

Reference Manual – 4

Diving Safety and Operations Manual

Approved:

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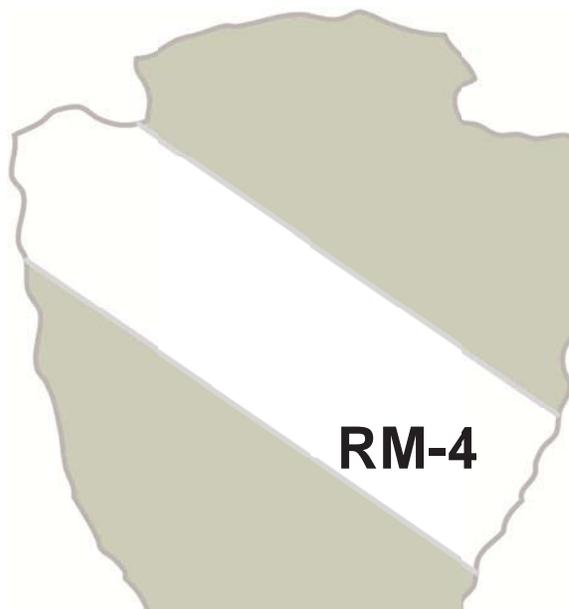


National Park Service
U.S. Department of the Interior

National Park Service

DIVING SAFETY AND OPERATIONS MANUAL REFERENCE MANUAL- 4

2014



RM-4

ERRATA

The following changes have been made to RM-4 since the last revision released in August of 2013:

Section 2.1.4 – Changed “Chief” to “Manager”. Three changes: chapter section list; section title; line four in paragraph.

Section 2.1.9.B.ii.2 – Changed “Emergency Diving Operations” to read “Public Safety Diving Operations”

Section 4.2.C.iii – Changed “Emergency Diving Operations Plan” to read “Public Safety Diving Operations Plan”, Changed “EDOP” to read “PSDOP”

Section 4.3.2.A.i – Changed “relative to an accident” to read “or conveyances”

Section 4.3.2.C – Changed section title from “Emergency Diving Operations Plan” to read “Public Safety Diving Operations Plan”

Section 4.6.4.C.i – Modified sentence to read “...all necessary equipment, or operations will be conducted from land or other suitable platform”.

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Chapter 1 Authorities, Scope, and Implementation

- 1.1 Introduction
 - 1.2 Authorities
 - 1.3 Scope
 - 1.4 Requirement
 - 1.5 Procedure for Change
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-

1.1 Introduction

- A. The National Park Service (NPS) manages many areas requiring underwater diving operations. Such operations are essential to the management and use of recreational, natural, and cultural resources, as well as resource and visitor protection. NPS dive operations are conducted for scientific, public service/safety, and Park maintenance and infrastructure purposes. These designations are defined in Chapter 4, Diving Operations, Section 4.3 Dive Classifications, of this manual.
- B. Diving can be an appropriate management function and recreational activity within the waters administered by NPS. Dives are conducted to protect submerged natural, cultural, and scientific features; provide visitor protection services; and for purposes of visitor enjoyment of park resources. Recreational diving is permitted only where compatible with other park uses and may be limited in time and/or area by the superintendent. Public safety is continuously fostered.

1.2 Authorities

- 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 as set out in 29 CFR 1910.401(a). NPS diving operations not meeting the criteria for 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. 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. current American Academy of Underwater Sciences [AAUS] standards) as reviewed and approved by the NPS National Dive Control Board.

1.3 Scope

- A. This policy (RM-4) covers management of and safe diving practices for Park Service divers and Park Service dive operations.
- B. Recreational Diving within park areas is beyond the scope of this policy. *NPS Management Policies*, Chapter 8.2; and statutory authorities provided to the superintendent to control and manage 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 license and/or permit regarding identification of hazardous conditions and/or sensitive resources issues.
- D. Commercial diving operations involving private salvage, marine construction, industrial inspection, and private sector commercial diving done to support concessionaire or NPS operations and infrastructure which 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 Park Dive Officer (PDO) and/or Regional Dive Officer (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 operating within NPS waters on a Scientific Research and Collecting Permit are also beyond the scope of this document. 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 permit regarding identification of hazardous conditions and/or sensitive resources issues.

1.4 Requirement

- 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), and this document (Reference Manual 4).
- 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 Section 2.1.5 of this standard.
 - ii. The PDO will coordinate the production of a Program Specific Dive Supplement (see Section 4.1) which has been reviewed and approved by the Park leadership, and the Regional Dive Officer (RDO) on an annual basis, at a minimum.

1.5 Procedures for Change

- A. Revision to Reference Manual 4 – Diving Safety and Operations Manual (RM-4) shall be made by the National Diving Control Board (NDCB). The board will review RM-4 annually. RM-4 and any interim changes will be issued by signature of the Associate Director, Visitor and Resource Protection.

1.6 Record of Change

- A. A record of change of this document shall be distributed electronically to all NPS units with dive programs as changes are implemented.

1.7 Implementation

- A. The NPS Diving Program is managed under a diving safety manual and diving safety control board model for scientific diving which contains the elements described in 29 CFR 1910.401(a)(iv).
- B. The responsibility for implementation, funding, and 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, capabilities of local diving affiliates, workload, and associated costs. When a superintendent decides to implement a diving program, he/she is mandated to manage it according to this Reference Manual.

Chapter 2 Operational Control

- 2.1 Organizational Levels and Functions
 - 2.1.1 Director and Deputy Director
 - 2.1.2 Associate Director, Visitor and Resource Protection
 - 2.1.3 Chief, Law Enforcement, Security and Emergency Services
 - 2.1.4 Park Superintendent or NPS Program Manager
 - 2.1.5 National Diving Control Board
 - 2.1.6 Dive Program Manager
 - 2.1.7 Regional Dive Officer
 - 2.1.8 Park Dive Officer
 - 2.1.9 Dive Safety Officer (DSO)
 - 2.1.10 NPS Dive Instructor (DI)
 - 2.1.11 Dive Supervisor
 - 2.1.12 Dive Examiner (DE)
 - 2.1.13 NPS Diver
 - 2.1.14 NPS Lead Diver
 - 2.1.15 National Advisors for Diving (NADs)
 - 2.2 Incident/Accident Reporting, Investigation and Review
 - 2.2.1 General Incident/Accident Reporting and Recordkeeping Requirements
 - 2.2.2 Incident/Accident Investigation
 - 2.2.3 Incident/Accident Review
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2.1 Organizational Levels and Functions

2.1.1 Director and Deputy Director

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

2.1.2 Associate Director, Visitor and Resource Protection

The Associate Director, Visitor and Resource Protection, is responsible for signature and release of dive policy put forward for consideration by the National Dive Control Board (NDCB), and providing effective review and oversight of the NPS Dive Program.

2.1.3 Chief, Law Enforcement, Security, and Emergency Services

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

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.

2.1.5 National Diving Control Board (NDCB)

A. Composition

- i. The NDCB will be made up of a majority of active divers. An active diver is defined as one who has logged a minimum of 12 dives per year. 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 3.6.3, 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. Chief of Submerged Resources Center, or designee
- v. Associate Director, Natural Resource Stewardship and Science, or designee
- vi. Dive Safety Officer: Ex Officio, non-voting

C. Officers

- i. The NDCB will have a Chair and a Vice Chair, who will be Regional Dive Officers.
- ii. These officers will serve in 2 year elected terms.

D. Meetings

- i. The NDCB will meet annually or more often when necessary.
- ii. A quorum will consist of five 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 DSO, training and safety standards, and dive policy to be implemented nationally and locally.
- ii. Issues written interpretation of NPS RM-4 dive policy as needed for safe and effective operations, or where questions related to field implementation exist.
- iii. Develops technical manuals.
- iv. Develops/maintains a diving information management system.
- v. Recommends changes in NPS diving policy.
- vi. At least annually:
 1. Develops, reviews, updates, and modifies NPS Dive Standards for field implementation
 2. Reviews NPS divers with regard to depth and other relevant certifications/requirements, and 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 audits of NPS Diving Programs with regard to compliance to the NPS Diving Safety and Operations Manual (RM-4) 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
 - vii. Reviews NPS Diving Incidents and Near Misses, modifies diving standards accordingly, and disseminates lessons learned.
 - viii. Develops/maintains liaison with other groups.
 - ix. Adjudicates appeals related to NPS Diving from areas or regions, or divers.
 - x. Approves NPS Dive Instructors.
 - xi. Secures funding, reviews regional programs, for Servicewide training.
 - xii. Establishes criteria for equipment selection and use.
 - xiii. Recommends new equipment or techniques.
 - xiv. Conducts dive program reviews on request from PDOs, RDOs, superintendents, or as needed.

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. The branch chief secures funding for Servicewide training and equipment, and works with the NDCB to represent NPS to external organizations.

2.1.7 Regional Dive Officer (RDO)

- A. The RDO, an NPS diver, will be appointed in writing by the Regional Director. This individual plans, directs, develops, coordinates, and advises on all phases of the Regional Diving Program. In doing so, the RDO serves as a technical advisor to the Associate Regional Director for Park Operations, or their designee. It is required that each RDO must have held a nationally recognized Instructor or Dive Master credential and have completed NPS Dive Leadership Training (See Section 3.5.1), or have completed NPS Dive Instructor Training (See Section 3.5.3). Dive Master or Instructor credential need not be maintained current or active with the non-NPS issuing agency. The RDO will:
 - i. Annually review park dive programs including RM-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 the NPS Diving Safety and Operations Manual (RM-4) and safe diving related practices on an as needed basis.
 - iii. Develop regional diving practices in line with current policy as required.
 - iv. Establish record keeping procedures for all diving programs, personnel, and equipment in the region.
 - v. Function as coordinator for all regional workshops and principal diving courses.
 - vi. Certify Divers with NPS Blue Card. (See Section 3.4)
 - vii. Collaborate on Servicewide dive programs with Service Training Offices, other RDOs and cooperating agencies. Prioritizes and selects those divers who will attend Servicewide courses.

- viii. Organize and/or coordinate those emergencies or incidents that exceed the ability of individual areas to manage safely or efficiently. The RDO has the authority to suspend/modify these operations as appropriate.
 - ix. Advises PDOs with regard to the use of personally-owned diving equipment when questions arise.
 - 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 submittal of annual diver summaries to NDCB for review
 - xiv. Act as subject matter expert to assist PDO in matters of policy, equipment and other forms of expertise.
 - xv. Review and approve dive program reciprocity 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. Evaluate the condition/credentials of incoming divers.
 - xvii. Designate Diving Examiners.
 - xviii. Review special equipment requirements.
 - xix. Provide park managers information on specialty dive situations.
 - xx. Serve as a member of 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 will be made by the NDCB Chair or Vice-Chair. Examples of conflict of interest include: approval of the individual's Blue Card, approval of Blue Cards for all divers under the individual's purview as PDO, review of the Program Specific Dive Supplement, Appeals for Blue Card revocation for divers under the individual's purview as PDO, etc.

2.1.8 Dive Safety Officer (DSO)

- A. The DSO is an active 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 possess 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 Diving Safety and Operations Manual (RM-4) 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 diver life support, or physiological monitoring equipment, 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 raising to the level of a SAI.

2.1.9 Park Dive Officer (PDO)

- A. In areas having diving programs, the superintendent shall be responsible for its management. The manager shall appoint a PDO in writing 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 PDO shall be an NPS Diver and have, as a minimum, been trained and certified as a Dive Master, or government equivalent, from an NDCB recognized agency and completion of an NPS Diving Leadership crossover workshop or NPS Dive Master/Leadership Course within two years of appointment. Dive Master Certification need not be current. 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-4 Standards may result in a letter of non-compliance to the Superintendent from the RDO and/or NDCB.
- B. The PDO:
 - i. Performs as the area's subject matter expert on matters pertaining to overall park management and goals.
 - ii. Prepares/transmits the following to the RDO:
 - 1. Program Specific Dive Supplement (annually)
 - 2. Public Safety Diving Operations Plan (annually)
 - 3. Annual Diver Certification Form (annually)
 - 4. Validated Diver Entry requirements
 - 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 for items listed (Section 3.8.3) 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 (Exhibit 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 Dive Management System (DMS).
 - vii. Insures Park/Program divers transmit a copy of their completed medical examination forms (See Exhibits 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 Annual Diver Certification Form 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.

2.1.10 NPS Dive Instructor (DI)

- A. A DI must have held an instructor's credential from any nationally recognized diving certifying agency, or government equivalent; have completed NPS Dive Leadership Training; and been reviewed and approved by the NDCB. An Instructor Certification received from a nationally recognized diving certification agency does not need not to be maintained as current. A DI will serve as core staff at NPS Dive Workshops and may conduct Special Circumstance Dives (See Section 6.5.3). A DI must be approved by the RDO with concurrence of the NDCB. An NPS DI qualifies as an NPS Dive Examiner.
- B. An NPS Dive Instructor must:
 - i. Be employed by the National Park Service
 - ii. Maintain an active Blue Card certification
 - iii. Participate as core staff of NPS 40hr dive training every three years
 - iv. Be reviewed annually by the NDCB

2.1.11 Dive Supervisor

- 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 dive supervisor must have experience and training in the conduct of the assigned diving operations. The dive supervisor shall be responsible for:
 - 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 held a Dive Master certification (at a minimum) from a recognized scuba certifying agency (non-NPS), or hold government equivalent training; be recommended by the PDO; and be approved by the RDO. Non-NPS certification need not be maintained current. The DE may perform checkout dives with incoming divers and may supervise Annual Blue Card Skills demonstrations.

2.1.13 NPS Diver

- A. A diver meeting and maintaining all NPS Blue Card requirements outlined in 3.2 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, the Lead Diver of record will be the diver holding the deeper depth certification.

2.1.15 National Advisors for Diving (NADs)

- A. The NADs will represent the professional, scientific, and operational dive industry, and will provide ad hoc advice to the NDCB. These advisors shall have national and, optimally, international recognition in the field of diving. These advisors will be appointed by the NDCB. (See Exhibit XIII)

2.2 Incident/Accident Reporting, Investigation and Review

2.2.1 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 29 CFR 1904 – Recording and Reporting Occupational Injuries and Illnesses.
- B. All 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

2.2.2 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 \$250,000 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 may 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 RDO within 24 hours. 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 (Exhibit XII) must be submitted to the RDO via the NPS Dive Management System or hard/electronic copy within 10 days of incident. In addition, a Board of Review must 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.

- 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.

2.2.3 Incident/Accident Review

- A. At the minimum, all dive incidents will be reviewed by the responsible PDO and RDO.
- 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 policies and safety practices.

Chapter 3 Training and Certification Requirements

3.1	<u>Scope</u>	3.6.2	<u>Public Safety Diving</u>
3.2	<u>Waiver of Requirements</u>	3.6.3	<u>Scientific Diving</u>
3.3	<u>Training Provisions</u>	3.7	<u>Dive Mode Training</u>
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3.6	<u>Dive Classification Training Requirements</u>	3.9.5	<u>Altitude Diving</u>
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		3.9.7	<u>Other Specialized Environments</u>
		3.10	<u>Specialized Diving Equipment Training Requirements</u>

3.1 Scope

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

3.2 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. 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.

3.3 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. 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 insure that equipment is returned to its original, operational configuration.

- C. 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.

3.4 NPS Blue Card Certification

- A. Individuals who have successfully completed NPS diver certification requirements, documented by the PDO to the RDO, will be issued an NPS Blue Card. This physical card is proof of the individual's initial certification but is not evidence of certification currency. 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.

3.4.1 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.

3.4.2 Requirements for NPS Blue Card Certification

- A. No dives may be made under the auspices of RM-4 without prior certification, except for evaluation purposes.
- B. The following are requirements for NPS certification:
 - i. Medical clearance.
 - ii. Dive experience log.
 - iii. 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.
 - iv. Successful completion of the NPS swim/physical fitness test as per Exhibit VII (Entry Level and Annual Refresher Worksheet). Both Entry Level and Annual Refresher requirements will be met the first year, and Annual Refresher requirements will be met every year thereafter.
 - v. Successful completion of high pressure cylinder handling training.
 - vi. Successful completion (80 %) of written examination that includes the use of the repetitive dive tables. (See Exhibit X)
 - vii. 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 anytime for cause by the PDO or RDO.
 - viii. The PDO compiles the necessary information as required and sends it to the RDO through the park superintendent.
 - ix. Final approval of NPS Blue Card certification is granted by the RDO.

3.4.3 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 RDO, or designee, 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 (Exhibit VII - 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 Annual Diver Certification Form (Exhibit VII - Annual) through the NPS Dive Management System (DMS).
 - vii. Currency with 40-hour NPS Core Dive Workshop requirement (See Section 3.4.4).
- 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 Exhibit VII - 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.

3.4.4 Periodic Training Requirements

- A. NPS 40-Hour Core Dive Workshop
- 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 Workshop within 3 years from the date of initial issuance of Blue Card and every 3 years thereafter, see Exhibit VIII. It is strongly recommended that divers who are not actively diving seek more than the 3-year formal requirement. The RDO should actively assist in this interpretation. Before attendance at any NPS-sponsored training, candidates shall successfully complete medical requirements (See Section 3.4.5) and have a Diving Fitness Medical Evaluation Report (Exhibit II) on file with the PDO, and should meet criteria given in Exhibit VII (Entry Level/Annual Refresher Worksheet). The candidate must be willing to operate under these guidelines, be safety conscious, and demonstrate the ability to work in a team effort.
 - ii. The objective of the training program is to permit diving personnel to support Park management and operations. Although it is expected that, initially, new divers will usually be certified at the "basic" level, it is necessary that operational skills be acquired as quickly as possible.
 - iii. Available training options may be area-based, region, or Servicewide.
 - iv. Adult CPR, First Aid, and oxygen administration, do not count toward 40-Hour Core Workshop Requirements.

B. Annual Continuing Education Requirement

- i. In addition to the 40-hour NPS Core Dive Workshop, 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:
 - 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.
 - 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.
 - Service-wide Training
 - a. This training consists of periodic courses that are coordinated by the DSO with the approval of the NDCB.
 - 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.

3.4.5 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.
- 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 Exhibits I-II)
- 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*. The MSP utilizes contract occupational medical examination services for applicants and employees. The MSP is the designated site for records management and storage of Medical Examination Forms and associated medical documents. 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. The Rule requires appropriate safeguards to

protect the privacy of personal health information, and sets limits and conditions on the uses and disclosures that may be made of such information without patient authorization. The Rule also gives patients' rights over their health information, including rights to examine and obtain a copy of their health records, and to request corrections.

- E. 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.
- F. The cost of all required medical examinations will be paid for by the government for employees.
- G. Information derived from medical examinations will be protected in accordance with the Healthcare Insurance Portability and Accountability Act (HIPAA) and subsequent legislative modifications.
- H. Medical Examination Requirements
 - i. Pre-Placement/Baseline/Exit:
 - 1. Authorization for Disclosure Form
 - 2. General Medical History
 - 3. General Physical Examination
 - 4. Chemistry Panel (including Glucose, Bilirubin (total), Cholesterol, HDL-C, LDL-C, Triglycerides, GGTP, LDH, SGOT, SGPT, Complete Blood Count, and Urinalysis)
 - 5. Audiometry (include noise exposure history)
 - 6. Electrocardiogram
 - 7. Spirometry
 - 8. Vision Screening (Corrected and Uncorrected Near and Far; Color; Peripheral; Depth Perception)
 - 9. (For age 40 and over) Multi Risk Factor Assessment (age lipid profile, blood pressure, diabetic screening)
 - 10. Chest X-Ray (PA/Lat)
 - 11. Blood Type and RH
 - 12. Sickle Cell Prep
 - ii. Periodic Re-exam (every three years until age 60 and every two years thereafter):
 - 1. Authorization for Disclosure Form
 - 2. General Medical History
 - 3. General Medical Examination
 - 4. Chemistry Panel (including Glucose, Bilirubin (total), Cholesterol, HDL-C, LDL-C, Triglycerides, GGTP, LDH, SGOT, SGPT, Complete Blood Count, and Urinalysis)
 - 5. (For age 40 and over) Multi Risk Factor Assessment (age lipid profile, blood pressure, diabetic screening)
 - 6. Audiometry (include noise exposure history)
 - 7. Vision (Corrected and Uncorrected Near and Far)
 - 8. Chest X-Ray (PA/Lat)
 - 9. Electrocardiogram

3.4.6 Types of Certification or Status

- A. The levels of diver certification status in the NPS are: Diver-In-Training, Active, Restricted, Inactive, and Retired.
 - i. Diver-In-Training (DIT) – This is the entry level into the NPS Diving Program. The Blue

Card will be marked accordingly. Conditions/requirements are:

1. Complete the items identified under “Requirements for NPS Certification.”
 2. Must be accompanied by NPS divers or divers approved by PDO on NPS dives.
 3. Depth certification for DITs will not exceed 30 feet. DITs will not dive deeper than 60 feet and divers must be accompanied by a diver certified to that depth. The 30-foot depth level will be retained until the DIT has made at least 12 NPS dives and a DE or PDO recommends to the RDO that the status be changed from DIT to Diver.
 4. 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.
 5. The PDO must approve NPS dives involving any DIT.
- ii. 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 3.4.3)
 - iii. Restricted Status – NPS Divers who have deficiencies related to Annual Certification Requirements (Exhibit VII - Annual) or 40 Hour Core Dive Workshop requirements will be placed on Restricted Status. Divers placed on restricted status may continue to dive under restrictions agreed to by the PDO and RDO. Restricted Status divers may not act as a Lead Diver or Dive Supervisor in any NPS diving operation. Additionally, a Restricted Status diver may not serve as a diver in emergency operations.
 - iv. Inactive Status – NPS Divers who remain in Restricted Status for more than one year or allow Medical Examination requirements to lapse (See Section 3.4.5) will be 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-4 requirements and any required mitigations imposed by the RDO or NDCB must be met for approval to be reinstated to Active Status.
 - v. 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.

3.4.7 Depth Certification

- A. Depth certification is not considered an indication of diving expertise, but will reflect the need of a particular diving operation. A given Depth Certification indicates the diver has demonstrated the skills and abilities necessary to manage the task loading associated with performing work underwater, as well as performing the tasks associated with safe individual diving skills and buddymanship; not the diver’s ability to achieve and return from a particular depth. Certification will authorize the holder to dive to the depth indicated on the Blue Card. The RDO will authorize these depths. NPS Depth Certification criteria are:
 - i. Depth increments are 30 (DIT), 60, 100, 130, 150 feet.
 - ii. Divers and DITs may exceed their certified depth by one step providing they are accompanied by a diver certified to at least that next step. This provision does not exist for Proficiency Dives (See Section 4.3.5).
 - iii. A diver is automatically certified to a depth of 60 feet after leaving DIT status.
 - iv. Certification for the 100-foot depth by a diver who has been certified to 60 feet may be made by the RDO following a minimum of four logged, supervised dives to depths over 90 feet. On at least 3 of these dives, the diver must demonstrate the skills and abilities necessary to manage the task loading associated with performing work underwater, as

- well as performing as a Lead Diver.
- v. Certification for the 130-foot depth by a diver who has been certified to 100 feet may be made by the RDO following four logged, supervised dives to depths of over 120 feet. On at least 3 of these dives, the diver must demonstrate the skills and abilities necessary to manage the task loading associated with performing work underwater, as well as performing as a Lead Diver.
 - vi. Certification for the 150-foot depth by a diver who has been certified to 130 feet may be made by the RDO with NDCB concurrence following a minimum of four 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. On at least 3 of these dives, the diver must demonstrate the skills and abilities necessary to manage the task loading associated with performing work underwater, as well as performing as a Lead Diver.
 - vii. Dives deeper than 150 feet require NDCB review and approval. Dives will be reviewed based on resource need.
 - viii. In order to maintain certification beyond the 60-foot level, the diver must dive to the Blue Card depth at least once during a six month period. Divers failing to meet depth certification maintenance requirements for depths beyond the 60-foot level will revert to the next shallower depth increment and must participate in PDO or RDO approved workup dives to reacquire their deeper depth certification.
 - ix. 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.
 - x. Divers whose depth certificates have lapsed due to lack of activity may be re-qualified by performing a series of RDO approved workup dives to the depth limit formally held.
 - xi. The RDO may approve, upon recommendation of the PDO, bypassing depth certification 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.
 - xii. For specific training purposes (i.e. mixed gas diving, etc.) depth certifications may be exceeded. Under these circumstances the depth certification progression does not have to be adhered to. However, if depth certification progression is not adhered to during a specific training cycle, the diver must proceed through the required depth certification progression prior to being certified to a given depth.

3.4.8 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 all NPS Certification Requirements (See Section 3.4).

3.5 NPS Dive Leadership

3.5.1 NPS Dive Leadership Training

- A. NPS Dive Leadership Training is required of NPS Divers to serve as a PDO, RDO, or NPS Dive Instructor (DI).
 - i. Divers demonstrating successful completion of a minimum of a Dive Master certification

- from a nationally recognized scuba certification organization, or equivalent, who successfully complete NPS Dive Leadership Training fulfill the training, skill demonstration, and skill evaluation requirements are qualified to serve as PDO or RDO.
- ii. Divers demonstrating successful completion of a Scuba Instructor certification from a nationally recognized scuba certification organization, or equivalent, who successfully complete NPS Dive Leadership Training fulfill the training and skill demonstration requirements are qualified to serve as a DE.
 - iii. This supplemental 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.
 - iv. Non-NPS Dive Master certification need not be current/active.

3.5.2 NPS Dive Master/Leadership Training

- A. This training combines the diving skills, diver skill evaluation techniques, and knowledge that a diver would learn in a Dive Master course from a recognized scuba agency with the NPS Dive Leadership Training. It is aimed at NPS Divers who do not have an outside Dive Master Certification.
- B. NPS Dive Master/Leadership Training is required of NPS Divers to serve as a PDO or RDO.
 - i. Divers without a Dive Master certification from a nationally recognized scuba certification organization, or equivalent, who successfully complete NPS Dive Master/Leadership Training, fulfill the training, knowledge and skill demonstrations requirements are qualified to serve as DE, PDO or RDO.
 - ii. This curriculum reviewed and approved by the NDCB, is designed to orient the diver in NPS Dive policy and operational procedures, and to teach and validate the knowledge and skills necessary to serve as an NPS DE, PDO or RDO.

3.5.3 NPS Dive Instructor Training

- A. NPS Dive Instructor Training is required of NPS Divers without a scuba instructor certification from a nationally recognized scuba certification organization to serve as NPS Dive Instructor.
 - i. Divers without a scuba instructor certification from a nationally recognized scuba certification organization, or equivalent, who successfully complete NPS Dive Instructor Training, fulfill the training, knowledge and skill demonstrations requirements are qualified to serve as an NPS Instructor.
 - ii. This curriculum reviewed and approved by the NDCB, is designed to orient the diver in NPS Dive policy and the operational procedures, and to teach and validate the knowledge and skills necessary to serve as an NPS Instructor.

3.6 Dive Classification Training Requirements

3.6.1 Maintenance Diving

- A. All NPS divers participating in maintenance diving will meet the requirements for NPS Certification (See Section 3.4) and complete “OSHA 29 CFR part 1910 Subpart T and NPS Diving” course work or receive on-the-job training which has been reviewed and approved by the NDCB. 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. Training will be documented in accordance with

section 3.3.

3.6.2 Public Safety Diving

- A. All NPS divers participating in Public Safety Diving will meet the requirements for NPS Certification (See Section 3.4) and complete “NPS Public Safety Diving” course work or receive on-the-job training which has been reviewed and approved by the NDCB. 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. Training will be documented in accordance with section 3.3.

3.6.3 Scientific Diving

- A. All NPS divers participating in Scientific Diving will meet the requirements for NPS Certification (See Section 3.4) 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. 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 3.4) requirements and scientific diving specific training will total a minimum cumulative 100 hours. Training will be documented in accordance with section 3.3.

3.7 Dive Mode Training

- A. All NPS divers will meet the requirements for NPS Certification (See Section 3.4) and complete course work specific to the diving mode being employed. 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. Training will be documented in accordance with section 3.3.

3.7.1 Open Circuit Scuba

- A. Open circuit scuba is the baseline diving mode used by NPS Divers. 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.

3.7.2 Rebreather

- A. Rebreather Diving Course Work
 - i. Satisfactory completion of a rebreather training program authorized or recommended by the manufacturer of the rebreather to be used, and approved by the NDCB/RDO, and successful completion of the practical training requirements of this standard qualifies the diver for rebreather diving using the system on which the diver was trained, to the depth limit in accordance with the diver’s rebreather training and as approved by the RDO, for dives using nitrogen/oxygen diluent that do not require decompression stops.
 - ii. 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.

iii. Classroom training shall include:

1. A review of those topics of diving physics and physiology, decompression management, and dive planning included in prior scientific diver, nitrox, staged decompression and/or mixed gas training, as they pertain to the safe operation of the selected rebreather system and planned diving application.
2. In particular, causes, signs and symptoms, first aid, treatment and prevention of the following must be covered:
 - a. Hyperoxia (CNS and Pulmonary Oxygen Toxicity)
 - b. Middle Ear Oxygen Absorption Syndrome (oxygen ear)
 - c. Hyperoxia-induced myopia
 - d. Hypoxia
 - e. Hypercapnia
 - f. Inert gas narcosis
 - g. Decompression sickness
3. Rebreather-specific information required for the safe and effective operation of the system to be used, including:
 - a. System design and operation, including:
 - i. Counterlung(s)
 - ii. CO₂ scrubber
 - iii. CO₂ absorbent material types, activity characteristics, storage, handling and disposal
 - iv. Oxygen control system design, automatic and manual
 - v. Diluent control system, automatic and manual (if any)
 - vi. Pre-dive set-up and testing
 - vii. Post-dive break-down and maintenance
 - viii. Required maintenance schedules and consumables life-span
 - b. Oxygen exposure management
 - c. Decompression management and applicable decompression tracking methods
 - d. Dive operations planning
 - e. Problem recognition and management, including system failures leading to hypoxia, hyperoxia, hypercapnia, flooded loop, and caustic cocktail
 - f. Emergency protocols and bailout procedures

iv. Practical Training (with model of rebreather to be used)

1. A minimum number of hours of underwater time:

Type	Pool/Confined Water	O/W Training	O/W Supervised
Oxygen Rebreather	1 dive, 90 min	4 dives, 120 min.*	2 dives, 60 min
Semi-Closed Circuit	1 dive, 90-120 min	4 dives, 120 min.**	4 dives, 120 min
Closed-Circuit	1 dive, 90-120 min	8 dives, 380 min.***	4 dives, 240 min
* Dives should not exceed 20 fsw. ** First two dives should not exceed 60 fsw. Subsequent dives should be at progressively greater depths, with at least one dive in the 80 to 100 fsw range. *** Total underwater time (pool and open water) of approximately 500 minutes. First two open water dives should not exceed 60 fsw.			

2. Amount of required in-water time should increase proportionally to the complexity of

- rebreather system used.
- 3. Training shall be in accordance with the manufacturer's recommendations.
- v. Practical Evaluations
 - 1. Upon completion of practical training, the diver must demonstrate to the NDCB or its designee proficiency in pre-dive, dive, and post-dive operational procedures for the particular model of rebreather to be used. Skills shall include, at a minimum:
 - a. Oxygen control system calibration and operation checks
 - b. Carbon dioxide absorbent canister packing as applicable
 - c. Supply gas cylinder analysis and pressure check
 - d. Test of one-way valves
 - e. System assembly and breathing loop leak testing
 - f. Pre-dive breathing to test system operation
 - g. In-water leak checks
 - h. Buoyancy control during descent, bottom operations, and ascent
 - i. System monitoring and control during descent, bottom operations, and ascent
 - j. Proper interpretation and operation of system instrumentation (PO2 displays, dive computers, gas supply pressure gauges, alarms, etc, as applicable)
 - k. Unit removal and replacement on the surface.
 - l. Bailout and emergency procedures for self and buddy, including:
 - i. System malfunction recognition and solution
 - ii. Manual system control as applicable
 - iii. Flooded breathing loop recovery (if possible)
 - iv. Absorbent canister failure
 - v. Alternate bailout options
 - vi. Symptom recognition and emergency procedures for hyperoxia, hypoxia, and hypercapnia
 - m. Proper system maintenance, including:
 - i. Full breathing loop disassembly and cleaning (mouthpiece, check-valves, hoses, counterlung, absorbent canister, etc.)
 - ii. Oxygen sensor replacement (for SCR and CCR)
 - iii. Other tasks required by specific rebreather models
- vi. Written Evaluation
 - 1. A written evaluation with a pre-determined passing score, covering concepts of both classroom and practical training, is required.
- vii. 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 may 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.
- viii. Extended Range, Required Decompression and Helium-Based Inert Gas
 - 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. As a prerequisite for training in staged decompression using rebreathers, the diver shall have logged a minimum of 25 hours of underwater time on the rebreather system to be used, with at least 10 rebreather dives in the 60 fsw to 150 fsw range.

3. As a prerequisite for training for use of rebreathers with gas mixtures containing inert gas other than nitrogen, the diver shall have logged a minimum of 50 hours of underwater time on the rebreather system to be used and shall have completed training in stage decompression methods using rebreathers. The diver shall have completed at least 12 dives requiring staged decompression on the rebreather model to be used.
4. Training shall be in accordance with standards for required-decompression and mixed gas diving, as applicable to rebreather systems.

3.7.3 Hookah

- A. 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

3.7.4 Surface Supplied

- A. 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

3.8 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. Training will be documented in accordance with section 3.3.

3.8.1 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 analyzation
 - 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

3.8.2 Nitrox

- A. Submission of documents and participation in aptitude examinations does not automatically result in authorization to use nitrox. The applicant 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.
- i. Academic Instruction
 1. 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.
 2. 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.
 - ii. Practical Training
 1. The practical training portion will consist of a review of scuba skills, with additional training as follows:
 - a. Oxygen analysis of nitrox mixtures
 - b. Determination of MOD, oxygen partial pressure exposure, and oxygen toxicity time limits, for various nitrox mixtures at various depths
 - c. 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.
 - d. Nitrox dive computer use and use of PC based decompression software may be included, as approved by the NDCB.
 - iii. Written Examination (based on academic instruction and practical training)
 1. Before authorization, the trainee should successfully pass a written examination demonstrating knowledge of at least the following:
 - a. Function, care, use, and maintenance of equipment cleaned for nitrox use.
 - b. Physical and physiological considerations of nitrox diving (ex.: O₂ and CO₂ toxicity).

- c. Diving regulations and procedures as related to nitrox diving, either scuba or surface-supplied (depending on intended mode)
 - d. Given the proper information, calculation of:
 - 1) Equivalent air depth (EAD) for a given fO_2 and actual depth;
 - 2) pO_2 exposure for a given fO_2 and depth;
 - 3) Optimal nitrox mixture for a given pO_2 exposure limit and planned depth;
 - 4) Maximum operational depth (MOD) for a given mix and pO_2 exposure limit;
 - 5) For nitrox production purposes, percentages/psi of oxygen present in a given mixture, and psi of each gas required to produce a fO_2 by partial pressure mixing.
 - e. Dive table and dive computer selection and usage;
 - f. Nitrox production methods and considerations
 - g. Oxygen analysis
 - h. Nitrox operational guidelines, dive planning, and dive station components.
- iv. Openwater Dives
- 1. A minimum of two supervised openwater dives using nitrox is required for authorization. The mode used in the dives should correspond to the intended application. If the MOD for the mix being used can be exceeded at the training location, direct, in-water supervision is required.

3.8.3 Mixed Gas

A. Prerequisites:

- i. Nitrox certification and authorization (See Section 3.8.2)
- ii. Required Decompression certification and authorization (See Section 3.9.1)
- iii. 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.

3.9 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 3.4) 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 3.3.

3.9.1 Required Decompression

A. Prerequisites

- i. NPS Diver qualification (See Section 3.4)
- 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.

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 4-dive increments at depth intervals as specified in Section 3.4.7.
- 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.

3.9.2 Cave and Overhead Diving

- A. 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 certification, but will not be deemed a replacement for the training and experience necessary to qualify the individual to work in these environments.
- B. Cavern Diver
 - i. Prerequisites
 1. The individual shall have met NPS Blue Card requirements (See Section 3.4), and be authorized in the dive mode being employed.
 - ii. Training:
 1. Successful completion in the following areas of training, or their equivalent:
 - a. Classroom:
 - 1) Policy for cavern diving
 - 2) Cavern environment and environmental hazards
 - 3) Accident analysis
 - 4) Psychological considerations
 - 5) Equipment
 - 6) Body control
 - 7) Communications
 - 8) Cavern diving techniques
 - 9) Navigation and guidelines
 - 10) Dive planning
 - 11) Cave geology, cave hydrology, cave biology
 - 12) Emergency procedures
 - 13) Training specific to the working tasks the diver is expected to perform
 - iii. Practical Training:
 - a. Land Drills:
 - 1) Use of guidelines and line reels – Drills are to emphasize proper use of the reel, techniques and considerations for laying a guideline, guideline following, buddy communication, problem solving and emergency procedures.
 - 2) Gear configuration and fitting
 - 3) Training specific to the working tasks the diver is expected to perform
 - b. A minimum of four (4) cavern dives, preferably to be conducted in a minimum of two (2) different caverns.
 - c. Skills demonstration includes:
 - 1) Safety drill (S-drill), gear matching, bubble check prior to entering the cavern

- on each dive
 - 2) Proper buoyancy compensator use, proper trim and body positioning, hovering and buoyancy with hand tasked (line reel deployment and pickup setting/retrieving line arrows, or other tasks requiring dedicated hand use),
 - 3) Specialized propulsion techniques (modified flutter kick, modified frog kick, pull and glide, ceiling walk or shuffle)
 - 4) Proper guideline and reel use
 - 5) Ability to follow the guideline with no visibility, sharing air while following a guideline, and sharing air while following the guideline with no visibility/light
 - 6) Hand and light signals
 - 7) Proper BuddymanSHIP
 - 8) Emergency Procedures (lost line, lost buddy, air sharing as donor and receiver, other procedures associated with dive mode, breathing gas, etc.
 - 9) Ability to comfortably work in a cavern without assistance.
 - 10) Skills demonstration specific to the working tasks the diver is expected to perform
- iv. Written Examination - A written evaluation approved by the NDCB with a predetermined passing score, covering concepts of both classroom and practical training is required.

C. Cave Diver

- i. Prerequisites
 - 1. Cavern diver certification from a nationally recognized certification or equivalent.
- ii. Training:
 - 1. Classroom:
 - a. Review of the topics listed in cavern diver training and differing techniques and procedures used in cave diving,
 - b. Cave environments and environmental hazards
 - c. Equipment, equipment procedures, and equipment configurations (tailored to diving mode),
 - d. Procedures for conducting diving operations involving complex navigation and use of line markers,
 - e. Advanced gas management
 - f. Review of dive tables, decompression tables, and decompression theory.
- iii. Practical Training:
 - 1. Land Drills:
 - a. Use of guidelines and line reels – are to emphasize proper use of the reel in lost diver procedures, as well as line placements and station location as for surveying, problem solving and emergency procedures.
 - b. Gear configuration and fitting
 - c. The applicant shall participate in drills above water included in cavern training. Drills are to emphasize proper use of the reel in lost diver procedures, as well as line placements and station location as required for surveying.
 - d. Training specific to the working tasks the diver is expected to perform
 - 2. A minimum of twelve (12) cave dives, to be conducted in a minimum of four (4) different cave sites with differing conditions recommended.
 - 3. Skills demonstration includes:
 - a. Review of cavern training skills,
 - b. Special techniques in buoyancy control,
 - c. Referencing and back-up navigation,

- d. Air sharing in a minor restriction using a single file method,
 - e. Special propulsion techniques in heavy outflow,
 - f. Anti-silting techniques,
 - g. Line jumping techniques and protocols,
 - h. Surveying,
 - i. Ability to critique their dives.
 - j. Emergency procedures (proficiency in lost line, lost diver, gas sharing, light failure procedures, valve manipulation, and no/low visibility situations).
 - k. Skills demonstration specific to the working tasks the diver is expected to perform
- iv. Written Examination - A written evaluation approved by the NDCB with a predetermined passing score, covering concepts of both classroom and practical training is required.

3.9.3 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

3.9.4 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

3.9.5 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.

3.9.6 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

3.9.7 Other Specialized Environments

- A. 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.

3.10 Specialized Diving Equipment Training Requirements

- A. All NPS divers using specialized diving equipment will meet the requirements for NPS Certification (See Section 3.4) 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 3.3.
- 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

Chapter 4 Diving Operations

- 4.1 Program Specific Dive Supplement
 - 4.2 Required Equipment and Diving Procedures for All NPS Diving Operations
 - 4.2.1 Personal Safety
 - 4.2.2 Buddy System
 - 4.2.3 Ascent Procedures and Decompression Calculations
 - 4.2.4 Mixed Equipment Configurations
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 - 4.2.7 Emergency Procedures for Fire
 - 4.2.8 Emergency Deviation from Diving Regulations and/or Policy
 - 4.3 Dive Classifications
 - 4.3.1 Maintenance Diving
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 - 4.3.6 Recreational Dives
 - 4.4 Diving Modes
 - 4.4.1 Equipment Required for All Diving Modes
 - 4.4.2 Open Circuit Scuba
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 - 4.4.4 Hookah
 - 4.4.5 Surface Supplied Diving
 - 4.5 Breathing Gases
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 - 4.6 Specialized Diving Environments
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 - 4.6.3 Shipwreck Penetration
 - 4.6.4 Ice Diving
 - 4.6.5 Altitude Diving
 - 4.6.6 Diving In Current
 - 4.6.7 Additional Specialized Diving Environments
 - 4.7 Specialized Diving Equipment
 - 4.8 Dive Incident Reporting and Review
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4.1 Program Specific Dive Supplement

- A. Parks or Programs having a diving program shall develop and maintain a Program Specific Dive Supplement to RM-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, NPS Dive Instructor, 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 Exhibit XVII)
- iii. Dive Emergency Evacuation Plan (See Exhibit XVIII)

4.2 Requirements and Diving Procedures for 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 Exhibit XVI) 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 (PSDOP) are exempt from this requirement. Training/Proficiency 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.
- 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 Exhibit XV)
 - iii. A copy of the Park's Program Specific 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 Exhibit VI:
 - 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 History and Contact Information (See Exhibit XIV)
 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 insure this information is at the dive location.

4.2.1 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

1. 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. 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. Heavy physical exertion and exercise will be avoided for at least 1 hour after diving.

4.2.2 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.

4.2.3 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. Current U.S. Navy decompression and diving tables (Exhibit XVI) will be used 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 Specific 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.
- F. Altitude conversions will follow Cross correction procedures (US Navy Tables Revision 6 Table 9-4 or equivalent, See Exhibit XVI) or use of a diving computer with an altitude algorithm.
- G. After all dives greater than 30ft, any repetitive dive series, or before ascending to altitude above 1000 feet, divers will follow the appropriate required surface interval before ascent to altitude after diving (US Navy Tables Revision 6 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.

4.2.4 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

4.2.5 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 the expected 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 flairs, 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. These devices require gas delivered from the diver’s regulator and would not be expected to 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. Divers finding visibility conditions for which they are not prepared or comfortable will terminate

diving operations

4.2.6 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. Document dive related information necessary for transport with victim to advanced medical treatment
 - viii. Coordinate evacuation procedures with appropriate authority
 - ix. Send victim's pertinent medical history, emergency contact information, and documented dive related information to medical facility with injured diver
 - x. Sequester diver's dive equipment; establish, document, and preserve the chain of custody
 - xi. Initiate Dive Incident Reporting Protocol and required notifications
 - xii. Follow-up

4.2.7 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.

4.2.8 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.

4.3 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. 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 4.3.1 – 4.3.6 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.

4.3.1 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.
 - iii. Other – NPS diving operations falling outside of the listed diving classifications of Section 4.3 are logged as “Other”.
- 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 4.2
 - 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. Then 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. If a program wishes to use surface supply for Maintenance Diving purposes, dives will be conducted in accordance with 29 CFR part 1910.425.

4.3.2 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:
- i. See Section 4.2

4.3.3 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 3.6.3, performing scientific diving tasks on a Scientific Diving operation qualifies as a scientific diver.
- D. Operational Requirements:
- i. See Section 4.2

4.3.4 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 3.3. 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).

4.3.5 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. Dives may not exceed Blue Card certification depth and must adhere to the requirements of section 3.4.7. Proficiency dives may be logged to meet annual recertification requirements (See Section 3.4.3). 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 and approve (in writing) all proficiency dives, prior to the dive being conducted.
 - iv. OSHA regulations do not apply to NPS proficiency dives.

4.3.6 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. 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 3.4.3).

4.4 Diving Modes

4.4.1 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)
- 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

4.4.2 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

- i. See Section 4.2

C. Maintenance of Proficiency

- i. See Section 3.4

D. Minimum Required Equipment:

- i. See 4.4.1 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
 - i. 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.
 - ii. Examples of acceptable gas management methods:
 - Reserve 1000psi down to 50', plus 200psi per additional 10' of planned depth
 - Rule of Thirds
 - Carry Pony/Bailout Redundant Air Source of sufficient volume for planned dive
 - 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
 - i. Pony Bottle / Redundant Air Source
 - ii. Terminate dive
 - b. Share Air
 - i. Pony Bottle / Redundant Air Source
 - ii. Octopus / Safe second
 - iii. Buddy breathe
 - iv. 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
 - i. 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. 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
 - ii. If cold water induced: When above thermocline, turn air back on to see if regulator functioning correctly
 - b. Switch from Primary to Octopus, continue to breathe from free-flowing regulator, and terminate dive
 - c. 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. Terminate dive.
- iv. Failed burst disc / tank o-ring / high volume first stage leaks
 - 1. Terminate dive. 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.
 - 2. Consider bailing out to redundant gas supply if available, terminate dive
 - 3. See ‘Out of air’
- vii. Depth Gauge / Computer / Timer Malfunction
 - 1. Avoidance:
 - a. 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.
- xiv. 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
- xv. 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
- xvi. 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.
- xvii. 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')
- xviii. 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

- xix. 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.
- xx. 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'

4.4.3 Rebreathers

- A. This section defines specific considerations regarding the following issues for the use of rebreathers:
 - i. Training and/or experience verification requirements for authorization
 - ii. Equipment requirements
 - iii. Operational requirements and additional safety protocols to be used
- B. Application of this standard is in addition to pertinent requirements of all other sections of the RM-4 Standards.
- C. 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.
- D. No NPS Dive Program shall conduct operations using rebreathers without prior review and approval of the NDCB.
- E. In all cases, trainers shall be qualified for the type of instruction to be provided. Training shall be conducted by agencies or instructors approved by RDO and NDCB.
- F. 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 (FO₂) 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 (PPO₂) during the dive, regardless of depth.
- G. Prerequisites
- 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. The NDCB and RDO must approve these proposals before a Park/Program can proceed with NPS sponsored training or operations involving rebreathers.
 - ii. Training in a specific rebreather platform shall include factory-recommended requirements, but may exceed this to prepare for the type of mission intended (e.g., staged decompression or heliox/trimix CCR diving).
- H. Operational Requirements, General
- i. 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.
- I. Maintenance of Proficiency
- i. To maintain authorization to dive with rebreathers, a diver shall log at least 24 rebreather dives annually for a minimum of approximately 18 hours of dive time, or participate in PDO approved workup dives specific to any proposed diving operation prior to engaging in rebreather diving. No 3-month period is to 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.
- J. Equipment Requirements
- i. General Requirements
 1. Only those models of rebreathers specifically approved by the NDCB shall be used.
 2. Rebreathers should be manufactured according to acceptable industry standards and Quality Control/Quality Assurance protocols. Manufacturers should be able to provide to the NDCB supporting documentation to this effect.
 3. Unit performance specifications should be within acceptable levels as defined by standards of a recognized authority as indicated by CE mark or third party testing (US Navy, Royal Navy, etc...). The following should be addressed in the manufacturers operations and maintenance manual:

- a. Operational depth range
 - b. Operational temperature range
 - c. Breathing gas mixtures that may be used
 - d. CO₂ absorbent durations Method, range and precision of inspired PP_{O₂} control
 - e. Likely failure modes and backup or redundant systems designed to protect the diver if such failures occur
 - f. Recommended sensors
 - g. Recommended power supply
 - h. Recommended maintenance schedule and procedures
 - i. Unit operation and emergency procedures
 - j. Recommended check lists
 - k. Minimum Equipment
 - l. A dive surface valve (DSV)
 - m. Gas addition valves (manual and/or automatic), so that volumetric compensation during descent and oxygen addition at all times during the dive are possible.
4. 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.
 5. 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.
- ii. Oxygen Rebreathers
 1. Oxygen rebreathers shall be equipped with manual and automatic gas addition valves.
 - iii. Semi-Closed Circuit Rebreathers
 1. SCR's shall be equipped with at least one manufacturer-approved oxygen sensor sufficient to warn the diver of impending hypoxia. Sensor redundancy is desirable, but not required.
 - iv. Closed Circuit Mixed-gas Rebreathers
 1. CCR systems shall have an oxygen sensing system consisting of three independent oxygen sensors or an active sensor validation system with two oxygen sensors.
 2. PPO₂ information should be available through a minimum of two independent displays.
- K. Operational Requirements
- i. General Requirements
 1. All dives involving rebreathers must comply with operational requirements listed in section 4.2.
 2. No rebreather system should be used in situations beyond the manufacturer's stated design limits (dive depth, duration, water temperature, etc).
 3. Modifications to rebreather systems should be in compliance with manufacturer's recommendations.
 4. Rebreather maintenance should be in compliance with manufacturer's recommendations including sanitizing, replacement of consumables (sensors, CO₂ absorbent, gas, batteries, etc) and periodic maintenance.
 5. 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.
 6. 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.
 - ii. Oxygen Exposures
 1. Planned oxygen partial pressure set point for CCR shall not be lower than 0.4 ata or higher than 1.4 ata.

2. Oxygen exposures should not exceed the NOAA oxygen single and daily exposure limits. Both CNS and pulmonary (whole-body) oxygen exposure indices should be tracked for each diver.
- iii. 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.
- iv. 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 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.)
- v. 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
- vi. 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 removed from the unit and 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.

- vii. 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.
- iii. Unit Disinfection
 - 1. The entire breathing loop, including mouthpiece, hoses, counterlungs, and CO2 canister, should be disinfected periodically according to manufacturer's specifications. The rebreather must be disinfected between each use of the same rebreather by different divers.
- iv. 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.
- v. 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.

- vi. 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).
- L. 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:
 - a. 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, insure 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, insure 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
 - a. Terminate the dive, or
 - 6. Bailout to open circuit and terminate the dive
- xiii. Solenoid Stuck Closed
 - 1. Check O₂ SPG to assure oxygen is available
 - 2. Check Handset
 - 3. Manually inject oxygen using O₂ Manual Add
 - 4. Manually maintain setpoint in the desired range
 - 5. 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 insure 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 insure the gas in the breathing loop has sufficient O₂ level to maintain consciousness
 - c. Check position of oxygen cylinder valve to insure it is in the open position
 - d. Connect off board oxygen supply if so equipped
 - i. If unit is configured to feed off board oxygen to the solenoid, allow unit electronics to maintain setpoint, if not;
 - ii. Manually inject oxygen into the breathing loop to maintain the desired setpoint
 - iii. Terminate the dive as appropriate to diver comfort level and diving conditions
 - e. If additional oxygen is not available:
 - i. Bailout to open circuit, or
 - ii. Operate the unit in semi-closed mode if trained to do so and diving conditions dictate
 - iii. Terminate dive
- xvi. 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:
 - a. Terminate the dive as appropriate to diver comfort level and diving conditions
 - 3. Three O₂ cell system, two cells excluded:
 - a. Terminate the dive as appropriate to diver comfort level and diving conditions
 - 4. Three O₂ cell system, three cells excluded:
 - a. Bailout to open circuit
 - b. Terminate the dive

- xvii. 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 insure cells are reactive and system electronics can produce High O₂ and Low O₂ alarms
 - i. Perform an O₂ flush sufficient to produce a High O₂ alarm followed by a diluent flush to produce a Low O₂ alarm, or
 - ii. Perform a Cell Check to compare what cell readings should be for O₂ and diluent flushes should be at the given depth
 3. Cell Warning at depth:
 - a. If in doubt of the ppO₂ in the breathing loop, perform a diluent flush to insure a gas capable of maintaining diver consciousness (assumes use of a non-hypoxic diluent or use of hypoxic diluent at the proper depth)
 - b. Perform a Cell Check to determine expected readings for diluent and O₂ flushes at the given depth
 - i. Add O₂ sufficient to produce a High O₂ alarm followed by a diluent flush to produce a Low O₂ alarm
 - ii. 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
 - c. If the results of the Cell Check indicate a multi cell problem:
 - i. Bailout to open circuit
 - ii. Terminate the dive
 - d. If the results of the Cell Check indicate a single cell problem, or erodes diver confidence in Cell performance:
 - i. Terminate the dive as appropriate to diver training, comfort level, and diving conditions
- xviii. 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
- xix. Scrubber Failure
1. Bailout to open circuit
 2. Terminate the dive

4.4.4 Hookah

- A. Hookah divers shall comply with all SCUBA diving procedures in RM-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.
- B. Divers using the Hookah mode shall be equipped with a diver carried independent reserve breathing gas supply at depths greater than 20 fsw.
- C. The reserve breathing gas supply shall be sufficient to safely terminate the dive, including safety stop.
- D. Hookah systems will include a downstream particulate filter capable of removing particles greater than 5 microns.
- E. 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.

4.4.5 Surface Supplied Diving

- A. Surface supplied divers shall comply with all diving procedures in Section 4.2 except for those provisions covered in Buddy System (See Section 4.2.2).
- B. During surface supplied diving operations, there must be a standby diver available at the surface at the dive location.
- C. 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.
- D. Each surface supplied diver shall be hose tended by a separate dive team member while in the water.
- E. Divers using the surface supplied mode shall maintain voice or line communication with the surface tender.
- F. 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.
- G. Air supply systems will include a downstream particulate filter capable of removing particles greater than 5 microns.
- H. 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
- I. Full face masks or helmets used with surface supply shall have a non-return valve (check valve) between the manifold block and the surface supply hose that shall close readily and positively, and shall be checked for proper function prior to the start of each diving day.
- J. 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
 - i. If found closed, surface personnel opens valve

- ii. If gas source found to be empty, or not supplying gas (compressor malfunction), surface personnel switch to backup gas supply
- iii. 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

4.5 Breathing Gases

4.5.1 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 Class E or better, or meet the following specifications:
 - 1. Oxygen content.....20-22%
 - 2. Maximum carbon monoxide.....0.001% (10 ppm)
 - a. Decompression dives.....0.001% (10 ppm)
 - b. Non-decompression dives.....0.002% (20 ppm)
 - 3. Maximum carbon dioxide.....0.030% (300 ppm)
 - 4. Dust and droplets of oil and water.....absent
 - 5. Odors and vapors.....absent
 - 6. Maximum total hydrocarbons.....0.005% (50 ppm)
 - 7. Maximum total oxidants.....0.0005% (5 ppm)
- C. Minimum Activity to Maintain Authorization
 - i. See Section 3.4.3
- D. Exposure Limits
 - i. NPS divers will not use air as the breathing gas below 150 fsw.
- E. Dive Tables
 - i. See Section 4.2.3

4.5.2 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.

4.5.3 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.
- i. Prerequisites
 1. 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.
 - ii. Minimum Activity to Maintain Authorization
 1. 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.
 - iii. Dive Personnel Requirements
 1. 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.

2. 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.
- iv. Pre-dive Procedures
 1. 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
 2. 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.
 3. Members of the dive team must confirm the gas mixture each diver is using, and establish dive team maximum depth and time limits.
 4. The maximum allowable pO_2 exposure limit for the dive team should be reduced if on-site conditions so indicate.
- v. Oxygen Exposure Limits
 1. 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 Partial Pressure Limits for ‘Normal’ Exposures”
 2. The maximum allowable exposure limit should be reduced in cases where cold or strenuous dive conditions, or extended exposure times are expected.
 3. 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.
- vi. Bottom Time Limits
 1. Maximum bottom time should be based on the depth of the dive and the nitrox mixture being used.
 2. 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.
- vii. Dive Tables and Gases
 1. A set of approved nitrox dive tables will be available at the dive site.
 2. When using the equivalent air depth (EAD) method, dives should be conducted using air dive tables.
 3. 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
 4. 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.
- viii. Nitrox Dive Computers
 1. Dive computers may be used to compute decompression status during nitrox dives. Manufacturers’ guidelines and operations instructions should be followed.
 2. 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.
 3. 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.
 4. 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.
- ix. Repetitive Diving
 1. Repetitive dives using nitrox mixtures should be performed in compliance with procedures required of the specific dive tables used.
 2. 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.
3. 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.
 4. 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.
- x. Oxygen Parameters
1. 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.
 2. 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 4.5.1), the following standard should be met for breathing air that is either:
 - a. Placed in contact with oxygen concentrations greater than 40%.
 - b. 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 4.5.1)	
Condensed Hydrocarbons	5mg/m ³
Hydrocarbon Contaminants	No greater than 0.1 mg/m ³

- xi. Gas Mixing and Analysis
1. Individuals responsible for producing and/or analyzing nitrox mixtures should be knowledgeable and experienced in all aspects of the technique.
 2. Only those individuals approved by the PDO and/or RDO should be responsible for mixing and/or analyzing nitrox mixtures.
 3. Production Methods - It is the responsibility of the DCB to approve the specific nitrox production method used.
 4. Analysis Verification by User
 - a. 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.
 - b. Individual dive log reporting forms should report fO₂ of nitrox used, if different than 21%.
- xii. Nitrox Diving Equipment
1. All of the designated equipment and stated requirements regarding scuba equipment required in the RM-4 apply to nitrox scuba operations. Additional minimal equipment necessary for nitrox diving operations includes:
 - a. Labeled SCUBA Cylinders
 - b. Oxygen Analyzers

- xiii. Oxygen Cleaning and Maintenance Requirements
 - 1. 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.
 - 2. Equipment used with oxygen or mixtures containing over 40% by volume oxygen shall be designed and maintained for oxygen service. 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.
- xiv. Scuba Cylinder Identification Marking
 - 1. Scuba cylinders to be used with nitrox mixtures should have the following identification documentation affixed to the cylinder:
 - a. Cylinders should be marked "NITROX", or "EANx", or "Enriched Air".
 - b. 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.
 - c. 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.
 - d. Other markings, which identify the cylinder as containing gas mixes other than Air, may be used as the approval of the RDO/NDCB.
 - e. A contents label should be affixed, to include the current fO_2 , date of analysis, and MOD.
 - f. The cylinder should be labeled to indicate whether the cylinder is prepared for oxygen or nitrox mixtures containing greater than 40% oxygen.
- xv. Regulators
 - 1. 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.
- xvi. Other Support Equipment
 - 1. An oxygen analyzer is required which is capable of determining the oxygen content in the scuba cylinder. Two analyzers are recommended to reduce the likelihood of errors due to a faulty analyzer. The analyzer should be capable of reading a scale of 0 to 100% oxygen, within 1% accuracy.
 - 2. All diver and support equipment should be suitable for the fO_2 being used.
- xvii. Compressor system
 - 1. Compressor/filtration system must produce oil-free air.
 - 2. An oil-lubricated compressor placed in service for a nitrox system should be checked for oil and hydrocarbon contamination at least quarterly.
- xviii. Fill Station Components
 - 1. 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.

4.5.4 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. Use of mixed gas, other than Nitrox by NPS divers, requires approval of the NDCB. A project specific Safe Practices and Dive Emergency Evacuation Plan 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, NAD, and other experts for technical review, safety practices, and compliance with RM-4. NDCB will review all comments and request revision, approve, or reject.
- B. For cooperative projects involving non-NPS divers, the NDCB will accept or reject technical diving plans following a review as above.
- C. 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.
- D. 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 pO_2 to be used for planning required decompression dives using open circuit as the diving mode is 1.6. It is recommended that a pO_2 of less than 1.6 be used during bottom exposure.
 - v. The maximum pO_2 to be used for planning required decompression dives using closed circuit rebreathers as the diving mode is 1.3.
 - 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.

4.6 Specialized Diving Environments

- A. 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.

4.6.1 Required Decompression

- A. An NPS diver participating in required decompression diving will meet the requirements for NPS Certification (See Section 3.4) 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.

- 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.
 - xiii. 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.
- ix. After 3 days of decompression diving, a 24-hour out gassing and rest period will be observed

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

- A. 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.
- B. A dive team shall 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.
- C. 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.
- D. The diver must demonstrate to the RDO, through the PDO that the diver possesses the proper attitude, judgment, and discipline to safety conduct cave and cavern diving in the context of planned operations.
- E. 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.
 - ii. Cavern Diving Equipment
 1. In addition to required equipment for a given dive mode:
 - a. Single cylinder used as primary breathing supply will be equipped with an “H” or “Y” valve
 - b. Slate and pencil
 - c. Two battery powered secondary lights of an approved type
 - d. Knife or line cutter, and a secondary cutting implement
 - e. One primary reel of at least 350 feet for each team
 - f. Snorkel—No snorkel shall be worn while inside underwater cave or cavern
 - iii. Cave and Flooded Mine Diving Equipment
 1. In addition to required equipment for a given dive mode:
 - a. A primary light with sufficient burn time for the planned dive.
 - b. Two battery powered secondary lights of an approved type
 - c. Knife or line cutter, and a secondary cutting implement
 - d. In addition to any other line reels employed during the dive, each diver will be equipped with a safety reel with at least 150 feet of line.
 - e. Appropriate submersible dive tables and/or dive computer (computers w/ backup tables).
 - f. Line markers.
 - g. Snorkel—No snorkel shall be worn while inside underwater cave or flooded mines.
 - h. Open Circuit:
 - 1) Double cylinders of sufficient volume for the planned diving operation
 - a) With dual orifice isolation valve manifold,
 - b) Or independent back or side mounted cylinders
 - 2) Two completely independent regulators (first stage and single second stage)
 - a) Doubles connected by manifold will be equipped with a minimum of one submersible pressure gauge

- b) Doubles configured as independent cylinders will be equipped with a submersible pressure gauge for each cylinder
- c) At least one regulator will be equipped with a five foot or longer second stage hose,
- d) A low pressure inflator for the BCD
- e) A low pressure inflator for a drysuit, as appropriate
 - Drysuit inflator and BCD inflator will not be run from the same regulator
- b. Rebreather:
 - 1) Sufficient CO₂ scrubber duration for the planned diving operation
 - 2) Redundant Rebreather, or Open Circuit bailout sufficient for planned diving operation
- iv. Operational Requirements and Safety Protocols
 - 1. Cavern Diving
 - a. Cavern diving shall not be conducted at depths greater than 100 feet.
 - b. Dive teams shall perform a safety drill prior to each cavern penetration that includes equipment check, gas management, and dive objectives.
 - c. Each team within the cavern 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.
 - d. Gas management must be appropriate for the planned dive with special considerations made for; DPV's (Dive Propulsion Vehicle), siphon diving, rebreathers, etc. The "Rule of Thirds" for gas management for all cavern dives is strongly encouraged.
 - e. The entire buddy team is to immediately terminate the dive whenever any team member feels an unsafe condition is present.
 - 2. Cave Diving
 - a. Dive teams shall perform a safety drill prior to each cave or cavern penetration that includes equipment check, gas management, and dive objectives.
 - b. Diver teams must run or follow a continuous guideline from the surface pool to maximum penetration.
 - c. Gas management must be appropriate for the planned dive with special considerations made for: DPV's, siphon diving, rebreathers, etc. The "Rule of Thirds" will form the basis for gas management for all cave dives.
 - d. Each diver must carry one primary and two back up lights.
 - e. Divers utilizing side mount diving or other dual independent diving systems must have the approval of the Diving Safety Officer or his/her designee.
 - f. The entire buddy team is to immediately terminate the dive whenever any team member feels an unsafe condition is present.

4.6.3 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

- i. 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 leading to a point from which an uninterrupted ascent to the surface may be made and requires adherence to cave diving protocols such as backup lights, rule of thirds, etc.

4.6.4 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
 1. 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

4.6.5 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 6 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 ascending to altitude above 1000 feet, divers will follow the appropriate required surface interval before ascent to altitude after diving (US Navy Tables Revision 6 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.

4.6.6 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.

4.6.7 Additional Specialized Environments

- A. 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.

4.7 Specialized Diving Equipment

- A. An NPS Diver using specialized diving equipment will demonstrate to the RDO, through the PDO, experience or specific training in use of that equipment.
- B. Specialized diving equipment includes but is not limited to:
 - i. Drysuits
 - ii. Doubles
 - iii. Full Face Masks
 - iv. Bailout Bottles
 - v. Helmets
 - vi. Lift Bags
 - vii. Line Reels
 - viii. Dive 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. Specialized diving equipment will be used in accordance with the diver's training.

Chapter 5 Equipment

- 5.1 Equipment General
 - 5.2 Equipment Specifications
 - 5.2.1 Regulators
 - 5.2.2 SCUBA Cylinders
 - 5.2.3 Weight Systems
 - 5.2.4 Buoyancy Compensators
 - 5.2.5 Full Face Masks and Helmets
 - 5.3 Equipment Maintenance
 - 5.3.1 Regulators
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 - 5.3.4 SCUBA Cylinders and Valves
 - 5.3.5 Buoyancy Compensators
 - 5.3.6 Diving Helmets
 - 5.3.7 Full Face Masks
 - 5.3.8 Rebreathers
 - 5.3.9 Gas Control Panels
 - 5.3.10 Air Storage Cylinders
 - 5.3.11 Air Filtration Systems
 - 5.3.12 Drysuits
 - 5.3.13 Compressor Systems
-

5.1 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 4.3.5, 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).

5.2 Equipment Specifications

5.2.1 Regulators

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

5.2.2 SCUBA Cylinders

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

5.2.3 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.

5.2.4 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.

5.2.5 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

5.3 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 with the PDO, 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:

5.3.1 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.

5.3.2 Submersible Pressure Gauge

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

5.3.3 Depth Gauges

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

5.3.4 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.

5.3.5 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.

5.3.6 Diving Helmets

- A. Diving Helmets will be maintained in accordance with manufacturer recommendations

5.3.7 Full Face Masks

- A. Full Face Masks will be maintained in accordance with manufacturer recommendations

5.3.8 Rebreathers

- A. Regulators used as part of a Rebreather will be maintained as regulators as defined in this standard (See 5.3.1).
- B. 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 service 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.

5.3.9 Gas Control Panels

- A. Gas Control Panels will be maintained in accordance with manufacturer recommendations

5.3.10 Air Storage Cylinders

- A. 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

5.3.11 Air Filtration Systems

- A. Air Filtration Systems will be maintained in accordance with manufacturer recommendations

5.3.12 Drysuits

- A. Drysuits will be inspected and tested for proper function before first use and every 12 months thereafter. Inflators and dump valves determined to be leaking or malfunctioning will be repaired or replaced or the suit will be pulled from service

5.3.13 Compressor Systems

- A. Design and Location of Compressor
 - i. 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)
 - ii. Compressed air systems over 500 psi shall have slow-opening shut-off valves.
 - iii. All air compressor intakes shall be located away from areas containing exhaust or other contaminants.
- B. Compressor Operation and Air Test Records
 - i. 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.
 - ii. 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.
 - iii. A log shall be maintained showing operation, repair, overhaul, filter maintenance, and gas mixture for each compressor.

Chapter 6 Administrative Procedures

- 6.1 Hazardous Duty Pay
 - 6.2 Physical Fitness
 - 6.3 Personal Equipment
 - 6.4 Inter-agency and Other Program Operations
 - 6.5 Specialized Diving Authorizations
 - 6.5.1 Volunteers in Parks (VIP)
 - 6.5.2 Temporary Authorization to Dive
 - 6.5.3 Special Circumstances
 - 6.6 NPS Dives by Non-NPS Divers
 - 6.7 Technical Advice
-

6.1 Hazardous Duty Pay

- A. Any duty dive will be subject to the conditions of the Hazard Duty Pay Schedule (FPM 990-2).
 - i. Dive Conditions
 - 1. Any of the following working dive conditions constitutes hazardous duty dive for pay scale purposes as determined by the Park Dive Officer:
 - a. At a depth of 20 feet or more below the surface.
 - b. Visibility is restricted.
 - c. In rapidly flowing or cold water.
 - d. Vertical access to the surface is restricted by ice, rock or, other structure.
 - e. 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. For Federal Wage System employees engaged in diving and tending diving duties, 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

6.2 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. This Reference Manual requires that divers successfully complete both medical examinations (See Section 3.4.5) and an annual skills refresher that includes a timed swim (See Section 3.4.3, Exhibit VII – Annual Certification Requirements).
- 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 2,700 feet 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 in this Reference Manual to preclude areas and 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 will not participate in the diving program. 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.

6.3 Personal Equipment

- A. Where personal protective equipment is determined by the PDO or RDO to be required to protect the safety and/or health of the diver, management shall provide the necessary equipment, material, or clothing from operating funds.
 - i. Suit – with hood, gloves, and booties where needed.
 - ii. Mask – NPS is responsible for providing prescription lenses.
 - iii. Snorkels.
 - iv. Fins.

6.4 Inter-agency and Other Program Operations

- A. The sharing of diving personnel and expertise between the NPS and other Federal, State, local agencies, academia, and non-government organizations is encouraged. These interactions will be established under some type of formal arrangement, including memoranda of understanding or general agreements in accordance with RM-20. These agreements should consider such issues as:
 - i. Compliance with scientific or public safety community standards.
 - ii. Insurance and Liability issues
 - iii. Reciprocity of diver use and certification.
 - iv. Compatibility of collaborator commitment in terms of numbers and skill levels of divers, kinds and amount of equipment to be shared, etc.
 - v. Jurisdictional issues and identification of agencies during certain types of diving activity.
 - vi. Cost and funding sources, if appropriate.

6.5 Specialized Diving Authorizations

6.5.1 Volunteers in Parks (VIP)

- A. The use of VIPs for NPS diving operations is approved and recommended. The Volunteers in Parks guideline (RM-7) must be referred to for specifics prior to diving. VIP divers will meet the standards that other NPS divers must meet, i.e., the Entry Level/Annual Refresher requirements as identified in Exhibit VI. Blue Cards may be issued.
- B. Emergency, non-NPS SAR divers are not VIPs under the scope of this document and should be pre-addressed in a General Agreement.

6.5.2 Temporary Authorization to Dive

- A. Temporary permission to dive for specific projects or events, not to exceed two consecutive weeks, can be granted by RDOs in the region in which the diving is to occur. Temporary permission will minimally include:
 - i. Diving Fitness Medical Evaluation Report (Exhibit II) or equivalent approved by a licensed physician.
 - ii. Dive log review by RDO or designee.
 - iii. Presentation of nationally or internationally recognized advanced diving certification, or equivalent experience level.
 - iv. In-water dive evaluation with PDO, DE, or designee.
 - v. Completion of any other requirements deemed necessary by RDO, PDO, or designee, for specific conditions.

6.5.3 Special Circumstances

- A. In special cases, dignitaries and other official visitors who are not divers may be introduced to diving in NPS areas when it is deemed to be in the interest of the government, at minimal risk to all concerned, and in a manner compatible with recreational diving community standards. Such exposures may be conducted upon RDO approval in the region in which the diving is to occur. Diving is to occur only with an NPS instructor after standard medical history demonstrates no contraindications for diving and 4 hours of instruction and other requirements as outlined in the NAUI “resort” course, or its equivalent.

6.6 NPS Dives by Non-NPS Divers

- A. NPS tracks dives made by non-NPS divers done in Park Service waters to better monitor the effort necessary to manage NPS submerged resources. These tracking categories include:
 - 1. Cooperator Dives – Dives involving non-NPS divers that are not under contract or memorandum of understanding (MOU) diving for NPS management purposes. (e.g., U.S. Geological Survey (USGS) dives done to evaluate geological substrate at a parks request.)
 - 2. Others Diving with NPS – Research divers diving with NPS, law enforcement assists with NPS divers, etc.
 - 3. Independent Dives – Dives conducted for NPS management purposes independent of NPS dive operations. (Contract dives, MOU dives not part of NPS operations.) This does not include volunteer research permit dives

6.7 Technical Advice

- A. The superintendent should seek technical advice from the PDO, RDO, and DSO regarding advanced or specialty types of diving. Examples include dives under ice, caves, in high-energy water areas, saturation dives, altitude dives, NITROX, etc.
- B. When diving in areas containing hazardous materials, all divers will have appropriate immunizations. Specialized training and equipment will be required for this type of diving. Appropriate hazmat notification to the regional risk manager and RDO will be made prior to the dive.

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.

DEPARTMENT OF THE INTERIOR STANDARD MEDICAL HISTORY AND EXAMINATION FORM

***** 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; 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, if he/she wishes consideration as a disabled veteran: copies of a) Rating Sheet; b) 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) specialist reports, if any.

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. Incomplete forms, or those missing information, may result in a delay in clearing you for your assigned functions. 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 if you wish to have your disabled veteran status considered: copies of a) Rating Sheet; b) 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) specialist reports, if any.

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.

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 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/GOVI-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 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 inability to assign you to certain job functions.

REGULATORY AUTHORITY TO REQUEST ADDITIONAL MEDICAL INFORMATION (e.g., from employee'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.

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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. Furthermore, consistent with the Privacy Act Notice above, I authorize the release to my employing agency of all information contained on this examination form and all other forms generated as a direct result of my examination (for example, laboratory, spirometry, vision, and audiometry test results, and any history forms completed by me). The information will be used strictly for official purposes, as outlined above.

Examinee's Signature:

Date:

DOI Occupational Health Services Program – Standard Medical History and Examination Form

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:	SS#:
Address:	Region:
Date of Scheduled Exam:	Work Phone:
DOI OHS PROGRAM MANAGER	Gender: Male <input type="checkbox"/> Female <input type="checkbox"/>
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 Request for Respirator Clearance 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)	Position/Job Title: Work Location: Home Phone: Date of Birth:
EXAMINING PHYSICIAN (Please Note - Core Exam Must Always be Completed, Plus All Function-Specific Services Shown on Following Page)	Required Services: (Check those services completed) <input type="checkbox"/> Authorization for Disclosure Form <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)
PRE-PLACEMENT/BASELINE/EXIT CORE EXAM Required Services: (Check those services completed) <input type="checkbox"/> Authorization for Disclosure Form <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"/> Authorization for Disclosure Form <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 Medicine Program Handbook for further guidance. For all Respirator User exams, completion of the DOI Request for Respirator Clearance form must precede this exam and be attached to this exam form when completed.	

RECEIVED DATE 17

FUNCTION AND CLEARANCE-SPECIFIC EXAMINATION COMPONENTS

<p><input type="checkbox"/> Respirator User <input type="checkbox"/> <u>Pre-Placement/Baseline/Exit Core Exam Services, plus:</u> <input type="checkbox"/> <i>DOI Request for Respirator Clearance</i> form <input type="checkbox"/> (May be a Limited Exam) <input type="checkbox"/> (Use above for any Respirator User exam)</p> <p><input type="checkbox"/> Law Enforcement <input type="checkbox"/> <u>Pre-Placement/Baseline/Exit Core Exam Services, plus:</u> <input type="checkbox"/> Tuberculosis skin test (PPD, Mantoux) <input type="checkbox"/> Maximal, diagnostic, symptom-limited stress EKG using the Bruce Protocol (every 5 yrs. after age 40 and per MRO) <input type="checkbox"/> Chest X-Ray – PA or PA/Lat (Requires MRO Clearance) <input type="checkbox"/> Blood lead and Zinc protoporphyrin <input type="checkbox"/> <u>Periodic Core Exam Services, plus:</u> <input type="checkbox"/> Vision (Cor. and Uncor. Near/Far, Color; Peripheral; Depth) <input type="checkbox"/> Audiometry (including noise exposure history) <input type="checkbox"/> Electrocardiogram <input type="checkbox"/> Maximal, diagnostic, symptom-limited stress EKG using the Bruce Protocol (every 5 yrs. after age 40 and per MRO) <input type="checkbox"/> Chest X-Ray – PA or PA/Lat (Requires MRO Clearance) <input type="checkbox"/> Blood lead and Zinc protoporphyrin (firearm instructor only)</p>	<p><input type="checkbox"/> Diver <input type="checkbox"/> <u>Pre-Placement/Baseline Core Exam Services, plus:</u> <input type="checkbox"/> (For age 40 and over) Multiple Risk Factor Assessment (age lipid profile, blood pressure, diabetic screening) <input type="checkbox"/> Chest X-Ray (PA/Lat) <input type="checkbox"/> Blood Type and Rh <input type="checkbox"/> Sickle Cell Prep <input type="checkbox"/> <u>Periodic Core Exam Services, plus:</u> <input type="checkbox"/> (For age 40 and over) Multiple Risk Factor Assessment (age lipid profile, blood pressure, diabetic screening) <input type="checkbox"/> Audiogram (every 5 years) (including noise exposure history) <input type="checkbox"/> Vision (Cor. and Uncor. Near and Far) <input type="checkbox"/> Chest X-Ray (PA/Lat) (every 2 years after age 40) <input type="checkbox"/> Electrocardiogram (every year after age 35)</p> <p><input type="checkbox"/> Commercial Drivers License <input type="checkbox"/> <u>Periodic Core Exam Services, plus:</u> <input type="checkbox"/> Audiometry (including noise exposure history) <input type="checkbox"/> Vision (Cor. and Uncor. Near/Far, Color; Peripheral; Depth)</p>	<p><input type="checkbox"/> Hazardous Waste Worker <input type="checkbox"/> <u>Pre-Placement/Baseline/Exit Core Exam Services, plus:</u> <input type="checkbox"/> Chest X-ray (PA/Lat) <input type="checkbox"/> Cholinesterase (RBC/Plasma) <input type="checkbox"/> <u>Periodic Core Exam Services, plus:</u> <input type="checkbox"/> Vision (Cor. and Uncor. Near/Far, Color; Peripheral; Depth) <input type="checkbox"/> Chest X-ray (PA/Lat) (pm) <input type="checkbox"/> Spirometry <input type="checkbox"/> Audiometry (including noise exposure history) <input type="checkbox"/> Cholinesterase (RBC/Plasma) <input type="checkbox"/> 24 hour Urine Heavy Metal Screen</p> <p><input type="checkbox"/> Laboratory Worker <input type="checkbox"/> <u>Pre-Placement/Baseline/Exit Core Exam Services, plus:</u> <input type="checkbox"/> Chest X-Ray – PA/Lat <input type="checkbox"/> Blood lead and Zinc Protoporphyrin (for firearms users) <input type="checkbox"/> Cholinesterase (RBC/Plasma) <input type="checkbox"/> Serum, 5cc, labeled, frozen, and stored <input type="checkbox"/> Immunizations and Screening (see <i>DOI Handbook</i>) <input type="checkbox"/> <u>Periodic Core Exam Services, plus:</u> <input type="checkbox"/> Vision (Cor. and Uncor. Near/Far, Color; Peripheral; Depth) <input type="checkbox"/> Spirometry <input type="checkbox"/> Audiometry (including noise exposure history) <input type="checkbox"/> Serum, 5cc, labeled, frozen, and stored <input type="checkbox"/> Cholinesterase (RBC/Plasma) <input type="checkbox"/> Blood lead and Zinc Protoporphyrin (for firearms users) <input type="checkbox"/> Immunizations and Screening (see <i>DOI Handbook</i>)</p>
<p><input type="checkbox"/> Tower Climber <input type="checkbox"/> <u>Pre-Placement/Baseline/Exit Core Exam Services, plus:</u> <input type="checkbox"/> Chest X-Ray - PA/Lat <input type="checkbox"/> Tuberculosis skin test (PPD, Mantoux) <input type="checkbox"/> Tetanus booster (if needed)</p> <p><input type="checkbox"/> <u>Periodic Core Exam Services, plus:</u> <input type="checkbox"/> Vision (Cor. and Uncor. Near/Far, Peripheral; Depth) <input type="checkbox"/> Audiometry (including noise exposure history)</p>	<p><input type="checkbox"/> Inspector (Off-Shore or Land-Based) <input type="checkbox"/> <u>Pre-Placement/Baseline/Exit Core Exam Services, plus:</u> <input type="checkbox"/> Chest X-Ray - PA/Lat <input type="checkbox"/> Tuberculosis skin test (PPD, Mantoux) (Offshore Only) <input type="checkbox"/> Tetanus booster (if needed) (Offshore Only)</p> <p><input type="checkbox"/> <u>Periodic Core Exam Services, plus:</u> <input type="checkbox"/> Vision (Cor. and Uncor. Near/Far, Peripheral; Depth) <input type="checkbox"/> Audiometry (including noise exposure history) <input type="checkbox"/> Chest X-Ray - PA/Lat (if indicated, by history or exam) <input type="checkbox"/> Spirometry (if indicated, by history or exam)</p>	

<p style="text-align: center;">PAST MEDICAL HISTORY</p> <p>(Please complete this page if this is your first time using this form, or if you are unsure if you have completed it before.)</p> <p>A. Have you ever been treated for a mental or emotional condition? (If Yes, specify when, where, and give details.) <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>B. Have you had or have you been advised to have any operation? (If Yes, specify when, and give details.) <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>C. Have you ever been a patient in any type of hospital after infancy? (If Yes, specify when, where, and give details.) <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>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.) <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>E. Have you ever had any other serious illness/injury? (If yes, specify when, where, and give details.) <input type="checkbox"/> No <input type="checkbox"/> Yes</p> <p>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.) <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>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.) <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>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.) <input type="checkbox"/> Yes <input type="checkbox"/> No</p>	<p>Every item checked "Yes" must be explained below or on the back of this form.</p>
<p style="text-align: center;">WELLNESS/HEALTH PROFILE</p> <p>Smoking History</p> <p><input type="checkbox"/> Current Smoker</p> <p>Number of cigarettes per day _____</p> <p>Number of cigars per day _____</p> <p>Number of pipe bowls per day _____</p> <p>Total years you have smoked _____</p> <p><input type="checkbox"/> Former Smoker</p> <p>Years since quitting _____</p> <p>Number of cigarettes per day _____</p> <p>Number of cigars per day _____</p> <p>Number of pipe bowls per day _____</p> <p>Total years you smoked _____</p> <p>Alcohol/Drug Use</p> <p>What is your average alcohol consumption (number) in a week? _____</p> <p>_____ Drinks</p> <p>(1 drink = 12 oz. beer, 1 glass wine or 1.5 oz. liquor)</p> <p>When do you drink alcohol?</p> <p><input type="checkbox"/> Weekdays <input type="checkbox"/> Weekends <input type="checkbox"/> Both <input type="checkbox"/> Don't drink</p>	<p style="text-align: center;">RESPIRATOR CLEARANCE QUESTIONS</p> <p>Have you ever used a respirator? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Will you use one in the coming year? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>(If no, please skip the rest of this section.)</p> <p>What hazards may be present during your use of a respirator?</p> <p><input type="checkbox"/> High altitude <input type="checkbox"/> Temperature extremes <input type="checkbox"/> Confined spaces</p> <p>Have you ever had, or do you now have any of the following?</p> <p>Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p><input type="checkbox"/> Persistent cough or shortness of breath</p> <p><input type="checkbox"/> Unexplained general weakness or fatigue</p> <p><input type="checkbox"/> Asbestosis or silicosis</p> <p><input type="checkbox"/> Lung cancer</p> <p><input type="checkbox"/> Broken ribs or chest injury</p> <p><input type="checkbox"/> Chest pain on deep inspiration</p> <p><input type="checkbox"/> Sensation of smothering when using a respirator</p> <p><input type="checkbox"/> Heat exhaustion or heat stroke</p> <p><input type="checkbox"/> Trouble smelling odors</p> <p><input type="checkbox"/> Difficulty squatting</p> <p><input type="checkbox"/> Difficulty climbing stairs or ladder carrying 25# weight</p> <p><input type="checkbox"/> Other conditions that might interfere with respirator use or result in limited work activity</p> <p>(Discuss all "Yes" responses with the examining physician.)</p>
<p>Describe Your Physical Activity or Exercise Program (check one)</p> <p>Intensity: Low _____ Moderate _____ High _____</p> <p>Describe activity _____</p> <p>Duration, in Minutes per Session _____</p> <p>Frequency _____ Days per week _____</p>	<p style="text-align: center;">MEDICATIONS</p> <p>List all medications (prescription and over-the-counter) you are currently taking.</p>

MEDICAL HISTORY	DIAGNOSTIC AND PHYSICAL FINDINGS				CHEST X-RAY																												
<p>VASCULAR</p> <p>Do you have any vascular (blood vessel) disease? Enlarged superficial veins, phlebitis, or blood clots? Anemia? Hardening of the arteries? High Blood Pressure? Heart failure? Stroke or Transient Ischemic Attack (TIA)? Aneurysms (Dilated arteries)? Poor circulation or swelling of the hands or feet? White fingers with cold or vibration?</p>	<p>Cardio/Pulmonary</p> <p>Normal <input type="checkbox"/> Abnormal <input type="checkbox"/></p> <p>Lungs/Chest <input type="checkbox"/></p> <p>Heart (thrill, murmur) <input type="checkbox"/></p> <p>Vascular (varicosities, stasis, insufficiency) <input type="checkbox"/></p> <p>Electrocardiogram - Attach with interpretation, if done <input type="checkbox"/></p> <p>Stress EKG - Bruce Protocol, attach with interpretation, if exam requires <input type="checkbox"/></p> <p>_____</p> <p>Pulmonary Function Testing: (Attach Copy)</p> <p>Calibration Date _____ (Should be same day as test) Machine Brand _____</p>	<p>Last PA Chest X-ray: Date _____</p> <p>Result: <input type="checkbox"/> Normal <input type="checkbox"/> Abnormal</p> <p>Comments: _____</p> <p>TB Mantoux (PPD) Date: _____ mm Induration: _____</p> <p>VITAL SIGNS</p> <p>Height _____ (inches) Weight _____ (pounds)</p> <p>Blood Pressure _____ / _____ mm/hg</p> <p>Pulse _____ /MIN (Conduct vital sign measurements while sitting; if elevated, repeat in 15 min.)</p>	<p>Respirations _____ /MIN Temp(if indicated) _____</p> <p>IMMUNIZATIONS</p> <p>Last Tetanus (Td) Shot (Date): _____ Given today? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Has client received Hepatitis B Vaccine? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Declined <input type="checkbox"/> Not Applicable</p> <p>Hep B series complete? <input type="checkbox"/> Yes <input type="checkbox"/> No When? _____</p> <p>Date Immunization #1: _____ #2: _____ #3: _____</p> <p>Has client received Hepatitis A Vaccine? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Declined <input type="checkbox"/> Not Applicable</p> <p>Hep A series complete? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Date Immunization #1: _____ #2: _____</p>																														
<p>RESPIRATORY</p> <p>Do you have any respiratory (lung/airway) disease? Asthma (including exercise induced asthma)? (Do you use an inhaler?) Bronchitis? Emphysema? Acute or chronic lung infections? Persistent or recurring coughing or wheezing? Wind pipe or lung surgery? Collapsed lung? Scoliosis (curved spine) with breathing limitations? History of Tuberculosis? Previous positive TB skin test? Date: _____</p>	<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:15%;">Actual FVC</td> <td style="width:15%;">Actual FEV1</td> <td style="width:15%;">Actual FEV1/FVC</td> <td style="width:15%;">Actual FEF 25-75</td> </tr> <tr> <td><input type="checkbox"/> Predicted FVC</td> <td><input type="checkbox"/> Predicted FEV1</td> <td><input type="checkbox"/> Predicted FEV1/FVC</td> <td><input type="checkbox"/> Predicted FEF 25-75</td> </tr> </table> <p>Comments/Findings on Vascular / Respiratory / Heart sections _____</p>	Actual FVC	Actual FEV1	Actual FEV1/FVC	Actual FEF 25-75	<input type="checkbox"/> Predicted FVC	<input type="checkbox"/> Predicted FEV1	<input type="checkbox"/> Predicted FEV1/FVC	<input type="checkbox"/> Predicted FEF 25-75	<p>CORONARY RISK FACTORS</p> <table style="width:100%;"> <tr> <td>Blood Pressure \geq 145/90</td> <td>Yes <input type="checkbox"/></td> <td>No <input type="checkbox"/></td> </tr> <tr> <td>Fasting Glucose \geq 120 mg/dl</td> <td>Yes <input type="checkbox"/></td> <td>No <input type="checkbox"/></td> </tr> <tr> <td>Total Cholesterol \geq 200 mg/dl</td> <td>Yes <input type="checkbox"/></td> <td>No <input type="checkbox"/></td> </tr> <tr> <td>Family history of CVD in members \leq 55</td> <td>Yes <input type="checkbox"/></td> <td>No <input type="checkbox"/></td> </tr> <tr> <td>Obesity</td> <td>Yes <input type="checkbox"/></td> <td>No <input type="checkbox"/></td> </tr> <tr> <td>No regular exercise program</td> <td>Yes <input type="checkbox"/></td> <td>No <input type="checkbox"/></td> </tr> <tr> <td>Currently smoking or \geq pack/yr history</td> <td>Yes <input type="checkbox"/></td> <td>No <input type="checkbox"/></td> </tr> </table>			Blood Pressure \geq 145/90	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Fasting Glucose \geq 120 mg/dl	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Total Cholesterol \geq 200 mg/dl	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Family history of CVD in members \leq 55	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Obesity	Yes <input type="checkbox"/>	No <input type="checkbox"/>	No regular exercise program	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Currently smoking or \geq pack/yr history	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Actual FVC	Actual FEV1	Actual FEV1/FVC	Actual FEF 25-75																														
<input type="checkbox"/> Predicted FVC	<input type="checkbox"/> Predicted FEV1	<input type="checkbox"/> Predicted FEV1/FVC	<input type="checkbox"/> Predicted FEF 25-75																														
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Family history of CVD in members \leq 55	Yes <input type="checkbox"/>	No <input type="checkbox"/>																															
Obesity	Yes <input type="checkbox"/>	No <input type="checkbox"/>																															
No regular exercise program	Yes <input type="checkbox"/>	No <input type="checkbox"/>																															
Currently smoking or \geq pack/yr history	Yes <input type="checkbox"/>	No <input type="checkbox"/>																															
<p>HEART</p> <p>Do you have any heart disease? Heart pain (Angina)? Heart rhythm disturbance or palpitations (irregular beat)? History of Heart Attack? Organic heart disease (including prosthetic heart valves, mitral stenosis, heart block, heart murmur, mitral valve prolapse, pacemakers, Wolf Parkinson White (WPW) Syndrome, etc.)? Heart surgery? Sudden loss of consciousness? Other (specify)? _____</p>	<p>Cardiac Risk Profile (record here, or attach report)</p> <p>Chol _____ HDL _____ LDL _____ Trig _____ Gluc _____</p> <p>Attach copy of complete blood count (CBC) report, including differential</p>	<p>Actual FVC <input type="checkbox"/> Predicted FVC <input type="checkbox"/></p> <p>Actual FEV1 <input type="checkbox"/> Predicted FEV1 <input type="checkbox"/></p> <p>Actual FEV1/FVC <input type="checkbox"/> Predicted FEV1/FVC <input type="checkbox"/></p> <p>Actual FEF 25-75 <input type="checkbox"/> Predicted FEF 25-75 <input type="checkbox"/></p>																															

DIAGNOSTIC AND PHYSICAL FINDINGS		Comments/Findings
<p>MEDICAL HISTORY</p> <p>NEUROLOGICAL</p> <p>Do you have any neurological disease? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Tremors, shakiness? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Seizures (recent or previous)? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Spinal Cord Injury? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Numbness or tingling? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Head/spine surgery? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>History of head trauma with persistent deficits? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Chronic recurring headaches (migraine)? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Brain tumor? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Loss of memory? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Insomnia (difficulty sleeping)? Yes <input type="checkbox"/> No <input type="checkbox"/></p>	<p>Neurological</p> <p>Normal <input type="checkbox"/> Abnormal <input type="checkbox"/></p> <p>Cranial Nerves (I - XII) <input type="checkbox"/></p> <p>Cerebellum <input type="checkbox"/></p> <p>Motor/Sensory (include vibratory and proprioception) <input type="checkbox"/></p> <p>Deep Tendon reflexes <input type="checkbox"/></p> <p>Mental Status Exam <input type="checkbox"/></p>	<p>Comments/Findings</p>
<p>GASTROINTESTINAL</p> <p>Do you have any stomach or intestinal disease? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Hernias? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Colostomy? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Persistent stomach/abdominal pain or heartburn? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Active ulcer disease? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Hepatitis or other liver disease? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Irritable bowel syndrome? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Rectal bleeding? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Vomiting blood? Yes <input type="checkbox"/> No <input type="checkbox"/></p>	<p>Gastrointestinal</p> <p>Normal <input type="checkbox"/> Abnormal <input type="checkbox"/></p> <p>Auscultation <input type="checkbox"/></p> <p>Palpation <input type="checkbox"/></p> <p>Organo-megaly <input type="checkbox"/></p> <p>Tenderness <input type="checkbox"/></p> <p>Inguinal hernia <input type="checkbox"/></p> <p>Attach blood chemistry panel report</p>	<p>Comments/Findings</p>
<p>GENITOURINARY</p> <p>Do you have any disease of the urinary system or genitals? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Blood in urine? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Kidney Stones? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Difficult or painful urination? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Infertility (difficulty having children)? Yes <input type="checkbox"/> No <input type="checkbox"/></p>	<p>Genitourinary</p> <p>Normal <input type="checkbox"/> Abnormal <input type="checkbox"/></p> <p>Urogenital exam <input type="checkbox"/></p> <p>(Attach urinalysis report, if done.)</p>	<p>Comments/Findings</p>

MEDICAL HISTORY	DIAGNOSTIC AND PHYSICAL FINDINGS																									
<p style="text-align: center;">VISION</p> <p>Do you have any vision problems or eye disease? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Frequent headaches? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Blurred vision? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Loss of vision in either eye? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Eye irritation when using a respirator or goggles? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Difficulty reading? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Eye disease, glaucoma? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Eyeglasses? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Contact lenses? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Cataracts? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Color blindness? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>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: _____</p>	<p style="text-align: center;">Head and Neck</p> <p>Abnormal <input type="checkbox"/></p> <p>Head, Face, Neck (thyroid), Scalp <input type="checkbox"/></p> <p>Nose/Sinuses/Eustachian tube <input type="checkbox"/></p> <p>Mouth/Throat <input type="checkbox"/></p> <p>Pupils equal/reactive <input type="checkbox"/></p> <p>Ocular Motility <input type="checkbox"/></p> <p>Ophthalmoscopic Findings <input type="checkbox"/></p> <p>Speech <input type="checkbox"/></p> <p>Comments/Findings _____</p>	<p style="text-align: center;">Eyes / Vision</p> <p>Color Vision Normal <input type="checkbox"/> Abnormal <input type="checkbox"/> Number Correct: _____ of _____ tested</p> <p>Can see Red/Green/Yellow? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Type of test <input type="checkbox"/> Ishihara plate <input type="checkbox"/> Function test (Yam, wire, etc.) <input type="checkbox"/></p> <p>Other (specify _____) _____</p> <p>Tonometry Right _____ mm/Hg Left _____ mm/Hg</p> <p>Visual Acuity Corrected vision (Snellen Units)</p> <p>Both Near 20/ _____ Right Near 20/ _____ Left Near 20/ _____</p> <p>Both Far 20/ _____ Right Far 20/ _____ Left Far 20/ _____</p> <p>Uncorrected vision (Snellen Units)</p> <p>Both Near 20/ _____ Right Near 20/ _____ Left Near 20/ _____</p> <p>Both Far 20/ _____ Right Far 20/ _____ Left Far 20/ _____</p> <p>Peripheral Vision Right _____ degrees Temporal _____ degrees</p> <p>Nasal _____ degrees Temporal _____ degrees</p> <p>Left _____ degrees Temporal _____ degrees</p> <p>Nasal _____ degrees Temporal _____ degrees</p> <p>Depth Perception (Type of test: _____)</p> <p><input type="checkbox"/> Normal <input type="checkbox"/> Abnormal Number Correct: _____ of _____ tested</p> <p>Interpretation: _____ Seconds of Arc</p>																								
<p style="text-align: center;">HEARING</p> <p>Do you have any hearing problems or ear disease? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Exposure to loud, constant noise or music in the last 14 hours? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Exposure to loud, impact noise in past 14 hours? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p> ringing in the ears? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Difficulty hearing? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Ear infections or cold in the last 2 weeks? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Dizziness or balance problems? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Eardrum perforation? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Do you use a hearing aide? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Are you in a Hearing Conservation Program? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Do you use protective hearing equipment? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p> If yes, type(s): <input type="checkbox"/> foam <input type="checkbox"/> pre-mold/plugs <input type="checkbox"/> ear muffs</p> <p>Have you had prior Military Service? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Have you had prior ear surgery? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Have you had recurrent ear infections? Yes <input type="checkbox"/> No <input type="checkbox"/></p>	<p style="text-align: center;">Ears</p> <p>Right Normal <input type="checkbox"/> Abnormal <input type="checkbox"/></p> <p>Canal/External ear <input type="checkbox"/></p> <p>Tympanic Membrane <input type="checkbox"/></p> <p>Left _____</p> <p>Canal/External ear <input type="checkbox"/></p> <p>Tympanic Membrane <input type="checkbox"/></p> <p>Comments/Findings: _____</p>	<p style="text-align: center;">Hearing</p> <p>Audiogram: Type <input type="checkbox"/> Baseline <input type="checkbox"/> Annual <input type="checkbox"/> Termination <input type="checkbox"/></p> <p>(Attach current and baseline audiogram)</p> <p>Calibration Method <input type="checkbox"/> Oscar <input type="checkbox"/> Biological Date _____</p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:15%;">Frequency</td> <td style="width:15%;">500Hz</td> <td style="width:15%;">1000Hz</td> <td style="width:15%;">2000Hz</td> <td style="width:15%;">3000Hz</td> <td style="width:15%;">4000Hz</td> <td style="width:15%;">6000Hz</td> <td style="width:15%;">8000Hz</td> </tr> <tr> <td>Right ear</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Left ear</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table> <p>Review/compare with baseline: No Change <input type="checkbox"/> Mild Change <input type="checkbox"/></p> <p><input type="checkbox"/> Normal <input type="checkbox"/> Abnormal Explain _____</p>	Frequency	500Hz	1000Hz	2000Hz	3000Hz	4000Hz	6000Hz	8000Hz	Right ear								Left ear							
Frequency	500Hz	1000Hz	2000Hz	3000Hz	4000Hz	6000Hz	8000Hz																			
Right ear																										
Left ear																										

<p>PROFESSIONAL STAFF Please check all the topics you discussed during the diagnostic work-up or physical examination</p>	<p>EXAMINING PHYSICIAN: WORKPLACE EXPOSURE MONITORING</p>	<p>EXAMINING PHYSICIAN Summary of Abnormal Findings with Plan of Action/Referral</p>
<p><input type="checkbox"/> Diet</p> <p><input type="checkbox"/> Low-calorie <input type="checkbox"/> Low-fat <input type="checkbox"/> Low-salt</p> <p><input type="checkbox"/> Cholesterol</p> <p><input type="checkbox"/> Hypertension</p> <p><input type="checkbox"/> Exercise</p> <p><input type="checkbox"/> Obesity</p> <p><input type="checkbox"/> Smoking Cessation</p> <p><input type="checkbox"/> Avoid Sun Exposure/Sun Screen</p> <p><input type="checkbox"/> Alcohol Use</p> <p><input type="checkbox"/> Cancer Screening</p> <p><input type="checkbox"/> Immunizations</p> <p><input type="checkbox"/> Hearing Protection</p> <p><input type="checkbox"/> Vision Referral</p> <p><input type="checkbox"/> Other Personal Protective Equipment</p> <p><input type="checkbox"/> Job Stressors</p> <p><input type="checkbox"/> Referral(s)</p> <p>Others</p>	<p>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</p> <p>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</p> <p>How was data made available? <input type="checkbox"/> Electronic Database <input type="checkbox"/> Hard Copy Report <input type="checkbox"/> Employee Self-Report</p> <p>If exposure data was available, please explain what changes, if any, were made in the examination due to this data.</p> <p>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</p>	<p><u>Impressions:</u></p> <p><u>1)</u></p> <p><u>2)</u></p> <p><u>3)</u></p> <p><u>4)</u></p> <p><u>5)</u></p> <p><u>Plan:</u></p> <p><u>1)</u></p> <p><u>2)</u></p> <p><u>3)</u></p> <p><u>4)</u></p> <p><u>5)</u></p>

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)

Functional Clearance Area	Pre-placement / Baseline / Exit	Periodic	Functional Clearance Area	Pre-placement / Baseline / Exit	Periodic
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: _____

Form 10-414 (Sept. 1975)	PART I		NATIONAL PARK SERVICE - USDOJ
DIVING FITNESS MEDICAL EVALUATION REPORT			
Applicant (<i>Name</i>)			DATE
<input type="checkbox"/> Approved: I find no defects which I consider incompatible with diving.			
<input type="checkbox"/> Disapproved: Applicant has defects which, in my opinion, would clearly constitute unacceptable hazards to his/her health and safety in diving.			
REMARKS: (<i>Regarding Medical Evaluation Criteria, etc.</i>)			
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	

BLUE CARD

This card serves to acknowledge the Active Diver or Diver-In-Training status of the bearer. It signifies that this individual has met the standards and conditions of RM-4 and is a member of the National Park Service diving “team.”

The space for the supervisor may force the recognition of the responsibilities of this position as it relates to the diver or DIT.

Comments may include other dive credentials such as Cave Diver, etc. Certification Agency Number spaces are available for initial training and/or advanced credentials such as instructor. The RDO has the discretion of completing this requirement.

NPS FORM 10-420
(Revised Aug 2006)

U.S. DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE




DIVER

NAME _____

PARK _____

REGIONAL DIVE OFFICER	DATE
DIVER'S SIGNATURE	DATE
SUPERVISOR	DATE

DEPTH			RENEWAL	
DEPTH	APPROVAL	DATE	APPROVAL	DATE
COMMENTS				
CERTIFICATION AGENCY			CERTIFICATION NUMBER	

INDIVIDUAL AND OPERATIONAL DIVING LOGS

The Individual and Operational Diving Logs are tools for both the diver and record keeper. They provide a means for compilation of a diver's history as well as Service-wide statistics. The use of these forms is at the discretion of the RDO and PDO. Entry of dive log information into the NPS online Dive Management System (DMS) is required.

The Individual Diving Log submitted through the NPS DMS is tabulated on an annual basis and available for review by individuals and NPS Dive Program Managers for the purpose of documenting diving activity and certification requirements. The Individual Diving Log is to be submitted via the NPS online Dive Management System; if DMS access is unavailable to an individual diver, the Individual Dive Logs may be submitted to the PDO on paper or electronic format as specified by the PDO for PDO entry of the information into the DMS. Information included on an Individual Diving Log must always include: Divers Name, Year of dives logged, Date of Dive, Dive Site, Depth, Dive Time in Minutes, Diving Mode, Deco Method employed, Gas Type, Dive Partner (no more than two per dive), Purpose, and any pertinent comments.

The Operational Dive Log is the record of diving activity for a given dive/diving day/project/etc. The information collected on Operational Dive Log is an essential check for conducting a safe dive site. It also provides detailed information in the event there is a diving related emergency, both during and after the fact. These records will be placed on file with the PDO for a minimum of five years in compliance with DOI record keeping policy. The Operational Dive Log may be modified as needed to meet specific requirements, however, the Operational Dive Log must always include:

Date, Dive Mode (Scuba, Surface Supplied, CCR, Hookah, etc.)

Dive Site(s)

NPS Dive Classification

Conditions (Sea State, Wind speed/Direction, Air Temperature, Surface Temperature, Bottom Temperature [Temperatures may be approximate], Current [Knots, estimated], Visibility [in-water, estimated])

Anticipated Hazards/Mitigations

The Dive Supervisor

Diver Name(s)

Assignments

Dive Task

Dive Plan Information (Starting letter group [if using dive tables], planned depth, planned time, planned gas management strategy [Turn pressure, etc.])

Dive information (gas type[s], PSI In/Out, Time In/Out, Maximum Depth, Bottom Time, Dive Time [surface to surface time], and Ending Letter Group [if using dive tables])

If pressure-related injuries are suspected, or if symptoms are evident, the following additional information shall be recorded on a NPS Diving Incident Report Form (Exhibit XII) and retained with the record of the dive, for a period of 5 years:

- a. Complete accident report
- b. Description of symptoms, including depth and time of onset
- c. Description and results of treatment



UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
INDIVIDUAL DIVING LOG



NO	DIVER:				AREA:				YEAR:
	MM-DD	DIVE SITE	DEPTH	DIVE TIME (MINUTES)	DIVE MODE	DECO. METHOD	GAS TYPE	PARTNER	PURPOSE **
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
COMMENTS:									
**USE THE FOLLOWING CODES FOR PURPOSE FIELD									
1. SEARCH/RECOVERY 2. LAW ENFORCEMENT 3. NATURAL RESOURCE MANAGEMENT 4. CULTURAL RESOURCE MANAGEMENT 5. MAINTENANCE / INSPECTION				6. PROPERTY / RECOVERY 7. INTERPRETATION 8. TRAINING 9. PROFICIENCY 10. RECREATIONAL			11. OTHER Non NPS Divers: 12. COOPERATOR DIVES 13. OTHERS DIVING W/NPS 14. INDEPENDENT DIVES		
Diving Mode Codes: Scuba = S, Closed Circuit Rebreather = CCR, Surface Supplied = SS, Hookah = H									



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			



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.	
75 foot underwater swim without swim aids and 1,200 foot 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 75 feet	
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	
Demonstrate proficiency in buddy breathing as both the 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 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	



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 six month 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 Workshop. (expiration date: _____)		
Part B (Blue Card Annual Skill Refresher): * Conducted by DE only.		
Demonstrate understanding of underwater signs and signals		
Swim 2,700 feet in 18 minutes using mask, fins and snorkel and any stroke		
Demonstrate three methods of water entry with full SCUBA		
*Perform Ditch/Recovery of scuba unit, fins, mask, and weight		
Surface dive both head and feet first		
*Demonstrate bail out (scuba unit, fins, mask, and weight)		
Oral exam of emergency swimming ascent		
Demonstrate static and dynamic buddy breathing and use of alternate air source, as both donor and recipient, both masked and unmasked in the water		
Demonstrate surface tired diver assist		
Demonstrate transport of an unconscious diver at the surface		
Demonstrate rescue of an unconscious diver from depth		
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 (REQUIRED ELEMENT)

Classroom

DOI Diving Policy Review (485 DM 27)
NPS Director's Order #4, Reference Manual 4 review, and Program Updates
High pressure cylinder handling review and update
Decompression review and update
Dive accident management
Equipment review, maintenance, and updates
Environmental diving
Written exam with successful completion of 80%

Skills Performance at an acceptable level as evaluated by instructional staff

Navigation
Problem Solving (obstacle course, etc.)
Maintenance/Inspection (inspection, aids to navigation, etc.)
Search Rescue and Recovery (systematic search, recovery, etc.)
Resource Management (survey, data collection techniques, etc.)
Site Documentation (photography, mapping, etc.)
Night /Reduced Visibility

DIVING SUMMARY

The Dive Management System (DMS) is an on-line, web based interface for compiling diving statistics at the park, regional and national level. The figures will reflect the amount, type, and cost of diving by NPS divers. At minimum, it will be completed for each calendar year by each region. It may be used, at the RDO's discretion, more often. Online training and access to the DMS can be found at the NPS Dive Sharepoint site at <http://inpshen-cirsc/dive/default.aspx>

Be sure to indicate whether the figures are for a region, park, or area, and whether they are for a quarter or the year. A "person" dive is one person going underwater. Where there are 10 divers making two dives each on a body recovery, then there are 20 "person" dives involved.

Definitions for types of NPS diving:

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 and within Blue Certification depth and Section 3.5 - Diving Procedures.
10. Recreational == Any dives made by NPS Divers for non-NPS purposes
11. Other == Any activities by NPS Divers not listed above.

NPS Managed Dives with Non-NPS Divers:

12. Cooperator Dives == Dives involving non-NPS divers that are not under contract or MOU diving for NPS management purposes. (Example - USGS dives done to evaluate geological substrate at a parks request.)
13. Others Diving w/NPS == Research divers diving with NPS, law enforcement assists with NPS divers, etc.
14. Independent Dives == Dives conducted for NPS management purposes independent of NPS dive operations. (Contract dives, memorandum of understanding (MOU) dives not part of NPS operations.) This does not include volunteer research permit dives.

Noteworthy events or incidents can be anything the reporting party believes is of significance from the local or regional levels. The figures generated for #3 can be approximations, if necessary.

WRITTEN EXAMINATION

Before receiving NPS Certification, the diver must pass a written examination that demonstrates knowledge of at least the following. The examination will be reviewed and approved by the NDCB. The RDO/PDO may augment the examination to fit special local needs:

- Diving Physics
- Diving Physiology
- Diving Emergency Care Training
- NPS Diving Policy and Procedures
- Dive Rescue
- Accident Management
- Diving Environments
- Decompression Theory and its Application
- Dive Planning and Supervision of Diving Operations
- Function, Care, Use, and Maintenance of Diving Equipment
- Maintenance Diving (As Applicable)
- Public Safety Diving (As Applicable)
- Scientific Diving (As Applicable)
- Specialized Diving Equipment, Breathing Gases, Environments, and Techniques (As Applicable)



Field Neurological Assessment

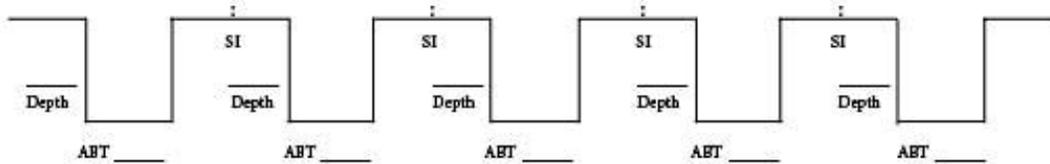
HISTORY

Diver First Name: _____ MI: _____ Diver Last Name: _____
 Date: _____ Time: _____ Name of Examiner: _____

Dive Profile

Incident Dive Bottom Time: _____ Depth: _____ Dive Partner: _____
 Breathing Gas(es): _____ Surface Interval: _____ Deco Method: _____
 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



Complete SAMPLE

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 Disurbance
 Ringing Ears Nausea Vomitting Decreased Hearing Rash/Itching
 Details: _____
 Allergies: _____
 Medications: _____
 Pre-existing Conditions/ Past History: _____
 Last Oral Intake (Substance and Time): _____
 Events Leading to Incident: _____

Conduct FAST

Check All that Apply for Abnormal Results

- 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 for one or more of the above is present: *activate EOP*)

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



Field Neurological Assessment

Vital Signs

(Take Approximately Every 5 Minutes) Set 1 Time (:) Set 2 Time (:) Set 3 Time (:) Set 4 Time (:)

Pulse _____

Respirations/ Min _____

B.P. _____

Pupils (Equal and Reactive?) _____

SPO2 (if available) _____

Mental Function

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

Orientation: (check in 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 response)

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 Yes No

Recall the three surrounding object previously identified Yes No

Cranial Nerves

Eyes (track any directional difficulties): Up Down Left Right Towards Nose

Hearing Symmetry (rub fingers together equidistant from ears): Yes No: problem in Left Right

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	Shoulder Shug _____ L _____ R	Lower	Leg Lifts _____ L _____ R
Body	Bicep Curl _____ L _____ R	Body	Quad Extensions _____ L _____ R
	Tricep Push _____ L _____ R		Hamstring Pull _____ L _____ R
	Forearm Rotation _____ L _____ R		Foot-up _____ L _____ R
	Finger Spread _____ L _____ R		Foot-down _____ L _____ R
	Grip Strength _____ L _____ R	Sensation: Hands _____ L _____ R	Feet _____ L _____ R

Notes: _____

Does moving increase pain level? Yes No Increase Pain Decrease Pain

Normal Bladder/ Bowel Movement: Yes No Unknown

Walk forward for 10 feet: Normal Wobbly Unable to Complete

Finger-Nose-Finger: Normal Few Missed Unable to Complete

Romberg (eyes closed, feet together, arms in front): Normal Swaying Unable to Complete

Exam Repeated: Time _____ Time _____

Comments/Observations: _____

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:	CYLINDER PRESSURE IN:	NPS ISSUED EQUIPMENT? <input type="checkbox"/> YES <input type="checkbox"/> NO
		BREATHING GAS:	CYLINDER PRESSURE OUT:	DIVER FAMILIAR WITH EQUIPMENT?

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	YES	NO
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Emergency oxygen available on-site?		Dive accident management plan in place for dive site?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Emergency scenarios (low on air, out of air, lost buddy, etc.) discussed with all divers prior to diving operations?		Dive accident management plan reviewed by all divers and support persons prior to diving operations?	
VI. SIGNS/SYMPOMS & 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:		ON-SITE FIRST AID TREATMENT:	
<input type="checkbox"/> AGE			
<input type="checkbox"/> DCS		ON-SITE OXYGEN ADMINISTRATION:	
<input type="checkbox"/> Other Barotrauma		Delivery Method _____ Time Started _____ Time Stopped _____	
<input type="checkbox"/> None		INITIAL EMERGENCY CONTACT (NAME OF PERSON OR AGENCY):	
<input type="checkbox"/> Other _____		TIME CONTACTED:	
EMERGENCY TRANSPORT METHOD(S):		FIRST AID DURING TRANSPORT:	TIME TRANSPORT STARTED
VII. MEDICAL INFORMATION - Hospital			
HOSPITAL NAME AND LOCATION:		HOSPITAL TREATMENT:	ARRIVAL DATE AT ER:
			ARRIVAL TIME AT ER:
HYPERBARIC UNIT NAME AND LOCATION:		CHAMBER TYPE:	CHAMBER TREATMENT:
		<input type="checkbox"/> Monoplace	#1 Time Started _____ Time Stopped _____
		<input type="checkbox"/> Multiplace	#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.

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

National Diving Advisors

Jeffery Bozanic, Ph.D. Technical Dive Instructor, Next Generation Services

Dr. Dudley Crosson, Hyperbaric Physiologist, Delta P

Gary Davis, President of GE Davis & Associates. Former Chief Ocean Scientist, National Park Service.

Walt 'Butch' Hendrick, President of Lifeguard Systems, Inc.

Doug Kesling, Advanced Diving Technology Manager, University of North Carolina Wilmington.

Dr. Richard Moon, Medical Director, Center for Hyperbaric Medicine and Environmental Physiology,
Duke University Medical Center

Steve Urick, Diving Safety Officer, National Oceanic and Atmospheric Administration Diving Program

National Park Service's 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 No.
Important Medical History:	
Emergency Contact Name	Relationship:
Primary Phone Number () -	Secondary Number () -

National Park Service's 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 No.
Important Medical History:	
Emergency Contact Name	Relationship:
Primary Phone Number () -	Secondary Number () -

National Park Service's 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 No.
Important Medical History:	
Emergency Contact Name	Relationship:
Primary Phone Number () -	Secondary Number () -

National Park Service
US Department of the Interior



U.S. Navy Dive Tables

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	595	20	33	47	62	78	97	117	140	166	198	236	285	354	469	595	
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	60	7	12	17	22	28	33	39	45	51	57	60					
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	30	4	7	11	14	17	21	24	28	30							
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	10	2	4	6	9	10											
140	10	2	4	6	8	10											
150	5	2	3	5													
160	5		3	5													
170	5			4	5												
180	5			4	5												
190	5			3	5												

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

U.S. Navy Dive
Tables Revision 6

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	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

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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
B	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	1:48	6:23
D	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	1:37	4:39	8:18	12:54
F	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.

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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	110	110	110	110	110	110	110	110
140	140	140	130	130	130	130	130	130	130	130	130	130	130	130	130	130
150	150	150	140	140	140	140	140	140	140	140	140	140	140	140	140	140
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.

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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	Repeat Group			
			100	90	80	70	60	50	40	30	20							
40 FSW																		
163	1:20	AIR													0	1:20	0	0
		AIR/O ₂													0	1:20		
170	0:40	AIR													6	7:20	0.5	0
		AIR/O ₂													2	3:20		
180	0:40	AIR													14	15:20	0.5	Z
		AIR/O ₂													5	5:20		
In-Water Air/O ₂ Decompression or Surf/O 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 Exposures: In-Water Air Decompression																		
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													194	195:20	2	
		AIR/O ₂													44	50:20		
420	0:40	AIR													248	248:20	2.5	
		AIR/O ₂													56	62:20		
480	0:40	AIR													321	322:20	2.5	
		AIR/O ₂													68	79:20		
Exceptional Exposures: In-Water Air/O ₂ Decompression																		
540	0:40	AIR													372	373:20	3	
		AIR/O ₂													90	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 Exposures: Surf/O ₂																		
720	0:40	AIR													461	462:20	4.5	
		AIR/O ₂													112	128:20		

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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) Stop times (min) include travel time, except first air and first O ₂ stop										Total Ascent Time (M:S)	Chamber O ₂ Periods	Repeat 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 Surf/O 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 Exposures: In-Water Air/O ₂ Decompression or Surf/O 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 Surf/O ₂ Recommended																		
270	0:30	AIR													29	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	18:10		
360	0:30	AIR													88	89:10	1	
		AIR/O ₂													22	23:10		
Exceptional Exposures: In-Water Air/O ₂ Decompression or Surf/O 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) Stop times (min) include travel time, except first air and first O ₂ stop										Total Ascent Time (M:S)	Chamber O ₂ Periods	Repeat Group				
			100	80	70	60	50	40	30	20									
60 FSW																			
60	2:00	AIR														0	2:00	0	K
		AIR/O ₂														0	2:00	0	
65	1:20	AIR														1	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	29:00		
Exceptional Exposure: 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	49:00		
160	1:20	AIR														169	169:00	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	65:00		
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														255	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 or SurDO ₂ Required																			
230	1:20	AIR														300	302:00	3.5	
		AIR/O ₂														92	94:00		
240	1:20	AIR														321	323:00	3.5	
		AIR/O ₂														88	100:00		
270	1:20	AIR														395	400:00	4	
		AIR/O ₂														102	119:00		
Exceptional Exposure: SurDO ₂ Required																			
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) Stop times (min) include travel time, except first air and first O ₂ stop										Total Ascent Time (M:S)	Chamber O ₂ Periods	Repeat Group				
			100	80	70	60	50	40	30	20									
55 FSW																			
74	1:50	AIR														0	1:50	0	L
		AIR/O ₂														0	1:50	0	
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	19:50	0.5	O
		AIR/O ₂														8	8:50		
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	19:50		
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/O ₂ Decompression or SurDO ₂ Required																			
150	1:10	AIR														105	105:50	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														209	209:50	2.5	
		AIR/O ₂														58	64:50		
220	1:10	AIR														224	225:50	2.5	
		AIR/O ₂														62	69:50		
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 or 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 Required																			
360	1:10	AIR														474	475:50	4.5	
		AIR/O ₂														118	134:50		

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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	Repeat 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	0	J	
40	2:00	AIR													1	3:40	0.5	J	
		AIR/O ₂													1	3:40	0.5	J	
45	2:00	AIR													10	12:40	0.5	K	
		AIR/O ₂													5	7:40			
In-Water Air/O ₂ Decompression or Surf/O 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 Surf/O ₂ Required																			
90	2:00	AIR													114	116:40	1.5	Z	
		AIR/O ₂													39	46:40			
100	1:40	AIR													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	85:20		
Exceptional Exposure: In-Water Air/O ₂ Decompression Surf/O ₂ Required																			
140	1:40	AIR													17	250	277:20	3.5	
		AIR/O ₂													9	73	84:20		
150	1:40	AIR													19	285	306:20	3.5	
		AIR/O ₂													10	80	102:20		
160	1:40	AIR													21	319	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: Surf/O ₂ Required																			
180	1:40	AIR													33	391	426:20	4.5	
		AIR/O ₂													17	96	130:20		
210	1:40	AIR													50	474	526:20	5	
		AIR/O ₂													26	110	158:20		

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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	Repeat 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	0	K	
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 Surf/O 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	86:20	1	Z	
		AIR/O ₂													24	26:20			
100	1:40	AIR													89	90:20	1.5	Z	
		AIR/O ₂													31	33:20			
Exceptional Exposure: In-Water Air Decompression In-Water Air/O ₂ Decompression or Surf/O ₂ Required																			
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 Surf/O ₂ Required																			
170	1:20	AIR													2	265	266:00	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	365:00	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: Surf/O ₂ Required																			
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 (MS)	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	Repeat 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	28:20	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	69:20	1.5	Z		
		AIR/O ₂													28	31:20				
60	2:40	AIR													81	84:20	1.5	Z		
		AIR/O ₂													33	35:20				
Exceptional Exposure: In-Water Air Decompression																				
70	2:20	AIR													11	124	138:00	2	Z	
		AIR/O ₂													6	39	53:00			
80	2:20	AIR													21	180	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	15	52	82:00		
Exceptional Exposure: In-Water Air/O ₂ Decompression																				
100	2:00	AIR													9	28	241	280:40	3	
		AIR/O ₂													9	14	66	102:00		
110	2:00	AIR													14	28	279	322:40	3.5	
		AIR/O ₂													14	15	75	117:00		
120	2:00	AIR													19	28	324	373:40	4	
		AIR/O ₂													19	15	84	136:00		
Exceptional Exposure: SurDO ₂																				
150	1:40	AIR													3	26	46	461	530:20	5
		AIR/O ₂													3	26	24	108	183:40	

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

Bottom Time (min)	Time to First Stop (MS)	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	Repeat Group				
			100	90	80	70	60	50	40	30	20								
90 FSW																			
30	3:00	AIR													0	3:00	0	I	
		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	25:00	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	58:00	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																			
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	85:40		
Exceptional Exposure: In-Water Air/O ₂ Decompression																			
120	1:40	AIR													1	29	256	280:20	3.5
		AIR/O ₂													1	15	70	98:40	
130	1:40	AIR													5	28	291	326:20	3.5
		AIR/O ₂													5	15	78	110:40	
140	1:40	AIR													8	28	330	365:20	4
		AIR/O ₂													6	15	86	125:40	
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	21	100	151:40	
170	1:40	AIR													15	46	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	287:00	

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	Repeat Group				
			100	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							2	6:00	0.5	H				
		AIR/O ₂							1	5:00						
25	3:20	AIR							8	12:00	0.5	J				
		AIR/O ₂							4	8:00						
In-Water Air/O ₂ Decompression or Surf/O 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	3:20	AIR							51	55:00	1	O				
		AIR/O ₂							27	31:00						
45	3:20	AIR							72	76:00	1.5	Z				
		AIR/O ₂							33	37:00						
Exceptional Exposure: In-Water Air Decompression																
50	3:00	AIR							9	95	95:40	1.5	Z			
		AIR/O ₂							5	33	46:40					
55	3:00	AIR							19	116	139:40	2	Z			
		AIR/O ₂							10	35	53:40					
60	3:00	AIR							27	142	172:40	2	Z			
		AIR/O ₂							14	38	61:40					
70	2:40	AIR							12	29	189	233:20	2.5	Z		
		AIR/O ₂							15	50	85:40					
Exceptional Exposure: In-Water Air/O ₂ Decompression																
80	2:40	AIR							24	28	246	301:20	3	Z		
		AIR/O ₂							24	14	67	118:40				
90	2:20	AIR							7	26	29	303	367:00	3.5	Z	
		AIR/O ₂							7	26	15	79	140:20			
100	2:20	AIR							14	26	28	372	443:00	4	Z	
		AIR/O ₂							14	26	15	94	167:20			
Exceptional Exposure: Surf/O ₂																
110	2:20	AIR							21	25	38	433	520:00	5	Z	
		AIR/O ₂							21	25	20	104	189:20			
120	2:00	AIR							3	23	25	47	480	580:40	5.5	Z
		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) Stop times (min) include travel time, except first air and first O ₂ stop							Total Ascent Time (M:S)	Chamber O ₂ Periods	Repeat Group				
			100	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							3	6:40	0.5	I				
		AIR/O ₂							2	5:40						
30	3:00	AIR							14	17:40	0.5	K				
		AIR/O ₂							7	10:40						
In-Water Air/O ₂ Decompression or Surf/O 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							31	34:40						
Exceptional Exposure: In-Water Air/O ₂ Decompression or Surf/O 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							13	43	84:20					
80	2:20	AIR							9	28	200	240:00	2.5	Z		
		AIR/O ₂							9	15	53	99:20				
Exceptional Exposure: In-Water Air/O ₂ Decompression																
90	2:20	AIR							17	29	248	297:00	3.5	Z		
		AIR/O ₂							17	15	67	112:20				
100	2:20	AIR							25	29	295	351:00	3.5	Z		
		AIR/O ₂							25	15	78	131:20				
110	2:00	AIR							5	26	28	353	414:40	4	Z	
		AIR/O ₂							5	26	15	90	154:00			
Exceptional Exposure: Surf/O ₂																
120	2:00	AIR							10	26	35	413	495:40	4.5	Z	
		AIR/O ₂							10	26	18	101	173:00			
180	1:40	AIR							3	23	47	60	593	735:20	7.5	Z
		AIR/O ₂							3	23	47	34	159	298:00		

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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										
140 FSW																					
10	4:40	AIR													0	4:40	0	E			
		AIR/O ₂													0	4:40					
15	4:00	AIR													2	6:40	0.5	H			
		AIR/O ₂													1	5:40					
20	4:00	AIR													7	11:40	0.5	J			
		AIR/O ₂													4	8:40					
In-Water Air/O ₂ Decompression or Surf/O ₂ Recommended																					
25	4:00	AIR													26	30:40	1	L			
		AIR/O ₂													14	18:40					
30	4:00	AIR													44	48:40	1	N			
		AIR/O ₂													23	27:40					
35	3:40	AIR													4	59	67:20	1.5	O		
		AIR/O ₂													2	30	36:20				
Exceptional Exposure: In-Water Air Decompression In-Water Air/O ₂ Decompression or Surf/O ₂ Required																					
40	3:40	AIR													11	80	85:20	1.5	Z		
		AIR/O ₂													6	33	48:20				
45	3:20	AIR													3	21	113	141:00	2	Z	
		AIR/O ₂													3	11	34	57:20			
50	3:20	AIR													7	28	145	184:00	2	Z	
		AIR/O ₂													7	14	40	70:20			
55	3:20	AIR													16	23	171	219:00	2.5	Z	
		AIR/O ₂													16	15	45	85:20			
Exceptional Exposure: In-Water Air/O ₂ Decompression Surf/O ₂ Required																					
60	3:00	AIR													2	23	209	265:40	3		
		AIR/O ₂													2	23	15	109:00			
70	3:00	AIR													14	25	28	276	346:40	3.5	
		AIR/O ₂													14	25	15	74	142:00		
80	2:40	AIR													2	24	25	29	382	445:20	4
		AIR/O ₂													2	24	25	15	91	175:40	
Exceptional Exposure: Surf/O ₂																					
90	2:40	AIR													12	23	26	38	443	545:20	5
		AIR/O ₂													12	23	26	19	107	210:40	

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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											
130 FSW																						
10	4:20	AIR													0	4:20	0	E				
		AIR/O ₂													0	4:20						
15	3:40	AIR													1	5:20	0.5	G				
		AIR/O ₂													1	5:20						
20	3:40	AIR													4	8:20	0.5	I				
		AIR/O ₂													2	6:20						
In-Water Air/O ₂ Decompression or Surf/O ₂ Recommended																						
25	3:40	AIR													17	21:20	0.5	K				
		AIR/O ₂													8	13:20						
30	3:40	AIR													34	38:20	1	M				
		AIR/O ₂													18	22:20						
35	3:40	AIR													49	53:20	1	N				
		AIR/O ₂													26	30:20						
40	3:20	AIR													3	67	74:00	1.5	Z			
		AIR/O ₂													2	31	37:00					
Exceptional Exposure: In-Water Air Decompression In-Water Air/O ₂ Decompression or Surf/O ₂ Required																						
45	3:20	AIR													12	84	100:00	1.5	Z			
		AIR/O ₂													6	33	48:00					
50	3:20	AIR													22	116	142:00	2	Z			
		AIR/O ₂													11	35	55:00					
55	3:00	AIR													4	28	145	190:40	2	Z		
		AIR/O ₂													4	15	39	67:00				
60	3:00	AIR													12	28	170	213:40	2.5	Z		
		AIR/O ₂													12	15	45	81:00				
Exceptional Exposure: In-Water Air/O ₂ Decompression Surf/O ₂ Required																						
70	2:40	AIR													1	26	235	293:20	3			
		AIR/O ₂													1	26	14	63	117:40			
80	2:40	AIR													12	26	29	297	365:20	3.5		
		AIR/O ₂													12	26	15	78	144:40			
90	2:40	AIR													21	26	28	374	452:20	4		
		AIR/O ₂													21	26	15	94	174:40			
Exceptional Exposure: Surf/O 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	23	28	57	533	681:00	6	
		AIR/O ₂													13	21	45	57	94	653	890:40	9
180	2:00	AIR													13	21	45	57	46	198	417:20	
		AIR/O ₂													13	21	45	57	46	198	417:20	

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	Repeat Group					
			100	80	70	60	50	40	30				20				
160 FSW																	
5	5:20	AIR							0	5:20	0	C					
		AIR/O ₂							0	5:20	0	C					
10	4:40	AIR							1	6:20	0.5	F					
		AIR/O ₂							1	6:20	0.5	F					
15	4:40	AIR							5	10:20	0.5	I					
		AIR/O ₂							3	8:00							
In-Water Air/O ₂ Decompression or Surf/O ₂ Recommended																	
20	4:40	AIR							22	27:20	0.5	L					
		AIR/O ₂							12	17:20							
25	4:20	AIR							3	41	48:00	1	N				
		AIR/O ₂							2	21	28:00						
30	4:00	AIR							1	8	60	73:40	1.5	O			
		AIR/O ₂							1	5	28	39:00					
Exceptional Exposures: In-Water Air/O ₂ Decompression In-Water Air/O ₂ Decompression or Surf/O ₂ Required																	
35	4:00	AIR							4	14	84	106:40	1.5	Z			
		AIR/O ₂							4	8	32	54:00					
40	4:00	AIR							12	20	130	166:40	2	Z			
		AIR/O ₂							12	11	37	70:00					
45	3:40	AIR							5	13	28	164	214:20	2.5	Z		
		AIR/O ₂							5	13	14	44	38:40				
Exceptional Exposures: In-Water Air/O ₂ Decompression Surf/O ₂ Required																	
50	3:40	AIR							10	19	28	207	268:20	3			
		AIR/O ₂							10	19	15	54	112:40				
55	3:20	AIR							2	12	26	28	248	320:00	3		
		AIR/O ₂							2	12	26	14	67	135:20			
60	3:20	AIR							5	18	25	29	290	371:00	3.5		
		AIR/O ₂							5	18	25	15	77	154:20			
Exceptional Exposures: Surf/O ₂																	
70	3:20	AIR							15	23	26	29	399	486:00	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	Repeat Group							
			100	80	70	60	50	40	30				20						
150 FSW																			
5	5:00	AIR							0	5:00	0	C							
		AIR/O ₂							0	5:00	0	C							
10	4:20	AIR							1	6:00	0.5	F							
		AIR/O ₂							1	6:00	0.5	F							
15	4:20	AIR							3	8:00	0.5	H							
		AIR/O ₂							2	7:00									
20	4:20	AIR							14	19:00	0.5	K							
		AIR/O ₂							8	13:00									
In-Water Air/O ₂ Decompression or Surf/O ₂ Recommended																			
25	4:20	AIR							35	40:00	1	M							
		AIR/O ₂							19	24:00									
30	4:00	AIR							3	51	58:40	1.5	O						
		AIR/O ₂							2	26	32:40								
35	4:00	AIR							11	72	87:40	1.5	Z						
		AIR/O ₂							6	31	46:40								
Exceptional Exposures: In-Water Air/O ₂ Decompression In-Water Air/O ₂ Decompression or Surf/O ₂ Required																			
40	3:40	AIR							4	18	102	128:20	2	Z					
		AIR/O ₂							4	9	34	56:40							
45	3:40	AIR							10	25	140	179:20	2	Z					
		AIR/O ₂							10	13	39	71:40							
50	3:20	AIR							3	15	28	170	220:00	2.5	Z				
		AIR/O ₂							3	15	15	45	87:20						
Exceptional Exposures: In-Water Air/O ₂ Decompression Surf/O ₂ Required																			
55	3:20	AIR							6	22	28	211	271:00	3					
		AIR/O ₂							6	22	15	56	113:20						
60	3:20	AIR							11	26	28	248	317:00	3					
		AIR/O ₂							11	26	15	66	132:20						
70	3:00	AIR							3	24	25	29	330	413:40	4				
		AIR/O ₂							3	24	25	15	84	170:00					
Exceptional Exposures: Surf/O 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	603	804:00	8		
		AIR/O ₂							3	20	22	23	50	37	168	385:40			
180	2:00	AIR							2	19	20	42	48	79	121	654	1027:40	10.5	
		AIR/O ₂							2	19	20	42	48	79	58	222	537:20		

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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	Repeat Group					
			100	80	70	60	50	40	30				20				
180 FSW																	
5	6:00	AIR							0	6:00	0	D					
		AIR/O ₂							0	6:00							
10	5:20	AIR							3	9:00	0.5	G					
		AIR/O ₂							2	8:00							
15	5:20	AIR							11	17:00	0.5	J					
		AIR/O ₂							6	12:00							
In-Water Air/O ₂ Decompression or SurDO ₂ Recommended																	
20	5:00	AIR	4	34					4	43:40	1	M					
		AIR/O ₂							2	18	25:40						
25	4:40	AIR	4	7	54				7	54	70:20	1.5	O				
		AIR/O ₂							4	26	39:40						
Exceptional Exposure: In-Water Air Decompression																	
30	4:20	AIR	2	7	14	83			2	7	14	83	1:5	Z			
		AIR/O ₂							2	7	7	31	57:20				
35	4:20	AIR	5	13	19	138			5	13	19	138	180:00	2	Z		
		AIR/O ₂							5	13	10	40	78:20				
Exceptional Exposure: In-Water Air/O ₂ Decompression																	
40	4:00	AIR	2	11	12	28	175		2	11	12	28	175	2:5	Z		
		AIR/O ₂							2	11	12	14	47	86:00			
45	4:00	AIR	7	11	20	28	231		7	11	20	28	231	3:01:40	3		
		AIR/O ₂							7	11	20	15	61	128:00			
50	3:40	AIR	1	11	13	25	28	276	1	11	13	25	28	276	3:58:20	3.5	
		AIR/O ₂							1	11	13	25	15	74	153:40		
55	3:40	AIR	5	11	19	26	28	335	5	11	19	26	28	335	4:28:20	4	
		AIR/O ₂							5	11	19	26	14	87	181:40		
Exceptional Exposure: SurDO ₂																	
60	3:40	AIR	8	13	24	25	31	405	8	13	24	25	31	405	5:10:20	4.5	
		AIR/O ₂							8	13	24	25	16	100	205:40		
70	3:20	AIR	3	13	21	24	25	48	3	13	21	24	25	48	490	6:36:00	5.5
		AIR/O ₂							3	13	21	24	25	25	118	283:20	

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	Repeat Group									
			100	80	70	60	50	40	30				20								
170 FSW																					
5	5:40	AIR							0	5:40	0	D									
		AIR/O ₂							0	5:40											
10	5:00	AIR							2	7:40	0.5	G									
		AIR/O ₂							1	6:40											
15	5:00	AIR							7	12:40	0.5	J									
		AIR/O ₂							4	9:40											
In-Water Air/O ₂ Decompression or SurDO ₂ Recommended																					
20	4:40	AIR	1	29	35:20				1	29	35:20	1	L								
		AIR/O ₂							1	15	21:20										
25	4:20	AIR	1	6	46	56:00			1	6	46	56:00	1	N							
		AIR/O ₂							1	4	23	33:20									
Exceptional Exposure: In-Water Air Decompression																					
30	4:20	AIR	5	11	72	83:00			5	11	72	83:00	1.5	Z							
		AIR/O ₂							5	6	29	45:20									
35	4:00	AIR	2	9	17	113	145:40		2	9	17	113	145:40	2	Z						
		AIR/O ₂							2	9	9	35	65:00								
40	4:00	AIR	6	13	23	155	201:40		6	13	23	155	201:40	2.5	Z						
		AIR/O ₂							6	13	12	43	84:00								
Exceptional Exposure: In-Water Air/O ₂ Decompression																					
45	4:00	AIR	12	16	28	164	254:40		12	16	28	164	254:40	2.5							
		AIR/O ₂							12	16	15	51	109:00								
50	3:40	AIR	5	12	23	28	243	315:20	3	12	23	28	243	315:20	3						
		AIR/O ₂							5	12	23	15	65	134:40							
55	3:40	AIR	9	16	25	28	287	389:20	3.5	16	25	28	287	389:20	3.5						
		AIR/O ₂							9	16	25	15	76	155:40							
60	3:20	AIR	2	11	21	26	28	344	435:00	4	11	21	26	28	344	435:00	4				
		AIR/O ₂							2	11	21	26	15	87	181:20						
Exceptional Exposure: SurDO ₂																					
70	3:20	AIR	7	19	24	25	39	454	572:00	5	19	24	25	20	109	229:20	5				
		AIR/O ₂							7	19	24	25	20	109	229:20						
80	3:20	AIR	17	22	23	26	53	625	670:00	6	22	23	26	27	128	287:20	6				
		AIR/O ₂							17	22	23	26	27	128	287:20						
90	3:00	AIR	7	20	22	23	37	66	574	752:40	7	20	22	23	37	149	318:20	7			
		AIR/O ₂							7	20	22	23	37	149	318:20						
120	2:40	AIR	9	19	20	22	42	60	659	928:20	9	19	20	22	42	60	659	928:20	9		
		AIR/O ₂							9	19	20	22	42	60	46	198	464:00				
180	2:20	AIR	10	18	19	40	43	70	155	703	1158:00	11.5	18	19	40	43	70	155	703	1158:00	11.5
		AIR/O ₂							10	18	19	40	43	70	97	75	228	648:00			

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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	Repeat Group									
			100	90	80	70	60	50	40	30	20													
200 FSW																								
5	6:00	AIR														1	7:40	0.5						
		AIR/O ₂														1	7:40							
10	6:00	AIR														2	8:40	0.5						
		AIR/O ₂														1	7:40							
15	5:40	AIR														2	30:20	0.5						
		AIR/O ₂														11	18:20							
20	5:20	AIR														5	6	43	60:00	1				
		AIR/O ₂														5	4	21	38:20					
25	5:00	AIR														5	6	11	78	105:40	1.5			
		AIR/O ₂														5	6	28	52:00					
30	4:40	AIR														4	5	11	103	179:20	2			
		AIR/O ₂														4	5	11	9	40	79:40			
35	4:20	AIR														1	6	10	13	26	179	240:00	2.5	
		AIR/O ₂														1	6	10	13	13	49	102:20		
40	4:20	AIR														3	10	12	18	28	243	319:00	3	
		AIR/O ₂														3	10	12	18	15	65	138:20		
45	4:20	AIR														8	11	12	26	28	300	380:00	3.5	
		AIR/O ₂														8	11	12	26	15	79	166:20		
50	4:00	AIR														3	10	11	20	26	28	377	479:40	4.5
		AIR/O ₂														3	10	11	20	26	15	95	200:00	
210 FSW																								
Exceptional Exposure																								
5	6:20	AIR														1	6:00	0.5						
		AIR/O ₂														1	8:00							
10	6:20	AIR														5	12:00	0.5						
		AIR/O ₂														3	10:00							
15	6:00	AIR														5	26	37:40	1					
		AIR/O ₂														3	13	22:40						
20	5:20	AIR														2	6	7	50	71:00	1.5			
		AIR/O ₂														2	6	4	24	42:20				
25	5:00	AIR														2	6	7	13	94	127:40	1.5		
		AIR/O ₂														2	6	7	7	32	65:00			
30	4:40	AIR														2	5	6	13	21	156	208:20	2	
		AIR/O ₂														2	5	6	13	11	43	90:40		
35	4:40	AIR														5	6	12	14	28	214	284:20	3	
		AIR/O ₂														5	6	12	14	14	58	124:40		
40	4:20	AIR														2	6	11	12	22	28	271	357:00	3.5
		AIR/O ₂														2	6	11	12	22	15	74	157:20	
45	4:20	AIR														4	10	11	16	25	29	347	447:00	4
		AIR/O ₂														4	10	11	16	25	15	89	190:20	
50	4:20	AIR														9	10	11	23	26	35	426	545:00	4.5
		AIR/O ₂														9	10	11	23	26	18	104	221:20	

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	Repeat 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	5:40	AIR														4	10:20	0.5	H							
		AIR/O ₂														2	8:20									
In-Water Air/O ₂ Decompression or SurDO ₂ Recommended																										
15	5:40	AIR														17	23:20	0.5	K							
		AIR/O ₂														9	15:20									
20	5:00	AIR														1	7	37	50:40	1	N					
		AIR/O ₂														4	19	30:00								
25	4:40	AIR														2	6	9	67	95:20	1.5	Z				
		AIR/O ₂														2	6	5	28	46:40						
Exceptional Exposure: In-Water Air/O ₂ Decompression or SurDO ₂ Required																										
30	4:40	AIR														6	8	14	111	144:20	2	Z				
		AIR/O ₂														6	8	8	35	67:40						
35	4:20	AIR														3	8	13	22	160	211:00	2.5	Z			
		AIR/O ₂														3	8	13	12	44	90:20					
Exceptional Exposure: In-Water Air/O ₂ Decompression or SurDO ₂ Required																										
40	4:20	AIR														7	12	14	29	210	277:00	3				
		AIR/O ₂														7	12	14	15	56	119:20					
45	4:00	AIR														2	11	12	23	28	262	342:40	3.5			
		AIR/O ₂														2	11	12	23	15	70	148:00				
50	4:00	AIR														7	11	16	26	29	321	413:40	4			
		AIR/O ₂														7	11	16	26	15	83	178:00				
Exceptional Exposure: SurDO ₂																										
55	3:40	AIR														2	10	10	24	25	30	396	501:20	4.5		
		AIR/O ₂														2	10	10	24	25	16	98	204:40			
60	3:40	AIR														5	10	16	24	25	40	454	578:20	5		
		AIR/O ₂														5	10	16	24	25	21	108	233:40			
90	3:20	AIR														11	19	20	21	28	51	626	883:00	9.5		
		AIR/O ₂														11	19	20	21	23	51	42	177	409:40		
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	580:20	

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

Bottom Time (min)	Time to First Stop (MS)	Gas Mix	DECOMPRESSION STOPS (FSW) Stop times (min) include final time, except first air and first O ₂ stop												Total Ascent Time (M-S)	Chamber O ₂ Periods	Repeat Group								
			100	90	80	70	60	50	40	30	20														
220 FSW																									
Exceptional Exposure																									
5	6:40	AIR													2	9:20	0.5								
		AR/O ₂													1	8:20	0.5								
10	6:40	AIR													8	15:20	0.5								
		AR/O ₂													4	11:20									
15	6:00	AIR								1	7	30	44:40	1											
		AR/O ₂								1	4	15	27:00												
20	5:40	AIR								5	6	7	63	87:20	1.5										
		AR/O ₂								5	6	4	27	48:40											
25	5:20	AIR								5	6	8	14	119	158:00	2									
		AR/O ₂								5	6	8	7	38	75:20										
30	5:00	AIR								5	5	8	13	24	174	234:40	2.5								
		AR/O ₂								5	5	8	13	47	102:00										
35	4:40	AIR								3	5	9	11	18	28	244	323:20	3							
		AR/O ₂								3	5	9	11	18	15	66	142:40								
40	4:20	AIR								1	4	9	11	11	26	28	312	407:00	4						
		AR/O ₂								1	4	9	11	11	26	15	82	178:20							
250 FSW																									
Exceptional Exposure																									
5	7:40	AIR													3	11:20	0.5								
		AR/O ₂													2	10:20	0.5								
10	7:20	AIR													2	15	25:00	0.5							
		AR/O ₂													1	8	17:00								
15	6:40	AIR													3	7	7	41	85:20	1					
		AR/O ₂													3	7	4	21	42:40						
20	6:00	AIR													2	6	5	7	12	106	144:40	2			
		AR/O ₂													2	6	5	7	6	35	73:00				
25	5:40	AIR													4	5	5	7	13	24	175	239:20	2.5		
		AR/O ₂													4	5	5	7	13	47	105:40				
30	5:20	AIR													4	4	5	9	11	20	28	257	344:00	3.5	
		AR/O ₂													4	4	5	9	11	20	14	70	153:20		
35	5:00	AIR													2	5	4	10	11	14	25	29	347	452:40	4
		AR/O ₂													2	5	4	10	11	14	25	29	347	452:40	
300 FSW																									
Exceptional Exposure																									
5	9:20	AIR														6	16:00	0.5							
		AR/O ₂														3	13:00								
10	8:20	AIR													2	5	7	32	85:00	1					
		AR/O ₂													2	5	4	16	36:20						
15	7:20	AIR													1	4	5	6	10	102	142:00	1.5			
		AR/O ₂													1	4	5	6	6	5	35	75:20			
20	6:40	AIR													1	4	5	5	14	28	196	271:20	2.5		
		AR/O ₂													1	4	5	5	6	14	15	52	124:40		
25	6:40	AIR													7	4	5	5	10	12	25	29	305	409:00	3.5
		AR/O ₂													7	4	5	5	10	12	25	29	305	409:00	

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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 ___ Other ___

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: _____

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

NPS DIVE SAFE PRACTICES WORKSHEET

PARK / PROGRAM:

DIVING TASK:

Description:

Identified Hazards

Mitigations

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: _____

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