Mantoux)

Chest X-Ray (PA/Lat)

Blood Type and Rh

Sickle Cell Prep

Periodic Core Exam Services, plus:

Audiogram (every 5 years) (including noise exposure history)

Vision (Cor. and Uncor. Near and Far)

Electrocardiogram (every year after age 40, and Exit)

Commercial Driver's License

Periodic Core Exam Services, plus:

Audiometry (including noise exposure history)

Vision (Corr. and Uncorr. Near/Far; Color; Peripheral; Depth)

Inspector (Off-Shore or Land-Based)

Pre-Placement/Baseline/Exit Core Exam Services, plus:

Chest X-Ray - PA/Lat

Tuberculosis skin test (PPD, Mantoux) (Offshore Only)

Tetanus booster (if needed) (Offshore Only)

Periodic Core Exam Services, plus:

Vision (Cor. and Uncor. Near/Far; Peripheral; Depth)

Audiometry (including noise exposure history)

Tetanus booster (if needed) (Offshore Only)

Hazardous Waste Worker

Pre-Placement/Baseline/Exit Core Exam Services, plus:

Chest X-ray (PA/Lat)

Cholinesterase (RBC/Plasma)

Periodic Core Exam Services, plus:

Vision (Cor. and Uncor. Near/Far; Color; Peripheral; Depth)

Chest X-ray (PA/Lat) (prn)

Spirometry

Audiometry (including noise exposure history)

Cholinesterase (RBC/Plasma)

24 hour Urine Heavy Metal Screen

Laboratory Worker

Pre-Placement/Baseline/Exit Core Exam Services, plus:

Chest X-Ray – PA/Lat

Blood lead and Zinc Protoporphyrin (for firearms users)

Cholinesterase (RBC/Plasma)

Serum, 5cc, labeled, frozen, and stored

Immunizations and Screening (see *DOI Handbook*)

Periodic Core Exam Services, plus:

Vision (Cor. & Uncor. Near/Far; Color; Peripheral; Depth)

Spirometry

Audiometry (including noise exposure history)

Serum, 5cc, labeled, frozen, and stored

Cholinesterase (RBC/Plasma)

Blood lead and Zinc Protoporphyrin (for firearms users)

Immunizations and Screening (see *DOI Handbook*)

PAST MEDICAL HISTORY

(Please complete this page if this is your first time using this form, or if you are unsure if you have completed it before.)

- A. Have you ever been treated for a mental or emotional condition? (If Yes, specify when, where, and give details.) Yes No
- B. Have you had or have you been advised to have any operation? (If Yes, specify when, and give details.) Yes No
- C. Have you ever been a patient in any type of hospital after infancy? (If Yes, specify when, where, and give details.) Yes No
- D. Have you ever been treated with an organ transplant, prosthetic device (e.g., artificial hip), or an implanted pump (e.g., for insulin) or electrical device (e.g., cardiac defibrillator)? (If Yes, please describe fully, and provide copies of pertinent medical records.) Yes No
- E. Have you ever had any other serious illness/injury? (If yes, specify when, where, and give details.) Yes No
- F. Have you consulted or been treated by clinics, physicians, healers, or other practitioners within the past year for other than minor illness? (If Yes, specify when, where, and give details.) Yes No
- G. Have you ever been rejected for military service or discharged from military service because of physical, mental, or other health reasons? (If Yes, give date and reason for rejection.) Yes No
- H. Have you ever received, is there pending, or have you applied for a pension or compensation for a disability? (If Yes, specify what kind, granted by whom, what amount, when, and why.) Yes No

Every item checked "Yes" must be explained below or on the back of this form.

Smoking History

Never Former Current

Years since quitting _____

Number of cigarettes per day _____

Number of cigars per day _____

Number of pipe bowls per day _____

Total years you have smoked _____

Alcohol Use

Have you ever been diagnosed with or treated for alcoholism or alcohol dependence? **Yes** **No**

If "Yes," Date(s): _____
Current status: _____

Have you ever been in rehabilitation? **Yes** **No**

If "Yes," when? _____
Details: _____

Drug Use

Have you ever been diagnosed as being dependent on illegal drugs or treated for drug abuse? **Yes** **No**

If "Yes," Date(s): _____
Current status: _____

Have you ever been in rehabilitation? **Yes** **No**

If "Yes," when? _____
Details: _____

RESPIRATOR CLEARANCE QUESTIONS

Have you ever used a respirator? Yes No

Will you use one in the coming year? Yes No
(If no, please skip the rest of this section.)

What hazards may be present during your use of a respirator?

High altitude Temperature extremes Confined spaces

Have you ever had, or do you now have any of the following?

- Yes** **No**
- Persistent cough or shortness of breath
 - Unexplained general weakness or fatigue
 - Asbestosis or silicosis
 - Lung cancer
 - Broken ribs or chest injury
 - Chest pain on deep inspiration
 - Sensation of smothering when using a respirator
 - Heat exhaustion or heat stroke
 - Trouble smelling odors
 - Difficulty squatting
 - Difficulty climbing stairs or ladder carrying 25# weight
 - Other conditions that might interfere with respirator use or result in limited work activity

(Discuss all "Yes" responses with the examining physician.)

Fully explain all medical problems identified in Respirator Clearance Questions section.

MEDICATIONS

List all medications (prescription and over-the-counter) you are currently taking.

Describe Your Physical Activity or Exercise Program(check one)

Intensity: Low _____ Moderate _____ High _____

Duration, in Minutes per Session

Describe activity _____

Frequency _____ Days per week

MEDICAL HISTORY	DIAGNOSTIC AND PHYSICAL FINDINGS																																																														
<p style="text-align: center;">VASCULAR</p> <table style="width:100%; border-collapse: collapse;"> <tr> <td style="width:80%;"></td> <td style="width:5%; text-align: center;">Yes</td> <td style="width:15%; text-align: center;">No</td> </tr> <tr> <td>Do you have any vascular (blood vessel) disease?</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>Enlarged superficial veins, phlebitis, or blood clots?</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>Anemia?</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>Hardening of the arteries?</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>High Blood Pressure?</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>Heart failure?</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>Stoke or Transient Ischemic Attack (TIA)?</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>Aneurysms (Dilated arteries)?</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>Poor circulation or swelling of the hands or feet?</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>White fingers with cold or vibration?</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </table>		Yes	No	Do you have any vascular (blood vessel) disease?	<input type="checkbox"/>	<input type="checkbox"/>	Enlarged superficial veins, phlebitis, or blood clots?	<input type="checkbox"/>	<input type="checkbox"/>	Anemia?	<input type="checkbox"/>	<input type="checkbox"/>	Hardening of the arteries?	<input type="checkbox"/>	<input type="checkbox"/>	High Blood Pressure?	<input type="checkbox"/>	<input type="checkbox"/>	Heart failure?	<input type="checkbox"/>	<input type="checkbox"/>	Stoke or Transient Ischemic Attack (TIA)?	<input type="checkbox"/>	<input type="checkbox"/>	Aneurysms (Dilated arteries)?	<input type="checkbox"/>	<input type="checkbox"/>	Poor circulation or swelling of the hands or feet?	<input type="checkbox"/>	<input type="checkbox"/>	White fingers with cold or vibration?	<input type="checkbox"/>	<input type="checkbox"/>	<p style="text-align: center;">Cardio/Pulmonary</p> <table style="width:100%; border-collapse: collapse;"> <tr> <td style="width:10%;"></td> <td style="width:15%; text-align: center;">Normal</td> <td style="width:15%; text-align: center;">Abnormal</td> <td style="width:60%;"></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>Lungs/Chest</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>Heart (thrill, murmur)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>Vascular (varicosities, stasis, insufficiency)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>Electrocardiogram - Attach with interpretation, if done</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>Stress EKG - Bruce Protocol, attach with interpretation, if exam requires</td> </tr> </table> <hr/> <p>Pulmonary Function Testing: (Attach Copy)</p> <p>Calibration Date _____ (Should be same day as test) Machine Brand _____</p>					Normal	Abnormal		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Lungs/Chest	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Heart (thrill, murmur)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vascular (varicosities, stasis, insufficiency)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Electrocardiogram - Attach with interpretation, if done	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Stress EKG - Bruce Protocol, attach with interpretation, if exam requires	<p style="text-align: center;">CHEST X-RAY</p> <p>Last PA Chest X-ray: Date _____ Result: <input type="checkbox"/> Normal <input type="checkbox"/> Abnormal</p> <p>Comments: _____</p> <p>TB Mantoux (PPD) Date: _____ mm Induration: _____</p>	
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<p style="text-align: center;">MENTAL HEALTH</p> <p>Do you have any psychiatric or mental health problems? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>History of psychosis? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Psychiatric/psychological consultation? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Difficulty dealing with stress? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Panic attacks, hyperventilation, or anxiety or phobia disorder? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Periods of uncontrollable rage? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Claustrophobia? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Diagnosed depression, personality disorder, or neuroses? <input type="checkbox"/> Yes <input type="checkbox"/> No</p>	<p style="text-align: center;">DERMATOLOGY/ALLERGY</p> <p>Do you have any skin or allergy diseases? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Sun sensitivity? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Allergic dermatitis to rubber or latex? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>History of chronic dermatitis? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Active skin disease or infections? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Moles that have changed in size or color? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Allergies, including hay fever? (If so, to what?) <input type="checkbox"/> Yes <input type="checkbox"/> No</p>	<p>Comments/Findings</p>																																																																												
<p style="text-align: center;">MUSCULOSKELETAL</p> <p>Do you have any muscle or bone disease? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Moderate to severe joint pain, arthritis, tendonitis? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Amputations? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Loss of use of arm, leg, fingers, or toes? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Loss of sensation? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Loss of strength in hands, arms, legs or feet? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Loss of coordination? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Back injury? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Chronic back pain? (back pain associated with neurological deficit or leg pain) <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Are you RIGHT <input type="checkbox"/> or LEFT <input type="checkbox"/> handed? (check one)</p>	<p style="text-align: center;">MUSCULOSKELETAL</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 10%;"></td> <td style="width: 10%;">Normal</td> <td style="width: 10%;">Abnormal</td> <td style="width: 80%;"></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>Upper extremities (strength)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>Upper extremities (range of motion)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>Lower extremities (strength)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>Lower extremities (range of motion)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>Feet</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>Hands</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>Spine, other musculoskeletal</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>Flexibility of neck, back, spine, hips, knees</td> </tr> </table> <p>Comments/Findings</p>		Normal	Abnormal		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Upper extremities (strength)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Upper extremities (range of motion)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Lower extremities (strength)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Lower extremities (range of motion)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Feet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Hands	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Spine, other musculoskeletal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Flexibility of neck, back, spine, hips, knees	<p>Please assess the following, if box is checked: <input type="checkbox"/></p> <p><u>Medically cleared to perform the following:</u></p> <table style="width: 100%; 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MEDICAL HISTORY			DIAGNOSTIC AND PHYSICAL FINDINGS					
<p align="center">NEUROLOGICAL</p> <p>Do you have any neurological disease? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Tremors, shakiness? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Seizures (recent or previous)? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Spinal Cord Injury? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Numbness or tingling? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Head/spine surgery? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>History of head trauma with persistent deficits? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Chronic recurring headaches (migraine)? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Brain tumor? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Loss of memory? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Insomnia (difficulty sleeping)? <input type="checkbox"/> Yes <input type="checkbox"/> No</p>			<p>NEUROLOGICAL</p> <p>Normal Abnormal</p> <p><input type="checkbox"/> <input type="checkbox"/> Cranial Nerves (I - XII)</p> <p><input type="checkbox"/> <input type="checkbox"/> Cerebellum</p> <p><input type="checkbox"/> <input type="checkbox"/> Motor/Sensory (include vibratory and proprioception)</p> <p><input type="checkbox"/> <input type="checkbox"/> Deep Tendon reflexes</p> <p><input type="checkbox"/> <input type="checkbox"/> Mental Status Exam</p>			Comments/Findings		
<p align="center">GASTROINTESTINAL</p> <p>Do you have any stomach or intestinal disease? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Hernias? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Colostomy? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Persistent stomach/abdominal pain or heartburn? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Active ulcer disease? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Hepatitis or other liver disease? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Irritable bowel syndrome? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Rectal bleeding? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Vomiting blood? <input type="checkbox"/> Yes <input type="checkbox"/> No</p>			<p>GASTROINTESTINAL</p> <p>Normal Abnormal</p> <p><input type="checkbox"/> <input type="checkbox"/> Auscultation</p> <p><input type="checkbox"/> <input type="checkbox"/> Palpation</p> <p><input type="checkbox"/> <input type="checkbox"/> Organo-megaly</p> <p><input type="checkbox"/> <input type="checkbox"/> Tenderness</p> <p><input type="checkbox"/> <input type="checkbox"/> Inguinal hernia</p> <p>Attach blood chemistry panel report</p>			Comments/Findings		
<p align="center">GENITOURINARY</p> <p>Do you have any disease of the urinary system or genitals? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Blood in urine? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Kidney Stones? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Difficult or painful urination? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Infertility (difficulty having children)? <input type="checkbox"/> Yes <input type="checkbox"/> No</p>			<p>GENITOURINARY</p> <p>Normal Abnormal</p> <p><input type="checkbox"/> <input type="checkbox"/> Urogenital exam</p> <p>(Attach urinalysis report, if done.)</p>			Comments/Findings		

MEDICAL HISTORY

VISION

	Yes	No
Do you have any vision problems or eye disease?	<input type="checkbox"/>	<input type="checkbox"/>
Frequent headaches?	<input type="checkbox"/>	<input type="checkbox"/>
Blurred vision?	<input type="checkbox"/>	<input type="checkbox"/>
Loss of vision in either eye?	<input type="checkbox"/>	<input type="checkbox"/>
Eye irritation when using a respirator or goggles?	<input type="checkbox"/>	<input type="checkbox"/>
Difficulty reading?	<input type="checkbox"/>	<input type="checkbox"/>
Eye disease, glaucoma?	<input type="checkbox"/>	<input type="checkbox"/>
Eyeglasses?	<input type="checkbox"/>	<input type="checkbox"/>
Contact lenses?	<input type="checkbox"/>	<input type="checkbox"/>
Cataracts?	<input type="checkbox"/>	<input type="checkbox"/>
Color blindness?	<input type="checkbox"/>	<input type="checkbox"/>
Have you had any type of eye surgery], (e.g., radial keratotomy, PRK [laser] cataract, etc.)? If "YES", please provide specific type and date of surgery:	<input type="checkbox"/>	<input type="checkbox"/>

HEARING

	Yes	No
Do you have any hearing problems or ear disease?	<input type="checkbox"/>	<input type="checkbox"/>
Exposure to loud, constant noise or music in the last 14 hours?	<input type="checkbox"/>	<input type="checkbox"/>
Exposure to loud, impact noise in past 14 hours?	<input type="checkbox"/>	<input type="checkbox"/>
Ringing in the ears?	<input type="checkbox"/>	<input type="checkbox"/>
Difficulty hearing?	<input type="checkbox"/>	<input type="checkbox"/>
Ear infections or cold in the last 2 weeks?	<input type="checkbox"/>	<input type="checkbox"/>
Dizziness or balance problems?	<input type="checkbox"/>	<input type="checkbox"/>
Eardrum perforation?	<input type="checkbox"/>	<input type="checkbox"/>
Do you use a hearing aide?	<input type="checkbox"/>	<input type="checkbox"/>
Are you in a Hearing Conservation Program?	<input type="checkbox"/>	<input type="checkbox"/>
Do you use protective hearing equipment?	<input type="checkbox"/>	<input type="checkbox"/>
If yes, type(s): <input type="checkbox"/> foam <input type="checkbox"/> pre-mold/plugs <input type="checkbox"/> ear muffs		
Have you had prior Military Service?	<input type="checkbox"/>	<input type="checkbox"/>
Have you had prior ear surgery?	<input type="checkbox"/>	<input type="checkbox"/>
Have you had recurrent ear infections?	<input type="checkbox"/>	<input type="checkbox"/>

DIAGNOSTIC AND PHYSICAL FINDINGS

HEAD AND NECK

Normal	Abnormal	
<input type="checkbox"/>	<input type="checkbox"/>	Head, Face, Neck (thyroid), Scalp
<input type="checkbox"/>	<input type="checkbox"/>	Nose/Sinuses/Eustachian tube
<input type="checkbox"/>	<input type="checkbox"/>	Mouth/Throat
<input type="checkbox"/>	<input type="checkbox"/>	Pupils equal/reactive
<input type="checkbox"/>	<input type="checkbox"/>	Ocular Motility
<input type="checkbox"/>	<input type="checkbox"/>	Ophthalmoscopic Findings
<input type="checkbox"/>	<input type="checkbox"/>	Speech

Comments/Findings

EYES / VISION

Color Vision

Normal	Abnormal	Number Correct:
<input type="checkbox"/>	<input type="checkbox"/>	_____ of _____ tested
Can see Red/Green/Yellow? <input type="checkbox"/> Yes <input type="checkbox"/> No		
Type of test		
<input type="checkbox"/>	<input type="checkbox"/>	Ishihara plate Function test (Yarn, wire, etc.)
<input type="checkbox"/>	Other (specify _____)	

Tonometry

Right _____ mm/Hg Left _____ mm/Hg

Visual Acuity

Corrected vision (Snellen Units)

Both Near 20/____ Right Near 20/____ Left Near 20/____

Both Far 20/____ Right Far 20/____ Left Far 20/____

Uncorrected vision (Snellen Units)

Both Near 20/____ Right Near 20/____ Left Near 20/____

Both Far 20/____ Right Far 20/____ Left Far 20/____

Peripheral Vision

Right
Nasal _____ degrees Temporal _____ degrees

Left
Nasal _____ degrees Temporal _____ degrees

Depth Perception (Type of test: _____)

_____ Seconds of Arc Number Correct: _____ of _____ tested

Interpretation:

Normal Abnormal

EARS

Right	Normal	Abnormal	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Canal/External ear
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Tympanic Membrane
Left	Normal	Abnormal	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Canal/External ear
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Tympanic Membrane

Comments/Findings:

HEARING

Audiogram: Type: Baseline Annual Termination With hearing aid? Yes No
(Attach current and baseline audiogram clearance examinations, such as for law enforcement.)
Calibration Method: Oscar Biological Date
(Note: The use of hearing aids is not acceptable for some)

Frequency	500Hz	1000Hz	2000Hz	3000Hz	4000Hz	6000Hz	8000Hz
Right ear							
Left ear							

Review/compare with baseline: No Change Mild Change Change of 10 dB ave. or more in 2000, 3000, and 4000 Hz

Normal Abnormal Explain

PROFESSIONAL STAFF Please check all the topics you discussed during the diagnostic work-up or physical examination	EXAMINING PHYSICIAN: WORKPLACE EXPOSURE MONITORING	EXAMINING PHYSICIAN Summary of Abnormal Findings with Plan of Action/Referral
<input type="checkbox"/> Diet <input type="checkbox"/> Low-calorie <input type="checkbox"/> Low-fat <input type="checkbox"/> Low-salt <input type="checkbox"/> Cholesterol <input type="checkbox"/> Hypertension <input type="checkbox"/> Exercise <input type="checkbox"/> Obesity <input type="checkbox"/> Smoking Cessation <input type="checkbox"/> Avoid Sun Exposure/Sun Screen <input type="checkbox"/> Alcohol Use <input type="checkbox"/> Cancer Screening <input type="checkbox"/> Immunizations <input type="checkbox"/> Hearing Protection <input type="checkbox"/> Vision Referral <input type="checkbox"/> Other Personal Protective Equipment <input type="checkbox"/> Job Stressors <input type="checkbox"/> Referral(s) Others	Is workplace monitoring data or other exposure data for this employee or this position available for your review? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, what type of data is available? <input type="checkbox"/> Acute Exposure Data <input type="checkbox"/> Periodic Exposure Data <input type="checkbox"/> Ongoing Workplace Monitoring Data <input type="checkbox"/> Individual Dosimetry Data <input type="checkbox"/> Material Safety Data Sheets How was data made available? <input type="checkbox"/> Electronic Database <input type="checkbox"/> Hard Copy Report <input type="checkbox"/> Employee Self-Report If exposure data was available, please explain what changes, if any, were made in the examination due to this data: Based upon your knowledge of the physical demands of the position and/or the potential exposure to occupational hazards, please answer the following: Does the employee need to be in a medical surveillance program? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Cannot determine based on information available <input type="checkbox"/> Other	<u>Impressions:</u> 1) 2) 3) 4) 5) <u>Plan:</u> 1) 2) 3) 4) 5)

SIGNATURES

DATE

Nurse: _____

Examining Physician: _____

I have had the examination findings explained to me. I understand these explanations and recommendations, and understand that this examination does not substitute for periodic health evaluations conducted by my personal physician; it has been conducted for occupational purposes only. I have received a copy of the examination results to share with my personal physician: Yes No

Examinee (person having the examination): _____

PLEASE BE SURE ALL REQUIRED SECTIONS OF THIS FORM HAVE BEEN COMPLETED AND ARE LEGIBLE, AND ALL INDICATED SIGNATURES HAVE BEEN ENTERED, BEFORE RETURNING IT FOR REVIEW BY THE DESIGNATED AGENCY REVIEWING MEDICAL OFFICER. THANK YOU.

DEPARTMENT OF THE INTERIOR OCCUPATIONAL HEALTH SERVICES PROGRAM

**Medical Review Officer's Qualification Statement
(to be completed only by the designated reviewing physician for this agency)**

Name of Examined Individual: _____

Physician/Clinic Address: _____

SS#: _____

Date of Birth: _____

Physician/Clinic Phone: _____

POSITION(S) OR FUNCTION(S) FOR WHICH CLEARANCE(S) HAVE BEEN REQUESTED
[please check all that apply]

<u>Functional Clearance Area</u>	<u>Pre-placement / Baseline / Exit</u>		<u>Periodic</u>	<u>Functional Clearance Area</u>	<u>Pre-placement / Baseline / Exit</u>	
<u>Periodic</u>						
Respirator Use	<input type="checkbox"/>	<input type="checkbox"/>		Hazardous Waste Work	<input type="checkbox"/>	<input type="checkbox"/>
Law Enforcement	<input type="checkbox"/>	<input type="checkbox"/>		Inspector	<input type="checkbox"/>	<input type="checkbox"/>
Diver	<input type="checkbox"/>	<input type="checkbox"/>		Tower Climber	<input type="checkbox"/>	<input type="checkbox"/>
Laboratory Worker	<input type="checkbox"/>	<input type="checkbox"/>		Other (specify: _____)	<input type="checkbox"/>	<input type="checkbox"/>
Commercial Driver's License	<input type="checkbox"/>	<input type="checkbox"/>		Other (specify: _____)	<input type="checkbox"/>	<input type="checkbox"/>

This review is based on:

Report of Medical Examination, Dated: _____

Supplemental Medical Information, Dated: _____

Findings:

No Significant Findings - Individual meets the Department's medical standards for the function(s) / clearance(s) requested.

A Final Determination Cannot be Made Based on Available Medical Information – The following results were inconclusive and require further information or additional testing. Final recommendations cannot be made until this has been completed. The requested information should be provided within 30 days of the review date to the Medical Review Officer at the address noted at the bottom of this page.

Significant Medical Findings - The individual does not meet the Department's medical standards for the safe and efficient performance of the duties of the function(s) / clearance(s) requested.

Date of Initial Medical Review: _____

Reviewing Physician: _____

Date of Final Medical Review: _____

Signature: _____

Reviewer's Address: _____

DEPARTMENT OF THE INTERIOR OCCUPATIONAL HEALTH SERVICES PROGRAM

DIVING FITNESS MEDICAL EVALUATION REPORT

Applicant (<i>Name</i>)	DATE
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- Approved: I find no defects which I consider incompatible with diving.
- Disapproved: Applicant has defects which, in my opinion, would clearly constitute unacceptable hazards to his/her health and safety in diving.

REMARKS: (*Regarding Medical Evaluation Criteria, etc.*)

NOTE: The evaluation report as shown above should be given to the applicant for transmittal to the Park Diving Officer.

I have discussed the applicant=s defects, if any, which would not seriously interfere with his/her diving, but which may seriously compromise his/her subsequent health. He/She understands the nature of the hazards and the risks involved in diving with these defects.

SIGNATURE (Examining physician)		
ADDRESS (Street)		
CITY	STATE	ZIP CODE
TELEPHONE NUMBER		



NAME _____ Park/Unit _____

ENTRY LEVEL REQUIREMENTS	Complete
Prerequisites	
Candidate written concurrence from supervisor on file.	
Copy of open-water or scientific diving certification on file.	
Copy of Dive Experience Log	
Current DOI Standard Medical History and Examination medical exam and approval on file.	
Part A:	
Pool or Confined Water Skills	
Copy of successfully passed diving written exam that includes the use of USN based repetitive dive tables completed and on file.	
25 yards (22.9 meters) underwater swim without swim aids and 400 yards (365.8 meters) swim without swim aids completed within 15 minute time limit.	
Surface dive without swim aids to least 10 feet and recover an object.	
Without swim aids, perform an in-water swimming rescue of a swimmer and transport a distance of 25 yards (22.9 meters)	
Tread water for 10 minutes, or 2 minutes without the use of hands/arms, without swim aids.	
Swim with snorkel/fins, with and without mask.	
Demonstrate mask clearing underwater.	
Open Water Evaluation * Conducted by DE only.	
Demonstrate proficiency in air sharing as both donor and receiver.	
Enter and leave open water or surf, or leave and board a vessel while wearing SCUBA unit.	
Kick on the surface 330 yards (301.8 meters) while wearing scuba gear, but not breathing from scuba unit.	
Demonstrate judgment adequate for safe diving.	
Demonstrate, where appropriate, the ability to maneuver efficiently in the environment, at and below the surface.	
Complete a simulated emergency swimming ascent.	
Demonstrate clearing mask and regulator while submerged.	
Demonstrate ability to achieve and maintain neutral buoyancy while submerged.	
Demonstrate techniques of self-rescue and buddy rescue.	
Navigate underwater.	
Plan and execute a dive.	
Qualifying Requirements	
Part B Annual Skill Refresher successfully completed and on file.	
Copy of current Adult CPR/AED Certification on file.	
Copy of current First Aid Certification on file.	
Copy of current Oxygen Administration on file.	
Above Prerequisites, Part A, and Qualifying Requirements transmitted to RDO and superintendent.	
RDO approval received and on file.	
Initial NPS Certification or Status Issued	
DIT Status issued	
Diver Status issued	



NAME _____ Park/Unit _____

Annual Certification Requirements	Complete	
	Yes	No
At least 12 dives logged in the last year. If No, Explain (use additional sheet[s] if necessary):		
Date: _____ and Depth: _____ of deepest dive made in the last year		
Has a 180 day period past without at least one dive completed? If Yes, explain (use additional sheet[s] if necessary):		
Current First Aid certification (expiration date: _____)		
Current Adult CPR/AED certification (expiration date: _____)		
Current Oxygen Administration certification (expiration date: _____)		
Current medical examination (expiration date: _____)		
Annual RDO approved 8-hour training completed.		
Currency with 40-hour NPS Core Dive Training. (expiration date: _____)		
Part B (Blue Card Annual Skill Refresher): * Conducted by DE only.		
Swim 900 yards (823 meters) in 18 minutes using mask, fins and snorkel and any stroke		
* Successfully Perform an NPS Ditch and Recovery		
* Successfully Perform an NPS Bailout		
* Successfully Perform an NPS Gas Sharing Skill Demonstration		
* Successfully Perform an NPS Rescue Demonstration		
Examining Official: _____ Date: _____		
Status, Depth Rating, Diving Modes, and Tasks – PDO Recommendation:		
Check Recommended Status: Diver-In-Training _____ Diver _____ Restricted _____ Inactive _____ Retired _____		
Check Recommended Depth Rating: 30ft. _____ 60ft. _____ 100ft. _____ 130ft. _____ Other _____		
Check Recommended Diving Modes: SCUBA _____ Surface Supplied _____ CCR _____ Other _____		
Check Recommended Breathing Gases: Air _____ Nitrox _____ Heliox _____ Trimix _____		
Check Approved Diving Task Classification: Scientific _____ Public Safety _____ Maintenance/Inspection _____ Property Recovery _____ Interpretation _____		
Are Additional Comments Attached?	Yes	No
PDO Signature: _____ Date: _____		
RDO Review:		
Check RDO Action: I Concur _____ I Do Not Concur _____		
If RDO Does Not Concur, please indicate approved Status, Depth Rating, Mode, Breathing Gases, and Tasks: Check Status: Diver-In-Training _____ Diver _____ Inactive _____ Check Depth Rating: 30ft. _____ 60ft. _____ 100ft. _____ 130ft. _____ Other _____ Check Diving Mode: SCUBA _____ Surface Supplied _____ CCR _____ Other _____ Check Breathing Gases: Air _____ Nitrox _____ Heliox _____ Trimix _____ Check Diving Task Classification: Scientific _____ Public Safety _____ Maintenance/Inspection _____ Property Recovery _____ Interpretation _____		
Are Additional Comments Attached?	Yes	No
RDO Signature: _____ Date: _____		

40-HOUR NPS DIVE WORKSHOP

The 40-Hour Dive Workshop curriculum is reviewed, updated and approved by the NDCB on a three year cycle. Workshops include classroom and in-water elements (Confined and/or Openwater). The lead instructor for NPS 40-Hour Workshops is the NPS National Dive Safety Officer, or designee. Staff for the workshops include: RDOs, PDOs, and other individuals as necessary to address specific skills and/or knowledge requirements for a given curriculum cycle.

Classroom

Diving Policy Review:

- DOI 485 DM 27
- NPS Director's Order #4
- Reference Manual/Field Manual 4 review

Program Updates

Aspects of:

- Diving Physics and Physiology
- Decompression review and update
- Near misses and lessons learned
- Dive accident management
- Equipment review, maintenance, and updates
- Environmental diving

Additional topics as approved by the NDCB

Written exam with successful completion of 80%

Confined and/or Openwater

Diving skills, problem solving, and exercises as approved by the NDCB

Skills Performance at an acceptable level as evaluated by instructional staff

Page 1 of 4

OFF-DUTY EQUIPMENT USER AGREEMENT AND LIABILITY RELEASE

The National Park Service (NPS) recognizes that NPS divers must dive with requisite frequency to maintain their credentials, and that there are safety benefits of NPS divers maintaining a high level of proficiency by diving as often as possible. Using NPS-owned gear during dives, either on-duty or off-duty, further increases the safety margin by increasing familiarity with the gear and insuring the use of high-quality, well-maintained gear. Therefore, the use of NPS gear for off-duty dives is permitted provided the users agree to abide by the following stipulations:

AGREEMENT

1. I agree to limit my use of government issued dive equipment to diving activities authorized on my NPS Blue Card, and my off duty use of government equipment will be in compliance with the regulations contained in the most current release of NPS Reference Manual 4 (RM-4).
2. I agree to provide my Park Dive Officer (PDO) a dive plan for NPS defined proficiency dives where I use NPS equipment (if possible). This dive plan does not require approval.
3. I agree to use my NPS gear for non-commercial purposes only.
4. I understand that my use of NPS gear during off-duty hours may be revoked for violation of any of the above requirements.

DIVER NAME	DIVER SIGNATURE	DATE
PARK DIVE OFFICER NAME	PARK DIVE OFFICER SIGNATURE	DATE

OFF-DUTY EQUIPMENT USER RELEASE OF LIABILITY

Assumption of risk and release of liability for NPS divers to use NPS dive gear for identified off-duty diving; hereinafter “Release”.

In consideration of NPS permitting my use of NPS owned and maintained dive equipment for non- work related dive activities (e.g., personal, recreational, proficiency, educational, weekend, or vacation use), I, for myself and on behalf of all my personal representatives, heirs, and next of kin do execute and certify the following:

I, _____, hereby declare that I am a NPS employee, that I am a certified _____ NPS diver trained in safe diving practices, and that I am fully informed of, aware of, and thoroughly understand the inherent hazards and risks associated with snorkeling, skin diving, scuba diving, and compressed gas diving (hereinafter collectively referred to as diving). I understand these risks can lead to severe injury, loss of life, or property damage and liability to others. I understand hazards include, but are not limited to, decompression sickness, embolism, barotraumas or other hyperbaric/air expansion injury that may require treatment in a recompression chamber, drowning, equipment failure, and other perils of the sea. I understand that diving is dangerous regardless of depth. I further acknowledge and agree that injuries received may be compounded or increased by negligent rescue operations or procedures.

By signing this Release, I certify that I am making full and honest representations of my dive skills and _____ certifications, and I am fully aware of and expressly assume all risks involved in making off-duty dives.

By signing this Release, I further certify that I am responsible for my own actions and use of dive gear, _____ including gear owned and maintained by NPS, and being used by me while off-duty, and I am financially responsible for expenses, including medical expenses, arising from my off-duty use of NPS dive gear.

By signing this Release, I acknowledge that past or present medical conditions may disqualify me for _____ diving. I declare that I am in good mental and physical fitness for diving, and that I am not nor will I be under the influence alcohol or any drugs contraindicated for diving. If I am taking medication, I declare that I have seen a physician and have approval to dive while under the influence of medications or drugs I am taking.

By signing this Release, I acknowledge diving is a physically strenuous activity and that I will be exerting _____ myself during this activity. I further acknowledge that if I die or am injured as a result of heart attack, panic attack, hyperventilation, drowning, or any other cause, I expressly assume the risk of said injuries or death, and neither myself, nor my representatives, heirs, agents, or assigns will hold NPS or the U. S. Government responsible for the same.

By signing this Release, I agree that I will inspect the gas supply and all equipment prior to use, and will _____ notify NPS if any equipment is not working properly or if I have any problems with the air supply or the equipment. I will not hold NPS responsible for my failure to inspect the gas supply or the equipment prior to diving, or for my use of such faulty equipment regardless of any inspection.

OFF-DUTY EQUIPMENT USER RELEASE OF LIABILITY

By signing this Release, I agree to adhere to NPS policies and procedures regarding proper use, _____ storage, cleaning, maintenance, operation, configuration, and all other instruction related to use of NPS dive equipment and gear, consistent with the written instructions NPS has provided, and which is incorporated by reference herein.

By signing this Release, I agree to replace, repair, or otherwise compensate NPS for any loss, damage, _____ or destruction of any NPS dive gear in my possession and use under this Release.

By signing this Release, I hereby assume full responsibility for any and all risk of bodily injury, _____ wrongful death, property loss or damage, and liability to myself or any third party, now and forever, arising out of my use of any NPS dive gear or during diving related activities using NPS dive gear, whether foreseen or unforeseen, and whether caused by the negligence of myself, third parties, or NPS.

By signing this Release, I hereby release, waive, discharge, and give up any and all claims against NPS, _____ the U. S. Government, and all its employees, agents and representatives for any and all liability, claims, and demands by me or made by my personal representative, heirs, agents, assigns, and next of kin for any and all loss or damage, and any claim or demands therefore, including for workers compensation or disability under the Federal Employee Compensation Act, on account of injury, death, or loss arising out of or related to my use of NPS dive equipment during off-duty hours.

By signing this Release, I understand and agree that this Release means that if I am injured or die in _____ an off-duty diving related incident while using NPS dive equipment, I am giving up my rights and the rights of my heirs, representatives, executors, or successors to sue NPS or the U. S. Government, or any of its representatives, employees, or agents for any damages or for any form of compensation.

By signing this Release, I further agree separately to indemnify, save, and hold harmless NPS and the _____ U. S. Government from any loss, liability, damage, or cost that they may incur, now and forever, arising out of or related to my use of NPS dive gear off-duty, whether caused by the negligence of NPS, the U. S. Government, or me.

By signing this Release, I certify that I am trained in diving and safe dive practices by NPS, and my _____ certification and qualifications are up to date.

By signing this Release I also represent that I have authority to do so and my heirs, assigns, _____ representatives, or beneficiaries will be stopped from claiming otherwise.

By signing this Release, I affirm that I am not relying on any oral or written representation or statements _____ made by NPS or the U. S. Government, other than what is set forth in this document. I further agree this document shall be interpreted in accordance with the laws of the United States.

By signing this Release, I agree that if any provision of this Release is found to be unenforceable or _____ invalid, that provision shall be severed from this release. The remainder of the Release will then be construed as though the unenforceable provision had never been contained in this release. All other provisions shall survive.

Page 4 of 4

OFF-DUTY EQUIPMENT USER RELEASE OF LIABILITY

ACCORDINGLY, WITH FULL UNDERSTANDING, BEING OF RIGHT MIND AND DULY TRAINED, I, _____, BY THIS INSTRUMENT, EXEMPT AND RELEASE NPS AND THE U.S. GOVERNMENT, ITS OFFICERS, AGENTS, REPRESENTATIVES, AND ASSIGNS FROM ALL LIABILITY AND RESPONSIBILITY FOR PERSONAL INJURY, PROPERTY DAMAGE, OR WRONGFUL DEATH, HOWEVER CAUSED, INCLUDING BUT NOT LIMITED TO EQUIPMENT FAILURE AND NEGLIGENCE, WHETHER PASSIVE OR ACTIVE. I ACKNOWLEDGE THAT I HAVE READ AND INITIALED THE FOREGOING PARAGRAPHS, FULLY UNDERSTAND THE POTENTIAL DANGERS INCIDENTAL TO MY USE OF NPS DIVE EQUIPMENT, AM FULLY AWARE OF THE LEGAL CONSEQUENCES OF SIGNING THIS INSTRUMENT, AM AN EMPLOYEE OF NPS, AND I AM OLDER THAN 18 YEARS OF AGE.

I UNDERSTAND AND AGREE THAT THIS DOCUMENT IS LEGALLY BINDING AND WILL PRECLUDE ME FROM RECOVERING MONETARY DAMAGES OR WORKER'S COMPENSATION AND DISABILITY FROM NPS OR THE U. S. GOVERNMENT FOR PERSONAL INJURY, PROPERTY DAMAGE, OR WRONGFUL DEATH CAUSED BY MY USE OF NPS GEAR AND EQUIPMENT DURING OFF-DUTY HOURS, WHETHER PASSIVE OR ACTIVE. I UNDERSTAND THAT BY SIGNING IT I AM GIVING UP SUBSTANTIAL RIGHTS.

I HAVE FULLY INFORMED MYSELF OF THE CONTENTS OF THIS RELEASE BY READING IT AND INITIALIZING IT. I ALSO UNDERSTAND I SIGN IT ON BEHALF OF MYSELF, MY HEIRS, MY REPRESENTATIVES, NEXT OF KIN, AND ASSIGNS. ACCORDINGLY, I AM BOUND BY THIS RELEASE AND ANYONE WHO SUCCEEDS TO MY RIGHTS AND RESPONSIBILITIES SUCH AS MY HEIRS OR THE EXECUTOR OF MY ESTATE IS ALSO BOUND.

I HAVE SIGNED THIS DOCUMENT FREELY AND VOLUNTARILY WITHOUT ANY INDUCEMENT, ASSURANCE, OR GUARANTEE BEING MADE TO ME. I INTEND MY SIGNATURE TO BE A COMPLETE AND UNCONDITIONAL RELEASE OF ALL LIABILITY TO THE GREATEST EXTENT ALLOWED BY LAW.

NPS PERSONNEL USING THE EQUIPMENT:

I HAVE READ THIS DOCUMENT, I UNDERSTAND IT, AND I AGREE TO BE BOUND BY IT.

DIVER NAME		
DIVER SIGNATURE		DATE
OFFICE	WORK PHONE NUMBER	EMERGENCY CONTACT PHONE NUMBER

NPS PERSONNEL RELEASING THE EQUIPMENT:

I HAVE REVIEWED THIS DOCUMENT AND CONFIRM IT HAS BEEN PROPERLY COMPLETED.

PARK DIVE OFFICER NAME	
PARK DIVE OFFICER SIGNATURE	DATE
DIVING PROGRAM NAME	PHONE NUMBER

Dive Management System and Dive Google Docs

The Dive Management System (DMS) is an on-line, web-based interface for compiling NPS Dive records and diving statistics. Every NPS diver from 2012 forward will have an individual DMS record indicating their qualifications, copies of individual dive logs, and authorizations as an NPS diver. Access to the DMS requires the individual to be on a computer inside the NPS VPN.

DMS Links:

- Diver access – <http://inpniscvdive/diverlogin1.cfm>
- PDO access – <http://inpniscvdive/pdologin1.cfm>
- RDO access – <http://inpniscvdive/rdologin1.cfm>
- DSO access – <http://inpniscvdive/dsologin1.cfm>
- NDCB access – <http://inpniscvdive/ndcblogin1.cfm>

In addition to information entered into the DMS, each diver has a Dive Google Docs Folder containing backup information / supporting documentation for the entries in the DMS. The diver's Dive Google Docs Folder replaces traditional paper filing cabinets. Access to the Dive Google Docs Folders requires the individual to be on a computer inside the NPS VPN.

Link to Dive Google Docs:

<https://drive.google.com/drive/folders/0B1RMUzE1k1dPNUFvZFIYZmR0ejQ>

NPS Skills Descriptions

The following describes skills specific to the NPS Blue Card process and critical elements for the evaluation of these skills, and other skills used to train and evaluate NPS divers.

Annual Blue Card and Entry Level Swim Test Administration Guidelines

- A [Diving Safe Practices Worksheet](#) and [Dive Emergency Evacuation Plan](#) (DEEP) is required for [Entry Level Training Requirements](#), and [Blue Card Annual Skills](#) administered in openwater.
- Test administrators must be familiar with the Safe Practices Worksheet and DEEP.
- Working oxygen kit, first aid equipment, and AED must be present at the testing location.
- Encourage participants to stretch and warm up adequately before the test.
- Do not test anyone who is tired or has been injured.
- Do not conduct tests during conditions that could compromise health or safety.
- Monitor participants to identify those having difficulties. Terminate their test, if necessary.
- Hyperventilation prior to the underwater swim is not permitted.
- At the midpoint of the [entry level swim](#), consider terminating the test for candidates who are substantially behind the required pace to meet the 15 minute requirement.
- At the midpoint of the [Annual Blue Card MFS Swim](#), consider terminating the test for candidates who are substantially behind the required pace to meet the 18 minute requirement.
- Encourage cooling down after the tests. Monitor the recovery of participants, especially those who appear distressed.

Buddy Breathing, Teaching of – This drill differs from Octopus Sharing in that both divers are breathing from a single second stage. With the advent of regulator configurations with a primary and secondary (octopus) second stage, most recreational diving training agencies have moved away from teaching buddy breathing. At best most recreational divers are not exposed to sharing gas using a single second stage until they advance to a leadership level in the recreational agency’s training rotation, if at all. Park Service divers must demonstrate the ability to safely perform this skill as a prerequisite to entering the dive program. Additionally, the Park Service recognizes the usefulness of this gas sharing technique in a real world environment and desire to have its divers trained in a way to provide as many options as possible in out of gas situations.

- This skill is initially administered and must be evaluated by an NPS Dive Examiner.
- Once divers have successfully demonstrated the critical elements of this skill they are free to practice it with other divers trained in the technique.
- Necessary equipment: Standard open circuit scuba.
- The skill is briefed in detail before entering the water.
- The skill should be introduced in shallow water to divers who have never performed the skill before. Once the divers have demonstrated they understand the critical element of blowing bubbles whenever the regulator is out of their mouth, the skill should be performed in 10 to 30 feet of water and an ascent while buddy breathing should be included in the skill rotation.
- A diver (the Receiver) simulates being out of gas and initiates the drill by giving an out of gas signal to the examiner or their dive buddy (situational dependent). As part of the signaling process the Receiver removes their second stage from their mouth. The Receiver blows bubbles whenever the regulator is not in their mouth.
- The person receiving the signal (the Donor) takes control of the situation by making contact with the Receiver and positioning them to best receive gas from the Donor’s primary second stage (the one they are breathing from). This is best accomplished by the Donor grabbing the Receiver with the Donor’s left hand on the Receiver’s left arm/shoulder and pulling the Receiver toward the Donor’s left side. Simultaneously the Donor removes their Primary second stage from their

mouth, maintains control of the regulator, and provides the regulator for the Receiver to breathe. The Donor blows bubbles whenever the regulator is out of their mouth.

- While making contact with the Receiver's donating hand/wrist, the Receiver takes two breaths and relinquishes the regulator to the Donor while maintaining contact with the Donor's hand/wrist.
- The Donor takes two breaths and moves the regulator to the Receiver.
- After several breathing cycles, the divers are given a signal to transition from a stationary position to moving horizontally through the water while buddy breathing. The Donor keeps the Receiver on the Donor's left side. The divers continue the two-breath breathing cycle, blowing bubbles whenever the regulator is not in their mouth.
- After several breathing cycles the divers are given a signal to ascend. The diver's communicate through hand signal to ascend. The Donor positions the Receiver to properly receive the Donor's Primary second stage during the ascent. The Receiver maintains contact with the Donor's hand/wrist while keeping a hand free to adjust their buoyancy on ascent (equipment configuration dependent). The divers continue the two-breath breathing cycle while ascending at a normal rate, blowing bubbles whenever the regulator is out of their mouth. A safety stop is not required for this drill.
- Once at the surface the Receiver orally inflates their BCD. The Donor may use their power inflator to inflate their own BDC and maintains contact with the Receiver until the Receiver is positively buoyant and has given an OK signal.
- Critical elements for evaluation:
 - The drill is initiated with a proper out of gas signal
 - Divers blow bubbles whenever the regulator is out of their mouth
 - The Donor maintains control of their Primary regulator. An effective method of maintaining control while allowing full access to the to the regulator is for the Donor to hold the regulator hose at the point near where the hose attaches to the second stage
 - The Receiver maintains contact with the Donor's breathing supply. An effective method of this is for the Receiver to grasp the Donor's hand/wrist, right hand to right hand
 - The Donor positions the Receiver to easily receive/breathe from the Donor's regulator while in the static position, the swimming position, and during the ascent
 - The divers ascend at a normal rate
 - Divers control their buoyancy as needed throughout the drill, using the technique appropriate to their assigned task and gear configuration
 - The Receiver orally inflates their BCD upon reaching the surface
 - The Donor maintains contact with the receiver until the Receiver is positively buoyant at the surface and has given an OK signal
 - The Donor achieves positively buoyant at the surface and gives an OK signal
 - Divers correctly perform the role of the Donor and Receiver

Five Minute Rescue Tow – Fitness check and distance estimate orientation exercise linked to the [NPS Rescue Demonstration](#) for the annual Blue Card Examination. Performed periodically in openwater so that divers learn to estimate what a five minute tow of a dive rescue victim equates to for them as individuals.

- This skill is initially administered by a PDO, RDO, DSO or NPS Dive Examiner.
- Once divers have successfully demonstrated the critical elements of this skill they are free to practice it with other divers trained in the technique.
- Necessary equipment: Scuba unit, fins, mask, weight, appropriate exposure protection for conditions. Equipment configuration for standard or proposed diving operations. Surface marker buoys, line and anchor weight (2 per buddy team). Rescue mannequin (optional).

- Divers working in pairs (or diver using a diver rescue mannequin) outfitted in working apparel and gear configuration appropriate for local conditions
- A starting point is established with a surface marker buoy affixed to the bottom
- At the surface the rescuer establishes positive buoyancy for victim and self and gives two rescue breaths and initiates an appropriate distress signal
- Variation One:
 - Remaining in place, the rescuer provides rescue breaths for one minute
 - With all equipment in place, rescuer tows the victim in the indicated direction for five minutes without giving breaths
 - At the end of five minutes the second surface marker buoy is affixed to the bottom and the rescuer evaluates the distance covered
 - Victim and observer(s) provide feedback to the rescuer on the effectiveness of the tow and the security of the victims airway
 - Rescuer and victim change roles and the exercise is repeated
- Variation two:
 - Requires gear catchers
 - Remaining in place, the rescuer provides rescue breaths for one minute
 - Rescuer tows the victim in the indicated direction while stripping gear
 - At the end of five minutes the second surface marker buoy is affixed to the bottom and the rescuer evaluates the distance covered
 - Victim and observer(s) provide feedback to the rescuer on the effectiveness of the tow and the security of the victims airway
 - Rescuer and victim change roles and the exercise is repeated
- Variation three:
 - Requires gear catchers
 - Remaining in place, the rescuer provides rescue breaths for one minute, during this time the rescuer begins the gear stripping process
 - Rescuer tows the victim in the indicated direction and if necessary completes stripping gear
 - At the end of five minutes the second surface marker buoy is affixed to the bottom and the rescuer evaluates the distance covered
 - Victim and observer(s) provide feedback to the rescuer on the effectiveness of the gear stripping, the tow and the security of the victims airway
 - Rescuer and victim change roles and the exercise is repeated

NPS Bailout – Composure and gear manipulation drill. Performed annually for Blue Card by all NPS divers. Performed in confined or openwater, with water depth from 10 to 30 feet.

- This skill is initially administered and must be evaluated by an NPS Dive Examiner.
- Once divers have successfully demonstrated the critical elements of this skill they are free to practice it with other divers trained in the technique.
- Necessary equipment: Scuba unit, fins, mask, weight, appropriate exposure protection for conditions.
- The skill is thoroughly briefed prior to entering the water.
- The Conductor/Observer should be positioned to observe critical elements and prepared to render aid, with air source readily available to donate, as the diver performs the exercise.
- The Conductor should not intervene with the diver's performance of the exercise, unless in the opinion of the Conductor the diver: is at risk of physical harm; exhibiting signs of impending panic; panics; or requests assistance.
- The diver starts out of the water at the surface wearing appropriate exposure protection for the conditions.

- The diver's scuba unit is fully assembled and the cylinder is on.
- The diver will not be significantly over-weighted.
- The diver's BCD should be empty of gas prior to starting the exercise, and the diver's drysuit (if worn) should contain minimal gas (minimal gas = insufficient gas to provide positive buoyancy when entering the water carrying required equipment, but enough gas to minimize the suit squeeze experienced during the descent).
- At a predetermined signal from the Conductor, the diver will enter the water carrying (not wearing) the charged scuba unit, mask, fins, and weight.
- The diver will enter the water carrying the required equipment in a way to allow the diver to descend while equalizing the pressure in their ears and sinuses, and allowing the diver to release and be free of the equipment if they have to abandon the descent and return to the surface.
- Upon entering the water the diver may put a regulator in their mouth, clear it, and breathe from the scuba unit.
- The diver is expected to jettison their carried equipment, abandon the descent and return to the surface if they are unable to equalize the pressure in their ears or sinuses during the descent, and expected to exhale to reduce the pressure in their lungs if they have breathed compressed gas and the regulator is not in their mouth.
- During a descent with no equalization issues, the diver is expected to maintain control of all carried equipment, arrive at the predetermined depth, and don all carried equipment.
- The order in which the equipment is donned is up to the diver.
- The underwater portion of the exercise is complete when all equipment is in place (including connection of drysuit hose, if worn), the diver has performed a self-check, achieves neutral buoyancy, and signals OK to the Conductor. The conductor return the OK and signals the diver to surface.
- Upon reaching the surface with all equipment in place, the diver dumps the air from their BCD and, if worn, from their drysuit and treads water for five minutes, not breathing from the scuba unit or snorkel.
- Critical elements for evaluation:
 - The diver exhales while the regulator is out of their mouth after breathing compressed gas.
 - The diver does not lose any equipment during the exercise (lose = unable to locate without Conductor help, or floats away beyond stationary reach).
 - The descent and bottom portion of the exercise should be complete with a calm demeanor, and within a reasonable time and effort (approximately 5 minutes).
 - The carried equipment is donned and configured correctly (the mask is clear, equipment buckles properly oriented, hoses properly routed and connected, regulators properly routed and secured, etc.).
 - The diver makes a controlled ascent at the proper ascent rate at the end of the bottom portion of the dive, and completes the 5 minute surface tread with minimal struggle and without assistance or jettison of weight.

NPS Buddy Breathing Skill Demonstration –Simulated out of gas drill and composure drill. Performed in confined or openwater, with water depth from 10 to 30 feet.

- This skill is initially administered and must be evaluated by an NPS Dive Examiner.
- Once divers have successfully demonstrated the critical elements of this skill they are free to practice it with other divers trained in the technique.
- Necessary equipment: Standard open circuit scuba, appropriate exposure protection for conditions.
- Buddy Breathing description see Buddy Breathing, Teaching of
- The skill is thoroughly briefed prior to entering the water.

- Prior to the start of the drill, the divers will have all equipment in place and will be neutrally buoyant.
- The Conductor initiates the start of the exercise and the drill will continue until concluded by the Conductor.
- At a predetermined signal from the Conductor, the out of gas diver (the Receiver) gives an appropriate out of gas signal to their dive buddy (the Donor).
- The Donor positions the Receiver to best share gas from the Donor's primary second stage, removes their primary second stage from their mouth and provides the regulator to the Receiver.
- The donor maintains control of their primary second stage at all times during the exercise.
- Whenever the regulator is out of the diver's mouth, the diver reduces the pressure in their lungs by blowing bubbles from their mouth and/or nose.
- The Receiver maintains contact with the Donor's primary second stage at all times during the exercise by holding the Donor's wrist of the hand holding the regulator or holding on to the Donor's primary regulator hose.
- The Receiver takes two breaths and passes the regulator back to the Donor. The divers alternate two breaths a piece throughout the rest of the exercise.
- Throughout the exercise the Conductor positions them self to be able to observe the divers blowing bubbles and correct any observed safety concerns.
- Once the divers have established a breathing rhythm and the Conductor is satisfied the divers are properly positioned and exhaling whenever the regulator is out of their mouth, the Conductor signals the Receiver to remove their mask. The Receiver removes and maintains control of their mask and preforms the remainder of the exercise without a mask.
- Once satisfied that the Receiver is composed and the established breathing rhythm is intact, the Conductor signals the Donor to move in a given direction. The Donor communicates the direction to the Receiver and positions the Receiver to best breathe from the Donor's regulator
- After a predetermined distance, the Conductor signals the Donor to ascend. The Donor communicates the ascent to the Receiver and begins the ascent.
- The Donor is expected to observe the breathing pattern of the Receiver and to arrest the ascent if they observe the Receiver not exhaling when the regulator is out of the Receiver's mouth.
- Donor and Receiver are expected to adjust their buoyancy as necessary to maintain a proper ascent rate.
- The Donor is expected to assist the Receiver as necessary to control the ascent.
- Once at the surface, the Receiver manually inflates their BCD. The Donor may inflate their BCD manually or by using their power inflator. The Donor maintains contact with the Receiver until the Receiver has established positive buoyancy.
- Once both divers have obtained positive buoyancy and the appropriate surfacing signals have been exchanged, the Conductor terminates the drill, debriefs as necessary.
- The drill is repeated switching roles between Donor and Receiver.
- Critical elements for evaluation:
 - Proper out of gas signals are given and responded to
 - Divers blow bubbles whenever the regulator is out of their mouth
 - The Donor positions the Receiver to easily receive/breathe from the Donor's regulator while in the static position, the swimming position, and during the ascent, and adjusts the Receiver's position as necessary
 - The Donor maintains control of their Primary regulator. An effective method of maintaining control while allowing full access to the to the regulator is for the Donor to hold the regulator hose at the point near where the hose attaches to the second stage
 - The Receiver maintains contact with the Donor's breathing supply. An effective method of this is for the Receiver to grasp the Donor's hand/wrist, right hand to right hand
 - The divers ascend at a normal rate

- Divers control their buoyancy as needed throughout the drill, using the technique appropriate to their assigned task and gear configuration
- The Receiver orally inflates their BCD upon reaching the surface
- The Donor maintains contact with the receiver until the Receiver is positively buoyant at the surface and has given an OK signal
- The Donor achieves positively buoyant at the surface and gives an OK signal
- Divers correctly perform the role of the Donor and Receiver
- Divers demonstrates good composure throughout the exercise

NPS Ditch and Recovery – Gear manipulation and composure drill. Performed annually by for Blue Card all NPS divers. Performed in confined or openwater, with water depth from 10 to 30 feet.

- This skill is initially administered and must be evaluated by an NPS Dive Examiner.
- Once divers have successfully demonstrated the critical elements of this skill they are free to practice it with other divers trained in the technique.
- Necessary equipment: Standard open circuit scuba, appropriate exposure protection for conditions. Auxiliary weight and/or weight belt available at the skill performance station.
- The Conductor/Observer should be positioned to observe critical elements and prepared to render aid, with air source readily available to donate, as the diver performs the exercise.
- The Conductor should not intervene with the diver's performance of the exercise, unless in the opinion of the Conductor the diver: is at risk of physical harm; exhibiting signs of impending panic; panics; or requests assistance.
- The skill is thoroughly briefed prior to entering the water.
- Equipment to be removed/replaced: scuba unit, fins, and mask.
- Divers may keep their weight. Divers with integrated weight may employ an auxiliary weight belt during the exercise.
- The diver will start the exercise neutrally buoyant, with all equipment in place.
- The exercise begins after a predetermined signal from the Conductor.
- The diver removes the gas from their BDC and, if worn, adjusts the flotation provided by their drysuit so that the diver can control their buoyancy once required equipment has been removed.
- It is the diver's preference as to the order of the equipment ditched and recovered.
- The diver removes and places on the bottom: scuba unit, mask, and fins. The removed equipment is arranged or secured so that it maintains its relative position and readily accessible to the diver to don.
- Prior to leaving his/her equipment, the diver turns off their cylinder.
- The diver moves away from their equipment a minimum of approximately one body length while maintaining their relative position to the bottom. It is the diver's preference how they move away from their equipment; they may back away always facing their equipment, or swim away and loop back.
- Whenever the regulator is out of the diver's mouth, the diver reduces the pressure in their lungs by blowing bubbles from their mouth and/or nose.
- Upon returning to their equipment and prior to donning the scuba unit, the diver turns on their cylinder.
- The diver dons removed equipment maintaining physical or visual contact with removed items during the donning process while not allowing positively buoyant items to float beyond their reach from the diver's position on the bottom.
- When all equipment is in place, the diver has performed a self-check, achieves neutral buoyancy, and signals "OK" to terminate the exercise.
- Critical elements for evaluation:
 - The diver exhales when the regulator is out of their mouth.

- The diver arranges/secures equipment so removed items are not “lost” or float away.
- The diver remembers to turn off their cylinder prior to moving away from their equipment, and turns on their cylinder when returning to their equipment or prior to donning their scuba unit.
- The skill is completed in a calm demeanor, and within a reasonable time and effort (approximately 5 minutes).
- At the completion of the drill, the diver is neutrally buoyant, breathing from their primary second stage, with all equipment in its original configuration.

NPS Gas Sharing Skill Demonstration – Simulated out of gas drill and composure drill. Performed annually for Blue Card by all NPS divers. Performed in confined or openwater, with water depth from 10 to 30 feet.

- This skill is initially administered and must be evaluated by an NPS Dive Examiner.
- Once divers have successfully demonstrated the critical elements of this skill they are free to practice it with other divers trained in the technique.
- Necessary equipment: Standard open circuit scuba, appropriate exposure protection for conditions.
- Prerequisite Skills:
 - Octopus Sharing – See Octopus Sharing, Teaching of
 - Buddy Breathing – See Buddy Breathing, Teaching of
- The skill is thoroughly briefed prior to entering the water.
- Prior to the start of the drill, the divers will have all equipment in place and will be neutrally buoyant.
- The Conductor initiates the start of the exercise and the drill will continue until concluded by the Conductor.
- At a predetermined signal from the Conductor, the out of gas diver (the Receiver) gives an appropriate out of gas signal to their dive buddy (the Donor).
- Based on the Donor’s gear configuration, the Donor provides the Receiver with one of the Donor’s second stage regulators (generally the second stage with the longer hose) and positions the Receiver to best share gas.
- Whenever the regulator is out of a diver’s mouth, the diver reduces the pressure in their lungs by blowing bubbles from their mouth and/or nose.
- Throughout the exercise the Conductor positions them self to be able to observe the divers blowing bubbles and correct any observed safety concerns.
- Once satisfied that the divers are composed and properly positioned, the Conductor signals the divers to move in a given direction. The Donor communicates the direction of travel to the Receiver and positions the Receiver to best breathe from the Donor’s donated regulator and so that the Donor can observe and maintain contact with the Receiver as necessary.
- Once the Conductor is satisfied with the divers positioning and performance, the Conductor signals the Receiver to refuse the Donor’s octopus regulator and to communicate to the Receiver the need to buddy breathe.
- The Receiver communicates to Donor using an appropriate out of gas signal the need to share gas.
- The Donor positions the Receiver to best share gas from the Donor’s primary second stage, removes their primary second stage from their mouth and provides the regulator to the Receiver.
- The donor maintains control of their primary second stage at all times during the exercise.
- Whenever the regulator is out of the diver’s mouth, the diver reduces the pressure in their lungs by blowing bubbles from their mouth and/or nose.

- The Receiver maintains contact with the Donor's primary second stage at all times during the exercise by holding the Donor's wrist of the hand holding the regulator or holding on to the Donor's primary regulator hose.
- The Receiver takes two breaths and passes the regulator back to the Donor. The divers alternate two breaths a piece throughout the rest of the exercise.
- Once the divers have established a breathing rhythm and the Conductor is satisfied the divers are properly positioned and exhaling whenever the regulator is out of their mouth, the Conductor signals the Receiver to remove their mask. The Receiver removes and maintains control of their mask and preforms the remainder of the exercise without a mask.
- Once satisfied that the Receiver is composed and the established breathing rhythm is intact, the Conductor signals the Donor to move in a given direction. The Donor communicates the direction to the Receiver and positions the Receiver to best breathe from the Donor's regulator
- After a predetermined distance, the Conductor signals the Donor to ascend. The Donor communicates the ascent to the Receiver and begins the ascent.
- The Donor is expected to observe the breathing pattern of the Receiver and to arrest the ascent if they observe the Receiver not exhaling when the regulator is out of the Receiver's mouth.
- Donor and Receiver are expected to adjust their buoyancy as necessary to maintain a proper ascent rate.
- The Donor is expected to assist the Receiver as necessary to control the ascent.
- Once at the surface, the Receiver manually inflates their BCD. The Donor may inflate their BCD manually or by using their power inflator. The Donor maintains contact with the Receiver until the Receiver has established positive buoyancy.
- Once both divers have obtained positive buoyancy and the appropriate surfacing signals have been exchanged, the Conductor terminates the drill, debriefs as necessary.
- The drill is repeated switching roles between Donor and Receiver.
- Critical elements for evaluation:
 - Proper out of gas signals are given and responded to
 - Divers blow bubbles whenever the regulator is out of their mouth
 - When octopus sharing, the Donor donates the correct regulator for their gear configuration, generally the second stage with the longer hose
 - When octopus sharing, the Receiver continues to breathe from the Donor's breathing supply until directed by the Conductor
 - The Donor positions the Receiver to easily receive/breathe from the Donor's regulator while in the static position, the swimming position, and during the ascent and adjusts the Receiver's position as necessary for the gas sharing technique being used
 - When buddy breathing, the Donor maintains control of their Primary regulator. An effective method of maintaining control while allowing full access to the to the regulator is for the Donor to hold the regulator hose at the point near where the hose attaches to the second stage
 - When buddy breathing, the Receiver maintains contact with the Donor's breathing supply. An effective method of this is for the Receiver to grasp the Donor's hand/wrist, right hand to right hand
 - The divers ascend at a normal rate
 - Divers control their buoyancy as needed throughout the drill, using the technique appropriate to their assigned task and gear configuration
 - The Receiver orally inflates their BCD upon reaching the surface
 - The Donor maintains contact with the receiver until the Receiver is positively buoyant at the surface and has given an OK signal
 - The Donor achieves positively buoyant at the surface and gives an OK signal
 - Divers correctly perform the role of the Donor and Receiver

- Divers demonstrates good composure throughout the exercise

NPS Rescue Demonstration – Performed annually for Blue Card by all NPS divers. Performed in confined or openwater, with water depth from 10 to 30 feet. The fundamentals of this exercise are based on the “Recommendations for rescue of a submerged unresponsive compressed-gas diver” by S.J. Mitchell, et al; Undersea and Hyperbaric Medicine 2012; 39(6): 1099-1108. The exercise concentrates on the rescue response guidelines outlined in the paper and does not harp on “hand placement”. NPS recognizes each in-water emergency situation is different and that no single approach or technique for diver rescue can address all possible scenarios. Rather than focus on mechanical detail, NPS divers are evaluated on the effectiveness of their response to the scenario they are presented with and addressing fundamental parts of the diver rescue process. NPS divers are encouraged to develop and adopt mechanical rescue techniques that work well for them personally and for the equipment configuration and local environment, and to share these techniques with others.

- This skill is initially administered and must be evaluated by an NPS Dive Examiner.
- Once divers have successfully demonstrated the critical elements of these skills they are free to practice them with other divers trained in the techniques.
- Necessary equipment: Standard open circuit scuba, rebreather, or other equipment for the diving mode(s) used by the dive team. A scuba equipped rescue mannequin, while not required, is useful for scenarios where the victim has no regulator or mouthpiece in place.
- For the Blue Card evaluation, the rescuer is dispatched to the dive buddy and must evaluate and respond to the situation as found ([see Appendix VIII: Rescue Decision Tree](#)). For a field exercise, the victim and at least one other individual on site should know that a drill is planned.
- Upon surfacing, the rescuer is provided additional verbal information on the scenario:
 - Immediate assisted removal from the water is possible – Yes or No
 - If No – Surface support < 5 minutes away – Yes or No, and is surface support fixed or moving?
 - If < than 5 minutes away is Yes – The rescuer has the option of towing the victim to surface support without giving breaths, or waiting and administering intermittent rescue breaths while surface support comes to the rescuer.
 - If < than 5 minutes away is No – The rescuer remains in place giving in water rescue breaths for approximately one minute, then tow (without breaths) to nearest support.
- Critical elements for evaluation:
 - Did the rescuer establish contact with the victim and properly evaluate the situation?
 - If the regulator or mouthpiece was in place, did the rescuer maintain it in place throughout the ascent? Was the technique used to keep the regulator or mouthpiece in the victim’s mouth effective in protecting the victim’s airway?
 - If the regulator or mouthpiece was not in place, did the rescuer follow the recommendation to not replace the regulator or mouthpiece? (The exception to this recommendation is when this exercise is being performed in an overhead environment.)
 - If the scenario was a victim in seizure and the regulator / mouthpiece is out, did the rescuer ascend the victim ASAP as recommended?
 - If the scenario was a victim in seizure and the regulator / mouthpiece is in, did the rescuer hold the regulator / mouthpiece in place and delay surfacing the victim until the seizure has passed as recommended?
 - Was the rescuer effective in ascending the victim?
 - Did the rescuer avoid extreme flexion of the victim’s neck during the ascent?
 - Did the rescuer control the ascent rate?
 - Was the victim placed and maintained in a face up position at the surface?
 - Did the rescuer establish positive buoyancy for the victim at the surface?

- Did the rescuer establish positive buoyancy for self at the surface?
- Did the rescuer call for help? Would the method used have been effective for the scenario?
- If the scenario was “immediate assisted removal from the water is possible”, did the rescuer move to remove the victim from the water and initiate CPR is indicated, as recommended?
 - Did the rescuer effectively and efficiently remove the victim’s dive gear prior to assisted removal from the water?
 - Did the rescuer efficiently exit the water and initiate CPR?
- If the scenario was “immediate assisted removal from the water is not possible”, did the rescuer give 2 rescue breaths and assess surface support availability, as recommended?
 - Was the victim’s airway protected during the rescue breath delivery?
 - Assessing surface support can be verbal (the rescuer asks or is provided the information verbally) or physical (the rescuer sees the surface support is within five minutes and reacts accordingly).
- If the scenario was “surface support < 5 minutes away” and surface support is fixed, did the rescuer tow the victim to surface support?
 - Did the rescuer reach the exit point within 5 minutes?
 - Was the tow effective? Was the victim’s airway protected during the tow?
 - Did the rescuer effectively and efficiently remove the victim’s dive gear prior to assisted removal from the water?
 - Did the rescuer efficiently exit the water and initiate CPR?
- If the scenario was “surface support < 5 minutes away” and surface support is moving, did the rescuer tow or wait whilst administering intermittent rescue breaths?
 - If rescuer chose to tow:
 - Was the tow effective?
 - Was the victim’s airway protected during the tow?
 - Were intermittent rescue breaths given?
 - Was the victim’s airway protected during the rescue breath delivery?
 - Did the rescuer effectively and efficiently remove the victim’s dive gear prior to assisted removal from the water?
 - Did the rescuer efficiently exit the water and initiate CPR?
 - If the rescuer chose to wait:
 - Were intermittent rescue breaths given?
 - Was the victim’s airway protected during the rescue breath delivery?
 - Did the rescuer effectively and efficiently remove the victim’s dive gear prior to assisted removal from the water?
 - Did the rescuer efficiently exit the water and initiate CPR?
- If the scenario was surface support is not < 5 minutes away
 - Did the rescuer give rescue breaths for approximately 1 minute prior to towing the victim to nearest exit point (without giving additional breaths)?
 - Was the victim’s airway protected during the rescue breath delivery?
 - Was the tow effective? Was the victim’s airway protected during the tow?
 - Did the rescuer effectively and efficiently remove the victim’s dive gear prior to assisted removal from the water?
 - Did the rescuer efficiently exit the water and initiate CPR?

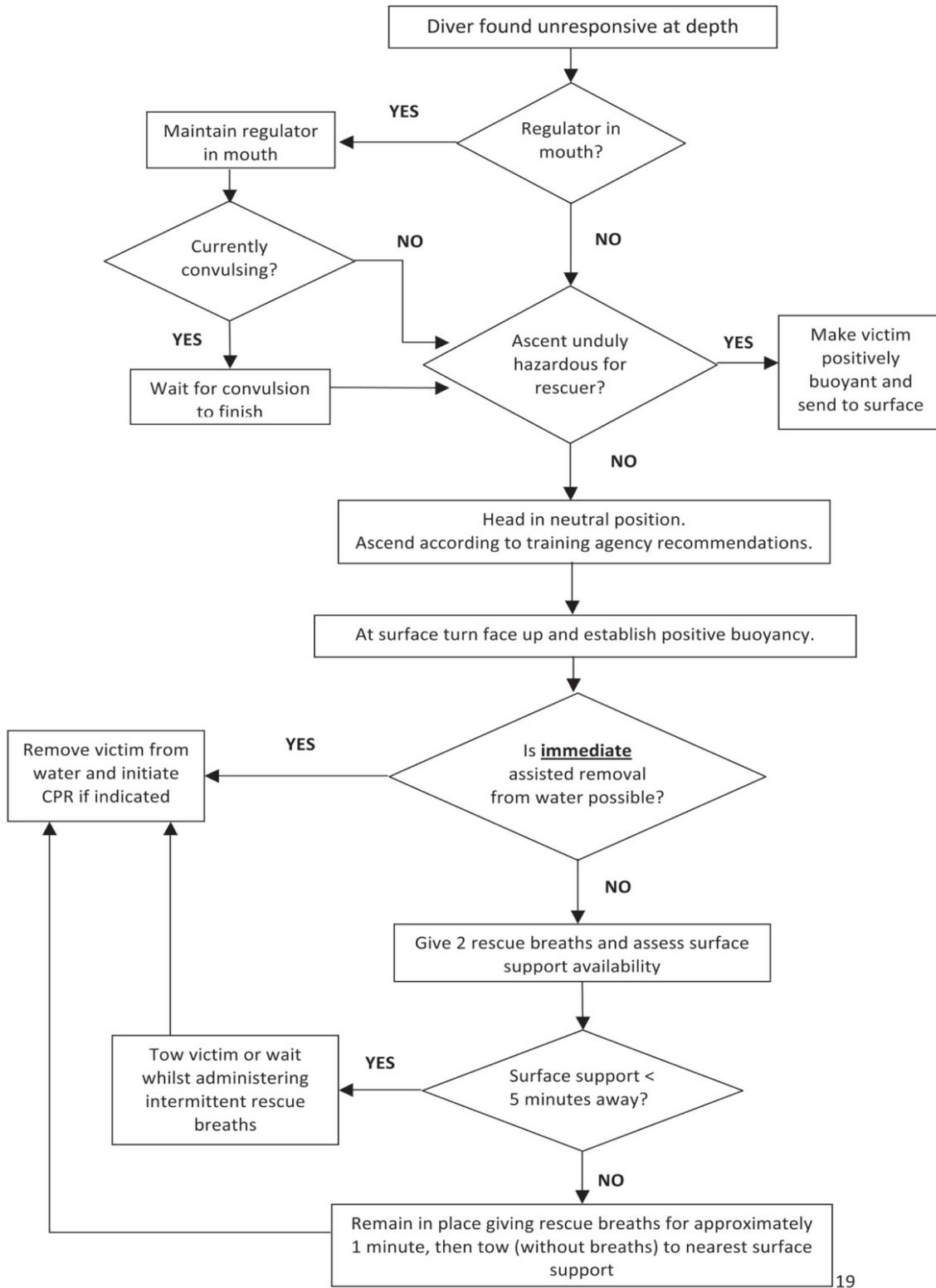
Octopus Sharing, Teaching Of – Simulated out of gas drill. This drill differs from Buddy Breathing in that both divers are breathing from an independent second stage supplied by the Donner.

- This skill is initially administered and must be evaluated by an NPS Dive Examiner.

- Once divers have successfully demonstrated the critical elements of this skill they are free to practice it with other divers trained in the technique.
- Necessary equipment: Standard open circuit scuba.
- The skill is briefed in detail before entering the water.
- The skill should be introduced in shallow water to divers who have never performed the skill before. Once the divers have demonstrated they understand the critical element of blowing bubbles whenever the regulator is out of their mouth, the skill should be performed in 10 to 30 feet of water and an ascent while octopus sharing should be included in the skill rotation.
- A diver (the Receiver) simulates being out of gas and initiates the drill by giving an out of gas signal to the examiner or their dive buddy (situational dependent). As part of the signaling process the Receiver removes their second stage from their mouth. The Receiver blows bubbles whenever the regulator is not in their mouth.
- The person receiving the signal (the Donor) takes control of the situation by making contact with the Receiver and positioning them to best receive gas from the Donor's donated second stage. The Donor may donate the second stage they are breathing from or donate their octopus regulator, depending on their gear configuration. If necessary the Donor blows bubbles whenever the regulator is out of their mouth.
- After several breathing cycles, the divers are given a signal to transition from a stationary position to moving horizontally through the water while octopus sharing. The Donor keeps the Receiver in the best position for the Donor's regulator hose configuration and so that they can monitor the Receiver visually and/or tactilely.
- After several breathing cycles the divers are given a signal to ascend. The diver's communicate through hand signal to ascend. The Donor positions the Receiver so that they can monitor the Receiver visually and/or tactilely during the ascent. The divers ascend at the proper ascent rate (30 fpm) adjusting their buoyancy as necessary. A safety stop is not required for this drill, but can be included if desired and the gas supply is adequate.
- Once at the surface the Receiver orally inflates their BCD. The Donor may use their power inflator to inflate their own BDC and maintains contact with the Receiver until the Receiver is positively buoyant and has given an OK signal.
- Critical Elements for evaluation:
 - The drill is initiated with a proper out of gas signal
 - Divers blow bubbles whenever the regulator is out of their mouth
 - The Donor donates the correct regulator for their gear configuration, generally the second stage with the longer hose
 - Once taken, the Receiver continues to breathe from the Donor's breathing supply until they reach the surface or the drill is terminated by the Conductor
 - The Donor positions the Receiver to easily receive/breathe from the Donor's regulator while in the static position, the swimming position, and during the ascent
 - The divers ascend at a normal rate
 - If included, the divers demonstrate effective buoyancy control during the safety stop
 - Divers control their buoyancy as needed throughout the drill, using the technique appropriate to their assigned task and gear configuration
 - The Receiver orally inflates their BCD upon reaching the surface
 - The Donor maintains contact with the receiver until the Receiver is positively buoyant at the surface and has given an OK signal
 - The Donor achieves positively buoyant at the surface and gives an OK signal
 - Divers correctly perform the role of the Donor and Receiver

Simulated Emergency Swimming Ascent (ESA) – Simulated out of gas exercise. Performed as part of the open water evaluation of the entry level requirements for a divers initial Blue Card.

- Must be conducted by an NPS Dive Examiner
- Necessary equipment: Standard OC scuba configuration for all participants with adequate breathing gas for the planned dive including reserve. A fixed line, of sufficient strength and diameter to allow the person conducting the exercise to arrest/slow the ascent of self and ascending diver, anchored to the bottom (either fixed or using sufficient weight to arrest divers during ascent) and buoyed at the surface.
- This drill is best conducted on the first dive of the day
- If conducting for multiple individuals, surface observers capable of rendering assistance to individuals who have completed the exercise are required
- Thorough briefing at the surface covering procedures, hand signals, and safety protocols is required
- Breathing from their back gas, the diver descends with the DE to a depth between 20 and 30 feet where they obtain neutral buoyancy. The diver is positioned with the DE between them and the fixed ascent line. The DE is positioned so that they can maintain contact with the fixed ascent line and make contact with the diver to slow or stop their ascent at any point during the exercise, if the diver ascends too rapidly or is observed to be holding their breath. At a signal from the DE, the diver maintains their second stage regulator in their mouth and performs a swimming ascent to the surface, blowing bubbles during the ascent. The diver has been briefed to blow bubbles when they were not inhaling (attempting to inhale) from the regulator. Once at the surface the diver manually inflates their BCD. The drill is completed when terminated by the DE.
- Critical Elements for evaluation:
 - The diver exhaled continually, or nearly continually, throughout the ascent (the diver can take a breath during the ascent, but cannot breath continually from the regulator during the ascent)
 - The diver ascended at a proper ascent rate (approximately 30 fpm and no faster than 60 fpm)
 - The diver maintained control of their buoyancy during the ascent
 - The diver manually inflated their BCD and achieved positive buoyancy at the surface



Recommendations for rescue of a submerged unresponsive compressed-gas diver; S.J Mitchel, et al; Undersea and Hyperbaric Medicine 2012; 39(6): 1099-1108

National Park Service
US Department of the Interior



US Navy Dive Tables, Revision 7

Table 9-7. No-Decompression Limits and Repetitive Group Designators for No-Decompression Air Dives.

Depth (fsw)	No-Stop Limit	Repetitive Group Designation															
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	Z
10	Unlimited	57	101	158	245	426	*										
15	Unlimited	36	60	88	121	163	217	297	449	*							
20	Unlimited	26	43	61	82	106	133	165	205	256	330	461	*				
25	1102	20	33	47	62	78	97	117	140	166	198	236	285	354	469	992	1102
30	371	17	27	38	50	62	76	91	107	125	145	167	193	223	260	307	371
35	232	14	23	32	42	52	63	74	87	100	115	131	148	168	190	215	232
40	163	12	20	27	36	44	53	63	73	84	95	108	121	135	151	163	
45	125	11	17	24	31	39	46	55	63	72	82	92	102	114	125		
50	92	9	15	21	28	34	41	48	56	63	71	80	89	92			
55	74	8	14	19	25	31	37	43	50	56	63	71	74				
60	63	7	12	17	22	28	33	39	45	51	57	63					
70	48	6	10	14	19	23	28	32	37	42	47	48					
80	39	5	9	12	16	20	24	28	32	36	39						
90	33	4	7	11	14	17	21	24	28	31	33						
100	25	4	6	9	12	15	18	21	25								
110	20	3	6	8	11	14	16	19	20								
120	15	3	5	7	10	12	15										
130	12	2	4	6	9	11	12										
140	10	2	4	6	8	10											
150	8		3	5	7	8											
160	7		3	5	6	7											
170	6			4	6												
180	6			4	5	6											
190	5			3	5												

* Highest repetitive group that can be achieved at this depth regardless of bottom time.

Table 9-8. Residual Nitrogen Time Table for Repetitive Air Dives.

Locate the diver's repetitive group designation from his previous dive along the diagonal line above the table. Read horizontally to the interval in which the diver's surface interval lies.

Next, read vertically downward to the new repetitive group designation. Continue downward in this same column to the row that represents the depth of the repetitive dive. The time given at the intersection is residual nitrogen time, in minutes, to be applied to the repetitive dive.

* Dives following surface intervals longer than this are not repetitive dives. Use actual bottom times in the Air Decompression Tables to compute decompression for such dives.

Dive Depth	Repetitive Group at Beginning of Surface Interval															
	Z	O	N	M	L	K	J	I	H	G	F	E	D	C	B	A
10	**	**	**	**	**	**	**	**	**	**	**	427	246	159	101	58
15	**	**	**	**	**	**	**	**	450	298	218	164	122	89	61	37
20	**	**	**	**	**	462	331	257	206	166	134	106	83	62	44	27
25	†	†	470	354	286	237	198	167	141	118	98	79	63	48	34	21
30	372	308	261	224	194	168	146	126	108	92	77	63	51	39	28	18
35	245	216	191	169	149	132	116	101	88	75	64	53	43	33	24	15
40	188	169	152	136	122	109	97	85	74	64	55	45	37	29	21	13
45	154	140	127	115	104	93	83	73	64	56	48	40	32	25	18	12
50	131	120	109	99	90	81	73	65	57	49	42	35	29	23	17	11
55	114	105	96	88	80	72	65	58	51	44	38	32	26	20	15	10
60	101	93	86	79	72	65	58	52	46	40	35	29	24	19	14	9
70	83	77	71	65	59	54	49	44	39	34	29	25	20	16	12	8
80	70	65	60	55	51	46	42	38	33	29	25	22	18	14	10	7
90	61	57	52	48	44	41	37	33	29	26	22	19	16	12	9	6
100	54	50	47	43	40	36	33	30	26	23	20	17	14	11	8	5
110	48	45	42	39	36	33	30	27	24	21	18	16	13	10	8	5
120	44	41	38	35	32	30	27	24	22	19	17	14	12	9	7	5
130	40	37	35	32	30	27	25	22	20	18	15	13	11	9	6	4
140	37	34	32	30	27	25	23	21	19	16	14	12	10	8	6	4
150	34	32	30	28	26	23	21	19	17	15	13	11	9	8	6	4
160	32	30	28	26	24	22	20	18	16	14	13	11	9	7	5	4
170	30	28	26	24	22	21	19	17	15	14	12	10	8	7	5	3
180	28	26	25	23	21	19	18	16	14	13	11	10	8	6	5	3
190	26	25	23	22	20	18	17	15	14	12	11	9	8	6	5	3

Residual Nitrogen Times (Minutes)

** Residual Nitrogen Time cannot be determined using this table (see paragraph 9-9.1 subparagraph 8 for instructions).

† Read vertically downward to the 30 fsw repetitive dive depth. Use the corresponding residual nitrogen times to compute the equivalent single dive time. Decompress using the 30 fsw air decompression table.

Table 9-4. Sea Level Equivalent Depth (fsw).

Actual Depth (fsw)	Altitude (feet)									
	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000
10	10	15	15	15	15	15	15	15	15	15
15	15	20	20	20	20	20	20	25	25	25
20	20	25	25	25	25	25	30	30	30	30
25	25	30	30	30	35	35	35	35	35	40
30	30	35	35	35	40	40	40	45	45	45
35	35	40	40	45	45	45	50	50	50	60
40	40	45	45	50	50	50	55	55	60	60
45	45	50	55	55	55	60	60	70	70	70
50	50	55	60	60	70	70	70	70	70	80
55	55	60	70	70	70	70	80	80	80	80
60	60	70	70	70	80	80	80	90	90	90
65	65	70	80	80	80	90	90	90	100	100
70	70	80	80	90	90	90	100	100	100	110
75	75	90	90	90	100	100	100	110	110	110
80	80	90	90	100	100	100	110	110	120	120
85	85	100	100	100	110	110	120	120	120	130
90	90	100	110	110	110	120	120	130	130	140
95	95	110	110	110	120	120	130	130	140	140
100	100	110	120	120	130	130	130	140	140	150
105	105	120	120	130	130	140	140	150	150	160
110	110	120	130	130	140	140	150	150	160	160
115	115	130	130	140	140	150	150	160	170	170
120	120	130	140	140	150	150	160	170	170	180
125	125	140	140	150	160	160	170	170	180	190
130	130	140	150	160	160	170	170	180	190	190
135	135	150	160	160	170	170	180	190	190	200
140	140	160	160	170	170	180	190	190	200	210
145	145	160	170	170	180	190	190	200	210	
150	160	170	170	180	190	190	200	210		
155	170	170	180	180	190	200	210			
160	170	180	180	190	200	200				
165	180	180	190	200	200					
170	180	190	190	200						
175	190	190	200							
180	190	200	210							
185	200	200								
190	200									
Table Water Stops	Equivalent Stop Depths (fsw)									
10	10	9	9	9	8	8	8	7	7	7
20	19	19	18	17	17	16	15	15	14	14
30	29	28	27	26	25	24	23	22	21	21
40	39	37	36	35	33	32	31	30	29	28
50	48	47	45	43	42	40	39	37	36	34
60	58	56	54	52	50	48	46	45	43	41

Note: **————** = Exceptional Exposure Limit

Table 9-5. *Repetitive Groups Associated with Initial Ascent to Altitude.*

Altitude (feet)	Repetitive Group
1000	A
2000	A
3000	B
4000	C
5000	D
6000	E
7000	F
8000	G
9000	H
10000	I

Table 9-6. Required Surface Interval Before Ascent to Altitude After Diving.

Repetitive Group Designator	Increase in Altitude (feet)										
	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	
A	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00
B	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	1:42
C	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	1:48	6:23
D	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	1:45	5:24	9:59
E	0:00	0:00	0:00	0:00	0:00	0:00	0:00	1:37	4:39	8:18	12:54
F	0:00	0:00	0:00	0:00	0:00	0:00	1:32	4:04	7:06	10:45	15:20
G	0:00	0:00	0:00	0:00	1:19	3:38	6:10	9:13	12:52	17:27	
H	0:00	0:00	0:00	1:06	3:10	5:29	8:02	11:04	14:43	19:18	
I	0:00	0:00	0:56	2:45	4:50	7:09	9:41	12:44	16:22	20:58	
J	0:00	0:41	2:25	4:15	6:19	8:39	11:11	14:13	17:52	22:27	
K	0:30	2:03	3:47	5:37	7:41	10:00	12:33	15:35	19:14	23:49	
L	1:45	3:18	5:02	6:52	8:56	11:15	13:48	16:50	20:29	25:04	
M	2:54	4:28	6:12	8:01	10:06	12:25	14:57	18:00	21:38	26:14	
N	3:59	5:32	7:16	9:06	11:10	13:29	16:02	19:04	22:43	27:18	
O	4:59	6:33	8:17	10:06	12:11	14:30	17:02	20:05	23:43	28:19	
Z	5:56	7:29	9:13	11:03	13:07	15:26	17:59	21:01	24:40	29:15	

Exceptional Exposure

Wait 48 hours before ascent

NOTE 1 When using [Table 9-6](#), use the highest repetitive group designator obtained in the previous 24-hour period.

NOTE 2 [Table 9-6](#) may only be used when the maximum altitude achieved is 10,000 feet or less. For ascents above 10,000 feet, consult NAVSEA 00C for guidance.

NOTE 3 The cabin pressure in commercial aircraft is maintained at a constant value regardless of the actual altitude of the flight. Though cabin pressure varies somewhat with aircraft type, the nominal value is 8,000 feet. For commercial flights, use a final altitude of 8,000 feet to compute the required surface interval before flying.

NOTE 4 No surface interval is required before taking a commercial flight if the dive site is at 8,000 feet or higher. In this case, flying results in an increase in atmospheric pressure rather than a decrease.

NOTE 5 For ascent to altitude following a non-saturation helium-oxygen dive, wait 12 hours if the dive was a no-decompression dive. Wait 24 hours if the dive was a decompression dive.

Table 10-1. Equivalent Air Depth Table.

Diver's Actual Depth (fsw)	EAD Feet															
	25% O ₂	26% O ₂	27% O ₂	28% O ₂	29% O ₂	30% O ₂	31% O ₂	32% O ₂	33% O ₂	34% O ₂	35% O ₂	36% O ₂	37% O ₂	38% O ₂	39% O ₂	40% O ₂
20	20	20	20	20	20	20	20	15	15	15	15	15	10	10	10	10
30	30	30	30	30	30	30	30	25	25	25	20	20	20	20	20	20
40	40	40	40	40	40	40	40	35	30	30	30	30	30	30	25	25
50	50	50	50	50	50	50	50	40	40	40	40	40	35	35	35	35
60	60	60	60	60	60	60	50	50	50	50	50	50	50	50	40	40
70	70	70	70	70	70	60	60	60	60	60	60	60	50	50	50	50
80	80	80	80	80	70	70	70	70	70	70	70	60	60	60	60	60
90	90	90	90	90	80	80	80	80	80	80	70	70	70	70	70	70
100	100	100	100	90	90	90	90	90	90	80	80	80	80	80	80	70
110	110	110	110	100	100	100	100	100	100	90	90	90	90	90	90	90
120	120	120	120	110	110	110	110	110	110	100	100	100	100	100	100	100
130	130	130	120	120	120	120	120	120	120	110	110	110	110	110	110	110
140	140	140	130	130	130	130	130	130	130	120	120	120	120	120	120	120
150	150	150	140	140	140	140	140	140	140	130	130	130	130	130	130	130
160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160

EAD = Equivalent Air Depth - For Decompression Table Selection Only Rounded to Next Greater Depth

— = 1.4 ata Normal working limit.

■ = Depth exceeds the normal working limit, requires the Commanding Officer's authorization and surface-supplied equipment. Repetitive dives are not authorized. Times listed in parentheses indicate maximum allowable exposure.

Note¹: Depths not listed are considered beyond the safe limits of NITROX diving.

Note²: The EAD, 1.4 ata Normal Working Limit Line and Maximum Allowable Exposure Time for dives deeper than the Normal Working Limit Line are calculated assuming the diver rounds the oxygen percentage in the gas mixture using the standard rounding rule discussed in [paragraph 10-4.1](#). The calculations also take into account the allowable ± 0.5 percent error in gas analysis.

Table 9-9. Air Decompression Table.
(DESCENT RATE 75 FPM—ASCENT RATE 30 FPM)

Bottom Time (min)	Time to First Stop (M:S)	Gas Mix	DECOMPRESSION STOPS (FSW)								Total Ascent Time (M:S)	Chamber O ₂ Periods	Repet Group	
			100	90	80	70	60	50	40	30				20
30 FSW														
371	1:00	AIR									0	1:00	0	Z
		AIR/O ₂									0	1:00		
380	0:20	AIR									5	6:00	0.5	Z
		AIR/O ₂									1	2:00		
In-Water Air/O ₂ Decompression or SurDO ₂ Recommended -----														
420	0:20	AIR									22	23:00	0.5	Z
		AIR/O ₂									5	6:00		
480	0:20	AIR									42	43:00	0.5	
		AIR/O ₂									9	10:00		
540	0:20	AIR									71	72:00	1	
		AIR/O ₂									14	15:00		
Exceptional Exposure: In-Water Air Decompression ----- In-Water Air/O ₂ Decompression or SurDO ₂ Required -----														
600	0:20	AIR									92	93:00	1	
		AIR/O ₂									19	20:00		
660	0:20	AIR									120	121:00	1	
		AIR/O ₂									22	23:00		
720	0:20	AIR									158	159:00	1	
		AIR/O ₂									27	28:00		
35 FSW														
232	1:10	AIR									0	1:10	0	Z
		AIR/O ₂									0	1:10		
240	0:30	AIR									4	5:10	0.5	Z
		AIR/O ₂									2	3:10		
In-Water Air/O ₂ Decompression or SurDO ₂ Recommended -----														
270	0:30	AIR									28	29:10	0.5	Z
		AIR/O ₂									7	8:10		
300	0:30	AIR									53	54:10	0.5	Z
		AIR/O ₂									13	14:10		
330	0:30	AIR									71	72:10	1	Z
		AIR/O ₂									18	19:10		
360	0:30	AIR									88	89:10	1	
		AIR/O ₂									22	23:10		
Exceptional Exposure: In-Water Air Decompression ----- In-Water Air/O ₂ Decompression or SurDO ₂ Required -----														
420	0:30	AIR									134	135:10	1.5	
		AIR/O ₂									29	30:10		
480	0:30	AIR									173	174:10	1.5	
		AIR/O ₂									38	44:10		
540	0:30	AIR									228	229:10	2	
		AIR/O ₂									45	51:10		
600	0:30	AIR									277	278:10	2	
		AIR/O ₂									53	59:10		
660	0:30	AIR									314	315:10	2.5	
		AIR/O ₂									63	69:10		
720	0:30	AIR									342	343:10	3	
		AIR/O ₂									71	82:10		

Table 9-9. Air Decompression Table (Continued).
(DESCENT RATE 75 FPM—ASCENT RATE 30 FPM)

Bottom Time (min)	Time to First Stop (M:S)	Gas Mix	DECOMPRESSION STOPS (FSW)								Total Ascent Time (M:S)	Chamber O ₂ Periods	Repet Group	
			100	90	80	70	60	50	40	30				20
40 FSW														
163	1:20	AIR									0	1:20	0	O
		AIR/O ₂									0	1:20		
170	0:40	AIR									6	7:20	0.5	O
		AIR/O ₂									2	3:20		
180	0:40	AIR									14	15:20	0.5	Z
		AIR/O ₂									5	6:20		
In-Water Air/O ₂ Decompression or SurDO ₂ Recommended -----														
190	0:40	AIR									21	22:20	0.5	Z
		AIR/O ₂									7	8:20		
200	0:40	AIR									27	28:20	0.5	Z
		AIR/O ₂									9	10:20		
210	0:40	AIR									39	40:20	0.5	Z
		AIR/O ₂									11	12:20		
220	0:40	AIR									52	53:20	0.5	Z
		AIR/O ₂									12	13:20		
230	0:40	AIR									64	65:20	1	Z
		AIR/O ₂									16	17:20		
240	0:40	AIR									75	76:20	1	Z
		AIR/O ₂									19	20:20		
Exceptional Exposure: In-Water Air Decompression ----- In-Water Air/O ₂ Decompression or SurDO ₂ Required -----														
270	0:40	AIR									101	102:20	1	Z
		AIR/O ₂									26	27:20		
300	0:40	AIR									128	129:20	1.5	
		AIR/O ₂									33	34:20		
330	0:40	AIR									160	161:20	1.5	
		AIR/O ₂									38	44:20		
360	0:40	AIR									184	185:20	2	
		AIR/O ₂									44	50:20		
420	0:40	AIR									248	249:20	2.5	
		AIR/O ₂									56	62:20		
480	0:40	AIR									321	322:20	2.5	
		AIR/O ₂									68	79:20		
Exceptional Exposure: In-Water Air/O ₂ Decompression ----- SurDO ₂ Required-----														
540	0:40	AIR									372	373:20	3	
		AIR/O ₂									80	91:20		
600	0:40	AIR									410	411:20	3.5	
		AIR/O ₂									93	104:20		
660	0:40	AIR									439	440:20	4	
		AIR/O ₂									103	119:20		
Exceptional Exposure: SurDO ₂ -----														
720	0:40	AIR									461	462:20	4.5	
		AIR/O ₂									112	128:20		

Table 9-9. Air Decompression Table (Continued).
(DESCENT RATE 75 FPM—ASCENT RATE 30 FPM)

Bottom Time (min)	Time to First Stop (M:S)	Gas Mix	DECOMPRESSION STOPS (FSW)								Total Ascent Time (M:S)	Chamber O ₂ Periods	Repet Group	
			100	90	80	70	60	50	40	30				20
45 FSW														
125	1:30	AIR									0	1:30	0	N
		AIR/O ₂									0	1:30		
130	0:50	AIR									2	3:30	0.5	O
		AIR/O ₂									1	2:30		
140	0:50	AIR									14	15:30	0.5	O
		AIR/O ₂									5	6:30		
In-Water Air/O ₂ Decompression or SurDO ₂ Recommended -----														
150	0:50	AIR									25	26:30	0.5	Z
		AIR/O ₂									8	9:30		
160	0:50	AIR									34	35:30	0.5	Z
		AIR/O ₂									11	12:30		
170	0:50	AIR									41	42:30	1	Z
		AIR/O ₂									14	15:30		
180	0:50	AIR									59	60:30	1	Z
		AIR/O ₂									17	18:30		
190	0:50	AIR									75	76:30	1	Z
		AIR/O ₂									19	20:30		
Exceptional Exposure: In-Water Air Decompression ----- In-Water Air/O ₂ Decompression or SurDO ₂ Required -----														
200	0:50	AIR									89	90:30	1	Z
		AIR/O ₂									23	24:30		
210	0:50	AIR									101	102:30	1	Z
		AIR/O ₂									27	28:30		
220	0:50	AIR									112	113:30	1.5	Z
		AIR/O ₂									30	31:30		
230	0:50	AIR									121	122:30	1.5	Z
		AIR/O ₂									33	34:30		
240	0:50	AIR									130	131:30	1.5	Z
		AIR/O ₂									37	43:30		
270	0:50	AIR									173	174:30	2	
		AIR/O ₂									45	51:30		
300	0:50	AIR									206	207:30	2	
		AIR/O ₂									51	57:30		
330	0:50	AIR									243	244:30	2.5	
		AIR/O ₂									61	67:30		
360	0:50	AIR									288	289:30	3	
		AIR/O ₂									69	80:30		
Exceptional Exposure: In-Water Air/O ₂ Decompression ----- SurDO ₂ Required-----														
420	0:50	AIR									373	374:30	3.5	
		AIR/O ₂									84	95:30		
480	0:50	AIR									431	432:30	4	
		AIR/O ₂									101	117:30		
Exceptional Exposure: SurDO ₂ -----														
540	0:50	AIR									473	474:30	4.5	
		AIR/O ₂									117	133:30		

Table 9-9. Air Decompression Table (Continued).
(DESCENT RATE 75 FPM—ASCENT RATE 30 FPM)

Bottom Time (min)	Time to First Stop (M:S)	Gas Mix	DECOMPRESSION STOPS (FSW)								Total Ascent Time (M:S)	Chamber O ₂ Periods	Repet Group	
			100	90	80	70	60	50	40	30				20
50 FSW														
92	1:40	AIR									0	1:40	0	M
		AIR/O ₂									0	1:40		
95	1:00	AIR									2	3:40	0.5	M
		AIR/O ₂									1	2:40		
100	1:00	AIR									4	5:40	0.5	N
		AIR/O ₂									2	3:40		
110	1:00	AIR									8	9:40	0.5	O
		AIR/O ₂									4	5:40		
In-Water Air/O ₂ Decompression or SurDO ₂ Recommended -----														
120	1:00	AIR									21	22:40	0.5	O
		AIR/O ₂									7	8:40		
130	1:00	AIR									34	35:40	0.5	Z
		AIR/O ₂									12	13:40		
140	1:00	AIR									45	46:40	1	Z
		AIR/O ₂									16	17:40		
150	1:00	AIR									56	57:40	1	Z
		AIR/O ₂									19	20:40		
160	1:00	AIR									78	79:40	1	Z
		AIR/O ₂									23	24:40		
Exceptional Exposure: In-Water Air Decompression ----- In-Water Air/O ₂ Decompression or SurDO ₂ Required -----														
170	1:00	AIR									96	97:40	1	Z
		AIR/O ₂									26	27:40		
180	1:00	AIR									111	112:40	1.5	Z
		AIR/O ₂									30	31:40		
190	1:00	AIR									125	126:40	1.5	Z
		AIR/O ₂									35	36:40		
200	1:00	AIR									136	137:40	1.5	Z
		AIR/O ₂									39	45:40		
210	1:00	AIR									147	148:40	2	
		AIR/O ₂									43	49:40		
220	1:00	AIR									166	167:40	2	
		AIR/O ₂									47	53:40		
230	1:00	AIR									183	184:40	2	
		AIR/O ₂									50	56:40		
240	1:00	AIR									198	199:40	2	
		AIR/O ₂									53	59:40		
270	1:00	AIR									236	237:40	2.5	
		AIR/O ₂									62	68:40		
300	1:00	AIR									285	286:40	3	
		AIR/O ₂									74	85:40		
Exceptional Exposure: In-Water Air/O ₂ Decompression ----- SurDO ₂ Required-----														
330	1:00	AIR									345	346:40	3.5	
		AIR/O ₂									83	94:40		
360	1:00	AIR									393	394:40	3.5	
		AIR/O ₂									92	103:40		
Exceptional Exposure: SurDO ₂ -----														
420	1:00	AIR									464	465:40	4.5	
		AIR/O ₂									113	129:40		

Table 9-9. Air Decompression Table (Continued).
(DESCENT RATE 75 FPM—ASCENT RATE 30 FPM)

Bottom Time (min)	Time to First Stop (M:S)	Gas Mix	DECOMPRESSION STOPS (FSW)									Total Ascent Time (M:S)	Chamber O ₂ Periods	Repet Group
			100	90	80	70	60	50	40	30	20			
55 FSW														
74	1:50	AIR									0	1:50	0	L
		AIR/O ₂									0	1:50		
75	1:10	AIR									1	2:50	0.5	L
		AIR/O ₂									1	2:50		
80	1:10	AIR									4	5:50	0.5	M
		AIR/O ₂									2	3:50		
90	1:10	AIR									10	11:50	0.5	N
		AIR/O ₂									5	6:50		
In-Water Air/O ₂ Decompression or SurDO ₂ Recommended -----														
100	1:10	AIR									17	18:50	0.5	O
		AIR/O ₂									8	9:50		
110	1:10	AIR									34	35:50	0.5	O
		AIR/O ₂									12	13:50		
120	1:10	AIR									48	49:50	1	Z
		AIR/O ₂									17	18:50		
130	1:10	AIR									59	60:50	1	Z
		AIR/O ₂									22	23:50		
140	1:10	AIR									84	85:50	1	Z
		AIR/O ₂									26	27:50		
Exceptional Exposure: In-Water Air Decompression ----- In-Water Air/O ₂ Decompression or SurDO ₂ Required -----														
150	1:10	AIR									105	106:50	1.5	Z
		AIR/O ₂									30	31:50		
160	1:10	AIR									123	124:50	1.5	Z
		AIR/O ₂									34	35:50		
170	1:10	AIR									138	139:50	1.5	Z
		AIR/O ₂									40	46:50		
180	1:10	AIR									151	152:50	2	Z
		AIR/O ₂									45	51:50		
190	1:10	AIR									169	170:50	2	
		AIR/O ₂									50	56:50		
200	1:10	AIR									190	191:50	2	
		AIR/O ₂									54	60:50		
210	1:10	AIR									208	209:50	2.5	
		AIR/O ₂									58	64:50		
220	1:10	AIR									224	225:50	2.5	
		AIR/O ₂									62	68:50		
230	1:10	AIR									239	240:50	2.5	
		AIR/O ₂									66	77:50		
240	1:10	AIR									254	255:50	3	
		AIR/O ₂									69	80:50		
Exceptional Exposure: In-Water Air/O ₂ Decompression ----- SurDO ₂ Required-----														
270	1:10	AIR									313	314:50	3.5	
		AIR/O ₂									83	94:50		
300	1:10	AIR									380	381:50	3.5	
		AIR/O ₂									94	105:50		
330	1:10	AIR									432	433:50	4	
		AIR/O ₂									106	122:50		
Exceptional Exposure: SurDO ₂ -----														
360	1:10	AIR									474	475:50	4.5	
		AIR/O ₂									118	134:50		

Table 9-9. Air Decompression Table (Continued).
(DESCENT RATE 75 FPM—ASCENT RATE 30 FPM)

Bottom Time (min)	Time to First Stop (M:S)	Gas Mix	DECOMPRESSION STOPS (FSW)									Total Ascent Time (M:S)	Chamber O ₂ Periods	Repet Group
			100	90	80	70	60	50	40	30	20			
60 FSW														
63	2:00	AIR									0	2:00	0	K
		AIR/O ₂									0	2:00		
65	1:20	AIR									2	4:00	0.5	L
		AIR/O ₂									1	3:00		
70	1:20	AIR									7	9:00	0.5	L
		AIR/O ₂									4	6:00		
80	1:20	AIR									14	16:00	0.5	N
		AIR/O ₂									7	9:00		
In-Water Air/O ₂ Decompression or SurDO ₂ Recommended -----														
90	1:20	AIR									23	25:00	0.5	O
		AIR/O ₂									10	12:00		
100	1:20	AIR									42	44:00	1	Z
		AIR/O ₂									15	17:00		
110	1:20	AIR									57	59:00	1	Z
		AIR/O ₂									21	23:00		
120	1:20	AIR									75	77:00	1	Z
		AIR/O ₂									26	28:00		
Exceptional Exposure: In-Water Air Decompression ----- In-Water Air/O ₂ Decompression or SurDO ₂ Required -----														
130	1:20	AIR									102	104:00	1.5	Z
		AIR/O ₂									31	33:00		
140	1:20	AIR									124	126:00	1.5	Z
		AIR/O ₂									35	37:00		
150	1:20	AIR									143	145:00	2	Z
		AIR/O ₂									41	48:00		
160	1:20	AIR									158	160:00	2	Z
		AIR/O ₂									48	55:00		
170	1:20	AIR									178	180:00	2	
		AIR/O ₂									53	60:00		
180	1:20	AIR									201	203:00	2.5	
		AIR/O ₂									59	66:00		
190	1:20	AIR									222	224:00	2.5	
		AIR/O ₂									64	71:00		
200	1:20	AIR									240	242:00	2.5	
		AIR/O ₂									68	80:00		
210	1:20	AIR									256	258:00	3	
		AIR/O ₂									73	85:00		
220	1:20	AIR									278	280:00	3	
		AIR/O ₂									77	89:00		
Exceptional Exposure: In-Water Air/O ₂ Decompression ----- SurDO ₂ Required-----														
230	1:20	AIR									300	302:00	3.5	
		AIR/O ₂									82	94:00		
240	1:20	AIR									321	323:00	3.5	
		AIR/O ₂									88	100:00		
270	1:20	AIR									398	400:00	4	
		AIR/O ₂									102	119:00		
Exceptional Exposure: SurDO ₂ -----														
300	1:20	AIR									456	458:00	4.5	
		AIR/O ₂									115	132:00		

Table 9-9. Air Decompression Table (Continued).
(DESCENT RATE 75 FPM—ASCENT RATE 30 FPM)

Bottom Time (min)	Time to First Stop (M:S)	Gas Mix	DECOMPRESSION STOPS (FSW)									Total Ascent Time (M:S)	Chamber O ₂ Periods	Repet Group	
			100	90	80	70	60	50	40	30	20				
70 FSW															
48	2:20	AIR									0	2:20	0	K	
		AIR/O ₂									0	2:20			
50	1:40	AIR									2	4:20	0.5	K	
		AIR/O ₂									1	3:20			
55	1:40	AIR									9	11:20	0.5	L	
		AIR/O ₂									5	7:20			
60	1:40	AIR									14	16:20	0.5	M	
		AIR/O ₂									8	10:20			
In-Water Air/O ₂ Decompression or SurDO ₂ Recommended -----															
70	1:40	AIR									24	26:20	0.5	N	
		AIR/O ₂									13	15:20			
80	1:40	AIR									44	46:20	1	O	
		AIR/O ₂									17	19:20			
90	1:40	AIR									64	66:20	1	Z	
		AIR/O ₂									24	26:20			
Exceptional Exposure: In-Water Air Decompression ----- In-Water Air/O ₂ Decompression or SurDO ₂ Required -----															
100	1:40	AIR									88	90:20	1.5	Z	
		AIR/O ₂									31	33:20			
110	1:40	AIR									120	122:20	1.5	Z	
		AIR/O ₂									38	45:20			
120	1:40	AIR									145	147:20	2	Z	
		AIR/O ₂									44	51:20			
130	1:40	AIR									167	169:20	2	Z	
		AIR/O ₂									51	58:20			
140	1:40	AIR									189	191:20	2.5		
		AIR/O ₂									59	66:20			
150	1:40	AIR									219	221:20	2.5		
		AIR/O ₂									66	78:20			
160	1:20	AIR								1	244	247:00	3		
		AIR/O ₂									1	72			85:00
Exceptional Exposure: In-Water Air/O ₂ Decompression ----- SurDO ₂ Required-----															
170	1:20	AIR								2	265	269:00	3		
		AIR/O ₂									1	78			91:00
180	1:20	AIR								4	289	295:00	3.5		
		AIR/O ₂									2	83			97:00
190	1:20	AIR								5	316	323:00	3.5		
		AIR/O ₂									3	88			103:00
200	1:20	AIR								9	345	356:00	4		
		AIR/O ₂									5	93			115:00
210	1:20	AIR								13	378	393:00	4		
		AIR/O ₂									7	98			122:00
Exceptional Exposure: SurDO ₂ -----															
240	1:20	AIR									25	454	481:00	5	
		AIR/O ₂									13	110	140:00		

Table 9-9. Air Decompression Table (Continued).
(DESCENT RATE 75 FPM—ASCENT RATE 30 FPM)

Bottom Time (min)	Time to First Stop (M:S)	Gas Mix	DECOMPRESSION STOPS (FSW) Stop times (min) include travel time, except first air and first O ₂ stop									Total Ascent Time (M:S)	Chamber O ₂ Periods	Repet Group
			100	90	80	70	60	50	40	30	20			
80 FSW														
39	2:40	AIR									0	2:40	0	J
		AIR/O ₂									0	2:40		
40	2:00	AIR									1	3:40	0.5	J
		AIR/O ₂									1	3:40		
45	2:00	AIR									10	12:40	0.5	K
		AIR/O ₂									5	7:40		
In-Water Air/O ₂ Decompression or SurDO ₂ Recommended -----														
50	2:00	AIR									17	19:40	0.5	M
		AIR/O ₂									9	11:40		
55	2:00	AIR									24	26:40	0.5	M
		AIR/O ₂									13	15:40		
60	2:00	AIR									30	32:40	1	N
		AIR/O ₂									16	18:40		
70	2:00	AIR									54	56:40	1	O
		AIR/O ₂									22	24:40		
80	2:00	AIR									77	79:40	1.5	Z
		AIR/O ₂									30	32:40		
Exceptional Exposure: In-Water Air Decompression ----- In-Water Air/O ₂ Decompression or SurDO ₂ Required -----														
90	2:00	AIR									114	116:40	1.5	Z
		AIR/O ₂									39	46:40		
100	1:40	AIR								1	147	150:20	2	Z
		AIR/O ₂								1	46	54:20		
110	1:40	AIR								6	171	179:20	2	Z
		AIR/O ₂								3	51	61:20		
120	1:40	AIR								10	200	212:20	2.5	
		AIR/O ₂								5	59	71:20		
130	1:40	AIR								14	232	248:20	3	
		AIR/O ₂								7	67	86:20		
Exceptional Exposure: In-Water Air/O ₂ Decompression ----- SurDO ₂ Required-----														
140	1:40	AIR								17	258	277:20	3.5	
		AIR/O ₂								9	73	94:20		
150	1:40	AIR								19	285	306:20	3.5	
		AIR/O ₂								10	80	102:20		
160	1:40	AIR								21	318	341:20	4	
		AIR/O ₂								11	86	114:20		
170	1:40	AIR								27	354	383:20	4	
		AIR/O ₂								14	90	121:20		
Exceptional Exposure: SurDO ₂ -----														
180	1:40	AIR								33	391	426:20	4.5	
		AIR/O ₂								17	96	130:20		
210	1:40	AIR								51	473	526:20	5	
		AIR/O ₂								26	110	158:20		

Table 9-9. Air Decompression Table (Continued).
(DESCENT RATE 75 FPM—ASCENT RATE 30 FPM)

Bottom Time (min)	Time to First Stop (M:S)	Gas Mix	DECOMPRESSION STOPS (FSW)									Total Ascent Time (M:S)	Chamber O ₂ Periods	Repet Group	
			100	90	80	70	60	50	40	30	20				
90 FSW															
33	3:00	AIR									0	3:00	0	J	
		AIR/O ₂									0	3:00			
35	2:20	AIR									4	7:00	0.5	J	
		AIR/O ₂									2	5:00			
40	2:20	AIR									14	17:00	0.5	L	
		AIR/O ₂									7	10:00			
In-Water Air/O ₂ Decompression or SurDO ₂ Recommended -----															
45	2:20	AIR									23	26:00	0.5	M	
		AIR/O ₂									12	15:00			
50	2:20	AIR									31	34:00	1	N	
		AIR/O ₂									17	20:00			
55	2:20	AIR									39	42:00	1	O	
		AIR/O ₂									21	24:00			
60	2:20	AIR									56	59:00	1	O	
		AIR/O ₂									24	27:00			
70	2:20	AIR									83	86:00	1.5	Z	
		AIR/O ₂									32	35:00			
Exceptional Exposure: In-Water Air Decompression ----- In-Water Air/O ₂ Decompression or SurDO ₂ Required -----															
80	2:00	AIR									5	125	132:40	2	Z
		AIR/O ₂									3	40	50:40		
90	2:00	AIR									13	158	173:40	2	Z
		AIR/O ₂									7	46	60:40		
100	2:00	AIR									19	185	206:40	2.5	
		AIR/O ₂									10	53	70:40		
110	2:00	AIR									25	224	251:40	3	
		AIR/O ₂									13	61	86:40		
Exceptional Exposure: In-Water Air/O ₂ Decompression ----- SurDO ₂ Required-----															
120	1:40	AIR									2	28	256	288:20	3.5
		AIR/O ₂									2	14	70	98:40	
130	1:40	AIR									5	28	291	326:20	3.5
		AIR/O ₂									5	14	79	110:40	
140	1:40	AIR									8	28	330	368:20	4
		AIR/O ₂									8	14	87	126:40	
Exceptional Exposure: SurDO ₂ -----															
150	1:40	AIR									11	34	378	425:20	4.5
		AIR/O ₂									11	17	94	139:40	
160	1:40	AIR									13	40	418	473:20	4.5
		AIR/O ₂									13	20	101	151:40	
170	1:40	AIR									15	45	451	513:20	5
		AIR/O ₂									15	23	106	166:40	
180	1:40	AIR									16	51	479	548:20	5.5
		AIR/O ₂									16	26	112	176:40	
240	1:40	AIR									42	68	592	704:20	7.5
		AIR/O ₂									42	34	159	267:40	

Table 9-9. Air Decompression Table (Continued).
(DESCENT RATE 75 FPM—ASCENT RATE 30 FPM)

Bottom Time (min)	Time to First Stop (M:S)	Gas Mix	DECOMPRESSION STOPS (FSW)									Total Ascent Time (M:S)	Chamber O ₂ Periods	Repet Group	
			100	90	80	70	60	50	40	30	20				
100 FSW															
25	3:20	AIR									0	3:20	0	H	
		AIR/O ₂									0	3:20			
30	2:40	AIR									3	6:20	0.5	J	
		AIR/O ₂									2	5:20			
35	2:40	AIR									15	18:20	0.5	L	
		AIR/O ₂									8	11:20			
In-Water Air/O ₂ Decompression or SurDO ₂ Recommended -----															
40	2:40	AIR									26	29:20	1	M	
		AIR/O ₂									14	17:20			
45	2:40	AIR									36	39:20	1	N	
		AIR/O ₂									19	22:20			
50	2:40	AIR									47	50:20	1	O	
		AIR/O ₂									24	27:20			
55	2:40	AIR									65	68:20	1.5	Z	
		AIR/O ₂									28	31:20			
60	2:40	AIR									81	84:20	1.5	Z	
		AIR/O ₂									33	36:20			
Exceptional Exposure: In-Water Air Decompression ----- In-Water Air/O ₂ Decompression or SurDO ₂ Required -----															
70	2:20	AIR									11	124	138:00	2	Z
		AIR/O ₂									6	39	53:00		
80	2:20	AIR									21	160	184:00	2.5	Z
		AIR/O ₂									11	45	64:00		
90	2:00	AIR								2	28	196	228:40	2.5	
		AIR/O ₂								2	14	53	82:00		
Exceptional Exposure: In-Water Air/O ₂ Decompression ----- SurDO ₂ Required-----															
100	2:00	AIR								9	28	241	280:40	3	
		AIR/O ₂								9	14	66	102:00		
110	2:00	AIR								14	28	278	322:40	3.5	
		AIR/O ₂								14	14	76	117:00		
120	2:00	AIR								19	28	324	373:40	4	
		AIR/O ₂								19	14	85	136:00		
Exceptional Exposure: SurDO ₂ -----															
150	1:40	AIR								3	26	46	461	538:20	5
		AIR/O ₂								3	26	23	109	183:40	

Table 9-9. Air Decompression Table (Continued).
(DESCENT RATE 75 FPM—ASCENT RATE 30 FPM)

Bottom Time (min)	Time to First Stop (M:S)	Gas Mix	DECOMPRESSION STOPS (FSW)									Total Ascent Time (M:S)	Chamber O ₂ Periods	Repet Group			
			100	90	80	70	60	50	40	30	20						
110 FSW																	
20	3:40	AIR									0	3:40	0	H			
		AIR/O ₂									0	3:40					
25	3:00	AIR									5	8:40	0.5	I			
		AIR/O ₂									3	6:40					
30	3:00	AIR									14	17:40	0.5	K			
		AIR/O ₂									7	10:40					
In-Water Air/O ₂ Decompression or SurDO ₂ Recommended -----																	
35	3:00	AIR									27	30:40	1	M			
		AIR/O ₂									14	17:40					
40	3:00	AIR									39	42:40	1	N			
		AIR/O ₂									20	23:40					
45	3:00	AIR									50	53:40	1	O			
		AIR/O ₂									26	29:40					
50	3:00	AIR									71	74:40	1.5	Z			
		AIR/O ₂									32	35:40					
Exceptional Exposure: In-Water Air Decompression ----- In-Water Air/O ₂ Decompression or SurDO ₂ Required -----																	
55	2:40	AIR									5	85	93:20	1.5	Z		
		AIR/O ₂									3	33	44:20				
60	2:40	AIR									13	111	127:20	2	Z		
		AIR/O ₂									7	36	51:20				
70	2:40	AIR									26	155	184:20	2.5	Z		
		AIR/O ₂									14	42	64:20				
Exceptional Exposure: In-Water Air/O ₂ Decompression ----- SurDO ₂ Required-----																	
80	2:20	AIR									9	28	200	240:00	2.5		
		AIR/O ₂									9	14	54	90:20			
90	2:20	AIR									18	28	249	298:00	3.5		
		AIR/O ₂									18	14	68	113:20			
100	2:20	AIR									25	28	295	351:00	3.5		
		AIR/O ₂									25	14	79	131:20			
110	2:00	AIR									5	26	28	353	414:40	4	
		AIR/O ₂									5	26	14	91	154:00		
Exceptional Exposure: SurDO ₂ -----																	
120	2:00	AIR									10	26	35	413	486:40	4.5	
		AIR/O ₂									10	26	18	101	173:00		
180	1:40	AIR									3	23	47	68	593	736:20	7.5
		AIR/O ₂									3	23	47	34	159	298:40	

Table 9-9. Air Decompression Table (Continued).
(DESCENT RATE 75 FPM—ASCENT RATE 30 FPM)

Bottom Time (min)	Time to First Stop (M:S)	Gas Mix	DECOMPRESSION STOPS (FSW)								Total Ascent Time (M:S)	Chamber O ₂ Periods	Repet Group	
			100	90	80	70	60	50	40	30				20
120 FSW														
15	4:00	AIR									0	4:00	0	F
		AIR/O ₂									0	4:00		
20	3:20	AIR									4	8:00	0.5	H
		AIR/O ₂									2	6:00		
25	3:20	AIR									9	13:00	0.5	J
		AIR/O ₂									5	9:00		
In-Water Air/O ₂ Decompression or SurDO ₂ Recommended -----														
30	3:20	AIR									24	28:00	0.5	L
		AIR/O ₂									13	17:00		
35	3:20	AIR									38	42:00	1	N
		AIR/O ₂									20	24:00		
40	3:00	AIR								2	49	54:40	1	O
		AIR/O ₂								1	26	30:40		
45	3:00	AIR								3	71	77:40	1.5	Z
		AIR/O ₂								2	31	36:40		
Exceptional Exposure: In-Water Air Decompression ----- In-Water Air/O ₂ Decompression or SurDO ₂ Required -----														
50	3:00	AIR								10	85	98:40	1.5	Z
		AIR/O ₂								5	33	46:40		
55	3:00	AIR								19	116	138:40	2	Z
		AIR/O ₂								10	35	53:40		
60	3:00	AIR								27	142	172:40	2	Z
		AIR/O ₂								14	39	61:40		
70	2:40	AIR							13	28	190	234:20	2.5	
		AIR/O ₂							13	14	51	86:40		
Exceptional Exposure: In-Water Air/O ₂ Decompression ----- SurDO ₂ Required-----														
80	2:40	AIR								24	28	246	301:20	3
		AIR/O ₂								24	14	67	118:40	
90	2:20	AIR							7	26	28	303	367:00	3.5
		AIR/O ₂							7	26	14	80	140:20	
100	2:20	AIR							15	25	28	372	443:00	4
		AIR/O ₂							15	25	14	95	167:20	
Exceptional Exposure: SurDO ₂ -----														
110	2:20	AIR							21	25	38	433	520:00	5
		AIR/O ₂							21	25	19	105	188:20	
120	2:00	AIR				3	23	25	47	480	580:40	5.5		
		AIR/O ₂				3	23	25	24	113	211:00			

Table 9-9. Air Decompression Table (Continued).
(DESCENT RATE 75 FPM—ASCENT RATE 30 FPM)

Bottom Time (min)	Time to First Stop (M:S)	Gas Mix	DECOMPRESSION STOPS (FSW)								Total Ascent Time (M:S)	Chamber O ₂ Periods	Repet Group				
			100	90	80	70	60	50	40	30				20			
130 FSW																	
12	4:20	AIR									0	4:20	0	F			
		AIR/O ₂									0	4:20					
15	3:40	AIR									3	7:20	0.5	G			
		AIR/O ₂									2	6:20					
20	3:40	AIR									8	12:20	0.5	I			
		AIR/O ₂									5	9:20					
In-Water Air/O ₂ Decompression or SurDO ₂ Recommended -----																	
25	3:40	AIR									17	21:20	0.5	K			
		AIR/O ₂									9	13:20					
30	3:20	AIR								2	32	38:00	1	M			
		AIR/O ₂								1	17	22:00					
35	3:20	AIR								5	44	53:00	1	O			
		AIR/O ₂								3	23	30:00					
40	3:20	AIR								6	66	76:00	1.5	Z			
		AIR/O ₂								3	30	37:00					
Exceptional Exposure: In-Water Air Decompression ----- In-Water Air/O ₂ Decompression or SurDO ₂ Required -----																	
45	3:00	AIR								1	11	84	99:40	1.5	Z		
		AIR/O ₂								1	6	33	49:00				
50	3:00	AIR								2	20	118	143:40	2	Z		
		AIR/O ₂								2	10	36	57:00				
55	3:00	AIR								4	28	146	181:40	2	Z		
		AIR/O ₂								4	14	40	67:00				
60	3:00	AIR								12	28	170	213:40	2.5	Z		
		AIR/O ₂								12	14	46	81:00				
Exceptional Exposure: In-Water Air/O ₂ Decompression ----- SurDO ₂ Required-----																	
70	2:40	AIR								1	26	28	235	293:20	3		
		AIR/O ₂								1	26	14	63	117:40			
80	2:40	AIR								12	26	28	297	366:20	3.5		
		AIR/O ₂								12	26	14	79	144:40			
90	2:40	AIR								22	25	28	375	453:20	4		
		AIR/O ₂								22	25	14	95	174:40			
Exceptional Exposure: SurDO ₂ -----																	
100	2:20	AIR								6	23	26	38	444	540:00	5	
		AIR/O ₂								6	23	26	20	106	204:20		
120	2:20	AIR								17	24	27	57	534	662:00	6	
		AIR/O ₂								17	24	27	29	130	255:20		
180	2:00	AIR								13	21	45	57	94	658	890:40	9
		AIR/O ₂								13	21	45	57	46	198	418:00	

Table 9-9. Air Decompression Table (Continued).
(DESCENT RATE 75 FPM—ASCENT RATE 30 FPM)

Bottom Time (min)	Time to First Stop (M:S)	Gas Mix	DECOMPRESSION STOPS (FSW)								Total Ascent Time (M:S)	Chamber O ₂ Periods	Repet Group					
			100	90	80	70	60	50	40	30				20				
140 FSW																		
10	4:40	AIR									0	4:40	0	E				
		AIR/O ₂									0	4:40						
15	4:00	AIR									5	9:40	0.5	H				
		AIR/O ₂									3	7:40						
20	4:00	AIR									13	17:40	0.5	J				
		AIR/O ₂									7	11:40						
In-Water Air/O ₂ Decompression or SurDO ₂ Recommended -----																		
25	3:40	AIR									3	24	31:20	1	L			
		AIR/O ₂									2	12	18:20					
30	3:40	AIR									7	37	48:20	1	N			
		AIR/O ₂									4	19	27:20					
35	3:20	AIR									2	7	58	71:00	1.5	O		
		AIR/O ₂									2	4	26	36:20				
Exceptional Exposure: In-Water Air/O ₂ Decompression ----- In-Water Air/O ₂ Decompression or SurDO ₂ Required -----																		
40	3:20	AIR									4	7	82	97:00	1.5	Z		
		AIR/O ₂									4	4	33	50:20				
45	3:20	AIR									5	18	114	141:00	2	Z		
		AIR/O ₂									5	9	36	59:20				
50	3:20	AIR									8	27	145	184:00	2	Z		
		AIR/O ₂									8	14	39	70:20				
55	3:00	AIR									1	15	29	171	219:40	2.5	Z	
		AIR/O ₂									1	15	15	45	85:00			
Exceptional Exposure: In-Water Air/O ₂ Decompression ----- SurDO ₂ Required-----																		
60	3:00	AIR									2	23	28	209	265:40	3		
		AIR/O ₂									2	23	14	56	109:00			
70	3:00	AIR									14	25	29	276	347:40	3.5		
		AIR/O ₂									14	25	15	74	142:00			
80	2:40	AIR									2	24	25	29	362	445:20	4	
		AIR/O ₂									2	24	25	15	91	175:40		
Exceptional Exposure: SurDO ₂ -----																		
90	2:40	AIR									12	23	26	38	443	545:20	5	
		AIR/O ₂									12	23	26	19	107	210:40		

Table 9-9. Air Decompression Table (Continued).
(DESCENT RATE 75 FPM—ASCENT RATE 30 FPM)

Bottom Time (min)	Time to First Stop (M:S)	Gas Mix	DECOMPRESSION STOPS (FSW) Stop times (min) include travel time, except first air and first O ₂ stop									Total Ascent Time (M:S)	Chamber O ₂ Periods	Repet Group					
			100	90	80	70	60	50	40	30	20								
150 FSW																			
8	5:00	AIR									0	5:00	0	E					
		AIR/O ₂									0	5:00							
10	4:20	AIR									2	7:00	0.5	F					
		AIR/O ₂									1	6:00							
15	4:20	AIR									8	13:00	0.5	H					
		AIR/O ₂									5	10:00							
In-Water Air/O ₂ Decompression or SurDO ₂ Recommended -----																			
20	4:00	AIR									2	15	21:40	0.5	K				
		AIR/O ₂									1	8	13:40						
25	4:00	AIR									7	29	40:40	1	M				
		AIR/O ₂									4	14	22:40						
30	3:40	AIR									4	7	45	60:20	1.5	O			
		AIR/O ₂									4	4	22	34:40					
Exceptional Exposure: In-Water Air Decompression ----- In-Water Air/O ₂ Decompression or SurDO ₂ Required -----																			
35	3:40	AIR									6	7	74	91:20	1.5	Z			
		AIR/O ₂									6	4	30	44:40					
40	3:20	AIR								2	6	14	106	132:00	2	Z			
		AIR/O ₂								2	6	7	35	59:20					
45	3:20	AIR								3	8	24	142	181:00	2	Z			
		AIR/O ₂								3	8	12	40	72:20					
50	3:20	AIR								4	14	28	170	220:00	2.5	Z			
		AIR/O ₂								4	14	14	46	87:20					
Exceptional Exposure: In-Water Air/O ₂ Decompression ----- SurDO ₂ Required-----																			
55	3:20	AIR								7	21	28	212	272:00	3				
		AIR/O ₂								7	21	14	57	113:20					
60	3:20	AIR								11	26	28	248	317:00	3				
		AIR/O ₂								11	26	14	67	132:20					
70	3:00	AIR								3	24	25	28	330	413:40	4			
		AIR/O ₂								3	24	25	14	85	170:00				
Exceptional Exposure: SurDO ₂ -----																			
80	3:00	AIR								15	23	26	35	430	532:40	4.5			
		AIR/O ₂								15	23	26	18	104	205:00				
90	2:40	AIR								3	22	23	26	47	496	620:20	5.5		
		AIR/O ₂								3	22	23	26	24	118	239:40			
120	2:20	AIR								3	20	22	23	50	75	608	804:00	8	
		AIR/O ₂								3	20	22	23	50	37	168	356:20		
180	2:00	AIR								2	19	20	42	48	79	121	694	1027:40	10.5
		AIR/O ₂								2	19	20	42	48	79	58	222	538:00	

Table 9-9. Air Decompression Table (Continued).
(DESCENT RATE 75 FPM—ASCENT RATE 30 FPM)

Bottom Time (min)	Time to First Stop (M:S)	Gas Mix	DECOMPRESSION STOPS (FSW)								Total Ascent Time (M:S)	Chamber O ₂ Periods	Repet Group		
			100	90	80	70	60	50	40	30				20	
160 FSW															
7	5:20	AIR									0	5:20	0	E	
		AIR/O ₂									0	5:20			
10	4:40	AIR									4	9:20	0.5	F	
		AIR/O ₂									2	7:20			
15	4:20	AIR								2	10	17:00	0.5	I	
		AIR/O ₂								1	6	12:00			
In-Water Air/O ₂ Decompression or SurDO ₂ Recommended -----															
20	4:00	AIR							1	4	19	28:40	0.5	L	
		AIR/O ₂							1	2	10	18:00			
25	4:00	AIR							4	7	35	50:40	1	N	
		AIR/O ₂							4	4	17	30:00			
30	3:40	AIR							2	6	7	62	81:20	1.5	Z
		AIR/O ₂							2	6	4	26	42:40		
Exceptional Exposure: In-Water Air Decompression ----- In-Water Air/O ₂ Decompression or SurDO ₂ Required -----															
35	3:40	AIR							4	6	8	89	111:20	1.5	Z
		AIR/O ₂							4	6	4	34	57:40		
40	3:40	AIR							6	6	21	134	171:20	2	Z
		AIR/O ₂							6	6	11	38	70:40		
45	3:20	AIR				2	5	11	28	166	216:00	2.5	Z		
		AIR/O ₂				2	5	11	14	45	86:20				
Exceptional Exposure: In-Water Air/O ₂ Decompression ----- SurDO ₂ Required-----															
50	3:20	AIR				2	8	19	28	207	268:00	3			
		AIR/O ₂				2	8	19	15	55	113:20				
55	3:20	AIR				3	11	26	28	248	320:00	3			
		AIR/O ₂				3	11	26	14	67	135:20				
60	3:20	AIR				6	17	25	29	291	372:00	3.5			
		AIR/O ₂				6	17	25	15	77	154:20				
Exceptional Exposure: SurDO ₂ -----															
70	3:20	AIR				15	23	26	29	399	496:00	4.5			
		AIR/O ₂				15	23	26	15	99	197:20				
80	3:00	AIR				6	21	24	25	44	482	605:40	5.5		
		AIR/O ₂				6	21	24	25	23	114	237:00			

Table 9-9. Air Decompression Table (Continued).
(DESCENT RATE 75 FPM—ASCENT RATE 30 FPM)

Bottom Time (min)	Time to First Stop (M:S)	Gas Mix	DECOMPRESSION STOPS (FSW) Stop times (min) include travel time, except first air and first O ₂ stop								Total Ascent Time (M:S)	Chamber O ₂ Periods	Repet Group			
			100	90	80	70	60	50	40	30				20		
170 FSW																
6	5:40	AIR									0	5:40	0	D		
		AIR/O ₂									0	5:40				
10	5:00	AIR									6	11:40	0.5	G		
		AIR/O ₂									3	8:40				
In-Water Air/O ₂ Decompression or SurDO ₂ Recommended -----																
15	4:40	AIR									3	13	21:20	0.5	J	
		AIR/O ₂									2	6	13:20			
20	4:20	AIR									3	6	24	38:00	1	M
		AIR/O ₂									3	3	12	23:20		
25	4:00	AIR								1	7	7	41	60:40	1	O
		AIR/O ₂								1	7	4	20	37:00		
Exceptional Exposure: In-Water Air Decompression ----- In-Water Air/O ₂ Decompression or SurDO ₂ Required -----																
30	4:00	AIR								5	7	7	77	100:40	1.5	Z
		AIR/O ₂								5	7	3	30	50:00		
35	3:40	AIR					2	6	6	15	120	153:20	2	Z		
		AIR/O ₂					2	6	6	8	37	37	68:40			
40	3:40	AIR					4	6	9	25	158	206:20	2.5	Z		
		AIR/O ₂					4	6	9	12	44	44	84:40			
Exceptional Exposure: In-Water Air/O ₂ Decompression ----- SurDO ₂ Required-----																
45	3:40	AIR					5	7	16	28	197	257:20	2.5	Z		
		AIR/O ₂					5	7	16	14	53	109:40				
50	3:20	AIR				1	5	11	23	28	244	316:00	3			
		AIR/O ₂				1	5	11	23	14	66	134:20				
55	3:20	AIR				2	7	16	26	28	289	372:00	3.5			
		AIR/O ₂				2	7	16	26	14	77	156:20				
60	3:20	AIR				2	11	21	26	28	344	436:00	4			
		AIR/O ₂				2	11	21	26	14	88	181:20				
Exceptional Exposure: SurDO ₂ -----																
70	3:20	AIR				7	19	24	25	39	454	572:00	5			
		AIR/O ₂				7	19	24	25	20	109	228:20				
80	3:20	AIR				17	22	23	26	53	525	670:00	6			
		AIR/O ₂				17	22	23	26	27	128	267:20				
90	3:00	AIR			8	19	22	23	37	66	574	752:40	7			
		AIR/O ₂			8	19	22	23	37	33	148	319:00				
120	2:40	AIR		9	19	20	22	42	60	94	659	928:20	9			
		AIR/O ₂		9	19	20	22	42	60	46	198	454:40				
180	2:20	AIR	10	18	19	40	43	70	97	156	703	1159:00	11.5			
		AIR/O ₂	10	18	19	40	43	70	97	74	229	648:00				

Table 9-9. Air Decompression Table (Continued).
(DESCENT RATE 75 FPM—ASCENT RATE 30 FPM)

Bottom Time (min)	Time to First Stop (M:S)	Gas Mix	DECOMPRESSION STOPS (FSW)								Total Ascent Time (M:S)	Chamber O ₂ Periods	Repet Group				
			100	90	80	70	60	50	40	30				20			
180 FSW																	
6	6:00	AIR									0	6:00	0	E			
		AIR/O ₂									0	6:00					
10	5:20	AIR									8	14:00	0.5	G			
		AIR/O ₂									4	10:00					
In-Water Air/O ₂ Decompression or SurDO ₂ Recommended -----																	
15	4:40	AIR								2	3	14	24:20	0.5	K		
		AIR/O ₂								2	2	7	16:40				
20	4:20	AIR								1	5	7	29	47:00	1	M	
		AIR/O ₂								1	5	3	15	29:20			
25	4:20	AIR								5	6	7	57	80:00	1.5	O	
		AIR/O ₂								5	6	4	24	44:20			
Exceptional Exposure: In-Water Air Decompression ----- In-Water Air/O ₂ Decompression or SurDO ₂ Required -----																	
30	4:00	AIR								3	6	6	7	95	121:40	1.5	Z
		AIR/O ₂								3	6	6	4	34	63:00		
35	3:40	AIR				1	5	6	6	22	144	188:20	2	Z			
		AIR/O ₂				1	5	6	6	11	41	79:40					
Exceptional Exposure: In-Water Air/O ₂ Decompression ----- SurDO ₂ Required-----																	
40	3:40	AIR				2	6	5	13	28	178	236:20	2.5				
		AIR/O ₂				2	6	5	13	14	48	97:40					
45	3:40	AIR				4	5	10	20	28	235	306:20	3				
		AIR/O ₂				4	5	10	20	14	63	130:40					
50	3:40	AIR				4	8	13	25	29	277	360:20	3.5				
		AIR/O ₂				4	8	13	25	15	75	154:40					
55	3:40	AIR				5	11	19	26	28	336	429:20	4				
		AIR/O ₂				5	11	19	26	14	87	181:40					
Exceptional Exposure: SurDO ₂ -----																	
60	3:20	AIR				1	8	13	23	25	31	406	511:00	4.5			
		AIR/O ₂				1	8	13	23	25	16	100	205:20				
70	3:20	AIR				4	12	21	24	25	48	499	637:00	5.5			
		AIR/O ₂				4	12	21	24	25	24	119	253:20				

Table 9-9. Air Decompression Table (Continued).
(DESCENT RATE 75 FPM—ASCENT RATE 30 FPM)

Bottom Time (min)	Time to First Stop (M:S)	Gas Mix	DECOMPRESSION STOPS (FSW) Stop times (min) include travel time, except first air and first O ₂ stop								Total Ascent Time (M:S)	Chamber O ₂ Periods	Repet Group		
			100	90	80	70	60	50	40	30				20	
190 FSW															
5	6:20	AIR									0	6:20	0	D	
		AIR/O ₂									0	6:20			
10	5:20	AIR								2	8	16:00	0.5	H	
		AIR/O ₂								1	4	11:00			
In-Water Air/O ₂ Decompression or SurDO ₂ Recommended -----															
15	4:40	AIR							1	3	3	16	28:20	0.5	K
		AIR/O ₂							1	3	2	8	19:40		
20	4:20	AIR					1	2	6	7	34	55:00	1	N	
		AIR/O ₂					1	2	6	4	17	35:20			
Exceptional Exposure: In-Water Air Decompression ----- In-Water Air/O ₂ Decompression or SurDO ₂ Required -----															
25	4:20	AIR					2	6	7	7	72	99:00	1.5	Z	
		AIR/O ₂					2	6	7	3	28	51:20			
30	4:00	AIR				1	6	5	7	13	122	158:40	2	Z	
		AIR/O ₂				1	6	5	7	7	38	74:00			
Exceptional Exposure: In-Water Air/O ₂ Decompression ----- SurDO ₂ Required-----															
35	4:00	AIR			4	5	6	8	26	165	218:40	2.5	Z		
		AIR/O ₂			4	5	6	8	13	45	91:00				
40	3:40	AIR		1	5	5	8	17	28	217	285:20	3			
		AIR/O ₂		1	5	5	8	17	15	58	123:40				
45	3:40	AIR		2	5	6	12	24	29	264	346:20	3.5			
		AIR/O ₂		2	5	6	12	24	15	71	149:40				
50	3:40	AIR		3	5	10	17	26	28	324	417:20	4			
		AIR/O ₂		3	5	10	17	26	14	85	179:40				
Exceptional Exposure: SurDO ₂ -----															
55	3:40	AIR			4	8	10	24	25	30	397	502:20	4.5		
		AIR/O ₂			4	8	10	24	25	15	99	204:40			
60	3:40	AIR			5	10	16	24	25	40	454	578:20	5		
		AIR/O ₂			5	10	16	24	25	20	109	233:40			
90	3:20	AIR		11	19	20	21	28	51	83	626	863:00	8.5		
		AIR/O ₂		11	19	20	21	28	51	41	178	408:20			
120	3:00	AIR	15	17	19	20	37	46	79	113	691	1040:40	10.5		
		AIR/O ₂	15	17	19	20	37	46	79	55	219	551:00			

Table 9-9. Air Decompression Table (Continued).
(DESCENT RATE 75 FPM—ASCENT RATE 30 FPM)

Bottom Time (min)	Time to First Stop (M:S)	Gas Mix	DECOMPRESSION STOPS (FSW) Stop times (min) include travel time, except first air and first O ₂ stop								Total Ascent Time (M:S)	Chamber O ₂ Periods	Repet Group		
			100	90	80	70	60	50	40	30				20	
200 FSW															
Exceptional Exposure -----															
5	6:40	AIR									0	6:40	0	E	
		AIR/O ₂									0	6:40			
10	5:40	AIR								3	8	17:20	0.5	H	
		AIR/O ₂								2	4	12:20			
15	5:00	AIR							2	3	5	19	34:40	0.5	L
		AIR/O ₂							2	3	3	9	23:00		
20	4:40	AIR						2	4	6	7	43	67:20	1	O
		AIR/O ₂						2	4	6	4	20	41:40		
25	4:20	AIR				1	5	6	6	7	85	115:00	1.5	Z	
		AIR/O ₂				1	5	6	6	4	32	64:20			
30	4:20	AIR				4	6	5	7	19	145	191:00	2	Z	
		AIR/O ₂				4	6	5	7	10	42	84:20			
35	4:00	AIR			2	5	5	6	13	28	188	251:40	2.5		
		AIR/O ₂			2	5	5	6	13	14	51	106:00			
40	4:00	AIR			4	5	5	11	21	28	249	327:40	3.5		
		AIR/O ₂			4	5	5	11	21	14	68	143:00			
45	3:40	AIR	1	4	5	10	14	25	28	306	397:20	3.5			
		AIR/O ₂	1	4	5	10	14	25	14	81	168:40				
50	3:40	AIR	2	4	8	10	21	26	28	382	485:20	4.5			
		AIR/O ₂	2	4	8	10	21	26	14	97	201:40				
210 FSW															
Exceptional Exposure -----															
4	7:00	AIR									0	7:00	0	D	
		AIR/O ₂									0	7:00			
5	6:20	AIR								2	9:00	0.5	E		
		AIR/O ₂								1	8:00				
10	5:40	AIR							2	3	9	20:20	0.5	I	
		AIR/O ₂							2	2	4	14:40			
15	5:00	AIR				1	3	3	6	24	42:40	1	M		
		AIR/O ₂				1	3	3	3	12	28:00				
20	4:40	AIR			1	3	5	6	7	57	84:20	1	O		
		AIR/O ₂			1	3	5	6	4	23	47:40				
25	4:40	AIR			3	6	5	7	8	110	144:20	2	Z		
		AIR/O ₂			3	6	5	7	4	38	73:40				
30	4:20	AIR			2	5	6	6	6	26	163	219:00	2.5	Z	
		AIR/O ₂			2	5	6	6	6	13	45	93:20			
35	4:00	AIR	1	4	5	6	7	18	28	223	296:40	3			
		AIR/O ₂	1	4	5	6	7	18	14	60	130:00				
40	4:00	AIR	2	5	5	7	11	26	28	278	366:40	3.5			
		AIR/O ₂	2	5	5	7	11	26	14	76	161:00				
45	4:00	AIR	4	4	6	11	18	26	28	355	456:40	4			
		AIR/O ₂	4	4	6	11	18	26	14	91	194:00				
50	3:40	AIR	1	4	5	10	12	23	26	36	432	553:20	5		
		AIR/O ₂	1	4	5	10	12	23	26	18	105	223:40			

Table 9-9. Air Decompression Table (Continued).
(DESCENT RATE 75 FPM—ASCENT RATE 30 FPM)

Bottom Time (min)	Time to First Stop (M:S)	Gas Mix	DECOMPRESSION STOPS (FSW) Stop times (min) include travel time, except first air and first O ₂ stop											Total Ascent Time (M:S)	Chamber O ₂ Periods	Repet Group			
			130	120	110	100	90	80	70	60	50	40	30				20		
220 FSW																			
Exceptional Exposure -----																			
4	7:20	AIR													0	7:20	0	E	
		AIR/O ₂													0	7:20			
5	6:40	AIR													3	10:20	0.5	E	
		AIR/O ₂													2	9:20			
10	6:00	AIR										3	4	10	23:40	0.5	J		
		AIR/O ₂										3	2	5	17:00				
15	5:20	AIR										3	2	4	7	28	50:00	1	N
		AIR/O ₂										3	2	4	4	14	33:20		
20	5:00	AIR								2	4	6	6	7	7	70	100:40	1.5	Z
		AIR/O ₂								2	4	6	6	4	26	54:00			
25	4:40	AIR							1	5	6	6	6	6	14	133	176:20	2	Z
		AIR/O ₂							1	5	6	6	6	7	41	82:40			
30	4:20	AIR					1	4	5	6	6	6	10	28	183	248:00	2.5		
		AIR/O ₂					1	4	5	6	6	6	10	14	50	106:20			
35	4:20	AIR					3	5	5	5	5	10	22	28	251	334:00	3.5		
		AIR/O ₂					3	5	5	5	5	10	22	14	68	147:20			
40	4:00	AIR				1	4	5	5	9	15	26	28	319	416:40	4			
		AIR/O ₂				1	4	5	5	9	15	26	14	84	183:00				

250 FSW																		
Exceptional Exposure -----																		
4	7:40	AIR													4	12:20	0.5	F
		AIR/O ₂													2	10:20		
5	7:40	AIR													7	15:20	0.5	G
		AIR/O ₂													4	12:20		
10	6:20	AIR								2	2	4	3	15	33:00	0.5	L	
		AIR/O ₂								2	2	4	2	7	24:20			
15	5:40	AIR					2	2	3	4	6	7	53	83:20	1	O		
		AIR/O ₂					2	2	3	4	6	4	22	49:40				
20	5:20	AIR				2	2	4	6	6	6	6	11	125	168:00	2	Z	
		AIR/O ₂				2	2	4	6	6	6	6	39	82:20				
25	5:00	AIR				1	4	4	5	6	6	10	28	189	258:40	2.5		
		AIR/O ₂				1	4	4	5	6	6	10	14	51	112:00			
30	4:40	AIR			1	4	4	4	5	6	9	25	28	267	358:20	3.5		
		AIR/O ₂			1	4	4	4	5	6	9	25	15	72	160:40			
35	4:40	AIR			3	4	4	5	5	10	19	26	28	363	472:20	4		
		AIR/O ₂			3	4	4	5	5	10	19	26	14	93	203:40			

Bottom Time (min)	Time to First Stop (M:S)	Gas Mix	DECOMPRESSION STOPS (FSW) Stop times (min) include travel time, except first air and first O ₂ stop											Total Ascent Time (M:S)	Chamber O ₂ Periods	Repet Group
			130	120	110	100	90	80	70	60	50	40	30			

300 FSW

Exceptional Exposure -----																				
4	9:00	AIR													3	7	19:40	0.5	G	
		AIR/O ₂													2	4	15:40			
5	8:40	AIR													3	3	8	23:20	0.5	I
		AIR/O ₂													3	2	4	18:40		
10	7:20	AIR						2	3	2	3	4	7	35	64:00	1	N			
		AIR/O ₂						2	3	2	3	4	4	18	44:20					
15	6:20	AIR			1	2	2	3	3	5	6	7	11	125	172:00	2	Z			
		AIR/O ₂			1	2	2	3	3	5	6	7	6	39	86:20					
20	6:00	AIR		2	2	2	4	5	5	5	6	16	28	219	300:40	3				
		AIR/O ₂		2	2	2	4	5	5	5	6	16	14	59	137:00					
25	5:40	AIR	1	3	4	4	4	5	5	5	18	26	28	324	433:20	4				
		AIR/O ₂	1	3	4	4	4	5	5	5	18	26	14	85	195:40					

PO ₂ (atm)	Maximum Single Exposure (minutes)	OTU per minute
1.80	-	2.21
1.75	-	2.14
1.70	-	2.07
1.65	-	2.00
1.60	45	1.92
1.55	83	1.85
1.50	120	1.78
1.45	135	1.70
1.40	150	1.63
1.35	165	1.55
1.30	180	1.48
1.25	195	1.40
1.20	210	1.32
1.15	225	1.24
1.10	240	1.16
1.05	270	1.08
1.00	300	1.00
0.95	330	0.92
0.90	360	0.83
0.85	405	0.74
0.80	450	0.65
0.75	510	0.56
0.70	570	0.47
0.65	645	0.37
0.60	720	0.27
0.55	-	0.15
0.50	-	0

NPS DIVE PROJECT PLAN

Date(s) of Operations: _____ Consecutive Dive Days: _____
 Total # of Dives Planned: _____ # Planned Dives per Day: _____
 Depth Range of Dive Ops: _____
 Location of Operations: _____
 Dive Mode(s) Employed: Open Circuit Scuba ___ CCR ___ Surface Supplied ___ Hookah ___
 Breathing Gas(s) Employed: Air ___ Nitrox ___ Mixed Gas ___
 Primary Decompression Management: Dive Tables ___ Dive Computer ___ PC DECO Software ___
 Will any dives occur outside of no decompression limits? Y / N
 Dive Classification: Scientific ___ Public Safety ___ Maintenance ___
 NPS Dive Purpose: Nat Resource Mgt ___ Cult Resources Mgt ___ Interpretation ___ SAR ___ LE ___
 Maint/Inspection ___ Property Recovery ___ Training ___ Proficiency ___

Primary Dive Supervisor: _____ Principal Investigator: _____

Participants	Qualifications:	Diver	Tender	Dive Supervisor	Boat Operator
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

Description (General project description, dive tasks to be performed, platform, etc. Attach additional sheets as necessary):

Tools / Specialized Equipment to be Used (Attach additional sheets as necessary):

Potential Hazards and No Go Limits (Attach additional sheets as necessary):

Dive Emergency Evacuation Plan

Standard D.E.E.P Employed ___ Project Specific D.E.E.P Attached ___

Submitted by: (Print) _____ Signature: _____ Date: _____

Reviewed by: (Print) _____ Signature: _____ Date: _____

NPS DIVE EMERGENCY EVACUATION PLAN

Park: _____ **Project (If Applicable)** _____

Procedure for, location of, Pertinent Emergency Medical History and Diver Emergency Contact Information to accompany the diver/victim to medical facility:

Emergency Contacts:	Name	Phone (Office/Cell)	Radio Call Sign
Park Dispatch		/	
Chief Ranger	_____	/	_____
District Ranger	_____	/	_____
PDO	_____	/	_____
Area EMS	_____	/	_____
Helicopter	_____	/	_____
Life Flight	_____	/	_____
US Coast Guard	_____	/	_____
Divers Alert Network		919-684-9111 (Emergency) or 919-684-2948 (Med Info)	

Doctor or Medical Facility	Phone	Address
1 st Option: _____	_____	_____
2 nd Option: _____	_____	_____
3 rd Option: _____	_____	_____

Hyperbaric Chamber(s)	Phone	Address
1 st Option: _____	_____	_____
2 nd Option: _____	_____	_____
3 rd Option: _____	_____	_____

Procedures for Emergency Evacuation (Attach additional sheets as necessary):

Incident Notification	Name	Phone (Office/Cell)
Superintendent:	_____	/ _____
RDO	_____	/ _____
DSO	<u>Steve Sellers</u>	<u>303-969-2901</u> / <u>720-393-9000</u>

Submitted by: (Print) _____ Signature: _____ Date: _____

Reviewed by: (Print) _____ Signature: _____ Date: _____

NPS DIVE SAFE PRACTICES WORKSHEET	
PARK / PROGRAM:	
DIVING TASK:	
Description:	
Identified Hazards	Mitigations



**NATIONAL PARK SERVICE
DIVE PROGRAM**

**LIABILITY ACKNOWLEDGEMENT & RELEASE (DIVING)
FOR NON-FEDERAL EMPLOYEE PARTICIPANTS**

I, _____, am about to participate in a diving activity under the auspices of the National Park Service (NPS) described as follows:

_____.

I am aware of the inherent risks and hazards associated with diving, including, but not limited to, barotrauma, lung over-expansion injuries, decompression sickness, and drowning. I understand that diving exposes my body to increased pressure and that I may be injured as a result of participation in such activities despite following appropriate practices and adhering to established decompression tables and procedures. I also understand that diving is a physically strenuous activity and that I will be exerting myself during this activity.

I declare that I am in good mental and physical condition for diving, and that I am not now and will not be under the influence of any drugs that are contradictory to diving when diving. If I am taking medication, I declare that I have consulted with a physician and have approval to dive while under the influence of such medications/drugs.

In consideration of being allowed to participate in this activity, and on behalf of myself, my family, heirs, executors, representatives, administrators, employers, insurers and assigns, I hereby agree to release, save and hold harmless the NPS and its employees, and the entire U.S. Government, from any demand, claim or lawsuit for any harm, injury, damage or death that I may sustain arising in connection with any dive(s) or otherwise arising out of my participation in this activity. I recognize that I (or my employer where applicable) accept any and all responsibility for any harm, injury, or death that I may sustain as a result of this activity, including but not limited to responsibility for medical and related expenses, lost wages, and disability.

I further declare that I am of lawful age and legally competent to sign this liability release or I have had this document cosigned by my parent or legal guardian.

I hereby affirm that I have read this liability release and that I fully understand its contents.

Print Name: _____ Signature: _____

Date: _____ Parent or Guardian: _____



Pre-Dive Checklist		Post Dive Check List	
Prep		Precautions	
Safe Practices and Dive Emergency Evacuation Plan addressing dive mode/operation at the dive location		Check physical condition of divers	
Emergency Aid Information identified and at dive location (Numbers for: Hospital, Physician, Available Means of Transport, USCG Rescue Coordination Center)		Advise divers to report physical problems or adverse physiological including signs/symptoms of DCS	
Communication device adequate for dive location present and in working condition (Radio, Cell phone, Sat phone, etc.)		Advise divers of location of operational decompression chamber	
Dive team members have training and experience for operations and assignments?		Alert divers of potential hazards of flying or altitude exposure after diving	
First aid kit adequate for diving operation at dive location		Signs & Symptoms Review	
Decompression Tables at the dive location		DCS	AGE
Altitude corrections (if applicable)		Headache	Stroke
DPIC identified and qualified		Vertigo	Headache
Diver emergency medical & contact info up to date & available		Extreme Fatigue	Confusion
Oxygen kit checked, O ₂ supply adequate for planned operation		Skin Rash	Agitation
Drinking water		Joint Pain	Partial Paralysis
Dive Flags		Tingling	Unconsciousness
Tools		Muscle Weakness	Seizure
Necessary dive equipment and spares		Breathing Difficulty	Shock
Briefing		Unconsciousness	Shortness of Breath
Review team assignments			Chest Pain
Review diving equipment and systems			Cough Blood
Review thermal protection			Voice Change
Surface and underwater conditions and hazards			Skin Crackle
Review and log individual diver inert gas status		NOTES:	
Review decompression and treatment procedures (including altitude corrections)			
Tasks to be undertaken			
Review of line and/or hand signals			
Safety procedures for diving mode			
Unusual hazards			
Unusual environmental conditions			
Modifications to operating procedures			
Are divers fit to dive?			
Remind team members on procedures for reporting physical problems or adverse physiological effects during or after dive			
Pre-dive equipment inspections conducted?			
Breathing gas starting pressure confirmed and logged?			
Reserve breathing gas starting pressure confirmed and logged?			
Dive plan reviewed and logged?			
Review of emergency procedures			
Dive Site Prep			
Dive flag(s) displayed			
Water entry method identified			
Water exit method extends below water line			
Means to assist an injured diver identified and reviewed			
Diver/Buddy Checks conducted			

Definitions of NPS Dive Classifications:

1. Search, Rescue, and Recovery:
Dives involving searches for submerged victims relative to an accident.
2. Law Enforcement:
Dives involving investigation, violation or enforcement
3. Natural Resource Management:
Dives involving the protection, monitoring, inventorying, documentation, and survey of natural resources.
4. Cultural Resource Management:
Dives involving the protection, monitoring, inventorying, documentation, and survey of cultural resources.
5. Maintenance / Inspection:
Dives involving inspections, construction, repair removal, and salvage (boats, docks, buoys, water intakes, anchors etc.)
6. Property/Recovery:
Dives involving light salvage of property at marinas, docks, etc. for park needs.
7. Interpretation:
Dives for the primary purposes of visitor-related activities and education.
8. Training:
Dives for the primary purpose of specific training.
9. Proficiency
Dives for the primary purpose of proficiency and skills maintenance utilizing government issued/authorized equipment in compliance with [Section 5.3.5](#).
10. Recreational:
Any dives made by NPS Divers for non-NPS purposes

National Park Service Emergency Medical Information Card

First Name: _____ MI: _____ Last Name: _____
Birthdate (MM/DD/YYYY): _____ SSN: _____ - _____ - _____
Address: _____
Primary Phone Number: () _____ - _____ Secondary Number: () _____ - _____
Allergies: _____
Medications: _____
Health Insurance: _____ ID Number: _____
Important Medical History: _____
Emergency Contact Name _____ Relationship: _____
Primary Phone Number: () _____ - _____ Secondary Number: () _____ - _____

National Park Service Emergency Medical Information Card

First Name: _____ MI: _____ Last Name: _____
Birthdate (MM/DD/YYYY): _____ SSN: _____ - _____ - _____
Address: _____
Primary Phone Number: () _____ - _____ Secondary Number: () _____ - _____
Allergies: _____
Medications: _____
Health Insurance: _____ ID Number: _____
Important Medical History: _____
Emergency Contact Name _____ Relationship: _____
Primary Phone Number: () _____ - _____ Secondary Number: () _____ - _____

National Park Service Emergency Medical Information Card

First Name: _____ MI: _____ Last Name: _____
Birthdate (MM/DD/YYYY): _____ SSN: _____ - _____ - _____
Address: _____
Primary Phone Number: () _____ - _____ Secondary Number: () _____ - _____
Allergies: _____
Medications: _____
Health Insurance: _____ ID Number: _____
Important Medical History: _____
Emergency Contact Name _____ Relationship: _____
Primary Phone Number: () _____ - _____ Secondary Number: () _____ - _____

NATIONAL PARK SERVICE - DIVING INCIDENT REPORT FORM

NOTE: This form shall be used by Park Dive Officers (PDO's) to report serious diving related injuries including near-drowning, decompression sickness, gas embolism, lung overexpansion, or injuries that require hospitalization. Contact the Regional Dive Officer with questions about whether or not to report an incident.

I. GENERAL INFORMATION ON ACCIDENT VICTIM

DIVER NAME:	DATE & TIME OF INCIDENT:
PARK UNIT & LOCATION:	CERTIFICATION LEVEL:
CURRENT MEDICATIONS:	CURRENT HEALTH PROBLEMS:

Non-NPS divers complete this section. All other NPS divers skip to the next section.

AGE:	SEX: (M/F)	HIGHEST DIVE CERTIFICATION LEVEL:	CERTIFYING AGENCY:
# YEARS DIVING:	TOTAL # DIVES:	# DIVES LAST 6 MONTHS:	PREVIOUS DIVE INCIDENTS & DATE:

II. EQUIPMENT USED BY ACCIDENT VICTIM

BREATHING LOOP: <input type="checkbox"/> Open-Circuit <input type="checkbox"/> Semi-Closed / Closed Circuit <input type="checkbox"/> Surface Supplied <input type="checkbox"/> Snorkel	DIVER DRESS: <input type="checkbox"/> None/Dive Skin <input type="checkbox"/> Wet Suit thickness _____ <input type="checkbox"/> Dry Suit	DIVE CYLINDER TYPE AND SIZE: BREATHING GAS:	CYLINDER PRESSURE IN: CYLINDER PRESSURE OUT:	NPS ISSUED EQUIPMENT? <input type="checkbox"/> YES <input type="checkbox"/> NO DIVER FAMILIAR WITH EQUIPMENT?
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III. DIVE INFORMATION - Incident Dive

NAME - ON-SITE DIVEMASTER OR LEAD DIVER:	AIR TEMP (°F):	WATER TEMP (°F):	U/W VIS (FT):	CURRENT SPEED (KTS):
NAME - DIVE BUDDY:		DIVE PURPOSE & LOCATION:		
DIVE BUDDY AFFILIATION: <input type="checkbox"/> NPS <input type="checkbox"/> OTHER _____		DIVE PLATFORM:	SURFACE CONDITIONS:	
# DIVES, DAY OF INCIDENT:	# DIVES, PREVIOUS DAY:	TYPE OF DIVE: <input type="checkbox"/> Duty <input type="checkbox"/> Non-Duty	DIVE(S) CONDUCTED WITH: <input type="checkbox"/> Dive Tables <input type="checkbox"/> Dive Computer (Model _____)	
<input type="checkbox"/> YES <input type="checkbox"/> NO Was this dive typical of diver's normal type of diving? If NO, explain:				

List any problems encountered during incident dive or previous dives:

IV. DIVE PROFILE(S) - Day of Incident

DIVE #	START TIME	MAX DEPTH (FT)	BOTTOM TIME (MINS)	END TIME	SURFACE INTERVAL (HR:MIN)	DECO STOP? (Y/N)	SAFETY STOP? (Y/N)	STOP PROFILE (DEPTH / TIME)	COLD OR ARDUOUS? (Y/N)	FAST ASCENT? (Y/N)	INCIDENT DIVE? (Y/N)
1.											
2.											
3.											
4.											
5.											
6.											

NOTE: Additional dive profiles for the day of the diving incident can be attached to this form.

V. EMERGENCY PROCEDURES

YES NO

- Emergency oxygen available on-site?
- Emergency scenarios (low on air, out of air, lost buddy, etc.) discussed with all divers prior to diving operations?

YES NO

- Dive accident management plan in place for dive site?
- Dive accident management plan reviewed by all divers and support persons prior to diving operations?

VI. SIGNS/SYMPTOMS & ON-SITE MEDICAL TREATMENT

DATE OF INJURY ONSET:	SIGNS, SYMPTOMS, AND LOCATION ON BODY:		
TIME OF INJURY ONSET:			
PRE-DIVE HEALTH, DESCRIBE:	FATIGUE/LACK OF SLEEP PRIOR TO DIVE?: <input type="checkbox"/> YES <input type="checkbox"/> NO	ALCOHOL CONSUMPTION, PREVIOUS 24 HRS:	STRENUOUS EXERCISE 6 HRS PRE OR 12 HRS POST DIVE?: <input type="checkbox"/> YES <input type="checkbox"/> NO
INJURIES SUSPECTED: <input type="checkbox"/> AGE <input type="checkbox"/> DCS <input type="checkbox"/> Other Barotrauma <input type="checkbox"/> None <input type="checkbox"/> Other _____	ON-SITE FIRST AID TREATMENT:		
	ON-SITE OXYGEN ADMINISTRATION: Delivery Method _____ Time Started _____ Time Stopped _____		
	INITIAL EMERGENCY CONTACT (NAME OF PERSON OR AGENCY):		TIME CONTACTED:
EMERGENCY TRANSPORT METHOD(S):	FIRST AID DURING TRANSPORT:	TIME TRANSPORT STARTED:	

VII. MEDICAL INFORMATION - Hospital (Attach ALL ER, Hyperbaric Unit, and follow-up medical records)

HOSPITAL NAME AND LOCATION:		HOSPITAL TREATMENT:		ARRIVAL DATE AT ER:	
				ARRIVAL TIME AT ER:	
HYPERBARIC UNIT NAME AND LOCATION:		CHAMBER TYPE: <input type="checkbox"/> Monoplace <input type="checkbox"/> Multiplace	CHAMBER TREATMENT: #1 Time Started _____ Time Stopped _____ #2 Time Started _____ Time Stopped _____ #3 Time Started _____ Time Stopped _____		
TREATMENT TABLE / DESCRIPTION:		TABLE EXTENSIONS:	RETREATMENT TABLE / DESCRIPTION:		
DESCRIBE WHEN RELIEF FROM SYMPTOMS OCCURRED:	DESCRIBE ANY RESIDUAL SYMPTOMS AFTER TREATMENT:	DURATION OF RESIDUAL SYMPTOMS: _____ Days	FINAL DIAGNOSIS: <input type="checkbox"/> DCS I <input type="checkbox"/> AGE <input type="checkbox"/> Other: _____ <input type="checkbox"/> DCS II <input type="checkbox"/> Pulm. Barotrauma _____		

NOTE: A Diving Incident Report shall be completed by the Park Dive Officer and be submitted to their Regional Dive Officer within 10 days of the diving incident. This report shall consist of the following items:

1. **Diving Incident Report Form**
2. A **cover memorandum** providing a narrative of the diving incident, including a causal analysis and recommendations for prevention of future injuries.
3. **Medical records** associated with any medical treatment of injuries resulting from this incident.

The **Regional Dive Officer** shall submit the report, along with their own causal analysis and recommendations for prevention of future injuries to the Chair of the NPS National Dive Control Board **within 45 days of the incident**

PRINTED NAME - PDO

SIGNATURE - PDO

DATE



Field Neurological Assessment

History

Diver First Name: _____ MI: _____ Diver Last Name: _____

Date: _____ Time: _____ Retest Number _____ of _____ Name of Examiner: _____

Conduct FAST

Check the Boxes to Indicate Any Problems or Failures

No Deficiencies Observed

- Facial Symmetry (smile/frown)
- Arms (have patient raise arms for approx. 10 sec., close eyes: *look for one arm drifting down*)
- Speech/Sudden Headache (have patient repeat phrase: *You can't teach an old dog new tricks.*)
- Time (if signs of one or more of the above is present: *activate DEEP*)

If any boxes above are checked, administer O2 and begin transport immediately.

Vital Signs

Time O₂ Therapy Began _____ Respirations/ Min _____ Pulse _____
 Blood Pressure _____ Pupils (Equal & Reactive) _____ SPO₂ (If available) _____

Complete SAMPLE

Check the Boxes to Indicate Any Problems or Failures

No Deficiencies Observed

Signs and Symptoms:

Symptoms Began: Before Dive During Descent At Depth During Ascent On Surface Time _____

- Symptoms Experienced:
- Numbness/Tingling
 - Difficulty Breathing
 - Dizziness/Light Headed
 - Vertigo/Imbalanced
 - Difficulty Walking
 - Arm/Leg Weakness
 - Visual Disturbance
 - Ringing Ears
 - Decreased Hearing
 - Nausea
 - Vomiting
 - Rash/Itching

Details: _____

Allergies: _____

Medications: _____

Pre-existing Conditions/ Past History: _____

Last Oral Intake (Substance and Time): _____

Events Leading to Incident: _____

Mental Function

Consciousness: Alert Verbal (responds to verbal stimuli) Pain (responds to painful stimuli) Unresponsive

Orientation: (check correct responses)

- What is your name?
- Where are you?
- What is the date and time?
- Why are you here?

Ability to Follow Commands: Ask Diver to.... (check diver's ability to respond)

Stick out your tongue and close your eyes Yes No

Name three surrounding objects: _____ Yes No

Count backwards from 100 by 7s (circle missed numbers)
93 86 79 72 65 58 51 44 37 30 23 16 9 2

Explain the relationship between: Student/Teacher; Dog/Puppy; etc. Yes No

Recall the three surrounding object previously identified Yes No

NOTE: Send forms with Medical Personal If available, attach dive buddy and witness comments to Neurological Assessment.



Field Neurological Assessment

Cranial Nerves

Check the Boxes to Indicate Any Problems or Failures

No Deficiencies Observed

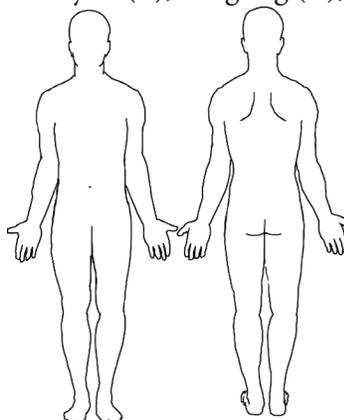
Eyes (track any directional difficulties): Up Down Left Right Towards Nose
 Hearing Symmetry (rub fingers together equidistant from ears): No Yes -> Problem in: L R
 Touch (identify any altered sensation while eyes closed): Forehead L R Cheek L R Chin L R
 Jaw L R Hands L R Feet L R Other _____ L R

Motor Function and Coordination

Identify functions in blanks: Normal (N), Weak (W), Paralysis (P), Tingling (T), Numbness (B), Pain (PN)

Upper Body
 Shoulder Shrug _____ L _____ R
 Bicep Curl _____ L _____ R
 Tricep Push _____ L _____ R
 Finger Spread _____ L _____ R
 Grip Strength _____ L _____ R

Lower Body
 Leg Lifts _____ L _____ R
 Quad Extensions _____ L _____ R
 Hamstring Pull _____ L _____ R
 Foot-up _____ L _____ R
 Foot-down _____ L _____ R



Indicate on body outlines where discomfort or abnormal sensations are occurring.

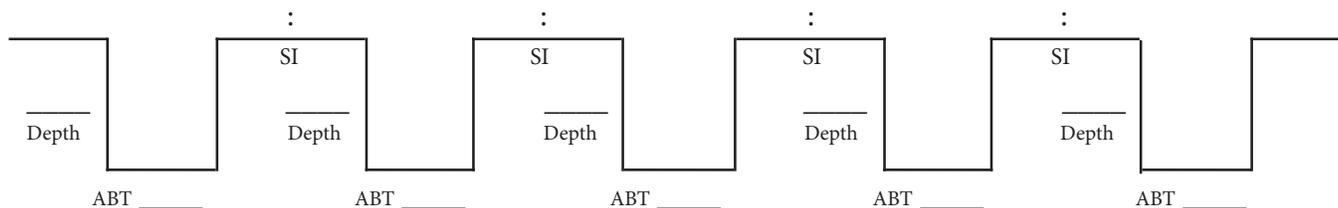
Does moving effect pain level? Yes No Increase Pain Decrease Pain
Normal Bladder/ Bowel Movement: Yes No Unknown
Walk (heel-toe) for 10 feet: Normal Wobbly Fail
Finger-Nose-Finger Matching: Normal Few Missed Fail
Romberg (eyes closed, feet together, arms raised to side): Normal Swaying Fail
Does O₂ relieve symptoms? Yes No Unknown

Dive Profile

Incident Dive Bottom Time: _____ Depth: _____ Dive Partner: _____
 Breathing Gas(es): _____ Deco Method: _____ Safety Stop: Time _____ Depth _____
 Time Reached Surface: _____ Deco Schedule: _____
 Number of Continuous Dive Days: _____ Diving Mode: _____
 Rapid Ascent Missed Decompression Out of Air Ascent

Details: _____

Dive Profile for the Past 24 Hours



Comments/Observations: _____