

## 3. Emergency Response Diver II

### 3.1 Introduction

The ERD II program is designed to enable the student to develop detailed knowledge and advanced skills in emergency response diving. It also serves as a base to develop experience and as a prerequisite for ERD II level Ops Components and ERDI Supervisor. This course may be taught in conjunction with ERD I Diver at the discretion of the instructor.

### 3.2 Student Prerequisites

1. ERD I or equivalent
2. Minimum age 18
3. Current CPR, first aid and oxygen administration certification
4. 10 or more logged public safety dives either training or operational dives beyond ERD I with a recognized public safety dive team \*

### 3.3 Qualifications of Graduates

Upon successful completion of this course, ERD II Divers may engage in rescue and recovery operations and activities under the direct authority of a sanctioned emergency response team provided that the activities, geography and environmental conditions do not exceed the level of training.

### 3.4 Who May Teach

Any active Emergency Response Diver Instructor (ERDI) with may teach this course.

### 3.5 Administrative Requirements

1. Have the students complete the:
  - a. *ERDI Liability Release and Express Assumption of Risk* Form
  - b. *ERDI Medical Statement* Form
2. Communicate the schedule of the course to the students
3. Ensure that the students have the required equipment

#### Required Materials

1. The *ERD Training Manual* or eLearning course is required for the ERD II course academics
2. Texts, other than ERDI manuals, used for ERD Ops Components must be approved by ERDI Headquarters

**Certification**

1. Upon successful completion of an ERDI course the instructor must issue the appropriate ERDI certification by submitting, the *ERDI Diver Registration* form to ERDI Headquarters or registering the students online through member's area of the ERDI website

**3.6 Student to Instructor Ratio****Academic**

1. Unlimited, so long as adequate facility, supplies and time are provided to ensure comprehensive and complete training of subject matter

**Confined Water**

1. A maximum of 6 students per ERDI Instructor
2. ERDI Instructors have the option of adding 2 more students with the assistance of an active ERDI Supervisor
3. The maximum number of students an ERDI Instructor may have in confined water is 12 with the assistance of active ERDI Supervisors

**Open Water**

1. A maximum of 3 dive teams or 6 tethered divers per ERDI Instructor is allowed; it is the instructor's discretion to reduce this number as conditions dictate

**3.7 Course Structure and Duration****Open Water Execution**

1. Student must complete 6 open water dives
2. Training depth must not exceed 18 metres/ 60 feet in depth
3. All dives must be completed during daylight hours

**Course Structure**

1. ERDI allows instructors to structure courses according to the number of participants and their skill level.

**Duration**

1. Classroom and briefing: Approximately 8 hours
2. Confined water: Approximately 4 hours

ERD I Diver training may be combined with ERD II Diver training at the discretion of the instructor with the incorporation of an additional 10 open water training dives as either tender or diver (minimum 5 as diver) in the program, with the course duration adjusted appropriately.

### **3.8 Required Equipment**

1. Same equipment as required for an ERD I Diver
2. In addition to the basic equipment, ERD II students will need to have the following equipment
  - a. Dry suit with appropriate insulation suitable for emergency response diving
  - b. Full face mask with communication capabilities

### **3.9 Academic Outline**

#### **Victim's Death**

##### **Accidental**

1. Misconceptions of Near Drowning
  - a. Immersion reflex
  - b. Secondary drowning
  - c. Chances of survival
2. Mechanics of Drowning
  - a. Dry
    - i. 10 - 15 percent of drownings
    - ii. Laryngospasm
    - iii. Possibility of resuscitation
    - iv. Infants vs. adults
  - b. Wet
    - i. Majority of drownings
    - ii. Agonal gasp
    - iii. Water aspirated into lungs
    - iv. Chemistry changes
    - v. Final moments

##### **Intentional**

1. Crime Scene
  - a. Identify
  - b. Evidence
    - i. Types of evidence
  - c. Skeletal remains
    - i. Human or other
    - ii. Handling of evidence

2. Physiological Changes in the Human Body
  - a. Rigor mortis
  - b. Livor mortis (lividity)
    - i. Absence
    - ii. Contact lividity
    - iii. Cadaveric spasm
    - iv. Decomposition
    - v. Putrification
    - vi. Anthropophagy
3. Removal of Crime Scene Evidence
  - a. Documentation/Recording of information, observations
    - i. Mapmaking
    - ii. Photography/Videography
    - iii. Topside documentation
    - iv. Written report
    - v. Accuracy
4. Vehicle removal/heavy lift
  - a. Preserving interior/evidence
    - i. Evidence recovery vs. salvage recovery
    - ii. Occupational Safety and Health Administration (OSHA)
  - b. Techniques
    - i. Utilizing non-public safety personnel
    - ii. Specific training required
  - c. Hazards
  - d. Vehicle/Accident analysis
  - e. Body Recovery
    - i. Surrounding area
  - f. Body Handling/Bagging
    - i. Still water vs. rapid water
    - ii. Rigor
    - iii. Water sample
    - iv. Diver safety/contamination

**Encapsulation****Environmental Issues**

1. Nuclear, Biological, Chemical
  - a. Medical concerns
    - i. Water sample
    - ii. Team health and safety
    - iii. Sources
2. Dangers to Diver, Scene, Team Members, Family
3. Suit Permeation
4. Protecting Potable Water Supply
5. Post Dive Observations
6. Decontamination Procedures

**Dry Suit**

1. Types of Dry Suits and Materials
  - a. Shell style, Trilaminates
  - b. Crushed neoprene, compressed neoprene
  - c. Neoprene
  - d. Vulcanized rubber
2. Appropriate for Emergency Response Diving
3. Types of Seals
  - a. Latex
  - b. Neoprene
4. Dry Suit Features
  - a. Self donning
  - b. Rear entry
  - c. Front entry
  - d. Boot styles
  - e. Zipper guard
  - f. Relief zipper
  - g. Internal suspenders
5. Dry Suit Insulation
  - a. Appropriate/Inappropriate
  - b. Compression resistant
  - c. Wicking action
  - d. Trapped air
  - e. Dive wear materials
6. Dry Suit Valves
  - a. Inflator
    - i. Location
    - ii. Push to inflate

- b. Exhaust
  - i. Location
  - ii. Automatic
  - iii. Adjustable
  - iv. Push to dump
  - v. Proper positioning
- 7. Buoyancy Control
  - a. Proper weighting and location
    - i. Cylinder weights
    - ii. Weight integrated BCD
    - iii. Harness system
  - b. Controlling buoyancy underwater
  - c. BCD also required
- 8. Maintenance and Care
  - a. Flush with fresh water
  - b. Drying
  - c. Avoiding heat, chemicals, oils
  - d. Zipper care
    - i. Cleaning
    - ii. Appropriate/Inappropriate lubricants
  - e. Seals
    - i. Appropriate/Inappropriate lubricants
    - ii. Repair/Replacement
    - iii. Minor repairs
    - iv. Leaks
    - v. Major repairs
    - vi. Zipper replacement
- 9. Dry Suit Emergencies
  - a. Excessive air in suit
  - b. Inflator valve stuck open
  - c. Exhaust valve stuck closed/open
  - d. Loss of weights
  - e. Excessive air in feet
  - f. Dry suit flood
- 10. Other Dry Suit Equipment
  - a. Helmet yokes
  - b. Dry glove systems
  - c. Inflation systems

**Full Face Mask**

1. Purpose
  - a. Diver safety
  - b. Communications
2. Advantages
  - a. Increased diver safety
    - i. Contaminated water
    - ii. Winter diving
    - iii. Communications
    - iv. Corrective lenses
3. Disadvantages
  - a. Increased air consumption
  - b. Buoyancy
  - c. Bulky
4. Types
  - a. Appropriate/Inappropriate
  - b. Scuba quick connect/disconnect
  - c. Surface supplied
5. Techniques/Procedures
  - a. Donning
    - i. In water vs. out of water
    - ii. Strap adjustment
    - iii. Skirt seal
  - b. Diving with a full face mask
    - i. Equalization
    - ii. Buoyancy
    - iii. Removal and replacement underwater
    - iv. Alternate air source use
      1. Spare mask
    - v. Surface options
      1. Surface valve
    - vi. Decontamination procedures prior to doffing
6. Underwater Communications
  - i. Occupational Safety and Health Administration (OSHA)
  - ii. Types of communication equipment
  - iii. Push to talk (PTT)
  - iv. Voice activated (VOX)
  - v. Hardwire/Tether
  - vi. Battery failure
7. User/Field Maintenance and Care
  - a. Authorized servicing/preventive maintenance
  - b. After use

**Lifting Techniques**

1. When Emergency Response Diving Becomes Commercial Diving
  - a. Occupational Safety and Health Administration (OSHA)
  - b. Risk vs. benefit
2. Recovery Decision
  - a. Operating beyond training
  - b. Methods available
    - i. External buoyancy
    - ii. Dead lift
    - iii. Internal buoyancy
  - c. Scene safety
  - d. Preservation of evidence
3. Equipment
  - a. Markers
  - b. Lift bags
    - i. Types
      1. Open bottom
      2. Closed (Pillow)
    - ii. Safety features
    - iii. Necessary features of lift devices
  - c. Lift straps
  - d. Lines
4. Lifting with External Buoyancy
  - a. Appropriate methods
  - b. Inappropriate methods/equipment
  - c. Calculating required lift
  - d. Overcoming ground effect
  - e. Rigging
  - f. Inflation methods/gas considerations
  - g. Hazards
    - i. Currents
    - ii. Loss of buoyancy
    - iii. Unsecured object
  - h. Securing object on surface
5. Lifting with Internal Buoyancy
  - a. When and if appropriate
  - b. Dangers
  - c. Generally not recommended
6. Dead Lift
  - a. Simple method
  - b. High degree of control
  - c. Rigging



### **3.10 Confined Water Outline**

**Students are required to successfully complete the following skills:**

#### **Scuba Skills**

1. Instructor evaluation of basic scuba skills including redundant air source use

#### **Dry Suit Skills**

1. Proper donning procedures
2. Proper weighting
3. Inflating and deflating dry suit
4. Simulated stuck inflator valve
5. Recover from inverted position
6. Buoyancy skills

#### **Full Face Mask Skills**

1. Equipment set up
2. Proper donning and adjustment
3. Entry techniques
4. Proper weighting
5. Equalization
6. Clearing partially flooded mask
7. Remove and replace mask underwater
8. Remove mask and utilization of redundant air source

**Students are to complete the following waterman-ship skills:**

1. 800 metre mask, snorkel and fins swim non-stop. Use of arms is not permitted in less than 16 minutes.
2. 500 metre distance swim, nonstop, without the use of swim aids in less than 14 minutes.
3. 100 metre buddy tow in full scuba equipment in less than 4 minutes.
4. Survival-float without aids, for 15 minutes; during the last 2 minutes the student will keep their hands above the waterline

### 3.11 Open Water Performance Requirements

The open water training consists of 6 dives. Each dive activity should be conducted as closely as possible to an actual incident response. The number of dives may be increased if, in the opinion of the instructor, it is necessary to meet a minimum training standard or proficiency level.

During all open water training there will be an ERDI Supervisor, Instructor or Instructor Trainer present and equipped to respond to an in-water emergency at all times. During any in-water training, NFPA 1006 and NFPA 1670 guidelines must be followed or for regions not governed by NFPA, any regulatory or legal requirements that apply to professional and/or volunteer public safety and emergency response divers.

The dive team will consist of:

- Primary diver
- Primary tender
- Backup diver
- Backup tender
- Incident commander – may be filled by backup tender

ERDI recommends that a third diver be partially geared up to assume backup diver status if needed.

#### **Required Skills**

**Students are to successfully complete the following skills:**

1. Scene size-up
2. Team briefing
3. Deploying the team
4. Inflate/deflate dry suit
5. Disconnect/connect dry suit hose underwater
6. Recover from inverted position
7. Clear a partially flooded full face mask
8. Remove and replace full face mask
9. Remove full face mask and utilize redundant air source to ascend
10. Locate object, rig lift bag and lift to surface object\*, maintaining evidence continuity
  - \* Object weight not to exceed 14 kilos/30 pounds
11. Debrief and record each dive, team log and diver log
12. Post dive diver evaluation (medical & psychological)

#### **Recommended Sequence**

1. Dive 1: Dry suit skills and emergency response diving skills
2. Dive 2: Dry suit skills and emergency response diving skills.
3. Dive 3: Full face mask skills and emergency response diving skills
4. Dive 4: Full face mask skills and emergency response diving skills, decontamination procedures
5. Dive 5: Light lift skills
6. Dive 6: Light lift skills (instructor may substitute dead lift for bag lift, weight limit must be still observed)

#### **3.12 Certification Requirements**

1. Satisfactorily complete all academic, confined water, and open water requirements