

**CRESP AMCHITKA PROJECT,**  
**Health and Safety Plan**

**EMERGENCY INFORMATION**

The Captain of the ship will coordinate any emergency action or evacuation. Evacuations will be initiated through the U.S. Coast Guard Rescue Coordination Center at Kodiak. If necessary evacuation may be arranged through Providence Hospital in Anchorage.

<b>Kodiak</b>	USGC Coordination Center/Air Station	907-487-5888
	Alaska Rescue Coordination Center (AKRCC)	
	Outside Anchorage area	800-420-7230
<b>U.S. Coast Guard (USCG) Rescue Coordination Center</b>		
	National Center	800-478-5555
Anchorage		
	Providence Hospital	907-562-2211
	Emergency Room	907-261-3111
	Air Ambulance: Providence	907-261-3070
	Outside Anchorage	800-478-5433
	Alaska Regional Hospital: Air Ambulance.	907-248-0617
	USCG	907-271-6700
<b>Adak</b>		
	Emergency	911
	Police	907-592-3323
	Medical Emergency Room	907-592-8382
<b>Dive Emergency</b> (see Dive Safety Plan for more details)		
<b>Diver's Alert Network (DAN)</b>		919-684-8111
<u>If emergency is Decompression Sickness or an Air Embolism, the dispatcher should also contact the nearest Recompression Chamber facility.</u>		
<b>Dutch Harbor (private company)</b>		
	Dan Magone	907-581-1401
	Dan Magone (cell)	907-391-1400
	V.J. Cross (Magone's lead diver) (home)	907-581-4925
	Magone's Shop Forman (cell)	907-391-7993
<b>Anchorage—Providence Hospital</b>		
	Outside Anchorage	800-478-5433
	Recompression Chamber Supervisor:	
	Robert Thompson, MD	907- 565-4600
	American Marine, 6251 Tuttle Street, Anchorage, Ak	907- 565-4600
	Alaska Regional Hospital: Air Ambulance	907- 248-0617

## INTRODUCTION

This Health and Safety Plan has been designed to protect all expedition participants from likely and unlikely physical, radiological, biological, and chemical hazards that may be encountered during the CRESP Amchitka Project (June-August 2004).

**Health and Safety Plan Acknowledgement** is essential. All expedition members will be required to read the Health and Safety Plan, attend a safety briefing on Adak and sign a form (Declaration of Understanding [Appendix 1](#)), stating that they understand and will follow the plan. All participants with questions or concerns must talk with Conrad Volz, Dr PH, MPH, Project Manager regarding their concerns. This will be accomplished at safety briefings on Adak. No one will be permitted to leave for Amchitka without signing the Expedition Declaration of Understanding.

**Emergency Contact Forms and Procedures** -The Emergency Contact Form ([Appendix 2](#)) has been developed and sent to all group leaders. All expedition personnel must fill out this form and return it to Xio Waldron. Ms. Waldron will bind copies of all Emergency Contact Forms for Michael Gochfeld MD, PhD, Expedition Safety and Health Director and Conrad D.Volz, DrPH, MPH Expedition Project Manager. A copy of the bound forms will also be kept at CRESP HQ. Should there be any emergency, problem or significant project delay (weather etc.), the Project Manager and/or the Safety and Health Director will inform CRESP HQ. A discussion will occur between Dr's Gochfeld, Volz and the Project PI, Charles Powers, PhD regarding the responsibility for notification of primary and/or secondary personal contacts.

**Health Services Questionnaire**-CRESP has adopted with modifications the NOAA Health and Safety Questionnaire. It is attached to this plan as [Appendix 3](#). This questionnaire must be completed by each expedition member This form is confidential and should be returned **ONLY** to Dr. Gochfeld by June 1, 2004 at email address [gochfeld@eohsi.rutgers.edu](mailto:gochfeld@eohsi.rutgers.edu) / by FAX 732-445-0130 or by mail. Only those cleared by Dr. Gochfeld as fit for sea duty will be permitted on the expedition. Dr. Gochfeld will keep all Questionnaires on file for the duration of the expedition. All records will be kept confidential.

### 2.0 General Project Information

The Consortium for Risk Evaluation with Stakeholder Participation (CRESP) is undertaking a scientific assessment regarding the possibility of current or future leakage of radionuclides from the three test shot cavities on the island. Three underground nuclear tests (*Long Shot* 1965, *Milrow* 1969, and *Cannikin* 1971) were detonated on Amchitka, with *Cannikin* at 5 megatons representing the largest United States underground nuclear test. Amchitka is in a region of high tectonic and volcanic activity, and a variety of stakeholders have voiced the need to conduct this assessment prior to the proposed termination of the Department of Energy's Environmental Management responsibility for the island. Amchitka is currently part of the Alaska Maritime National Wildlife Refuge and is administered by the U.S. Fish and Wildlife Service. But although USFWS is the landlord, the DOE retains responsibility for radiation wastes.

Accordingly CRESP (2003) developed a Science Plan to conduct this assessment which was approved by the Department of Energy (DOE), the State of Alaska's Department of Environmental Conservation (ADEC), the U.S. Fish and Wildlife Service (USFWS), and the Aleutian Pribilof Island Association (APIA). The main part of the plan will be implemented in 2004 with three expeditions which will perform a series of oceanographic and geologic surveys using modern technology as well as extensive biological sampling to obtain

specimens representative of all trophic levels and subsistence and commercial foods from Amchitka and reference sites.

The main focus of CRESA's scientific investigation is on the coastal and marine environment. Studies of the Amchitka terrestrial environment have been completed recently (Dasher et al. 2002). This HASP will parallel the CRESA-Amchitka Implementation Plan, including transportation within chartered vessels to and from assessment sites where the sampling will be obtained, using the same paragraph structure, facilitating cross-reference.

## 2.1 Purpose of the Safety and Health Plan

A Health and Safety Plan (HASP) details the preventive, intervention and communication aspects of a project that are necessary to fully anticipate and provide for the protection of those involved in the activity and to meet applicable regulations and laws. It serves as both a training guide, a reference manual, and also as contract acknowledged by all expedition participants. It is predicated on the underlying principle that occupational diseases and injuries are preventable and that good planning, careful oversight, training, and participant responsibility combine to assure that work is conducted safely.

The HASP covers routine activities as well as contingencies for managing emergencies.

A HASP is a "living" document and may be modified as new information, procedures, equipment or personnel become involved in the project. Any changes to the HASP must be conveyed to all expedition personnel affected by the change.

## 2.2 Project Scope and Activities

The following list identifies the components of the 2004 CRESA Amchitka project and identifies the individuals responsible for each activity. Transportation between home-Anchorage-Adak will be by commercial air carrier.

Travel between Adak, Amchitka and reference sites will be on the *Ocean Explorer*. General Maritime Operations and Authority of the *Ocean Explorer* are under the jurisdiction of its Captain. All safety procedures are determined by the *Ocean Explorer* and all personnel will be familiarized with those procedures. Collections from the "NOAA Trawler" {name of ship} will be under the jurisdiction of its captain.

### 2.2.4 Group Assembly and Disassembly on Adak Island (Volz)

### 2.2.5 On Island transportation (Volz)

### 2.2.6 Bathymetric Profile/ CTD Scanning (Johnson) and Water and Sediment Sampling (Volz)

### 2.2.7 Magneto-tellurics (MT) (Unsworth)

#### (w) DIGGING

Installing the MT station involves digging the following holes:

- 4 electrode holes, each 6" deep
- 2 trenches for magnetic sensors (called induction coils ) 6" deep, 6" wide, 4 feet long)
- 1 vertical hole for magnetic sensors (3" deep with post-hole digger)

Any activity that involves walking off-road through vegetation will require visual inspection and sweeping by with a metal detector.

All digging will be preceded by visual inspection of the ground surface and by metal detector sweeping. The entire deployment pattern of each MT data point will be inspected and swept before digging and laying of electrical wiring can proceed.

All diggings will be done carefully with small shovels, and pick-axes. Small amounts of soil will be removed and metal detection performed at different depths as the process proceeds

When digging, eye protection and gloves will be worn at all times.

If any metal objects are found, no further digging within 15 feet of the metal object will occur.

The site(s) of any metal objects will be marked with a flag and the GPS coordinates noted on the Safety Log.

(x) MT electrodes contain minor amounts of lead chloride and will not be touched without gloves. Hands will be washed prior to eating.

(y) The DC resistivity system uses voltages on bare metal electrodes up to 200 V. The operator must ensure that all field crew have moved away from electrodes before switching current on. Before the operator switches the current on the operator will inform the crew to move away from the electrodes. One whistle blast will signal that the crew members move at least 20 feet away from electrodes. Once the operator has visually verified that all personnel are away from the electrodes he/she will issue three whistle blasts indicating that all personnel must not move and that the current will be turned on within 5 seconds.

Most digging on the island will be superficial, less than 1 foot in depth. Any trench exceeding 2 ft in depth will have a 1 ft x 2 ft bench profile to prevent cave-ins. There is no anticipation of any confined space activity.

1.2.5 Base Camp Construction (Volz) A Base Camp will be constructed for the expedition. A total of 7 people will be staying at this base camp, which will consist of 4 -3 person three season tents, a tarped cooking and eating area, an area for storage of gasoline for cooking and ATV usage, an area for stationing of generators and land vehicles and two latrine trenches.

The sleeping area will be located on the heights above Constantine Harbor on tundra that has been swept for unexploded ordinance. Tents will be pitched so that the main opening is opposite the prevailing northwest winds. All tents will be anchored using dead-man/ buried snow pegs to maintain the integrity of the campsite during inclement weather. All land based expedition members will be issued Therm-A-Rest ground pads (reducing thermal heat loss to the ground) as well as sleeping bags, which are rated to +20 degrees Fahrenheit. Sleeping bags are filled with a synthetic fiber, which retains over 50% of its insulating capacity even when wet. This tent/ground pad and sleeping bag arrangement reduces the chances for hypothermia. Four extra sleeping bags will be stationed at base camp for use in an emergency or for evacuations.

The tarped cooking and eating area will be at least 20 feet from the nearest tent. Fire extinguishers will be on hand for cooking fires and stove gloves provided to prevent burns from handling hot cookware.

The generators, land vehicles and fuel supply will be located on a hard paved surface, at least 150 ft from the tent area. The gasoline fuel supply (5-7.5 gallon plastic containers) will be located on a berm with raised sides to prevent release of spillage into the underlying surface. Land vehicles will be at least 50 ft from the gasoline supply and will be covered by plastic tarps. The generators will be located near the land vehicles

(within 30 feet), they will also be bermed and covered by a waterproof tarp when not in use.

Two latrines will be constructed to the southeast and southwest of the tent camp. These will be trench latrines, original construction to be 5 ft long by 16 inches deep. A metal detector will be employed to scan for unexploded ordinance before the trench is dug. Persons using the latrine will be instructed to cover waste with at least 6 inches of soil after each use. The trail to each latrine will be carefully inspected for unexploded ordinance, concertina wire, rommel spikes and other impediments and hazards before it is constructed and authorized for usage.

## 1.2.6 Biological Sampling---Marine

### 1.2.6.1 Intertidal (Burger)

The intertidal may be accessed by small boat from sea or vehicle from land in which case the relevant transportation safety sections apply. All work will involve a buddy system.

All persons must have appropriate cold weather gear and footwear to prevent hypothermia. Because of frequent rains, polyester insulation is preferred. Wet suits or comparable neoprene material must be worn for wading in the intertidal.

All activities will require a buddy system within visual contact. Entry into the intertidal requires carefully chosen pathways and a support stick. Non-skid rubber soled waders with spikes or wet suit boots are required to minimize the risk of slipping on kelp or wet rocks. A cycling-type of plastic head protection is required at all times in the intertidal zone.

### 1.2.6.2 Subtidal (Jewett)

All work will adhere to the Dive Safety Manual attached to this HASP. All work will be done with a buddy system. All dives will be less than 30 m and of variable duration. No decompression will be needed. Work will be done from shore or from small skiffs. Boating safety procedures of the *Ocean Explorer* will be followed.

### 1.2.6.3 Biological Sampling/Fishing (Patrick)

The Patrick team will be guided by the small boat safety provisions of the *Ocean Explorer*

On land activity will follow vehicle safety rules. Use of firearms will follow the Firearms section of this HASP (1.2.10). All work will involve a buddy system. All field work will require a checkout with Volz or Burger and two forms of communication.

## 1.2.7. Biological Sampling---terrestrial

### 1.2.7.1 Biological Sampling/Marine Mammal Take and Salvage (Burger, Gochfeld, Patrick, Volz)

This will be a diverse activity involving small boats and/or vehicles and the pertinent safety procedures will be applied.

Collecting by SCUBA in the subtidal and intertidal zones (Jewett)

The safety procedures for these operations are detailed in the Dive Safety Plan to be appended to this HASP.

### 1.2.7.2 Bird Take (Burger)

All work will involve a buddy system. Bird breeding colonies will be located using information and maps provided by the U.S. Fish and Wildlife Service, by circumnavigation of the island by ship, and by enclosed vehicle. Travel to the north end of the island will be accomplished by a crew-cab 4-wheel drive pickup truck. A four wheel drive utility vehicle with a heated cab may be substituted if a pickup truck is not available.

Main hazards are vehicular accidents on the unfamiliar road which has not been maintained. Slow vehicular speed will be necessary in order to safely anticipate rough road conditions and possibly out-of-date road signs. Slips, trips, and falls on irregular terrain must be anticipated and avoided.

- 1.2.8 Rifle and Shotgun Safety (Volz) Birds will be taken using a 12 gauge shotgun with #5 stainless steel shot pellets. Marine Mammals including Harbor Seals and Sea Otters will be taken using both 30-30 and 30-06 caliber rifles with mounted and sighted scopes. Rifles will be field tested for accuracy at a rifle range, During sighting operations at the rifle range the rifle operator will wear hearing and eye protection and will follow the rules and regulations of the rifle range concerning gun safety.

#### **Storage of Rifles and Shotgun on Board the *Ocean Explorer***

##### **Rifles**

The rifles and shotgun and all ammunition will be kept in a locked steel case on board the *Ocean Explorer* at all times. Keys to this locked case will be held by Dan Volz and the Captain of the *Ocean Explorer*. Entry to the guncase will only be given when the days planned activities include an authorized use of a weapon (authorized in writing on the daily activity log by Joanna Burger, Michael Gochfeld and Dan Volz) to accomplish collection of specimens.

At the conclusion of each days collection effort all weapons and ammunition will again be stored in the locked gun case. It is the responsibility of Dan Volz to insure that weapons issued for the days sampling are collected and stored properly.

**No one will be permitted to carry handguns or unauthorized weapons on board the *Ocean Explorer*.** This is a breach of maritime policy, adopted by the B&N Fleet of Vessels. An announcement relative to this matter will be made as expedition members board the vessel. If handguns are found over the course of the voyage they will be confiscated by the Captain and safely impounded.

##### **Use of Weapons in the Field**

Weapons will be transported to collection areas (to be predetermined during the morning daily activity briefing) unloaded. Weapons will be loaded only when specimens for collection have been identified at a distance using binoculars or telescope [if available]. Weapons will be kept on safety until the moment of firing. Once loading occurs, the hunter will take a position in the front of the boat (for marine mammal collection) or ahead of scientists (for bird collection). Shooters will wear eye and hearing protection. A shot will only be taken if the all personnel are behind the shooter and if feasible, outside a 45degree arc established from the midpoint of the shooters body. Additionally, no shot will be taken unless there is verification by a second person of the target specificity and background objects safety. Immediately after specimen collection the weapon will be unloaded and safely stored for transport to the ship. No unspent

ammunition will be cached or discarded. All used cartridge cases or shotgun shells will be collected and returned to the ship and treated as waste material.

#### 1.2.9 Climb Safety (Volz)

Certain bird nest sampling may involve accessing nests on slopes or stacks that will require climbing equipment and secure anchor. All such work will involve a buddy system. Only persons who have been checked out and have proper equipment will be involved in this endeavor.

#### 1.2.10 Biological Sampling Rat Take (Gochfeld)

Rat traps will be set near camp and in areas where rat runways or evidence of rat predation are found. Setting snap traps requires caution and must be done with gloves to avoid injury.

Dead rats will be removed using vinyl gloves and will be stored in zipped plastic bags on ice for transport to the Mother Ship.

#### 1.2.11 Biological Preparation, Sample Dissection and Compositing (Burger)

Samples will be collected and transported to the ship following a chain of custody. Specimens will be screened with hand-held radiation detectors. Radiation readings will be recorded. On the ship sample bags will be opened onto a working surface covered with a sheet of aluminum foil (dull-side up). Workers will wear vinyl gloves and will also wear a steel mesh glove when slicing with fillet knives. Shears and saws will be available for cutting bone. Use of dust masks and safety glasses is optional. Hard hats are not required in the laboratory area.

Workers may use stools to avoid prolonged standing. A minimum of 10 min breaks are required each hour. Total duration of work in field and laboratory shall not exceed 15 hours per day.

#### 1.2.12 Biological Sample Storage (Burger)

Specimens will be stored in standard electric freezers with documentation and chain of custody forms. Access to freezers must be documented on at least a daily basis. Care must be taken in opening freezers since loads may shift. Food will not be stored in the biological specimen freezers.

#### 1.2.13 Offloading and Shipment of Samples (Volz, Burger, Weston)

Handling of loaded coolers and other heavy equipment usually requires two persons and coordinated handling to avoid musculoskeletal injuries. Back belts will be available, but are not required. NIOSH does not recognize back belts as effective prevention, but empirical observations indicate that they are often helpful.

#### 1.2.14 NOAA Trawl Boat Activity (Weston)

All activities on the Trawl boat will follow the health and safety procedures of that vessel. Specimen preparation procedures will adhere to section 1.2.14 of this document.

#### 1.2.15 Base Camp Sanitation and Housekeeping (Volz)

##### **Human waste**

Latrine construction has been detailed above, all human waste will be covered immediately with at least 6 inches of dirt. If this is found to be an insufficient depth the trench will be filled to its entire depth of 16 inches. If rats continue to pose a problem concerning human waste trenches will be dug to a deeper depth and immediately filled or as a last resort a pit will be dug and human waste will be contained in kitchen garbage

bags and brought back to an area remote from the camp location and kept in a secure plastic garbage can, double lined with contractor size refuse bags. All waste in this last case will be removed from the island and shipped to Adak for proper disposal.

### **Housekeeping**

All food for land operations will be kept in plastic garbage cans, lined with contractor refuse bags. Types of food will be segregated in these cans by kitchen bags and large freezer bags. No food will be kept outside the garbage cans or in tents. Food will only be removed from storage for preparation and immediate consumption. The kitchen area will be kept free of unused and excess food, even small pieces of food will be policed for storage in refuse containers, All pots/pans and individual mess items will be washed immediately and stored in kitchen boxes.

- 1.2.16 Base Camp Refuse Disposal (Volz) Two secure plastic garbage cans will be at the base camp location and all refuse generated by the land crew will be deposited in these cans for evacuation and disposal in Adak. No material will be left on Adak from any operation. All scientific and waste material will be removed from the island. A line search by expedition members to find residual refuse at the base camp site will be performed after camp demobilization. Pictorial documentation of base camp construction and demobilization will be made.

Fueling Operations (Volz) The Ocean Explorer will carry all gasoline needed for on board operations, outboard motor use, generator use and land based vehicle use. Gasoline will be stored and dispensed on the Ocean Explorer per their Marine Safety Policy Statement. All on board gasoline dispensing from the Ocean Explorers 500 gallon tank will be done by ships crew following their protocols.

Expedition personnel will be involved in the transport of gasoline to the base camp area and by boat for outboard motor refueling. There will be no smoking in skiffs or inflatables at any time and no open ignition sources, regardless of the amount of fuel being transported. Expedition personnel will exercise great caution when refueling land-based vehicles and generators. A funnel will be used in all refueling operations and care will be taken not to spill or overflow when refueling. All refueling operations will be done using the buddy system, with one member removed from the operation and with immediate access to a fire extinguisher.

Refueling at sea presents a far greater hazard, for if a fire or explosion were to occur, expedition members might need to abandon ship. To the greatest extent possible all refueling of outboard motors will be done on a beach. If this is not possible refueling will be performed with great care, to avoid spillage or overflow to hot surfaces. A fire extinguisher will be available on board skiffs and inflatables at all times.

- 1.2.17 Operation of Mobile Equipment Land-Based Vehicles

Land-based vehicles will include 2 covered Polaris Rangers (with a small flatbed) and 2 - 4 wheeler ATV's. All project personnel riding in these vehicles will wear a helmet and eye protection at all times.

All persons using ATVs must be "checked out" by Dr. Volz including operating details, safe speed, and guidance. ATVs behave differently from trucks and must be treated with respect and always operated at a safe speed. They are prone to tip on slopes and must be operated up slope as much as possible.

The use of land-based vehicles must be authorized at the daily activity and safety conference by either Joanna Burger, Michael Gochfeld or Dan Volz. Specific directions for travel to and from collection sites or study areas will be outlined during these conferences, deviations from these instructions can only occur with the prior approval of the Project Manager, Safety and Health Director and Lead Biological Scientist.

At no time will expedition members be permitted to use these vehicles for recreation. Land-Based Vehicles will be operated within the safety limits prescribed by the manufacturer. No vehicle will be used in areas of extensive hillocks, extreme slopes or cliffs where there is a high potential for a vehicle to flip or turn-over. Vehicles will be operated at safe speeds at all times, which will depend on weather, road and/or off-road conditions.

For added protection, in the event of changing weather conditions, each land-based vehicle leaving base camp (Magnetotullerics Phase) or Constantine Harbor (Biological Collection Phase) will be required to carry the following items, in sufficient quantity for all team members, in waterproof dry-bags:

- Tents and tarps
- Sleeping Bags and Therm-A-Rest Ground Covers
- Water sufficient for 24 hours of intake
- Food-Power bars or equivalent
- 2-way radios for intragroup communication
- A VHF or UHF handset or Satellite Phone
- First Aid Kit ##

Adequate back-up gasoline is also required to be taken. Gasoline needs will be calculated during morning activity and safety briefings.

#### 1.2.18 Medical Services

A. Emergency Services: The remote nature of this research expedition makes it necessary to pre-arrange for emergency evacuation procedures to off-island health facilities. In the event of needed emergency evacuation, as determined on site by the expedition health and safety personnel (Gochfeld and Volz), in consultation with the ship captain and the destination hospital, an airlift will be arranged. The primary point of contact will be the U.S. Coast Guard (see emergency contact information at the beginning of this document).

B. On site emergency services of a very limited nature will be provided, where indicated, to prevent damage to, stabilize and maintain the injured or ill individual(s). All land-based expedition personnel will have basic training in first aid and CPR – and will be supported by automated external defibrillator equipment. The *Ocean Explorer* crew includes paramedics and emergency medical technicians. Additional information on shipboard services are provided in the *Ocean Explorer* manual.

C. General care: Dr. Gochfeld will be available on the second expedition to provide health support and advice, operating under guidance, if indicated, (via telecommunication) of an Alaska-licensed physician at a hospital. All research personnel will have necessary immunizations (tetanus within the last 10 years). Individuals will fill out a health questionnaire, to be evaluated by Dr. Gochfeld, and may be required to provide written medical clearance by their own physician. Any prescribed medications that need to be taken on this trip will be the responsibility of the participant, and will be

listed on the medical questionnaire. All injuries or illnesses will be promptly communicated to Dr. Gochfeld, and will be logged.

## 2.3 Management Structure, Key Project Personnel and Responsibilities

Table 1 illustrates the Key Project Personnel for each of the research tasks.

**Stop Work Authority STOP-WORK** authority is divided between two distinct authorities.

### **Maritime Safety**

The Captain of the ship has the authority and the responsibility to stop all or any part of the expedition without consultation with or without approval of any other person on board or on shore. Furthermore the Captain may at any time:

- Order all expedition personnel below deck.
- Deny launching of skiffs or inflatables for any purpose and for any reason.
- Order all launched boats and personnel back to the *Ocean Explorer*.
- Order that the *Ocean Explorer* be moved regardless of collection implications.
- Order the *Ocean Explorer* to a port of his choosing at any time, regardless of implications to fulfill the objectives of the expedition.

The captain may also determine which side of Amchitka is safe to work on.

### **Expedition STOP-WORK**

The order to STOP WORK and evacuate a specific area or abort the expedition entirely is a very serious decision but is a decision that must rest with one person. This authority and responsibility rests with Dan Volz, CRESP/Amchitka Project Manager. It is the responsibility of the following expedition principals to bring information that bears on STOP-WORK or Immediately Dangerous to Life and Health (IDLH) conditions and decisions to Dan Volz's attention immediately.

- Michael Gochfeld, Amchitka Project, Safety and Health Director
- Joanna Burger, Lead Biological Scientist
- Stephen Jewett, Dive Master
- Mark Johnson, Lead Oceanographic Scientist
- Martyn Unsworth, Lead Magnetotullerics Scientist

Each lead scientist has the prerogative to stop work of his/her project team if weather or other conditions render work unfeasible or dangerous.

This is particularly true of the Diving. Dr. Jewett has the responsibility to halt diving until conditions improve.

2.4 Dan Volz will consult as appropriate and as much as can be expected under specific circumstances with all project principals concerning issuing an order to Stop work, either temporarily or to evacuate. He will attempt to consult with the Projects Principal Investigator, Charles Powers PhD and/or with CRESP Associate Director Barry Friedlander MD, concerning the reasons for a specific site STOP-WORK or evacuation order. But the order to STOP-WORK or evacuate rests entirely with him and once a decision is made all expedition members will follow his directives, Dan Volz will then communicate the expedition's specific needs to the Captain and he will proceed as directed.

### **1.4.1 Individual Responsibility**

Each individual has the right to refuse hazardous duty that in their judgement carries a high risk of bodily harm. The dive safety manual specifically address this issue in section 2.34.1

“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”

## 2.5 Disclaimer

This HASP attempts to identify and predict possible health and safety problems that may arise during the CRESA Amchitka Project. It follows standard HASP formats and incorporates procedures to minimize risk to participants. Participants are expected to be familiar with the provisions that are relevant to their activities and to adhere to them.

### Workers' Compensation

It is understood that all expedition participants are employees or students of their respective Universities and are covered under their respective workers' compensation provisions once CRESA has issued a subcontract to their university. The Institute for Responsible Management, the Consortium for Risk Evaluation with Stakeholder Participation, the Director (Volz) and the senior scientists (Burger, Gochfeld, Jewett, Unsworth,, Johnson, Patrick) will act in good faith to protect the safety and health of all expedition members and are not liable for illness, injury or their consequences.

1.6 Daily Coordination and Safety Meetings A key feature of a HASP is the daily coordination and briefing sessions. Each days work includes a workplan designating personnel, targets, locations, methods, special equipment and communication. The work of each group will be briefly reviewed, hazards identified, and safety precautions explained. The minutes of these meetings will be documented on a Plan of the Day form ([Appendix 4](#)).

## 1.7 Emergency First Aid/CPR/AED Training

Each land-based expedition participant will be trained in CPR (Cardio-pulmonary Resuscitation) and AED (Automated External Defibrillator). An AED will accompany land-based expeditions. Personnel who will remain on the ship need not have CPR/AED certification since that will be subsumed by the ship's crew.

## 2.0 Hazard Analysis

**Radiation:** Although Amchitka Island was once highly contaminated with radioactive materials and chemical hazards, the Department of Energy has reported that the surface contamination has been removed. Accordingly we do not expect to encounter hazardous chemicals or surface contamination. While the annualized general public exposure limitation (DOE) is 100 mrem, this research project will have as a guideline an Occupational Exposure Limit (OEL) which should not permit participant exposures to exceed 10% of the annualized dose (i.e., maximum of 10 mrem ) throughout the expedition. The bathymetry study will include water and sediment samples and such samples will be screened for radiation above background using hand-held instruments. Such screening will be conducted in areas where the biological sampling will take place, prior to divers beginning their collections. Water and sediment are to be collected in approximately 100 gram samples. No high levels of radiation are expected, however all samples will be screened with hand held sodium iodide and Geiger-Muller counters, with set action levels defined (see table 1), to assure the safety of those handling the materials and the adequacy of safety controls throughout handling, processing, shipping, analysis and disposition.

**Physical Hazards:** There are many hazards common to general workplaces which are particularly dangerous on this expedition, because of the remoteness of Amchitka. This includes the possibility of slips, trips, falls, which require recognition of hazardous areas or obstacles conducive to slipping. Lacerations and abrasions, contusions, overexertion, sprains, strains, hypothermia are all hazards likely to be encountered on Amchitka, while the possibility of hypothermia must always be considered. Many situations pose an eye hazard, and eye protection is necessary. Pedestrians will have to watch out for vehicles on the Infantry Road as well as protruding objects when off road.

## 2.1 Physical Hazards

For all Ship-related hazards, the *Ocean Explorer* safety procedures will be followed and all expedition participants will be briefed on emergency procedures at the start of their expedition. These are detailed in a Hard Copy manual which will be reviewed by all participants before departing on the *Ocean Explorer*.

Injury reporting and documentation is essential (Appendix 5). Must be completed as soon as possible by the injured individual and their supervisor. Injury forms will be reviewed with the entire group at the next-day safety briefing.

- 2.1.1 Man Overboard. *Ocean Explorer* procedures will be followed and all personnel will be trained in emergency procedures.
- 2.2.2 Ship Evacuation/ Fire and/or Collision *Ocean Explorer* procedures will be followed and all personnel will be trained in emergency procedures
- 2.1.3 Ship Hazards, Slips/Falls/Overhead Cranes/Pinch Points/Head Trauma/Eye Injury. *Ocean Explorer* procedures will be followed and all personnel will be trained in emergency procedures.
- 1.1.1 Excursion/Small Boat Water Hazards-Sinking, Flipping and Grounding; Fog and Lack of Visibility, Lost and Lost Communication with the *Ocean Explorer*
- 1.1.2 On Island, Slips, Trips and Falls  
Slips, trips, and falls are among the commonest causes of worker injury. Footwear with non-skid soles will be worn. Slip hazards can occur anywhere---on ship or on shore, in camp or far away. The irregular terrain, rain-soaked grass and mud, hidden wires and obstacles, are conducive to slips, trips, and falls. All expedition participants will be reminded of the need to be careful on unfamiliar terrain and to examine carefully areas that will be covered on foot, particularly in tall grass-covered areas.  
All field work requires a buddy system so that no one is out of visual, auditory, or walkie-talkie contact.  
Electric power generators will be operated for battery charging, requiring safety procedures for handling the gasoline storage and fueling operation as well as electrical safety.
- 1.1.3 Rommel Stakes and Concertina Wire  
Most of these structures have been removed from Amchitka, however, there is always the possibility that some such obstacles will be encountered, particularly in dense vegetation. Careful attention to where one is walking is needed to prevent injuries. Any obstacles encountered should be flagged and GPS coordinates should be written down.  
If the obstacle is hidden in vegetation or soil, expedition members are not to examine or unearth it. Simply document its location and provide a brief description and leave.
- 2.1.7 Unexploded Ordinance

The recent federal cleanup activities on Amchitka included the removal of Unexploded Ordnance (UXO). However, it is highly likely that various forms of ammunition and mines may remain hidden on the island surface. Encountering an unexploded mine is highly unlikely, but all participants should be aware of the possibility. As indicated above, the location of such items should be documented with GPS coordinates and flagged, but no attempt to investigate should be made.

#### 2.1.8 Adverse Weather

The Aleutians are notorious for rapid changes in weather. Beautiful cloudless skies and comfortable temperature can suddenly shift to wind-driven rain with fog and low visibility. To the extent possible weather reports will be made available, but all expeditions from the ship or from camp, must be equipped in case inclement weather is encountered. Workers must have sufficient food and clothing in case their return to base is delayed. All cold weather clothing with water repellent shell, should be properly fitted and provide adequate insulation. Polyester rather than down will be used because of better performance in wet weather. See section 1.2.16 for equipment that must be carried when traveling away from base camp.

#### 2.1.9 Hypothermia

Field workers can expect to get wet and chilled on some occasions, but true hypothermia can have a sudden onset and can be disabling. All participants must be able to recognize signs of hypothermia and all participants must have suitable insulated garments and foul-weather gear to prevent chilling. Each expedition whether in boat or on land should have at least one hypothermia blanket.

Because weather in the Aleutians can change rapidly, all personnel traveling away from base should carry rain gear.

***What is hypothermia:*** *When exposed to cold temperatures, the body begins to lose heat faster than it can be produced. The result is hypothermia (abnormally low body temperature). Hypothermia affects the brain, potentially impairing judgement and motivation. This makes hypothermia particularly dangerous because a person may not know it is happening and won't be able to do anything about it. Shivering is a first sign of hypothermia, but as it progresses, shivering is inadequate to generate heat, and may even stop altogether.*

*Hypothermia occurs most commonly at very cold environmental temperatures, but can occur even at cool temperatures (above 40°F) if a person becomes chilled from rain, sweat, or submersion in cold water.*

2.1.10 Dehydration can occur at high latitudes on sunny, windy days when perspiration is not obvious. Fresh drinking water must be obtained from the ship daily, and a minimum of one quart per person per half day must be carried by field personnel. A Katadyn filter and water purification tablets will be carried on long expeditions in case surface water must be purified as an emergency water source. Do not drink surface water on Amchitka until it has been treated.

#### 2.1.11 Operation of All Terrain Vehicles (ATV'S) and Polaris Vehicles

Vehicles must be operated safely at all times. Drivers must be checked out by Dr. Volz, prior to operating any vehicle. The road conditions on Amchitka are uncertain and there are blind curves which must be approached with caution at slow speed. Vehicles should be operated at an appropriate speed with careful attention to avoid collisions, rollovers, and other accidents.

Vehicles should not be overloaded with personnel or equipment. Nor more than two people can ride in a single vehicle.

ATVs should not be operated on tundra.

- 2.1.12 Compressed Gases (Dive Tank Refill and Compressor Usage, Emergency Oxygen Tanks. These procedures are Described in the *Ocean Explorer* and Dive Safety plans.

An oxygen tank will be on board the *Ocean Explorer* for the administration of 100% oxygen in cases of Decompression Illness, or Near Drowning.

- 2.1.13 Lost on Land and/or Out of Communication

All expeditions away from base should have at least two means of communication---a satellite phone and one other. All expeditions must file a “flight plan” with a contingency return time in case of delayed return.

All participants or buddy-teams should have a GPS unit and a compass. Any travel away from the Infantry Road requires documenting the general direction of movement. Thus anyone should be able to return to the Infantry Road.. Any movement on the highway should be toward base camp.

#### SEARCH STRATEGY

If lost and injured---stay put, stay warm and stay in communication. A buddy should be close by.

All individuals should carry an emergency insulation sheet.

- 2.1.14 Falls during Collection in the Intertidal

The intertidal zone is a high hazard area. Kelp is extremely slippery and the surface of wet rocks is extremely slippery. Moreover, the bottom structure is usually obscured by kelp and incoming tide surge can upset balance. All work in this area requires extreme caution. Non-skid Neoprene or Rubber soles with spikes are essential. A support stick is desirable. A plastic cycle-type hard hat should be worn. A flotation device should be pulled behind the samplers.

- 2.1.15 Dive Team Hazards (see attached Dive Safety Plan)

Attached to this document (as of 6-8-04) is the University of Alaska-Fairbanks *SCIENTIFIC DIVING SAFETY MANUAL* (revised May 2004), herein referred to as the Dive Safety Plan. It covers the following topics:

Section 1. General Policy, standards, operational control and record maintenance.

Section 2 Diving regulations for SCUBA, including pre-dive, diving, and post-dive procedures as well as emergency procedures and flying after diving.

Section 3. Diving equipment, equipment maintenance and air quality standards

Section 4. Entry level training requirements

Section 5. Scientific Diver certification types, policies, requirements, depth certification and recertification.

Section 6. Medical standards and medical requirements

Section 7. Other diving technology

And Appendices including medical forms, physicians with diving expertise, definition of terms, and emergency management and contact information.

- 2.2 Specimen Preparation Hazards

Specimen preparation is also a critical phase and workers must pay attention to quality assurance procedures, cross-contamination, as well as safety procedures. Workers will be equipped with a series of dissection trays, sharp knives, vinyl and steel mesh gloves.

There will be a demonstration of proper cutting techniques for each type of specimen. Dissections can be carried out on a flat surface. If using a tray, be sure to raise arms frequently so that forearm circulation is not compromised by the rim of the tray. Pay attention to the dictum: “dull knives cut deep”, and make sure that knives are sharpened as needed. Any cut involving biological material has the potential to become infected, often with organisms that are unfamiliar to the body’s immune system. Any cut requires first aid attention as soon as possible. During laboratory work use of masks and goggles/glasses is optional. Boots, shoes or sandals with non-skid soles is required.

Eating and drinking is not permitted in the laboratory.

All primary data entry will be in “hard copy” bound notebooks according to standard laboratory procedures.

As time is available data will be entered into computer spreadsheets and archived and transmitted. During data entry, attention should be paid to all ergonomic procedures for chair, desk, screen, mouse and keyboard use and frequent breaks should be taken.

### 2.3 Radiological Hazards (STABIN)

#### **General Statement**

It is not expected that radiological hazards will be significant on this mission and all personnel will wear personal dosimetry badges during the expedition. At the conclusion of the expedition a second badge will be issued to be worn for the same period as a “control”. The “expedition badge” will be collected by Dr. Volz or his designee, when each participant leaves Adak. The “control badge” will be sent to Dr. Volz.

Radiation is both an endpoint of this Project and a health concern. Therefore all specimens will be screened with hand held monitors (NaI) when they are brought on board the ship, to verify that they do not pose a radiation hazard. This measures gamma radiation. External exposure to alpha radiation is not considered a hazard in this project because of the very short travel distance of an alpha particle.

#### **Screening of Specimens**

The allowable radiation exposure for a radiation worker is 5000 mrem per year. This assumes that the workers have undergone a radiation training program with refresher courses as needed. Therefore all expedition members will be considered to be members of the general public (i.e. not radiation workers) and are thus limited to an annual exposure of 100 mrem per year. If we assume a 4 week mission, with (conservatively) 24 hr/day, 7 day/week exposure to a sample at 1 m distance from a stored sample, samples reading more than 0.15 mR/hr (150 microR/hr) at 1 m should be isolated, in a leaded bag, and if necessary in a lead box. If the radiation on the external surface of the box still exceeds this value, the specimen, location, date and time of collection, and its radiation measurements should be documented and the specimen discarded. Due to the small total amount of radioactivity, the specimen could be discarded at sea.

In the unlikely event that a specimen exceeds this criterion and warrants a lead bag, it will be processed carefully to minimize exposure and avoid cross contamination. The retained specimens will be frozen in a lead bag, sealed inside a plastic bag. They will be shipped in a separate cooler directly to the Nelson Laboratory (Rutgers University) for processing. Given the short period of processing (about one hour), the cumulative exposure from a specimen will not pose a hazard to the laboratory workers.

#### **Rationale for Expedition Occupational Exposure Guideline**

- 1) 100 mrem is the yearly protection standard for incremental radiation to members of the public.
  - 2) Radiation risk is thought to be linear, with no threshold, so every mrem has some accompanying risk.
  - 3) Radiation exposure should be controlled to As Low As Reasonably Achievable (ALARA)
  - 4) The actual Amchitka expedition will take approximately 10% of a year.
  - 5) Therefore, as a guideline an appropriate radiation occupational exposure limit (OEL) for the expedition would be around 10 mrem (i.e., 10% of 100 mrem)
    - a) 10 mrem should certainly be achievable (this is expected to be a low radiation exposure effort, excluding flights);
    - b) 10 mrem should be more protective than 100 mrem;
    - c) 10 mrem would better reflect ALARA than would 100 mrem, and is an equitable proportion of the annual allowable limit.
- Therefore an Occupational Exposure Limit Guideline of 10 mrem (cumulative for the expedition) is established. Exceedance of this exposure level will require documentation and review of the conditions causing it.

Collecting biological specimens for radioactive material rarely involves contact with significant sources of radiation, except at sites in which intense sources may have been used and/or abandoned. Usually biologic samples contain very little radioactivity, since high levels would have been incompatible with survival of the organism. However, some samples could be encountered with a particularly high concentration of radioactivity, because of an unusual accumulation of fission products at some point, so precautions will be followed for monitoring of samples, personnel and the work areas to ensure radiological safety and also prevent and document of cross-contamination.

Details on the radiation screening protocol are provided in the Implementation Plan.

Discovery of one or more very hot specimens will also require re-direction of the sampling effort to investigate the nature and extent of the contamination.

### 2.3.1 Sample Collection and Preparation

- a. Personnel will be assigned radiation monitoring devices, to be worn throughout the mission and read upon return. These devices may be supplied by Landauer, Inc. (<http://www.landauerinc.com/products.htm>), Only body badges (i.e. not finger, or extremity, badges) are indicated for use in this study.
- b. Cross-contamination of samples that are processed shipboard or in land-based laboratories is an important consideration from a quality assurance standpoint. Should a sample be encountered that has a particularly high level of radioactive contamination, it is of course important that remnants of this sample do not mix with other samples that may have little or no activity. Personnel hazards from handling possibly contaminated samples are expected to be minimal. At the end of each working shift or working day, for 2-3 areas considered the most important (sample preparation area, sinks, storage refrigerators, etc.), a moistened filter paper disk is wiped over a representative area of about 100 cm<sup>2</sup>. These will be read with the hand held device and results will be recorded.  
Hand held samplers will be calibrated with a known radiation source.

### 2.3.2 Land Based Radiological Hazards

The Department of Energy has completed its surface cleanup of Amchitka and repeatedly reassured CRESP verbally that there was no significant surface contamination. Initial field surveys will be made at Base Camp and magneto-telluric field sites. Personnel monitors be worn at all times during the expedition.

## 2.4 Biological Hazards

2.4.1 *Rattus norvegicus*: The Norway Rat is present on Amchitka and will be targeted by trapping operations. Rats are potential disease vectors, and can bite. They are also potential camp pests. Camp hygiene and safe food storage will discourage rodent depredations. Rat traps (snap-type) will be set and inspected daily. Removal of dead rats will require vinyl gloves, and rats will be taken into an inverted plastic zipping bag, which will be labeled and sealed for transport to the ship.

## 2.4.2 Marine Animals

The only animals likely to be hazardous to humans are Fur Seals (not usually present on Amchitka) and Stellers Sea Lions. These animals should be given a wide berth and approached no closer than 50 feet, except during collection attempts. Animals to be collected will be shot in the head with a 30 caliber rifle and death will be ascertained prior to close approach. Collection of marine mammals requires special federal permits.

## 2.4.3 Waterborne Bacteria and Parasites

Pathogenic microorganisms are seldom a problem on a remote, uninhabited island, unless they are carried by expedition members. Appropriate camp sanitation and disposal of human waste is essential. Care in handling marine organisms is required since they may harbor unusual infectious agents. Any cuts need to have prompt first aid.

2.4.4 A plant in the Wild Parsnip family can cause significant contact dermatitis. Learn to recognize it and avoid it. Pictures of this plant will be provided during initial training and if encountered it will be pointed out.

## 3.0 Personal Protection.

We do not anticipate encountering any hazardous chemicals or radiation that would warrant more than Level D protection. Hard hats and non-skid footwear are required. Rain coats are necessary for land work in light rain.

Appropriate comfortable, properly-fitting foul weather gear, insulated coats, gloves and head ware will be required for work on land, in the event that sudden storms arise. Volz and/or Gochfeld will not allow personnel into the field if they are not properly equipped.

3.1.1 Routine shipboard protection: a hard hat is required on deck at all times. Non-skid boots are also necessary.

### 3.1.2 Specimen preparation on ship.

Vinyl gloves are required to protect both the specimen and personnel.

Safety glasses or goggles and masks are optional.

3.1.3 Gloves: work gloves will be available for most activities on ship or on island. Divers will use special rubberized diving gloves. Dissectors will use a combination of vinyl gloves and steel mesh gloves.

## 4.0 Dive Safety Procedures (refer to the Dive Safety Manual---attached)

## 5.0 Emergency Procedures

Due to the extreme remoteness of Amchitka and the lack of medical facilities, emergency procedures and evacuation plans are needed. The nearest medical facility is at Dutch

Harbor and the nearest hospital of any size is at Anchorage. The Airfield on Amchitka is of sufficient size to accommodate jet airplanes, but there is no on-island communication, weather station, or emergency landing lights. Anchorage is about 5 hours away by air, which means a minimum of 10 hours from notification to arrival at hospital.

Dr. Dan Volz serves as the Emergency Coordinator with Dr. Michael Gochfeld as backup. Communications with U.S. Coast Guard will be established. Phone 800-478-5555

Specific tasks would include:

- a. notification of ship captain who will notify off-island emergency personnel.
- b. Identify location of sick or injured person and assist in stabilization of condition.
- c. Apply first aid and CPR as needed. Operate the AED if needed.
- d. Provide periodic checks of emergency and communications equipment.
- e. Provide emergency evacuation people with location of patient, nature of injury, and what help has been provided.
- f. In providing emergency information Let the person you call hang-up first.

#### 5.0.1 Evacuation Procedures

Ship Evacuation of the Ocean Explorer – Orders given by the Captain of the ship relative to evacuation **for any reason** are final and must be followed without delay. Included as Appendix (TT) the Maritime Safety Procedures for the Ocean Explorer.

APPENDIX 1 DECLARATION OF UNDERSTANDING

I \_\_\_\_\_, have read the Health and Safety Plan and understand the nature of the Expedition, the potential exposures and risks, the necessary precautions, and the line of communications, responsibilities and authority. I will take appropriate actions as outlined within the HASP or as required by the Captain, Project Director or Senior Investigators. I understand that they will make a good faith effort to operate safely at all times and that they will err on the side of caution when weather and/or sea conditions are unfavorable

I specifically understand and agree with my role in the expedition and my health and safety responsibilities and reporting relationships. I agree to adhere to the HASP, to ask for any needed clarifications and to fully participate in the spirit and fact of making this Expedition a safe and collegial undertaking.

I understand that I have the right to refuse hazardous duty that in my judgement carries a high risk of bodily harm.

I will not participate in any activity that knowingly puts me or others in jeopardy, and will clearly communicate any concerns I may have regarding unsafe practices of which I am aware to the Project Director or a Senior Investigator. I will report to Drs. Volz or Gochfeld in a timely manner, any injury or illness that I may develop during this expedition.

I understand that any illness or injury that is caused or aggravated by this work will be reported under the appropriate Workers' Compensation rules of my university or agency employer.

Signature \_\_\_\_\_ Date \_\_\_\_\_

**APPENDIX II---IRM/CRESP EMERGENCY INFORMATION FORM**

**Amchitka Approved Science Plan, Summer 2004**

This form must be completed by all Amchitka Expedition members and returned to Conrad (Dan) Volz DrPH, Amchitka Project Manager at CRESP HQ by May 28, 2004. Please complete and to Fax # 732-235-9607 or email [waldronx@ehsi.rutgers.edu](mailto:waldronx@ehsi.rutgers.edu).

Name: \_\_\_\_\_

Home Phone: \_\_\_\_\_

Home Address: \_\_\_\_\_  
\_\_\_\_\_

Cell Phone: \_\_\_\_\_

Email Address: \_\_\_\_\_

University Affiliation: \_\_\_\_\_

Office Address: \_\_\_\_\_

Office Phone: \_\_\_\_\_

Name of Immediate Supervisor: \_\_\_\_\_

Phone: \_\_\_\_\_

Primary Emergency Contact: \_\_\_\_\_

Relationship: \_\_\_\_\_

Address: \_\_\_\_\_  
\_\_\_\_\_

Phone: \_\_\_\_\_

Email: \_\_\_\_\_

Secondary Emergency Contact: \_\_\_\_\_

Relationship: \_\_\_\_\_

Address: \_\_\_\_\_  
\_\_\_\_\_

Phone: \_\_\_\_\_

Email: \_\_\_\_\_

Your Blood type: \_\_\_\_\_

Medic Alert Tag:  Y  N

Your Usual Blood Pressure \_\_\_\_\_

Allergies: \_\_\_\_\_

Antibiotics: \_\_\_\_\_

Anesthesia: \_\_\_\_\_

Current Medication: \_\_\_\_\_

Other Relevant Medical Considerations: \_\_\_\_\_

Do you Wear Contact Lenses:  Y  N

Year of Most Recent Tetanus Shot: \_\_\_\_\_

Personal Medical Coverage: \_\_\_\_\_

Policy Number(ID): \_\_\_\_\_

Group Number: \_\_\_\_\_

Telephone of Plan Representative: \_\_\_\_\_

Name of Physician: \_\_\_\_\_

Phone: \_\_\_\_\_

APPENDIX 3 PERSONAL CONFIDENTIAL HEALTH QUESTIONNAIRE

This has been circulated to all personnel and is not included here at this time 6/2/04

APPENDIX 4 PLAN-OF-THE-DAY HAZARD ASSESSMENT

ACTIVITY	Hazards	Controls	PPE
Bathymetry			
Fresh-water			
Magneto-tellurics			
Subtidal invertebrates	Boating Diving	Dive gear	
Intertidal organisms	Slips Rocks	Non-skid soles, hard hats	
Seabirds	Terrain Falls Vehicles	Training Ropes	
Marine Mammals	Terrain Falls Vehicles	Training	
Rats	Fire arms Terrain Traps	Training	
Aleut fishing	Boating Firearms	Training	
NOAA Trawler	Ship		
Sample Preparation	Ship Cuts		

APPENDIX 5 --ACCIDENT-INCIDENT-INJURY REPORT FORM

This will be photocopied and will be available on the expedition

# **ATTACHMENT**

## **SCIENTIFIC DIVING SAFETY MANUAL**

**University of Alaska**

May 1 1991  
Revision July 1992  
Revision January 1996  
Revision January 2001  
Revision May 2004

## **FOREWORD**

Since 1951 the scientific diving community has endeavored to promote safe, effective diving through self-imposed diver training and education programs. Over the years, manuals for diving safety have been circulated between organizations, revised and modified for local implementation, and have resulted in an enviable safety record.

This document represents the minimal safety standards for scientific diving at the present day. As diving science progresses so shall this manual, and it is the responsibility of every member of the American Academy of Underwater Sciences (AAUS) to see that it always reflects state of the art, safe diving practice. Guidelines for diving technologies sanctioned by AAUS but not included in this manual, e.g., Nitrox Diving, Aquarium Diving, Staged Decompression Diving, Saturation Diving, and Mixed Gas Diving (<http://www.aaus.org>), may be added to future revisions of this manual as that diving technique becomes necessary.

The policies, procedures and standards set forth in this Scientific Diving Safety Manual are intended to govern the training and diving operations of all personnel participating in the Scientific Diving Program at the University of Alaska (UA). It applies to all divers operating under UA auspices, including visiting divers, and to those UA Fairbanks, UA Anchorage, and UA Southeast campus officers responsible for the administration of this scuba program.

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## **SECTION 1.00**

### **GENERAL POLICY**

#### **1.10 THE SCIENTIFIC DIVING STANDARDS**

##### 1.11 Purpose

The purpose of these Scientific Diving Standards is to ensure that all scientific diving is conducted in a manner that will maximize protection of scientific divers from accidental injury and/or illness, and to set forth standards for training and certification which will allow a working reciprocity between UA and other American Academy of Underwater Sciences (AAUS)-recognized scientific diving programs. Fulfillment of the purposes shall be consistent with the furtherance of research and safety.

This standard sets minimal standards for the establishment of the UA scientific diving program, the organization for the conduct of this program, and the basic regulations and procedures for safety in scientific diving operations. It also establishes a framework for reciprocity between AAUS organizational members that adhere to these minimum standards.

This manual been modified from the procedures developed and written by the AAUS by compiling the policies set forth in the diving manuals of several university, private, and governmental scientific diving programs. These programs share a common heritage with the scientific diving program at the Scripps Institution of Oceanography (SIO). Adherence to the SIO standards has proven both feasible and effective in protecting the health and safety of scientific divers since 1954.

In 1982, OSHA exempted scientific diving from commercial diving regulations (29 CFR Part 1910, Subpart T) under certain conditions which are outlined below. The final guidelines for the exemption became effective in 1985 (Federal Register, Vol. 50, No.6, p.1046). The AAUS is recognized by OSHA as the scientific diving standard-setting organization.

##### 1.12 Scientific Diving Definition

Scientific diving is defined (29 CFR 1910.402) as 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.

##### 1.13 Scientific Diving Exemption

OSHA has granted an exemption for scientific diving from commercial diving regulations under the following guidelines (Appendix B to 29CFR1910 Subpart T):

1.13.1 The UA Diving Control Board (DCB) consists of a majority of active scientific divers and has autonomous and absolute authority over the scientific diving program's operation.

1.13.2 The purpose of any project using scientific diving is the advancement of science; therefore, information and data resulting from any project are non-proprietary.

1.13.3 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.

1.13.4 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.

1.13.5 In addition, the UA scientific diving program shall contain at least the following elements (29CFR1910.401):

1.13.5.1 Diving safety manual which includes at a minimum: Procedures covering all diving operations specific to the program; including procedures for emergency care, recompression and evacuation; and the criteria for diver training and certification.

1.13.5.2 Diving control (safety) board, with the majority of its members being active scientific divers, which shall at a minimum have the authority to: approve and monitor diving projects, review and revise the diving safety manual, assure compliance with the manual, certify the depths to which a diver has been trained, take disciplinary action for unsafe practices, and assure adherence to the buddy system (a diver is accompanied by and is in continuous contact with another diver in the water) for scuba diving.

## 1.14 Review of Standards

As part of UA's annual report, any recommendations for modifications of these standards shall be submitted to the AAUS for consideration.

## **1.20 OPERATIONAL CONTROL**

### 1.21 Organizational Member Auspices Defined

For the purposes of these standards the auspices of UA includes any scientific diving operation in UA is connected because of ownership of any equipment used, locations selected, or relationship with the individual(s) concerned. This includes all cases involving the operations of employees of UA or employees of auxiliary organizations, where such employees are acting within the scope of their employment, and the

operations of other persons who are engaged in scientific diving of UA or are diving as members of an organization recognized by UA.

It is UA's responsibility to adhere to the AAUS Standards for Scientific Diving Certification and Operation of Scientific Diving Programs. The administration of the local diving program will reside with UA's DCB.

The regulations herein shall be observed at all locations where scientific diving is conducted.

## 1.22 UA Scientific Diving Standards and Safety Manual

UA maintains a scientific diving safety manual that provides for the development and implementation of policies and procedures that will enable the dive program to meet requirements of local environments and conditions as well as to comply with the AAUS scientific diving standards. The UA scientific diving standards shall include, but not be limited to:

1.22.1 The AAUS Standards may be used as a set of minimal guidelines for the development of UA's scientific diving safety manual.

1.22.2 Emergency evacuation and medical treatment procedures.

1.22.3 Criteria for diver training and certification.

1.22.4 Standards written or adopted by reference for each diving mode utilized which include the following:

1.22.4.1 Safety procedures for the diving operation.

1.22.4.2 Responsibilities of the dive team members.

1.22.4.3 Equipment use and maintenance procedures.

1.22.4.4 Emergency procedures.

## 1.1 The Diving Safety Officer

The Diving Safety Officer (DSO) serves as a member of the DCB. This person should have broad technical and scientific expertise in research related diving.

### 1.23.1 Qualifications

1.23.1.1 Shall be appointed by the responsible administrative officer or his/her designee, with the advice and counsel of the diving control board.

1.23.1.2 Shall be trained as a scientific diver.

1.23.1.3 Shall be a full member as defined by the AAUS.

1.23.1.4 Shall be an active underwater instructor from a nationally recognized agency.

#### 1.23.2 Duties and Responsibilities

1.23.2.1 Shall be responsible, through the DCB, to the responsible administrative officer or his/her designee, for the conduct of the UA scientific diving program. The routine operational authority for this program, including the conduct of training and certification, approval of dive plans, maintenance of diving records, and ensuring compliance with this manual and all relevant regulations of UA, rests with the Diving Safety Officer.

1.23.2.2 May permit portions of this program to be carried out by a qualified delegate, although the Diving Safety Officer may not delegate responsibility for the safe conduct of the local diving program.

1.23.2.3 Shall be guided in the performance of the required duties by the advice of the DCB, but operational responsibility for the conduct of the local diving program will be retained by the Diving Safety Officer.

1.23.2.4 Shall suspend diving operations which he/she considers to be unsafe or unwise.

#### 1.24 The Diving Control Board

1.24.1 The Diving Control Board (DCB) shall consist of a majority of active scientific divers. Voting members shall include the Diving Safety Officer, the responsible administrative officer, or his/her designee, and should include other representatives of the diving program such as qualified divers and members selected by procedures established by UA. A chair-person and a secretary may be chosen from the membership of the board according to local procedure.

1.24.2 Has autonomous and absolute authority over the scientific diving program's operation.

1.24.3 Shall approve and monitor diving projects.

1.24.4 Shall review and revise the diving safety manual.

1.24.5 Shall assure compliance with the manual.

1.24.6 Shall certify the depths to which a diver has been trained.

- 1.24.7 Shall take disciplinary action for unsafe practices.
- 1.24.8 Shall assure adherence to the buddy system for scuba diving.
- 1.24.9 Shall act as the official representative of UA in matters concerning the scientific diving program.
- 1.24.10 Shall act as a board of appeal to consider diver-related problems.
- 1.24.11 Shall recommend the issue, reissue, or the revocation of diving certifications.
- 1.24.12 Shall recommend changes in policy and amendments to the AAUS and UA's scientific diving manual as the need arises.
- 1.24.13 Shall establish and/or approve training programs through which the applicants for certification can satisfy the requirements of UA's diving safety manual.
- 1.24.14 Shall suspend diving programs which it considers to be unsafe or unwise.
- 1.24.15 Shall establish criteria for equipment selection and use.
- 1.24.16 Shall recommend new equipment or techniques.
- 1.24.17 Shall establish and/or approve facilities for the inspection and maintenance of diving and associated equipment.
- 1.24.18 Shall ensure that UA's air station(s) meet air quality standards as described in Section 3.60 of this manual.
- 1.24.19 Shall periodically review the Diving Safety Officer's performance and program.
- 1.24.20 Shall sit as a board of investigation to inquire into the nature and cause of diving accidents or violations of UA's diving manual.

## 1.25 Instructional Personnel

- 1.1.1 Qualifications - All personnel involved in diving instruction under the auspices UA shall be qualified for the type of instruction being given.
- 1.1.2 Selection - Instructional personnel will be selected by the responsible administrative officer, or his/her designee, who will solicit the advice of the DCB in conducting preliminary screening of applicants for instructional positions.

## 1.26 Lead Diver

For each dive, one individual shall be designated as the Lead Diver. He/she shall be at the dive location during the diving operation. The Lead Diver shall be responsible for:

1.26.1 Coordination with other known activities in the vicinity which are likely to interfere with diving operations.

1.26.2 Ensuring all dive team members possess current certification and are qualified for the type of diving operation.

1.26.3 Planning dives in accordance with section 2.21

1.26.4 Ensuring safety and emergency equipment is in working order and at the dive site.

1.26.5 Briefing the dive team members on:

1.26.5.1 Dive objectives.

1.26.5.2 Unusual hazards or environmental conditions likely to affect the safety of the diving operation.

1.26.5.3 Modifications to diving or emergency procedures necessitated by the specific diving operation.

1.26.6 Suspending diving operations if in his/her opinion conditions are not safe.

1.26.7 Reporting to the DSO and DCB any physical problems or adverse physiological effects including symptoms of pressure-related injuries.

## 1.27 Reciprocity And Visiting Scientific Diver

1.27.1 Two or more AAUS Organizational Members engaged jointly in diving activities, or engaged jointly in the use of diving resources, shall designate one of the participating Diving Control Boards to govern the joint dive project.

1.27.2 A scientific diver from one Organizational Member shall apply for permission to dive under the auspices of another Organizational Member by submitting to the Diving Safety Officer of the host Organizational Member a document containing all the information described in Appendix 6 (Letter of Reciprocity) signed by the Diving Safety Officer or Chairperson of the home Diving Control Board.

1.27.3 A visiting scientific diver may be asked to demonstrate his/her knowledge and skills for the planned diving.

1.27.4 If a host Organizational Member denies a visiting scientific diver permission to dive, the host Diving Control Board shall notify the visiting scientific diver and his/her Diving Control Board with an explanation of all reasons for the denial.

#### 1.28 Waiver of Requirements

The UA Diving Control Board may grant a waiver for specific requirements of training, examinations, depth certification, and minimum activity to maintain certification.

#### 1.29 Consequence of Violation of Regulations by Scientific Divers

Failure to comply with the regulations of UA's diving manual may be cause for the revocation or restriction of the diver's scientific diving certificate by action of UA's Diving Control Board.

### **1.30 CONSEQUENCES OF VIOLATION OF REGULATIONS BY ORGANIZATIONAL MEMBERS**

Failure to comply with the regulations of this standard may be cause for the revocation or restriction of UA's recognition by the AAUS.

### **1.40 RECORD MAINTENANCE**

The Diving Safety Officer or his/her designee shall maintain permanent records for each individual scientific diver certified. The file shall include evidence of certification level, log sheets, results of current physical examination, reports of disciplinary actions by UA's Diving Control Board, and other pertinent information deemed necessary.

#### 1.40.1 Availability of Records:

1.40.1.1 Medical records shall be available to the attending physician of a diver or former diver when released in writing by the diver.

1.40.1.2 Records and documents required by this standard shall be retained by UA for the following period:

1.40.1.2.1 Physician's written reports of medical examinations for dive team members - 5 years.

1.40.1.2.2 Manual for diving safety - current document only.

1.40.1.2.3 Records of dive - 1 year, except 5 years where there has been an incident of pressure-related injury.

1.40.1.2.4 Pressure-related injury assessment or death - 5 years.

1.40.1.2.5 Equipment inspection and testing records - current entry or tag, or until equipment is withdrawn from service.

## **SECTION 2.00**

### **DIVING REGULATIONS FOR SCUBA (OPEN CIRCUIT, COMPRESSED AIR)**

#### **2.10 INTRODUCTION**

No person shall engage in scientific diving operations under the auspices of the UA scientific diving program unless he/she holds a current certification issued pursuant to the provisions of this manual.

#### **2.20 PRE-DIVE PROCEDURES**

##### **2.21 Dive Plans**

Dives should be planned around the competency of the least experienced diver. Before conducting any diving operations under the auspices of UA, the lead diver for a proposed operation must formulate a dive plan which should include the following:

2.21.1 Divers qualifications, and the type of certificate or certification held by each diver.

2.21.2 Emergency plan (see Appendix 7) with the following information:

2.21.2.1 Name, telephone number, and relationship of person to be contacted for each diver in the event of an emergency.

2.21.2.2 nearest operational recompression chamber

2.21.2.3 nearest accessible hospital

2.21.2.4 available means of transport

2.21.3 Approximate number of proposed dives.

2.21.4 Location(s) of proposed dives.

2.21.5 Estimated depth(s) and bottom time(s) anticipated.

2.21.6 Decompression status and repetitive dive plans, if required.

2.21.7 Proposed work, equipment, and boats to be employed.

2.21.8 Any hazardous conditions anticipated.

##### **2.22 Pre-dive Safety Checks**

### 2.22.1 Diver's Responsibility:

2.22.1.1 Each scientific diver shall conduct a functional check of his/her diving equipment in the presence of the diving buddy or tender.

2.22.1.2 It is the diver's responsibility and duty to refuse to dive if, in his/her judgement, conditions are unfavorable, or if he/she would be violating the precepts of his/her training, of this manual.

2.22.1.3 No dive team member shall be required to be exposed to hyperbaric conditions against his/her will, except when necessary to prevent or treat a pressure-related injury.

2.22.1.4 No dive team member shall be permitted to dive for the duration of any known condition which is likely to adversely affect the safety and health of the diver or other dive members.

### 2.22.2 Equipment Evaluations

2.22.2.1 Each diver shall ensure that his/her equipment is in proper working order and that the equipment is suitable for the type of diving operation.

2.22.2.2 Each diver shall have the capability of achieving and maintaining positive buoyancy.

2.22.3 Site Evaluation - The environmental conditions at the site will be evaluated.

## **2.30 DIVING PROCEDURES**

### 2.31 Solo Diving Prohibition

All diving activities shall assure adherence to the buddy system (two comparably equipped scuba divers in the water in constant communication) for scuba diving. This buddy system is based upon mutual assistance, especially in the case of an emergency.

### 2.32 Safety Stop

A 3-5 minute stop during ascent shall be made in the 25 to 15 fsw depth range on every dive greater than 60 fsw

### 2.33 Refusal to Dive

2.33.1 The decision to dive is that of the diver. A diver may refuse to dive, without fear of penalty, whenever he/she feels it is unsafe for them to make the dive (see Sec. 2.22.1).

2.33.2 Safety - The ultimate responsibility for safety rests with the individual diver. It is the diver's responsibility and duty to refuse to dive if, in his/her judgement, conditions are unsafe or unfavorable, or if he/she would be violating the precepts of his/her training or the regulations in this manual.

## 2.34 Termination of the Dive

2.34.1 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 (see Sec. 2.22.1).

2.34.2 The dive shall be terminated while there is still sufficient cylinder pressure to permit the diver to safely reach the surface, including decompression time, or to safely reach an additional air source at the decompression station.

2.35 Emergencies and Deviations from Regulations - Any diver may deviate from the requirements of this manual to the extent necessary to prevent or minimize a situation which is likely to cause death, serious physical harm, or major environmental damage. A written report of such actions must be submitted to the UA Diving Control Board explaining the circumstances and justifications.

## 2.40 POST-DIVE PROCEDURES

### 2.41 Post-Dive Safety Checks

2.41.1 After the completion of a dive, each diver shall report any physical problems, symptoms of decompression sickness, or equipment malfunctions.

2.41.2 When diving outside the no-decompression limits, the divers should remain awake for at least one hour after diving, and in the company of a dive team member who is prepared to transport him/her to a hyperbaric chamber if necessary.

## 2.50 EMERGENCY PROCEDURES

UA will develop emergency procedures which follow the standards of care of the community and must include procedures for emergency care, recompression and evacuation for each dive location (See Appendix 7).

## 2.60 FLYING AFTER DIVING

Divers should have a minimum surface interval of 12 hours before ascending to altitude.

## 2.70 RECORDKEEPING AND REQUIREMENTS

### 2.71 Personal Diving Log

Each certified scientific diver shall log every dive made under the auspices of UA's program, and is encouraged to log all other dives. Standard forms will be provided by the UA program. Log sheets shall be submitted to the Diving Safety Officer to be placed in the diver's permanent file. Details of the submission procedures are left to the discretion of the Diving Safety Officer. The diving log shall be in a form specified by the UA's DCB and shall include at least the following:

- 2.71.1 Name of diver, partner, and Lead Diver.
- 2.71.2 Date, time, and location.
- 2.71.3 Diving modes used.
- 2.71.4 General nature of diving activities.
- 2.71.5 Approximate surface and underwater conditions.
- 2.71.6 Maximum depths, bottom time and surface interval time.
- 2.71.7 Diving tables or computers used.
- 2.71.8 Detailed report of any near or actual incidents.

## 2.72 Required Incident Reporting

All diving incidents requiring recompression treatment, or resulting in moderate or serious injury, or death shall be reported to the UA's Diving Control Board and the AAUS. UA's regular procedures for incident reporting, including those required by the AAUS, shall be followed. The report will specify the circumstances of the incident and the extent of any injuries or illnesses.

Additional information must meet the following reporting requirements:

- 2.72.1 The UA shall record and report occupational injuries and illnesses in accordance with requirements of the appropriate Labor Code section.
- 2.72.2 If pressure-related injuries are suspected, or if symptoms are evident, the following additional information shall be recorded and retained by UA, with the record of the dive, for a period of 5 years:
  - 2.72.2.1 Complete AAUS Incident Report Form at <http://www.aaus.org>.
  - 2.72.2.2 Written descriptive report to include:
    - 2.72.2.2.1 Name, address, phone numbers of the principal parties involved.

2.72.2.2.2 Summary of experience of divers involved.

2.72.2.2.3 Location, description of dive site and description of conditions that led up to incident.

2.72.2.2.4 Description of symptoms, including depth and time of onset.

2.72.2.2.5 Description and results of treatment.

2.72.2.2.6 Disposition of case.

2.72.2.2.7 Recommendations to avoid repetition of incident.

2.72.3 The UA Diving Control Board shall investigate and document any incident of pressure-related injury and prepare a report which is to be forwarded to the AAUS during the annual reporting cycle. This report must first be reviewed and released by UA's Diving Control Board.

## **SECTION 3.00**

### **DIVING EQUIPMENT**

#### **3.10 GENERAL POLICY**

3.10.1 All equipment shall meet standards as determined by the Diving Safety Officer and the Diving Control Board. Equipment that is subjected to extreme usage under adverse conditions should require more frequent testing and maintenance.

3.10.2 All equipment shall be regularly examined by the person using them.

#### **3.20 EQUIPMENT**

##### **3.21 Regulators**

3.21.1 Only those makes and models specifically approved by the Diving Safety Officer and the Diving Control Board shall be used.

3.21.2 Scuba regulators shall be inspected and tested prior to first use and every twelve months thereafter.

3.21.3 Regulators will consist of a primary second stage and an alternate air source (such as an octopus second stage or redundant air supply).

##### **3.22 Breathing Masks and Helmets**

Breathing masks and helmets shall have:

3.22.1 A non-return valve at the attachment point between helmet or mask and hose, which shall close readily and positively.

3.22.2 An exhaust valve.

3.22.3 A minimum ventilation rate capable of maintaining the diver at the depth to which he/she is diving.

##### **3.23 Scuba Cylinders**

3.23.1 Scuba cylinders shall be designed, constructed, and maintained in accordance with the applicable provisions of the Unfired Pressure Vessel Safety Orders.

3.23.2 Scuba cylinders must be hydrostatically tested in accordance with DOT standards.

3.23.3 Scuba cylinders must have an internal inspection at intervals not to exceed twelve months.

3.23.4 Scuba cylinder valves shall be functionally tested at intervals not to exceed twelve months.

### 3.24 Backpacks

Backpacks without integrated flotation devices and weight systems shall have a quick release device designed to permit jettisoning with a single motion from either hand.

### 3.25 Gauges

Gauges shall be inspected and tested before first use and every twelve months thereafter.

### 3.26 Flotation Devices

3.26.1 Each diver shall have the capability of achieving and maintaining positive buoyancy.

3.26.2 Personal flotation systems, buoyancy compensators, dry suits, or other variable volume buoyancy compensation devices shall be equipped with an exhaust valve.

3.26.3 These devices shall be functionally inspected and tested at intervals not to exceed twelve months.

### 3.27 Timing Devices, Depth and Pressure Gauges

Both members of the diving pair must have an underwater timing device, an approved depth indicator, and a submersible pressure gauge.

### 3.28 Determination of Decompression Status: Dive Tables, Dive Computers

3.28.1 A set of diving tables, approved by the Diving Control Board, must be available at the dive location.

3.28.2 Dive computers may be utilized in place of diving tables, and must be approved by the Diving Control Board. AAUS recommendations on dive computers are available at <http://www.aaus.org>.

## **3.30 AUXILIARY EQUIPMENT**

Hand held underwater power tools. Electrical tools and equipment used underwater shall be specifically approved for this purpose. Electrical tools and equipment supplied with power from the surface shall be de-energized before being placed into or retrieved from

the water. Hand held power tools shall not be supplied with power from the dive location until requested by the diver.

### **3.40 SUPPORT EQUIPMENT**

#### 3.41 First aid supplies.

A first aid kit and emergency oxygen shall be available.

#### 3.42 Diver's Flag

A diver's flag shall be displayed prominently whenever diving is conducted under circumstances where required or where water traffic is probable.

#### 3.43 Compressor Systems - UA Controlled

The following will be considered in design and location of compressor systems:

3.43.1 Low pressure compressors used to supply air to the diver if equipped with a volume tank shall have a check valve on the inlet side, a relief valve, and a drain valve.

3.43.2 Compressed air systems over 500 psig shall have slow-opening shut-off valves.

3.43.3 All air compressor intakes shall be located away from and upwind of areas containing exhaust or other contaminants.

### **3.50 EQUIPMENT MAINTENANCE**

#### 3.51 Record keeping

Each equipment modification, repair, test, calibration, or maintenance service shall be logged, including the date and nature of work performed, serial number of the item, and the name of the person performing the work for the following equipment:

3.51.1. Regulators

3.51.2 Submersible pressure gauges

3.51.3 Depth gauges

3.51.4 Scuba cylinders

3.51.5 Cylinder valves

3.51.6 Diving helmets

3.51.7 Submersible breathing masks

3.51.8 Compressors

3.51.9 Gas control panels

3.51.10 Air storage cylinders

3.51.11 Air filtration systems

3.51.12 Analytical instruments

3.51.13 Buoyancy control devices

3.51.14 Dry suits

### 3.52 Compressor Operation and Air Test Records

3.52.1 Gas analyses and air tests shall be performed on UA-controlled breathing air compressor at regular intervals of no more than 100 hours of operation or six months, whichever occurs first. The results of these tests shall be entered in a formal log and be maintained.

3.52.2 A log shall be maintained showing operation, repair, overhaul, filter maintenance, and temperature adjustment for each compressor.

## 3.60 AIR QUALITY STANDARDS

Breathing air for scuba shall meet the following specifications as set forth by the Compressed Gas Association (CGA Pamphlet G-7.1) and referenced in OSHA 29 CFR 1910.134

### CGA Grade E

<b>Component</b>	<b>Maximum</b>
Oxygen	20 - 22%/v
Carbon Monoxide	10 PPM/v
Carbon Dioxide	1000 PPM/v
Condensed Hydrocarbons	5 mg/m <sup>3</sup>

Water Vapor

NS

Objectionable Odors

None

## **SECTION 4.00**

### **ENTRY-LEVEL TRAINING REQUIREMENTS**

This section describes training for the non-diver applicant, previously not certified for diving, and equivalency for the certified diver.

#### **4.10 EVALUATION**

##### **4.11 Medical Examination**

The applicant for training shall be certified by a licensed physician to be medically qualified for diving before proceeding with the training as designated in Section 4.20 (see Sec. 6.00 and Appendices 1 - 4).

##### **4.12 Swimming Evaluation**

The applicant for training shall successfully perform the following tests, or their equivalent, in the presence of the Diving Safety Officer, or an examiner approved by the Diving Safety Officer.

4.12.1 Swim underwater without swim aids for a distance of 25 yards without surfacing.

4.12.2 Swim 400 yards in less than 12 minutes without swim aids.

4.12.3 Tread water for 10 minutes, or 2 minutes without the use of hands, without swim aids.

4.12.4 Without the use of swim aids, transport another person of equal size a distance of 25 yards in the water.

#### **4.20 SCUBA TRAINING**

##### **4.21 Practical Training**

At the completion of training, the trainee must satisfy the Diving Safety Officer or the instructor of his/her ability to perform the following, as a minimum, in a pool or in sheltered water:

4.21.1 Enter water with full equipment.

4.21.2 Clear face mask.

4.21.3 Demonstrate air sharing, including both buddy breathing and the use of alternate air source, as both donor and recipient, with and without a face mask.

- 4.21.4 Demonstrate ability to alternate between snorkel and scuba while kicking.
- 4.21.5 Demonstrate understanding of underwater signs and signals.
- 4.21.6 Demonstrate simulated in-water mouth-to-mouth resuscitation.
- 4.21.7 Rescue and transport, as a diver, a passive simulated victim of an accident.
- 4.21.8 Demonstrate ability to remove and replace equipment while submerged.
- 4.21.9 Demonstrate watermanship ability which is acceptable to the instructor.

#### 4.22 Written Examination

Before completing training, the trainee must pass a written examination that demonstrates knowledge of at least the following:

- 4.22.1 Function, care, use, and maintenance of diving equipment.
- 4.22.2 Physics and physiology of diving.
- 4.22.3 Diving regulations and precautions.
- 4.22.4 Near-shore currents and waves.
- 4.22.5 Dangerous marine animals.
- 4.22.6 Emergency procedures, including buoyant ascent and ascent by air sharing.
- 4.22.7 Currently accepted decompression procedures.
- 4.22.8 Demonstrate the proper use of dive tables.
- 4.22.9 Underwater communications.
- 4.22.10 Aspects of freshwater and altitude diving.
- 4.22.11 Hazards of breath-hold diving and ascents.
- 4.22.12 Planning and supervision of diving operations.
- 4.22.13 Diving hazards.
- 4.22.14 Cause, symptoms, treatment, and prevention of the following: near drowning, air embolism, carbon dioxide excess, squeezes, oxygen poisoning, nitrogen

narcosis, exhaustion and panic, respiratory fatigue, motion sickness, decompression sickness, hypothermia, and hypoxia/anoxia.

#### 4.23 Open Water Evaluation

The trainee must satisfy an instructor, approved by the Diving Safety Officer, of his/her ability to perform at least the following in open water:

- 4.23.1 Surface dive to a depth of 10 feet in open water without scuba.
- 4.23.2 Demonstrate proficiency in air sharing, including both buddy breathing and the use of alternate air source, as both donor and receiver.
- 4.23.3 Enter and leave open water or surf, or leave and board a diving vessel, while wearing scuba gear.
- 4.23.4 Kick on the surface 400 yards while wearing scuba gear, but not breathing from the scuba unit.
- 4.23.5 Demonstrate judgment adequate for safe diving.
- 4.23.6 Demonstrate, where appropriate, the ability to maneuver efficiently in the environment, at and below the surface.
- 4.23.7 Complete a simulated emergency swimming ascent.
- 4.23.8 Demonstrate clearing of mask and regulator while submerged.
- 4.23.9 Demonstrate ability to achieve and maintain neutral buoyancy while submerged.
- 4.23.10 Demonstrate techniques of self-rescue and buddy rescue.
- 4.23.11 Navigate underwater.
- 4.23.12 Plan and execute a dive.
- 4.23.13 Successfully complete 5 open water dives for a minimum total time of 3 hours, of which 1-1/2 hours cumulative bottom time must be on scuba. No more than 3 training dives shall be made in any one day.

## **SECTION 5.00**

### **SCIENTIFIC DIVER CERTIFICATION**

#### **5.10 CERTIFICATION TYPES**

5.10.1 Scientific Diver Certification - this is a permit to dive, usable only while it is current and for the purpose intended.

5.10.2 Temporary Diver Permit - this permit constitutes a waiver of the requirements of Sec. 5.00 and is issued only following a demonstration of the required proficiency in diving. It is valid only for a limited time, as determined by the Diving Safety Officer. This permit is not to be construed as a mechanism to circumvent existing standards set forth in this manual.

Requirements of this section may be waived by the Diving Safety Officer if the person in question has demonstrated proficiency in diving and can contribute measurably to a planned dive. A statement of the temporary diver's qualifications shall be submitted to the Diving Safety Officer as a part of the dive plan. Temporary permits shall be restricted to the planned diving operation and shall comply with all other policies, regulations, and standards of this manual, including medical requirements.

#### **5.20 GENERAL POLICY**

The AAUS requires that no person shall engage in scientific diving unless that person is authorized by UA pursuant to the provisions of this manual. The following are considered minimal standards for a scientific diver certification.

#### **5.30 REQUIREMENTS FOR SCIENTIFIC DIVER CERTIFICATION**

Submission of documents and participation in aptitude examinations does not automatically result in certification. The applicant must convince the Diving Safety Officer and members of the DCB that he/she is sufficiently skilled and proficient to be certified. This skill will be acknowledged by the signature of the Diving Safety Officer. Any applicant who does not possess the necessary judgment, under diving conditions, for the safety of the diver and his/her partner, may be denied UA scientific diving privileges. Minimum documentation and examinations required are as follows:

##### **5.31 Prerequisites**

5.31.1 Application – Application for certification shall be made to the Diving Safety Officer on the form prescribed by UA DCB.

5.31.2 Medical approval – Each applicant for diver certification shall submit a statement from a licensed physician, based on

an approved medical examination, attesting to the applicant's fitness for diving (Section 6.00 and Appendices 1-4).

5.31.2 Scientific Diver-In-Training permit level – This permit signifies that a diver has completed and been certified as at least an open water diver through an internationally recognized certifying agency or scientific diving program, and has the knowledge skills and experience to that gained by successful completion of training as specified in Section 4.00.

## 5.32 Theoretical and Practical Training

The diver must complete theoretical aspects and practical training for a minimum cumulative time of 100 hours. Theoretical aspects should include principles and activities appropriate to the intended area of scientific study.

### 5.32.1 Required Topics

5.32.1.1 Diving Emergency Care Training: Cardiopulmonary Resuscitation (CPR); Standard or Basic First Aid; Recognition of DCS and AGE; Accident Management; Field Neurological Exam; Oxygen Administration

5.32.1.2 Dive Rescue

5.32.1.3 Dive Physics

5.32.1.4 Dive Physiology

5.32.1.5 Dive Environments

5.32.1.6 Decompression Theory and its Application

5.32.1.7 AAUS Scientific Diving Regulations and History: Scientific Dive Planning; Coordination with other Agencies; Appropriate Governmental Regulations

5.32.1.8 Scientific Method

5.32.1.9 Data Gathering Techniques: Quadrating; Transecting; Mapping; Coring; Photography; Tagging; Collecting; Animal Handling; Archaeology; Common Biota including organism id, behavior, and ecology; Site Selection, Location and Re-location; Specialized Equipment for Data Gathering

5.32.1.10 HazMat Training: HP Cylinders; Chemical Hygiene, Laboratory Safety (Use of Chemicals)

### 1.1.1 Suggested Topics

5.32.2.1 Specific Dive Modes (methods of gas delivery): Open Circuit; Hookah; Surface Supplied Diving

5.32.2.2 Small Boat Operation

5.32.2.3 Rebreathers: Closed; Semi-closed

5.32.2.4 Specialized Breathing Gas: Nitrox; Mixed Gas

5.32.2.5 Specialized Environments and Conditions: Blue Water Diving; Ice and Polar Diving (Cold Water Diving); Zero Visibility Diving; Polluted Water Diving; Saturation Diving; Decompression Diving; Overhead Environments; Aquarium Diving; Night Diving; Kelp Diving; Strong Current Diving (Live-boating); Potential Entanglement

5.32.2.6 Specialized Diving Equipment: Full Face Mask; Dry Suit; Communications

5.32.3 Practical training must include a checkout dive, with evaluation of the skills listed in Section 4.23 (Open Water Evaluation), with the DSO or qualified delegate followed by at least 11 ocean or open water dives in a variety of dive sites and diving conditions, for a cumulative bottom time of 6 hours. Dives following the checkout dive must be supervised by a certified Scientific Diver with experience in the type of diving planned, with the knowledge and permission of the DSO.

5.32.4 Examinations

5.32.4.1 Written Examination: General exam required for scientific diver certification; Examination covering the suggested topics at the DSO's discretion.

5.32.4.2 Examination of equipment: Personal diving equipment; Task specific equipment

## **5.40 DEPTH CERTIFICATIONS**

### **1.1 Depth Certifications and Progression to Next Depth Level**

A certified diver diving under the auspices of UA may progress to the next depth level after successfully completing the required dives for the next level. Under these circumstances the diver may exceed their depth limit. Dives shall be planned and executed under close supervision of a diver certified to this depth, with the knowledge and permission of the DSO.

5.41.1 Certification to 30 Foot Depth - Initial permit level, approved upon the successful completion of training listed in Sections 4.00 and 5.30.

5.41.2 Certification to 60 Foot Depth - A diver holding a 30 foot certificate may be certified to a depth of 60 feet after successfully completing, under supervision, 12

logged training dives to depths between 31 and 60 feet, for a minimum total time of 4 hours.

5.41.3 Certification to 100 Foot Depth - A diver holding a 60 foot certificate may be certified to depths of 100 feet after successfully completing 4 dives to depths between 61 and 100 feet. The diver shall also demonstrate proficiency in the use of the appropriate Decompression Tables.

5.41.4 Certification to 130 Foot Depth - A diver holding a 100 foot certificate may be certified to a depth of 130 feet after successfully completing, 4 dives to depths between 100 and 130 feet. The diver shall also demonstrate proficiency in the use of the appropriate Dive Tables.

5.41.5 Certification to 150 Foot Depth - A diver holding a 130 foot certificate may be certified to a depth of 150 feet after successfully completing, 4 dives to depths between 130 and 150 feet. The diver must also demonstrate knowledge of the special problems of deep diving, and of special safety requirements.

5.41.6 Certification to 190 Foot Depth - A diver holding a 150 foot certificate may be certified to a depth of 190 feet after successfully completing, 4 dives to depths between 150 and 190 feet. The diver must also demonstrate knowledge of the special problems of deep diving, and of special safety requirements.

**Diving on air is not permitted beyond a depth of 190 feet.**

## **5.50 CONTINUATION OF CERTIFICATE**

### 5.51 Minimum Activity to Maintain Certification

During any 12-month period, each certified scientific diver must log a minimum of 12 dives. At least one dive must be logged near the maximum depth of the diver's certification during each 6-month period. Divers certified to 150 feet or deeper may satisfy these requirements with dives to 130 feet or over. Failure to meet these requirements may be cause for revocation or restriction of certification. Divers who fail to make a minimum of 12 dives during any 12-month period must conduct a check-out dive by an appropriate skilled and proficient examiner designated by the DSO or DCB. Special exceptions may be granted by the DCB as noted in Sec. 1.28, Waiver of Requirements.

### 5.52 Re-qualification of Depth Certificate

Once the initial certification requirements of Sec. 5.30 are met, divers whose depth certification has lapsed due to lack of activity may be re-qualified by procedures adopted by UA's DCB. Divers who fail to make at least one dive near the maximum depth of their certification during each 6-month period shall be recertified at the previous or reduced depth level.

### 5.53 Medical Examination

All certified scientific divers shall pass a medical examination at the intervals specified in Section 6.12. After each major illness or injury, as described in Sec. 6.12, a certified scientific diver shall receive clearance to return to diving from a physician before resuming diving activities.

### **5.60 REVOCATION OF CERTIFICATION**

A diving certificate may be revoked or restricted for cause by the Diving Safety Officer or the DCB. Violations of regulations set forth in this manual, or other governmental subdivisions not in conflict with this manual, may be considered cause. The Diving Safety Officer shall inform the diver in writing of the reason(s) for revocation. The diver will be given the opportunity to present his/her case in writing for reconsideration and/or re-certification. All such written statements and requests, as identified in this section, are formal documents which will become part of the diver's file.

### **5.70 RECERTIFICATION**

If a diver's certificate expires or is revoked, he/she may be re-certified after complying with such conditions as the Diving Safety Officer or the DCB may impose. The diver shall be given an opportunity to present his/her case to the DCB before conditions for re-certification are stipulated.

## **SECTION 6.00**

### **MEDICAL STANDARDS**

#### **6.10 MEDICAL REQUIREMENTS**

##### **6.11 General**

6.11.1 The UA shall determine that divers have passed a current diving physical examination and have been declared by the examining physician to be fit to engage in diving activities as may be limited or restricted in the medical evaluation report.

6.11.2 All medical evaluations required by this standard shall be performed by, or under the direction of, a licensed physician of the applicant-diver's choice, preferably one trained in diving/undersea medicine.

6.11.3 The diver should be free of any chronic disabling disease and be free of any conditions contained in the list of conditions for which restrictions from diving are generally recommended. (Appendix 1)

##### **6.12 Frequency of Medical Evaluations**

Medical evaluation shall be completed:

6.12.1 Before a diver may begin diving, unless an equivalent initial medical evaluation has been given within the preceding 5 years (3 years if over the age of 40, 2 years if over the age of 60), UA has obtained the results of that examination, and those results have been reviewed and found satisfactory by the UA DCB.

6.12.2 Thereafter, at 5-year intervals up to age 40, every 3 years after the age of 40, and every 2 years after the age of 60

6.12.3 Clearance to return to diving must be obtained from a physician following any major injury or illness, or any condition requiring hospital care. If the injury or illness is pressure related, then the clearance to return to diving must come from a physician trained in diving medicine.

##### **6.13. Information Provided Examining Physician**

The UA shall provide a copy of the medical evaluation requirements of this manual to the examining physician. (Appendices 1, 2, and 3).

##### **6.14 Content of Medical Evaluations**

Medical examinations conducted initially and at the intervals specified in Section 6.12 shall consist of the following:

6.14.1 Applicant agreement for release of medical information to the Diving Safety Officer and the DCB (Appendix 2).

6.14.2 Medical history (Appendix 3)

1.1.1 Diving physical examination (Section 6.15 and Appendix 2).

1.2 Conditions Which May Disqualify Candidates From Diving (Adapted from Bove, 1998)

1. Abnormalities of the tympanic membrane, such as perforation, presence of a monomeric membrane, or inability to autoinflate the middle ears.
2. Vertigo including Meniere's Disease.
3. Stapedectomy or middle ear reconstructive surgery.
4. Recent ocular surgery.
5. Psychiatric disorders including claustrophobia, suicidal ideation, psychosis, anxiety states, untreated depression.
6. Substance abuse, including alcohol.
7. Episodic loss of consciousness.
8. History of seizure.
9. History of stroke or a fixed neurological deficit.
10. Recurring neurologic disorders, including transient ischemic attacks.
11. History of intracranial aneurysm, other vascular malformation or intracranial hemorrhage.
12. History of neurological decompression illness with residual deficit.
13. Head injury with sequelae.
14. Hematologic disorders including coagulopathies.
15. Evidence of coronary artery disease or high risk for coronary artery disease.
16. Atrial septal defects.
17. Significant valvular heart disease - isolated mitral valve prolapse is not disqualifying.
18. Significant cardiac rhythm or conduction abnormalities.
19. Implanted cardiac pacemakers and cardiac defibrillators (ICD).
20. Inadequate exercise tolerance.
21. Severe hypertension.
22. History of spontaneous or traumatic pneumothorax.
23. Asthma.
24. Chronic pulmonary disease, including radiographic evidence of pulmonary blebs, bullae or cysts.
25. Diabetes mellitus.
26. Pregnancy.

1.3 Laboratory Requirements for Diving Medical Evaluation and Intervals.

6.16.1 Initial examination under age 40:

- \* Medical History
- \* Complete Physical Exam, emphasis on neurological and otological components

- \* Chest X-ray
- \* Spirometry
- \* Hematocrit or Hemoglobin
- \* Urinalysis
- \* Any further tests deemed necessary by the physician.

6.16.2 Periodic re-examination under age 40 (every 5 years)

- \* Medical History
- \* Complete Physical Exam, emphasis on neurological and otological components

- \* Hematocrit or Hemoglobin
- \* Urinalysis
- \* Any further tests deemed necessary by the physician

6.16.3 Initial exam over age 40:

- \* Medical History
- \* Complete Physical Exam, emphasis on neurological and otological components

- \* Assessment of coronary artery disease using Multiple-Risk-Factor Assessment<sup>1</sup> (age, lipid profile, blood pressure, diabetic screening, smoker)
- \* Resting EKG
- \* Chest X-ray
- \* Spirometry
- \* Urinalysis
- \* Hematocrit or Hemoglobin
- \* Any further tests deemed necessary by the physician
- \* Exercise stress testing may be indicated based on risk factor assessment<sup>2</sup>

6.16.4 Periodic re-examination over age 40 (every 3 years); over age 60 (every 2 years):

- \* Medical History
- \* Complete Physical Exam, emphasis on neurological and otological components

- \* Assessment of coronary artery disease using Multiple-Risk-Factor Assessment<sup>1</sup> (age, lipid profile, blood pressure, diabetic screening, smoker)
- \* Resting EKG
- \* Urinalysis
- \* Hematocrit or Hemoglobin
- \* Any further tests deemed necessary by the physician
- \* Exercise stress testing may be indicated based on risk factor assessment<sup>2</sup>

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<sup>1</sup>“Assessment of Cardiovascular Risk by Use of Multiple-Risk-Factor Assessment Equations.” Grundy et. al. 1999. AHA/ACC Scientific Statement. <http://www.acc.org/clinical/consensus/risk/risk1999.pdf>

<sup>2</sup> Gibbons RJ, et al. ACC/AHA Guidelines for Exercise Testing. A report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Committee on Exercise Testing). Journal of the American College of Cardiology. 30:260-311, 1997. <http://www.acc.org/clinical/guidelines/exercise/exercise.pdf>

#### 6.17 Physician's Written Report.

6.17.1 After any medical examination relating to the individual's fitness to dive, the UA shall obtain a written report prepared by the examining physician, which shall contain the examining physician's opinion of the individual's fitness to dive, including any recommended restrictions or limitations. This will be reviewed by the DCB.

6.17.2 The UA shall make a copy of the physician's written report available to the individual.

## **SECTION 7.00**

### **OTHER DIVING TECHNOLOGY**

Certain types of diving, some of which are listed below, require equipment or procedures that require training. Supplementary guidelines for these technologies are in development by the AAUS UA divers using them, must have guidelines established by the UA Diving Control Board. Divers shall comply with all scuba diving procedures in this manual unless specified.

#### **7.10 BLUE WATER DIVING**

Blue water diving is defined as diving in open water where the bottom is generally greater than 200 feet deep. It requires special training and the use of multiple-tethered diving techniques.

Specific guidelines that should be followed are outlined in “Blue Water Diving Guidelines”

(California Sea Grant Publ. No. T-CSGCP-014).

#### **7.20 ICE AND POLAR DIVING**

Divers planning to dive under ice or in polar conditions should use the following: “Guidelines for Conduct of Research Diving”, National Science Foundation, Division of Polar Programs, 1990.

#### **7.30 OVERHEAD ENVIRONMENTS**

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 line shall be used.

#### **7.40 HOOKAH**

7.41 Divers using the hookah mode shall be equipped with a diver-carried independent reserve breathing gas supply.

7.42 Each hookah diver shall be hose-tended by a separate dive team member while in the water.

7.43 The hookah breathing gas supply shall be sufficient to support all hookah divers in the water for the duration of the planned dive, including decompression.

#### **7.50 SURFACE SUPPLIED DIVING**

7.51 Surface supplied divers shall comply with all scuba diving procedures in this manual (except Sec. 2.31). Surface supplied diving shall not be conducted at depths greater than 190 fsw (58 msw).

7.52 Divers using the surface supplied mode shall be equipped with a diver-carried independent reserve breathing gas supply.

7.53 Each surface supplied diver shall be hose tended by a separate dive team member while in the water.

7.54 Divers using the surface supplied mode shall maintain voice communication with the surface tender.

7.55 The surface supplied breathing gas supply shall be sufficient to support all surface supplied divers in the water for the duration of the planned dive, including decompression.

7.56 During surface supplied diving operations when only one diver is in the water, there must be a standby diver in attendance at the dive location.

#### **7.60 CLOSED AND SEMI-CLOSED CIRCUIT SCUBA (REBREATHERS)**

Closed and semi-closed circuit scuba (rebreathers) shall meet the following requirements:

7.61 Oxygen partial pressure in the breathing gas shall not exceed values approved by the organizational member's DCB. The generally accepted maximum value is 1.5 atmospheres  $pO_2$  at depths greater than 25 fsw (7.6 msw).

7.62 Chemicals used for the absorption of carbon dioxide shall be kept in a cool, dry location in a sealed container until required for use.

7.63 The designated person-in-charge shall determine that the carbon dioxide absorption canister is used in accordance with the manufacturer's instructions.

7.64 Closed and semi-closed diving equipment will not be used at a depth greater than that recommended by the manufacturer of the equipment.

**APPENDIX 1**  
**DIVING MEDICAL EXAM OVERVIEW FOR THE EXAMINING PHYSICIAN**

TO THE EXAMINING PHYSICIAN:

This person, \_\_\_\_\_, requires a medical examination to assess his/her fitness for certification as a Scientific Diver for the University of Alaska (UA). His /her answers on the Diving Medical History Form (attached), may indicate potential health or safety risks as noted. Your evaluation is requested on the attached scuba Diving Fitness Medical Evaluation Report. If you have questions about diving medicine, you may wish to consult one of the references on the attached list or contact one of the physicians with expertise in diving medicine whose names and phone numbers appear on an attached list. Please contact the undersigned Diving Safety Officer if you have any questions or concerns about diving medicine or the UA standards. Thank you for your assistance.

_____ Diving Safety Officer	_____ Date
_____ Printed Name	_____ Phone Number

Scuba and other modes of compressed-gas diving can be strenuous and hazardous. A special risk is present if the middle ear, sinuses or lung segments do not readily equalize air pressure changes. The most common cause of distress is eustachian insufficiency. Most fatalities involve deficiencies in prudence, judgement, emotional stability or physical fitness. Please consult the following list of conditions that usually restrict candidates from diving.

(Adapted from Bove, 1998: bracketed numbers are pages in Bove)

**CONDITIONS WHICH MAY DISQUALIFY CANDIDATES FROM DIVING**

1. Abnormalities of the tympanic membrane, such as perforation, presence of a monomeric membrane, or inability to autoinflate the middle ears. [5,7,8,9]
2. Vertigo including Meniere's Disease. [13]
3. Stapedectomy or middle ear reconstructive surgery. [11]
4. Recent ocular surgery. [15,18,19]
5. Psychiatric disorders including claustrophobia, suicidal ideation, psychosis, anxiety states, untreated depression. [20 - 23]
6. Substance abuse, including alcohol. [24-25]
7. Episodic loss of consciousness. [1, 26,27]
8. History of seizure. [27, 28]
9. History of stroke or a fixed neurological deficit. [29,30]
10. Recurring neurologic disorders, including transient ischemic attacks. [29,30]

11. History of intracranial aneurysm, other vascular malformation or intracranial hemorrhage. [31]
12. History of neurological decompression illness with residual deficit. [29,30]
13. Head injury with sequelae. [26, 27]
14. Hematologic disorders including coagulopathies. [41, 42]
15. Evidence of coronary artery disease or high risk for coronary artery disease<sup>3</sup>. [33 - 35]
16. Atrial septal defects. [39]
17. Significant valvular heart disease - isolated mitral valve prolapse is not disqualifying. [38]
18. Significant cardiac rhythm or conduction abnormalities. [36 - 37]
19. Implanted cardiac pacemakers and cardiac defibrillators (ICD). [39, 40]
20. Inadequate exercise tolerance. [34]
21. Severe hypertension. [35]
22. History of spontaneous or traumatic pneumothorax. [45]
23. Asthma<sup>4</sup>. [42 - 44]
24. Chronic pulmonary disease, including radiographic evidence of pulmonary blebs, bullae or cysts.[45,46]
25. Diabetes mellitus. [46 - 47]
1. Pregnancy. [56]

#### SELECTED REFERENCES IN DIVING MEDICINE

Most of these are available from Best Publishing Company, P.O. Box 30100, Flagstaff, AZ 86003-0100, the Divers Alert Network (DAN) or the Undersea and Hyperbaric Medical Association (UHMS), Bethesda, MD.

- ACC/AHA Guidelines for Exercise Testing. A report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Committee on Exercise Testing). Gibbons RJ, et al. 1997. Journal of the American College of Cardiology. 30:260-311. <http://www.acc.org/clinical/guidelines/exercise/exercise.pdf>
- Alert Diver Magazine; Articles on diving medicine  
<http://www.diversalertnetwork.org/medical/articles/index.asp>
- “Are Asthmatics Fit to Dive?” Elliott DH, ed. 1996 Undersea and Hyperbaric Medical Society, Kensington, MD.
- “Assessment of Cardiovascular Risk by Use of Multiple-Risk-Factor Assessment Equations.” Grundy et. al. 1999. AHA/ACC Scientific Statement.  
<http://www.acc.org/clinical/consensus/risk/risk1999.pdf>
- DIVING MEDICINE, Third Edition, 1997. A. Bove and J. Davis. W.B. Saunders Company, Philadelphia
- DIVING AND SUBAQUATIC MEDICINE, Third Edition, 1994. C. Edmonds, C. Lowery and J. Pennefather. Butterworth-Heinemann Ltd. Oxford

- MEDICAL EXAMINATION OF SPORT SCUBA DIVERS, 1998. Alfred Bove, M.D., Ph.D. (ed.). Medical Seminars, Inc. San Antonio, TX
- NOAA DIVING MANUAL, NOAA. Superintendent of Documents, U.S. Government Printing Office, Washington, D.C.
- U.S. NAVY DIVING MANUAL. Superintendent of Documents, U.S. Government Printing Office, Washington, D.C.

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<sup>3</sup>“Assessment of Cardiovascular Risk by Use of Multiple-Risk-Factor Assessment Equations.” Grundy et. al. 1999. AHA/ACC Scientific Statement.  
<http://www.acc.org/clinical/consensus/risk/risk1999.pdf>

<sup>4</sup>“Are Asthmatics Fit to Dive? “ Elliott DH, ed. 1996 Undersea and Hyperbaric Medical Society, Kensington, MD.

## APPENDIX 2 MEDICAL EVALUATION OF FITNESS FOR SCUBA DIVING REPORT

\_\_\_\_\_  
Name of Applicant (Print or Type)

\_\_\_\_\_  
Date(Mo/Day/Year)

**To The PHYSICIAN:**

This person is an applicant for training or is presently certified to engage in diving with self-contained underwater breathing apparatus (scuba). This is an activity that puts unusual stress on the individual in several ways. Your opinion on the applicant's medical fitness is requested. Scuba diving requires heavy exertion. The diver must be free of cardiovascular and respiratory disease. An absolute requirement is the ability of the lungs, middle ear and sinuses to equalize pressure. Any condition that risks the loss of consciousness should disqualify the applicant.

TESTS: Please initial that the following tests were completed.

Initial Examination

Re-examination (Every 5 years under age 40, or first exam over age 40, every 3 years over age 40, every 2 years over age 60)

\_\_\_\_\_  
Medical History  
\_\_\_\_\_  
Complete Physical Exam, with  
\_\_\_\_\_  
Physical Exam, with emphasis on neurological and  
emphasis on neurological and  
otological components  
otological components

\_\_\_\_\_  
Medical History  
\_\_\_\_\_  
Complete  
otological

\_\_\_\_\_  
Chest X-Ray  
\_\_\_\_\_  
Spirometry  
\_\_\_\_\_  
Hematocrit or Hemoglobin  
Hemoglobin  
\_\_\_\_\_  
Urinalysis  
\_\_\_\_\_  
Any further tests deemed

\_\_\_\_\_  
Hematocrit or  
\_\_\_\_\_  
Urinalysis  
\_\_\_\_\_  
Any further tests deemed

necessary by the physician  
physician.

necessary by the

**Additional testing for first over age 40**

**Additional testing for over age**

\_\_\_\_\_  
Resting EKG  
\_\_\_\_\_  
Assessment of coronary artery disease  
using Multiple-Risk-Factor Assessment<sup>5</sup>  
Risk-

\_\_\_\_\_  
Resting EKG  
\_\_\_\_\_  
Assessment of coronary  
artery  
disease using Multiple-

(age, lipid profile, blood pressure, diabetic screening, smoker) Note: Exercise stress may be indicated based on risk factor assessment<sup>6</sup>

Factor Assessment<sup>5</sup>

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<sup>5</sup> “Assessment of Cardiovascular Risk by Use of Multiple-Risk-Factor Assessment Equations.” Grundy et. al. 1999. AHA/ACC Scientific Statement. <http://www.acc.org/clinical/consensus/risk/risk1999.pdf>

<sup>6</sup> Gibbons RJ, et al. ACC/AHA Guidelines for Exercise Testing. A report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Committee on Exercise Testing). Journal of the American College of Cardiology. 30:260-311, 1997. <http://www.acc.org/clinical/guidelines/exercise/exercise.pdf>

**RECOMMENDATION:**

APPROVAL. I find no medical condition(s) that I consider incompatible with diving.

RESTRICTED ACTIVITY APPROVAL. The applicant may dive in certain circumstances as described in REMARKS.

FURTHER TESTING REQUIRED. I have encountered a potential contraindication to diving. Additional medical tests must be performed before a final assessment can be made. See REMARKS.

REJECT. This applicant has medical condition(s) that, in my opinion, clearly would constitute unacceptable hazards to health and safety in diving.

**REMARKS:**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**PHYSICIAN'S STATEMENT:**

I have evaluated the above-mentioned individual according to the American Academy of Underwater Sciences medical standards for scientific diving (Section 6.00), and find no conditions that may be disqualifying. I have discussed with the patient any medical condition(s) that would not disqualify him/her from diving but which may seriously compromise subsequent health. The patient understands the nature of the hazards and the risks involved in diving with these conditions.

\_\_\_\_\_  
Date Signature M.D.

\_\_\_\_\_  
Name (Print or Type)

\_\_\_\_\_  
Address

\_\_\_\_\_  
Telephone Number

My familiarity with applicant is:

- With this exam only
- Regular Physician for \_\_\_\_\_ years
- Other (describe) \_\_\_\_\_

\_\_\_\_\_  
My familiarity with diving medicine is:  
\_\_\_\_\_  
\_\_\_\_\_

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**APPLICANT'S RELEASE OF MEDICAL INFORMATION FORM:**

I authorize the release of this information and all medical information subsequently acquired in association with my diving to the

\_\_\_\_\_ Diving Safety Officer and Diving Control  
Board or their designee at (place) \_\_\_\_\_ on  
(date)\_\_\_\_\_.

Signature of Applicant \_\_\_\_\_

**APPENDIX 3**  
**DIVING MEDICAL HISTORY FORM**  
 (To Be Completed By Applicant-Diver)

Name \_\_\_\_\_ Sex \_\_\_\_ Age \_\_\_\_ Wt. \_\_\_\_ Ht. \_\_\_\_

Sponsor \_\_\_\_\_ Date \_\_\_\_/\_\_\_\_/\_\_\_\_  
 (Dept./Project/Program/School, etc.) (Mo/Day/Yr)

**TO THE APPLICANT:**

Scuba diving makes considerable demands on you, both physically and mentally. Diving with certain medical conditions may be asking for trouble not only for yourself, but also to anyone coming to your aid if you get into difficulty in the water. Therefore, it is prudent to meet certain medical and physical requirements before beginning a diving or training program.

Your answers to the questions are as important, in determining your fitness as your physical examination. Obviously, you should give accurate information or the medical screening procedure becomes useless.

This form shall be kept confidential. If you believe any question amounts to invasion of your privacy, you may elect to omit an answer, provided that you shall subsequently discuss that matter with your own physician and he/she must then indicate, in writing, that you have done so and that no health hazard exists.

Should your answers indicate a condition, which might make diving hazardous, you will be asked to review the matter with your physician. In such instances, his/her written authorization will be required in order for further consideration to be given to your application. If your physician concludes that diving would involve undue risk for you, remember that he/she is concerned only with your well-being and safety. Please respect the advice and the intent of this medical history form.

	<b>Have you ever had or do you presently have any of the following?</b>	<b>Yes</b>	<b>No</b>	<b>Comments</b>
1.	Trouble with your ears, including ruptured eardrum, difficulty clearing your ears, or surgery.			
2.	Trouble with dizziness.			
3.	Eye surgery.			
4.	Depression, anxiety, claustrophobia, etc.			
5.	Substance abuse, including alcohol.			
6.	Loss of consciousness.			
7.	Epilepsy or other seizures, convulsions or fits.			
8.	Stroke or a fixed neurological deficit.			
9.	Recurring neurologic disorders, including transient ischemic attacks.			

10.	Aneurysms or bleeding in the brain.			
11.	Decompression sickness or embolism.			
12.	Head injury			
13.	Disorders of the blood, or easy bleeding.			
14.	Heart disease, diabetes, high cholesterol			
15.	Anatomical heart abnormalities including patent foramen ovale, valve problems, etc.			
16.	Heart rhythm problems.			
17.	Need for a pacemaker			
18.	Difficulty with exercise.			
19.	High blood pressure			
20.	Collapsed lung			
21.	Asthma.			
22.	Other lung disease.			
23.	Diabetes mellitus.			
24.	Pregnancy			
25.	Surgery If yes explain below			
26.	Hospitalizations. If yes explain below			
27.	Do you take any medications? If yes list below			
28.	Do you have any allergies to medications, foods, environmentals? If yes explain below			
29.	Do you smoke?			
30.	Do you drink alcoholic beverages?			
31.	Is there a family history of high cholesterol?			
32.	Is there a family history of heart disease or stroke?			
33.	Is there a family history of diabetes?			
34.	Is there a family history of asthma?			

Please explain any "yes" answers to the above questions.

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I certify that the above answers and information represent an accurate and complete description of my medical history.

Signature

Date

**APPENDIX 4**  
**RECOMMENDED PHYSICIANS WITH EXPERTISE IN DIVING MEDICINE**

List of local Medical Doctors that have training and expertise in diving or undersea medicine:

1. Fairbanks Urgent Care  
Name  
1867 Airport Way, Ste 130B  
Address  
Fairbanks, AK 99709  
  
907-452-2178  
Telephone

2. Chest Medicine Fairbanks  
Name  
1701 Gillam Way  
Address  
Fairbanks, AK 99709  
  
907-456-3750  
Telephone

3. \_\_\_\_\_  
Name  
\_\_\_\_\_  
Address  
\_\_\_\_\_  
  
\_\_\_\_\_  
Telephone

## **APPENDIX 5 DEFINITION OF TERMS**

**Air sharing** - The sharing of an air supply between divers.

**ATA(s)**: Abbreviation for “Atmospheres Absolute”, defines as the total pressure exerted on an object, by a gas or mixture of gases, at a specific depth or elevation, including normal atmospheric pressure.

**Breath-hold Diving** - A diving mode in which the diver uses no self-contained or surface-supplied air or oxygen supply.

**Buddy Breathing** - The sharing of a single air source between divers.

**Buddy Diver** - Second member of the dive team.

**Buddy system** - Two comparably equipped scuba divers in the water in constant communication.

**Buoyant Ascent** - An ascent made using some form of positive buoyancy.

**Burst Pressure** - Pressure at which a pressure containment device would fail structurally.

**Certified Diver** - A diver who holds a recognized valid certification from an organizational member or recognized certifying agency.

**Controlled Ascent** - Any one of several kinds of ascents including normal, swimming, and air sharing ascents where the diver(s) maintain control so a pause or stop can be made during the ascent.

**Cylinder** - A pressure vessel for the storage of gases.

**Decompression Chamber** - A pressure vessel for human occupancy. Also called a hyperbaric chamber or recompression chamber.

**Decompression Sickness** - A condition with a variety of symptoms which may result from gas and bubbles in the tissues of divers after pressure reduction.

**Dive** - A descent into the water, an underwater diving activity utilizing compressed gas, an ascent, and return to the surface.

**Dive Computer**- A microprocessor based device which computes a diver's theoretical decompression status, in real time, by using pressure (depth) and time as input to a decompression model, or set of decompression tables, programmed into the device.

**Dive Location** - A surface or vessel from which a diving operation is conducted.

Dive Site - Physical location of a diver during a dive.

Dive Table - A profile or set of profiles of depth-time relationships for ascent rates and breathing mixtures to be followed after a specific depth-time exposure or exposures.

Diver - An individual in the water who uses apparatus, including snorkel, which supplies breathing gas at ambient pressure.

Diver-In-Training - An individual gaining experience and training in additional diving activities under the supervision of a dive team member experienced in those activities.

Diver-Carried Reserve Breathing Gas - A diver-carried independent supply of air or mixed gas (as appropriate) sufficient under standard operating conditions to allow the diver to reach the surface, or another source of breathing gas, or to be reached by another diver.

Diving Mode - A type of diving required specific equipment, procedures, and techniques, for example, snorkel, scuba, surface-supplied air, or mixed gas.

Diving Control Board (DCB). The group of individuals who act as the official representative of the membership organization in matters concerning the scientific diving program (see Sec. 1.24).

Diving Safety Officer (DSO) - The individual responsible for the safe conduct of the scientific diving program of the membership organization (see Sec. 1.23).

EAD: Equivalent Air Depth (see below).

Emergency Ascent - An ascent made under emergency conditions where the diver exceeds the normal ascent rate.

Enriched Air (EAN<sub>x</sub>): a name for a breathing mixture of air and oxygen when the percent of oxygen exceeds 21%. This term is considered synonymous with the term “nitrox” .

Equivalent Air Depth (EAD): The depth at which air will have the same nitrogen partial pressure as the nitrox mixture being used. This number, expressed in units of feet seawater, will always be less than the actual depth for any enriched air mixture.

fN<sub>2</sub> - Fraction of nitrogen in a gas mixture, expressed as either a decimal or percentage, by volume.

fO<sub>2</sub> - Fraction of oxygen in a gas mixture, expressed as either a decimal or percentage, by volume.

FSW - Feet of seawater, or equivalent static head.

Hookah Diving - A type of shallow water surface-supplied diving where there is no voice communication with the surface.

Hyperbaric Chamber - See decompression chamber.

Hyperbaric Conditions - Pressure conditions in excess of normal atmospheric pressure at the dive location.

Lead Diver - Certified scientific diver with experience and training to conduct the diving operation.

Maximum Working Pressure - Maximum pressure to which a pressure vessel may be exposed under standard operating conditions.

Organizational member - An organization which is a current member of the AAUS, and which has a program which adheres to the standards of the AAUS as set forth in the AAUS Standards for Scientific Diving Certification and Operation of Scientific Diving Programs.

Mixed Gas - MG

Mixed-Gas Diving - A diving mode in which the diver is supplied in the water with a breathing gas other than air.

MOD: Maximum Operating Depth, usually determined as the depth at which the  $pO_2$  for a given gas mixture reaches a predetermined maximum.

MSW - Meters of seawater or equivalent static head.

Nitrox: Any gas mixture comprised predominately of nitrogen and oxygen, most frequently containing between 21% and 40% oxygen. Also be referred to as Enriched Air Nitrox, abbreviated EAN.

NOAA Diving Manual: refers to the *NOAA Diving Manual, Diving for Science and Technology*, 2001 edition. National Oceanic and Atmospheric Administration, Office of Undersea Research, US Department of Commerce.

No-Decompression limits - Depth-time limits of the "no-decompression limits and repetitive dive group designations table for no-decompression air dives" of the U.S. Navy Diving Manual or equivalent limits.

Normal Ascent - An ascent made with an adequate air supply at a rate of 60 feet per minute or less.

Oxygen Clean: All combustible contaminants have been removed.

Oxygen Compatible: A gas delivery system that has components (o-rings, valve seats, diaphragms, etc.) that are compatible with oxygen at a stated pressure and temperature.

Oxygen Service: A gas delivery system that is both oxygen clean and oxygen compatible.

Oxygen Toxicity: Any adverse reaction of the central nervous system (“acute” or “CNS” oxygen toxicity) or lungs (“chronic”, “whole-body”, or “pulmonary” oxygen toxicity) brought on by exposure to an increased (above atmospheric levels) partial pressure of oxygen.

Pressure-Related Injury - An injury resulting from pressure disequilibrium within the body as the result of hyperbaric exposure. Examples include: decompression sickness, pneumothorax, mediastinal emphysema, air embolism, subcutaneous emphysema, or ruptured eardrum.

Pressure Vessel - See cylinder.

pN<sub>2</sub> - Inspired partial pressure of nitrogen, usually expressed in units of atmospheres absolute.

pO<sub>2</sub> - Inspired partial pressure of oxygen, usually expressed in units of atmospheres absolute.

Psi - Unit of pressure, “pounds per square inch”.

Psig - Unit of pressure, "pounds per square inch gauge".

Recompression Chamber - see decompression chamber.

Scientific Diving - Scientific diving is defined (29 CFR 1910.402) as 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.

Scuba Diving - A diving mode independent of surface supply in which the diver uses open circuit self-contained underwater breathing apparatus.

Standby Diver - A diver at the dive location capable of rendering assistance to a diver in the water.

Surface Supplied Diving - A diving mode in which the diver in the water is supplied from the dive location with compressed gas for breathing.

Swimming Ascent - An ascent which can be done under normal or emergency conditions accomplished by simply swimming to the surface.

Umbilical - Composite hose bundle between a dive location and a diver or bell, or between a diver and a bell, which supplies a diver or bell with breathing gas, communications, power, or heat, as appropriate to the diving mode or conditions, and includes a safety line between the diver and the dive location.

Working Pressure - Normal pressure at which the system is designed to operate.

**APPENDIX 6**  
**AAUS REQUEST FOR DIVING RECIPROCITY FORM**  
**VERIFICATION OF DIVER TRAINING AND EXPERIENCE**

UNIVERSITY OF ALASKA SCIENTIFIC DIVING PROGRAM  
SCHOOL OF FISHERIES & OCEAN SCIENCES  
UNIVERSITY OF ALASKA FAIRBANKS  
FAIRBANKS, ALASKA 99775-7220  
<http://www.sfos.uaf.edu/dive/>

Date:

To:

From:

Subject:           Scientific Diving Reciprocity

This letter certifies that \_\_\_\_\_ has been issued a \_\_\_\_\_ depth certification under the current *University of Alaska Scientific Diving Safety Manual* regulations and is a currently certified UA Scientific Diver. The UA Scientific Diving Program is a current Organizational Member of the American Academy of Underwater Sciences and adheres to the *AAUS Standards for Scientific Diving Certification and Operation of Scientific Diving Programs*. The following is a brief summary of this diver's file regarding diving status at UA. Unless otherwise specified under "Specialties", this diver is authorized to perform no-decompression, open water, compressed air scuba dives to the depth certification indicated above.

Regulator/equipment maintenance expiration date: \_\_\_\_\_.  
Diving medical expiration date: \_\_\_\_\_.  
First aid expiration date and agency: \_\_\_\_\_.  
CPR expiration date and agency: \_\_\_\_\_.  
Oxygen administration expiration date and agency: \_\_\_\_\_.  
Number of dives completed within the previous 12 months: \_\_\_\_\_.  
Maximum depth in last 12 months: \_\_\_\_\_.  
Date of last dive: \_\_\_\_\_.  
Check-out dive: \_\_\_\_\_.  
Scientific diving written exam: \_\_\_\_\_.

Specialties:

_____ Dry suit	_____ Rescue	_____ Blue water
_____ Dive Computer	_____ Divemaster	_____ Altitude
_____ Nitrox	_____ Instructor	_____ Ice/Polar
_____ Mixed gas	_____ EMT	_____ Cave
_____ Closed circuit	_____ Dive Accident Management	_____ Night
_____ Saturation	_____ Chamber operator	Other: _____.
_____ Decompression	_____ Lifesaving	

Diver's name, address, email address, phone and fax number:

Diver's emergency contact information:

UAF Dive Safety Plan May 2004

Please do not hesitate to contact me if I may be of further assistance: [jewett@ims.uaf.edu](mailto:jewett@ims.uaf.edu) 907-474-7841,  
907-474-7204 fax

## **APPENDIX 7 DIVING EMERGENCY MANAGEMENT PROCEDURES**

### **Introduction**

A diving accident victim could be any person who has been breathing air underwater regardless of depth. It is essential that emergency procedures are pre-planned and that medical treatment is initiated as soon as possible. It is the responsibility of each AAUS organizational member to develop procedures for diving emergencies including evacuation and medical treatment for each dive location.

### **General Procedures**

Depending on and according to the nature of the diving accident:

1. Make appropriate contact with victim or rescue as required.
2. Establish (A)irway, (B)reathing, (C)irculation as required.
3. Stabilize the victim
  3. Administer 100% oxygen, if appropriate (in cases of Decompression Illness, or Near Drowning).
  4. Call local Emergency Medical System (EMS) for transport to nearest medical treatment facility. Explain the circumstances of the dive incident to the evacuation teams, medics and physicians. Do not assume that they understand why 100% oxygen may be required for the diving accident victim or that recompression treatment may be necessary.
5. Call appropriate Diving Accident Coordinator for contact with diving physician and decompression chamber. etc.
  6. Notify DSO or designee according to the Emergency Action Plan of the organizational member.
  7. Complete and submit Incident Report Form ([www.aaus.org](http://www.aaus.org)) to the DCB of the organization and the AAUS (Section 2.70 Required Incident Reporting).

### **List of Emergency Contact Numbers Appropriate For Dive Locations in Alaska and the Pacific Northwest:**

1. If emergency is Decompression Sickness or an Air Embolism, the dispatcher should contact the nearest Recompression Chamber facility.

**A. Dutch Harbor**

Dan Magone (PRIVATE COMPANY- check for availability)	581-1401
Dan Magone (cell)	391-1400
V.J. Cross (Magone's lead diver) (home)	581-4925
Magone's Shop Forman (cell)	391-

7993

- B. Anchorage**
  - Providence Hospital 1-(907)-562-2211
  - Providence Hospital Emergency 261-3111
  - Air Ambulance: Providence 261-3070
  - Outside Anchorage 1-(800)-478-5433
  - Recompression Chamber Supervisor:
    - Robert Thompson, MD 565-4600
    - American Marine, 6251 Tuttle Street, Anchorage, Ak 565-4600
    - Alaska Regional Hospital: Air Ambulance 248-0617
  
- C. Juneau**
  - Bartlett Memorial Hospital 1-(907)-796-8900
  - Bartlett Memorial Hospital Emergency 796-8427
  - Recompression Chamber Supervisor:
    - David Job, MD 796-8446
  
- D. Seattle, WA**
  - Virginia Mason Medical Center 1-206-583-6543

2. The following emergency numbers are listed for additional reference and information in case of a diving-related emergency or for consultation regarding a diving-related problem.

- A. Diver's Alert Network (DAN)** 1-(919)-684-8111
  - Duke University Medical Ctr. (Emergency only)
  - Durham, North Carolina
  
- B. U.S. Coast Guard (USCG) Rescue Coordination Center**
  - National Center 1-(800)-478-5555
  - 1-(888)-399-5555
  - Boating Safety 1-(800)-478-6381
  - Juneau 1-(907)-586-7344
  - Kodiak 1-(907)-487-5888
  
- C. Alaska Rescue Coordination Center (AKRCC)**
  - Anchorage area 1-(907)-428-7230
  - Outside Anchorage area 1-(800)-420-7230
  
- D. Kaktovik**

	Emergency	611
	Health Clinic	640-6413
	Fire	640-6212
<b>E.</b>	<b>Prudhoe Bay/Deadhorse</b>	
	Public Safety Office	659-2515
<b>F.</b>	<b>Barrow</b>	
3473/3476	Fire	852-
	Hospital	852-4611
	Health Services	852-2466
	Rescue Coordination	1-(800)-830-2822
	Public Safety Office	852-6111
<b>G.</b>	<b>Kotzebue</b>	
	Fire	442-3204
	Police/Search & Rescue	422-3351
	Ambulance	422-3404
	Public Health Service Hospital/ Maniilag Medical Center	422-3321
<b>H.</b>	<b>Nome</b>	
3311/5411	Fire/Police/Ambulance	911
	Hospital	433-
<b>I.</b>	<b>Bethel</b>	
3711/3811/2251	Fire	543-2131
	Police	543-3781
3773/3774	Hospital	543-
	Clinic	543-
<b>J.</b>	<b>Dillingham</b>	
	Fire	842-2288
	Police	842-5354
	Kanakanak Hospital	842-5201
	Dillingham Health Center	842-5981
<b>K.</b>	<b>Cold Bay</b>	
	Fire & Crash Station	532-5000
<b>L.</b>	<b>Dutch Harbor/Unalaska</b>	
	Fire/Police/Ambulance	911

1202/1203	Lliuliuk Health Clinic	581-
	Public Safety, after hrs number for clinic	581-1233
	State Trooper	581-1432
	<b>M. Kenai</b>	
	Fire	283-7666
	Police	283-
7879/7980		
	Central Peninsula General Hospital	262-
4404/7361		
	<b>N. Soldotna</b>	
	Fire	262-4792
	Police	262-4455
	Central Peninsula General Hospital	262-
4404/7361		
	<b>O. Seldovia</b>	
	Fire/Ambulance/Clinic	234-7812
	Police	234-7640
	<b>P. Kodiak</b>	
	Fire/Ambulance	911
	Police	486-8000
	Hospital	486-3281
	USGC Coordination Center/Air Station	1-(907)-487-5888
	<b>Q. Homer</b>	
	Fire	235-3155
	Police	235-3150
	Hospital	235-8101
	<b>R. Anchorage</b>	
	Providence Hospital	1-(907)-562-2211
	Emergency Room	261-3111
	Air Ambulance: Providence	261-3070
	Outside Anchorage	1-(800)-478-5433
	Recompression Chamber: Robert Thompson, MD	565-4600
	American Marine	565-4600
	Alaska Regional Hospital: Air Ambulance	248-0617
	USCG	271-6700
	<b>S. Fairbanks</b>	
	Fire (UAF)	474-7721

	Alaska State Troopers	451-5333
	Fairbanks Memorial Hospital	452-8181
	Police	459-6500
<b>T.</b>	<b>Seward</b>	
	Fire	224-3445
	Police	224-3338
	Providence-Seward Medical Center	224-5205
<b>U.</b>	<b>Valdez</b>	
	Fire/Police/Ambulance	835-4560
	Valdez Community Hospital	835-2249
	Valdez Medical Clinic	835-4811
	USCG	835-
4791/4793		
<b>V.</b>	<b>Cordova</b>	
	Fire/Police/Ambulance	424-6100
	Medical Clinic	424-8200
	Hospital	424-8000
	USCG (Summer only: May 1- Oct. 1: Helicopter)	424-
7346/7891		
		424-
7894/7898		
<b>W.</b>	<b>Yakutat</b>	
	Fire/Police/Ambulance	911
	Yakutat Community Health Center	784-
3275/3391		
<b>X.</b>	<b>Haines</b>	
	Fire	766-2115
	Police	766-2121
	Health Center	766-2521
<b>Y.</b>	<b>Skagway</b>	
	Fire/Ambulance	983-2300
	Police	911/ 983-
2232		
	Hospital	983-2255
<b>Z.</b>	<b>Juneau</b>	
	Fire/Police/Ambulance	911
	Bartlett Memorial Hospital	796-8900
	Emergency Room	796-8427
	Recompression Chamber Contact: David Job, MD	796-8446

	Juneau Health Center	586-3736
	USCG Coordination Center	586-7344
<b>AA.</b>	<b>Sitka</b>	
	Fire	747-3233
	Police	747-3245
	Sitka Community Hospital	747-3241/966-2411
	USCG (Air Station)	966-5434
<b>BB.</b>	<b>Petersburg</b>	
	Fire	722-3355
	Police	722-3838
	Petersburg General Hospital	722-4291
	Health Center	722-4611
<b>CC.</b>	<b>Wrangell</b>	
	Fire/Ambulance	911
	Police	874-3304
	Wrangell General Hospital	874-3356
	Health Center	874-3615
<b>DD.</b>	<b>Ketchikan</b>	
	Fire	225-9616
	Police	225-6631
	Ketchikan General Hospital	225-5171
	USCG	225-5666
<b>Outside Alaska</b>		
<b>EE.</b>	<b>Prince Rupert, B.C.</b>	
	Fire	1-(604)-627-2211
	Police	624-2136
	Ambulance	624-4157
	Hospital	624-2171
<b>FF.</b>	<b>Vancouver, B.C.</b>	
	Fire/Police/Ambulance	911
	Hospital	1-(604)-837-5441/683-2474
	Canadian Coast Guard (CCG)	984-3700
	Search & Rescue	666-7888
	Rescue Coordination Center	388-3303
<b>GG.</b>	<b>Seattle</b>	
	Fire/Police/Ambulance	911
	University of Washington Medical Center	1-(206)-548-4000/3360
	Virginia Mason General Hospital	583-6543/624-1144
	USCG	286-5400/533-9295

