

# Chignik Weir SCUBA Diving Operational Plan, 2013

by

**Charles W. Russell**

April 2013

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Alaska Department of Fish and Game

Divisions of Sport Fish and Commercial Fisheries



## Symbols and Abbreviations

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<b>Weights and measures (metric)</b>		<b>General</b>		<b>Mathematics, statistics</b>	
centimeter	cm	Alaska Administrative Code	AAC	<i>all standard mathematical signs, symbols and abbreviations</i>	
deciliter	dL	all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.	alternate hypothesis	$H_A$
gram	g	all commonly accepted professional titles	e.g., Dr., Ph.D., R.N., etc.	base of natural logarithm	$e$
hectare	ha	at	@	catch per unit effort	CPUE
kilogram	kg	compass directions:		coefficient of variation	CV
kilometer	km	east	E	common test statistics	(F, t, $\chi^2$ , etc.)
liter	L	north	N	confidence interval	CI
meter	m	south	S	correlation coefficient (multiple)	R
milliliter	mL	west	W	correlation coefficient (simple)	r
millimeter	mm	copyright	©	covariance	cov
		corporate suffixes:		degree (angular)	$^\circ$
<b>Weights and measures (English)</b>		Company	Co.	degrees of freedom	df
cubic feet per second	ft <sup>3</sup> /s	Corporation	Corp.	expected value	$E$
foot	ft	Incorporated	Inc.	greater than	>
gallon	gal	Limited	Ltd.	greater than or equal to	≥
inch	in	District of Columbia	D.C.	harvest per unit effort	HPUE
mile	mi	et alii (and others)	et al.	less than	<
nautical mile	nmi	et cetera (and so forth)	etc.	less than or equal to	≤
ounce	oz	exempli gratia (for example)	e.g.	logarithm (natural)	ln
pound	lb	Federal Information Code	FIC	logarithm (base 10)	log
quart	qt	id est (that is)	i.e.	logarithm (specify base)	log <sub>2</sub> , etc.
yard	yd	latitude or longitude	lat. or long.	minute (angular)	'
		monetary symbols (U.S.)	\$, ¢	not significant	NS
<b>Time and temperature</b>		months (tables and figures): first three letters	Jan, ..., Dec	null hypothesis	$H_0$
day	d	registered trademark	®	percent	%
degrees Celsius	°C	trademark	™	probability	P
degrees Fahrenheit	°F	United States (adjective)	U.S.	probability of a type I error (rejection of the null hypothesis when true)	$\alpha$
degrees kelvin	K	United States of America (noun)	USA	probability of a type II error (acceptance of the null hypothesis when false)	$\beta$
hour	h	U.S.C.	United States Code	second (angular)	"
minute	min	U.S. state	use two-letter abbreviations (e.g., AK, WA)	standard deviation	SD
second	s			standard error	SE
<b>Physics and chemistry</b>				variance	
all atomic symbols				population sample	Var var
alternating current	AC				
ampere	A				
calorie	cal				
direct current	DC				
hertz	Hz				
horsepower	hp				
hydrogen ion activity (negative log of)	pH				
parts per million	ppm				
parts per thousand	ppt, ‰				
volts	V				
watts	W				

# **CHIGNIK WEIR SCUBA DIVING OPERATIONAL PLAN, 2013**

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April 2013

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*This document should be cited as:*

*Russell, C.W. 2013. Chignik weir SCUBA diving operational plan, 2013. [In] Salmon operational plans for the Chignik area, 2013. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 4K13-05, Kodiak.*

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## **ABSTRACT**

The Alaska Department of Fish and Game conducts non-scientific diving at the Chignik weir for the installation, removal, recovery, and maintenance of weir components. All dive projects conducted by the department fall under the authority of the Occupational Safety and Health Administration (OSHA) and the department's Dive Safety Board (DSB), which governs dive safety policies, training, and equipment. This document provides Chignik weir divers with the specific regulations, restrictions, and emergency procedures for all dive activities at the weir.

Key words: Chignik, weir, diving, SCUBA, Dive Safety Board, standards, CMA

## **INTRODUCTION**

Accurate inseason monitoring of salmon escapement is necessary for the management of commercial and subsistence salmon fisheries in the Chignik Management Area (CMA). To obtain escapement estimates, the Alaska Department of Fish and Game (ADF&G) constructs and operates a large unconventional weir across the Chignik River. The depth of the Chignik River at the weir location ranges from 2 to 15 feet, and fluctuates daily depending on tides, watershed runoff, and wind direction. Therefore, Self-Contained Underwater Breathing Apparatus (SCUBA) diving at the Chignik weir is necessary for the installation, removal, and maintenance of weir components.

The only ADF&G dive project in the Westward Region occurs at the Chignik weir. Weir diving is atypical of open-water diving because divers are virtually never in a free-swimming state. The divers support themselves against the current by lying or standing on the weir panels or by standing on the river bottom. However, strong currents and the angle of the weir panels typically force divers to the surface. As a result, buoyancy control is either highly positive to remain on the surface or highly negative to stay in contact with the weir or the river bottom. Maximum depth is usually less than 15 feet and accurate 'bottom times' (dive times at depth) are difficult to determine because divers typically spend considerable time at the surface.

## **REGULATIONS**

Most ADF&G dive projects are exempt from federal Occupational Safety and Health Administration (OSHA) SCUBA regulations because they qualify for a scientific diver exemption. The scientific diver exemption allows the ADF&G to form a Dive Safety Board (DSB) and regulate their own safety practices. However, weir diving does not entirely qualify for this exemption because conducting scientific observations or recording data is not the primary purpose for SCUBA diving at the Chignik weir. Thus, the DSB oversees some aspects of weir diving operations while OSHA regulations govern the rest. All DSB and applicable OSHA policies for ADF&G dive activities are published in the statewide Dive Safety Manual (Hebert 2006).

At Chignik, diving is necessary to construct, maintain, or remove the structures, equipment, and materials associated with the Chignik weir. Therefore, weir diving standards must comply with the OSHA regulations for commercial diving construction practices (29 CFR, subpart T, section 1910.401–1910.440; OSHA 2003). However, weir diving differs from typical underwater construction (which is further restricted) in its simplicity and scale; materials are pre-fabricated and only basic assembly with simple fasteners is required. Additionally, no underwater welding is performed, and no power equipment is used by Chignik weir divers. All weir diving must be conducted within 100 feet of the weir in depths similar to those found at the weir.

# **DIVE PLAN**

## **DIVING RESTRICTIONS**

Since weir divers do not qualify as scientific divers, ocean, lake, or other departmental diving activities will not be allowed unless approved by the ADF&G Local Dive Safety Officer (LDSO). Any non-weir departmental SCUBA diving must be done in accordance with OSHA regulations and under ADF&G auspices.

## **AUTHORIZED CHIGNIK WEIR DIVERS**

Todd Anderson, the Chignik Area Management Biologist, serves as the Westward Region LDSO. Charles Russell will serve as the lead diver at the Chignik weir and will be assisted by Todd Anderson as needed. The lead diver shall follow the approved dive plan and is responsible for the proper operation and maintenance of all dive and safety equipment. The lead diver will coordinate all dive activities at the weir. All weir divers are required to read this diving plan, the ADF&G Dive Safety Manual, OSHA dive regulations, and any other information recommended by the LDSO.

The DSB recommends that all ADF&G divers complete a minimum of six proficiency dives during the off season. If a weir diver is unable to complete this requirement prior to returning to Chignik, then that diver is required to do a checkout dive at the Chignik weir under the direction of the LDSO. The Chignik weir checkout dive sheet is found in Appendix A1. Personal recreational diving can satisfy the minimum proficiency dive requirements, and is encouraged.

## **SAFETY PROCEDURES**

All employees, including divers, at the Chignik weir are required to be certified in Cardio Pulmonary Resuscitation (CPR), First Aid, and emergency oxygen administration. All employees will be briefed with other dive-specific emergency procedures and equipment as needed by the LDSO.

The proposed dive plan for the Chignik weir in 2013 is detailed in Table 1. All dives will follow limits established in standardized recreational dive tables (e.g., PADI Recreational Dive Planner). All ADF&G divers are additionally required to maintain personal dive logs. Dive logs will be reviewed by the LDSO before and after each field season to monitor safety and proficiency standards.

Two ADF&G certified weir divers must be on site prior to any SCUBA diving activities at the weir. Generally, one diver will be in the water and the other will serve as a dive tender. The dive tender shall be comparably SCUBA equipped and located either on the weir boardwalk immediately above, or in the water adjacent to the diver. Hand signals or a repeating series of three taps on any metal portion of the weir will be the signal that the diver needs immediate emergency assistance from the dive tender (Hebert 2006).

Medical grade oxygen cylinders and respirators, in a ready-to-use configuration, will be on site during each SCUBA dive and all Chignik weir staff must be trained in their use. A copy of the diving emergency management procedures (Appendix A2) with emergency first aid and contact information will be located near the phone in the ADF&G Chignik office.

Local residents routinely operate skiffs on the Chignik River. Before diving, a safety announcement must be made on VHF channel 6 to inform local boat traffic that a diver is in the

water and caution should be exercised when traveling near the weir. Additionally, standard red and white SCUBA dive flags and life rings must be posted upstream and downstream of the weir. When a diver is within 150 feet of the boat gate, they must be verbally alerted by the boat gate operator and dive tender prior to opening the boat gate. When the diver is within 50 feet of the boat gate, the diver must remain at the surface prior to and throughout the time the boat gate is open without exception. It is the responsibility of the individual operating the boat gate to verbally alert the dive tender, who is then responsible for alerting the diver. Boat passage will not be allowed until diver communication has been established and all conditions have been met.

Hypothermia may become a factor at any time while diving, especially during weir installation which occurs during mid-May when the water temperatures are relatively cold (usually 38° to 42° F). Divers are in the water much longer compared to normal open water diving situations and frequent periods of reduced diver activity can expose a diver to hypothermic conditions. Each diver must be aware of, and operate within, their individual limits. Dive tenders must be attentive and aware that hypothermia can affect behavior including judgment, speech, and motor skills.

In times of flooding and falling tides, the force of the current in the Chignik River can be significant. While diving near the open boat gate or open panel sections, the diver must use additional caution to avoid being swept downstream past the weir. In these situations, dive operations may be cancelled until conditions improve.

Normally, ropes, cables, and lines are not commonly encountered while diving at the Chignik weir. However, foreign debris may collect on the weir and the aluminum panels and camera gates may have sharp edges that could entangle or tear a diver's dry suit or gear. Therefore, a dive knife should be worn at all times by each diver.

## **EMERGENCY PLAN**

General guidelines for managing dive emergencies are found in Appendix A2. In the event of any dive emergency, it is critical to seek qualified medical attention as soon as possible. The medical clinic at Chignik Lake Village should be the first point of contact during emergency situations (VHF channel 6 or phone 907-845-2236). Inform clinic personnel that an underwater diving-related injury has occurred and medical oxygen may be necessary. If the injury potentially involves an air embolism (obstruction of a blood vessel by an air bubble or detached clot) or decompression illness, take the diver to the clinic immediately and provide the clinic with the Divers Alert Network (DAN) phone number at 919-684-8111 for additional dive-related medical assistance. If the injury is serious and/or life threatening, it is important that one person is designated to coordinate treatment and/or evacuation. If possible, treatment and evacuation plans should be coordinated through the Chignik Lake clinic and the US Coast Guard (USCG) flight surgeon. The flight surgeon and Kodiak USCG Search and Rescue can be reached at 800-478-5555 or 907-487-5888.

## **EMERGENCY TRANSPORT**

When coordinating an emergency evacuation, inform the Chignik Lake clinic and the USCG flight surgeon that department aircraft may be available to respond and transport the injured diver. To determine the location and response time of department aircraft, contact the ADF&G field offices in Chignik 907-845-2243, Sand Point 907-383-2066, Port Moller 907-375-2716, or Cold Bay 907-523-2419.

Other emergency evacuation options include: Peninsula Airways (Chignik: 907-845-2228; King Salmon: 907-246-3372; Cold Bay: 907-532-2484) and the Alaska Regional Hospital Life Flight (800-478-9111 or 907-264-2388). The Life Flight plane is specialized and costly, but it may be the fastest way to get a patient to Anchorage. However, depending on conditions, Life Flight may not be able to land at the Chignik Lake air strip and it may be necessary to arrange alternative transport to King Salmon or Kodiak before transferring to the Life Flight aircraft for the remainder of the evacuation to Anchorage. Generally, it takes a minimum of four hours to reach a recompression chamber in Anchorage from Chignik. If possible, an ADF&G representative familiar with the injury should accompany the evacuated diver to the treatment facility.

It is critical to inform any air carrier that the injury is dive-related and medical grade oxygen must be available and administered to the patient continuously during the flight. It is also important to inform the evacuating plane to pressurize to sea level if possible. If the plane does not have this capability, request the pilot to fly as low as possible (no higher than 800 feet) to avoid further endangering the patient's life.

## **NEAREST HOSPITALS**

Depending on the severity or type of dive injury, the patient may be transported to either Kodiak or Anchorage. A complete list of emergency medical and evacuation contacts is found in Appendix A2.

The nearest hospitals to Chignik are:

1. Providence Kodiak Island Medical Center, Kodiak, AK 907-486-3281, 2-3 hours from Chignik (no hyperbaric facilities in Kodiak).
2. Alaska Regional Hospital Emergency Room, Anchorage, AK 907-276-1131 or 907-264-1222, 4-5 hours from Chignik (hyperbaric facilities are available in Anchorage).

## **HYPERBARIC (RECOMPRESSION) CHAMBERS**

A doctor must refer a patient for any hyperbaric chamber treatment. The nearest hyperbaric chamber to Chignik is located at the American Hyperbaric Center in Anchorage, AK 907-565-4600 or 907-357-5400 (Wasilla, AK).

## **FAMILY CONTACTS IN CASE OF DIVER EMERGENCY**

In any dive emergency or injury, the diver's family should be notified. Family contact information for each Chignik weir diver is on file with the LDSO and personnel office in Kodiak.

## **INCIDENT REPORTING**

All injuries, regardless of type or severity, must be reported to the employee's supervisor and an accident report form must be completed. All dive related injuries requiring recompression treatment or resulting in serious injury or death must be reported to the employee's supervisor, the LDSO, and the statewide Dive Safety Officer (DSO). The DSO or LDSO and the employee's supervisor shall investigate and document the incident, specifying the circumstances of the accident and the extent of injury/illness. The incident report must include a current State of Alaska Accident/Injury form, a description of symptoms, and the results of any treatment. The

report will be filed with the DSO following standard State of Alaska accident/injury reporting protocols. Complete reporting requirements are outlined in the Dive Safety Manual (Hebert 2006). If the injury is pressure related, an American Academy of Underwater Sciences (AAUS) Accident or Incident Report Form (Appendix A3) must be completed.

## **EQUIPMENT**

### **SCUBA EQUIPMENT**

Dive equipment will be operated and maintained in accordance with the ADF&G Dive Safety Manual (chapter II, section 3; Hebert 2006) and OSHA standards (OSHA 2003).

SCUBA regulators (first and second stages) must be inspected and tested by a factory-authorized technician prior to first use and a minimum of every 12 months thereafter. Compressed air cylinders must have internal visual inspections (IVP) at least every 12 months and have a dated IVP sticker attached to each tank. In addition, compressed air cylinders require hydrostatic testing by a qualified technician in accordance with U.S. Department of Transportation standards once every five years. Pressure and depth gauges must be inspected and tested before first use and every 12 months thereafter. A record of testing, inspections, and repairs will be maintained by the LDSO.

A pressure gauge will be attached to all SCUBA tanks when in use and a minimum cylinder pressure of 500 pounds per square inch (PSI) must be maintained. Buoyancy compensation devices (BCDs) are optional for Chignik weir divers. BCDs increase resistance to the current and may hinder performance of a diver unnecessarily. However, an inflatable vest capable of maintaining a diver at the surface in a face-up position, equipped with a manually activated inflation source independent of the breathing supply (e.g. CO<sub>2</sub> cartridge), an oral inflation device, and an exhaust valve must be worn whenever a BCD is not used (OSHA 1910.430; OSHA 2003).

### **BREATHABLE-AIR COMPRESSOR**

Only air compressor systems intended for breathable air will be used to fill SCUBA cylinders. Any person who fills tanks must first be trained in the use of the compressor by the LDSO or the lead diver in Chignik. Compressed air analyses must be performed on each department owned breathing air compressor at regular intervals of no more than 100 hours of operation or six months, whichever occurs first, or when the compressor is returned to service from storage. Air quality standards are listed in Table 2.

A maintenance log shall be maintained and attached to the compressor showing operation times, repairs, filter maintenance, air testing results, and temperature adjustments for the compressor. Only ADF&G SCUBA cylinders will be filled from the department's air compressor.

## **REFERENCES CITED**

Hebert, K. 2006. Dive Safety Manual. Alaska Department of Fish and Game, Special Publication No. 06-39, Anchorage.

OSHA Office of Publications. 2003. 29 CFR part 1910 Commercial Diving Operations. Department of Labor, 200 Constitution Avenue, NW, Washington D.C. [http://www.osha.gov/FedReg\\_osha\\_pdf/FED20030110.pdf](http://www.osha.gov/FedReg_osha_pdf/FED20030110.pdf).

## **TABLES**

Table 1.–Proposed 2013 Chignik weir dive schedule.

Dive Type	Dive Location	Number of Proposed Dives	Average/ Maximum Depth (ft.)	Bottom Time (mins./dive)	Time in Water (hrs./dive)
Weir Installation	Weir	3	4–15	40	2.5
Weir Removal	Weir	2	4–15	30	2.5
Weir Maintenance	Weir	6–12	4–15	15	1.0
Gear Recovery	Chignik River	As Needed	4–15	10	0.5

Table 2.–Compressed Gas Association Grade E air quality standards.

Component	Maximum
Oxygen	20–22 %/volume
Carbon Monoxide	10 parts per million/volume
Carbon Dioxide	500 parts per million/volume
Condensed Hydrocarbons	5 milligrams/meter <sup>3</sup>
Water Vapor	Not Specified
Objectionable Odors	None

## **APPENDIX A. MISC. DIVE INFORMATION**

Appendix A1.–Chignik weir checkout dive.

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Weir Divers should be able to demonstrate proficiency in the following skills during a checkout dive with the Local Dive Safety Officer (LDSO) or designee.

- Knowledge of department diving standards and regulations
- Pre-dive planning, briefing, site orientation, and buddy check
- Equipment familiarity
- Proper buddy contact
- Monitor cylinder pressure
- Weir dive skills:
  - Shoreline entry
  - Establish neutral buoyancy
  - Stand/balance on weir against current
  - Walk 25 feet along weir
  - Alternate between snorkel and SCUBA
  - Descend to bottom
  - Remove mask, replace, and clear
  - Remove regulator, recover, clear, and replace
  - Simulate weight belt jettison
  - Underwater swim/pull 25 feet along weir
  - Ascend from bottom, practicing safe ascent
  - Shoreline exit
- Rescue briefing:
  - Self-rescue techniques
  - Tows of conscious and unconscious victim
  - Simulated in-water rescue breathing
  - Rescue of submerged non-breathing diver (including equipment removal, simulated rescue breathing, towing, and recovery to boat or shore)
  - Rescue of submerged pinned diver
  - Use of emergency oxygen on breathing and non-breathing victim
  - Accident management and evacuation procedures

**Additional Training**

- Practice rescue of diver drifting downstream of weir (both self-rescue and with dive tender)
- Dive tender training
- Small boat handling

## **Introduction**

A diving accident victim could be any person who has been breathing compressed 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 department diver to understand the procedures for diving emergencies, including evacuation and medical treatment, prior to diving.

## **General Procedures**

Depending on and according to the nature of the diving accident, stabilize the patient, administer 100% oxygen, contact local Emergency Medical System (EMS) for transport to a medical facility, and contact a dive physician/recompression chamber as appropriate. 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.

1. Make appropriate contact with victim or rescue as required.
2. Establish (A)irway, (B)reathing, (C)irculation as required.
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.
5. Contact diving physician and recompression chamber as necessary.
6. Notify Dive Safety Officer (DSO) or designee.
7. Complete and submit Incident Report Form (Appendix A3) to ADF&G's Dive Safety Board and the AAUS.

## **List of Emergency Contacts:**

Chignik Lake Medical Clinic.....	907-845-2236 or VHF channel 6
Kodiak US Coast Guard Search and Rescue (flight surgeon).....	800-478-5555 or 907-487-5888
Alaska Regional Hospital Life Flight .....	800-478-9111 or 907-264-2318
Providence Kodiak Island Medical Center .....	907-486-3281
Alaska Regional Hospital Emergency Room.....	907-264-1222 or 907-276-1131
Hyperbaric Chamber Nursing Supervisor.....	907-264-1598
American Hyperbaric Center, Anchorage (hyperbaric chamber) .....	907-357-5400 or 907-565-4600
Divers Alert Network (DAN) 24-hour Emergency Line .....	919-684-8111
Peninsula Airways .....	907-845-2228 or 907-246-3372
Kyle Hebert (ADF&G Dive Safety Officer).....	907-465-4228
Todd Anderson (ADF&G Region IV Local Dive Safety Officer).....	907-845-2243 (Chignik)

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**DIVE ACCIDENT OR INCIDENT**

<b>21. DIVE PLATFORM</b> <input type="checkbox"/> A - Shore <input type="checkbox"/> B - Small boat <input type="checkbox"/> C - Research Vessel	<b>22. DIVE ACTIVITY</b> (up to 2 responses) <input type="checkbox"/> A - Collecting <input type="checkbox"/> B - Photography <input type="checkbox"/> C - Installing Equip. <input type="checkbox"/> D - Servicing Equip. <input type="checkbox"/> E - Observing <input type="checkbox"/> F - Under instruction <input type="checkbox"/> G - Providing instruction <input type="checkbox"/> H - Other _____	<b>23. ENVIRONMENT</b> <input type="checkbox"/> A - Freshwater <input type="checkbox"/> B - Saltwater	<b>24. ALTITUDE OF DIVE</b> <input type="checkbox"/> A - Sea Level! <input type="checkbox"/> B - > Sea Level! but <1000 ft <input type="checkbox"/> C - >1000 ft		
<b>25. Was this dive or dive series typical of your normal type of diving?</b> <input type="checkbox"/> Y - Yes IF NO, Explain _____ <input type="checkbox"/> N - No		<b>26. DIVER'S PERCEPTION OF TEMPERATURE</b> <input type="checkbox"/> A - Cold <input type="checkbox"/> B - Hot <input type="checkbox"/> C - Comfortable	<b>27. CURRENT STRENGTH</b> <input type="checkbox"/> A - Strong <input type="checkbox"/> B - Moderate <input type="checkbox"/> C - Mild <input type="checkbox"/> D - None		
<b>28. AIR SUPPLY</b> <input type="checkbox"/> A - Scuba Air <input type="checkbox"/> B - Surface Supply Air <input type="checkbox"/> C - Mixed gas <input type="checkbox"/> D - None/Breath-hold dive	<b>29. AIR CONSUMPTION</b> <input type="checkbox"/> A - Ran low <input type="checkbox"/> B - Out of air <input type="checkbox"/> C - Not a problem <input type="checkbox"/> D - Buddy breathing (not octopus)	<b>30. BUOYANCY PROBLEM</b> <input type="checkbox"/> Y - Yes <input type="checkbox"/> N - No	<b>31. RAPID ASCENT</b> <input type="checkbox"/> Y - Yes <input type="checkbox"/> N - No	<b>32. WITHIN LIMITS-Y or N</b> <input type="checkbox"/> Tables (which table _____) or <input type="checkbox"/> Computer (type _____)	<b>33. TYPE OF SUIT</b> <input type="checkbox"/> A - Wet <input type="checkbox"/> B - Partial Wet <input type="checkbox"/> C - Dry <input type="checkbox"/> D - Lycra <input type="checkbox"/> E - Swim
<b>34. EQUIPMENT USED ON DIVE:</b> (please check all that apply) <input type="checkbox"/> Depth gauge <input type="checkbox"/> Timing device/watch <input type="checkbox"/> Buoyancy vest <input type="checkbox"/> BC Inflator hose in use <input type="checkbox"/> Decompression computer	<b>35. EQUIPMENT MALFUNCTION:</b> <input type="checkbox"/> A - None <input type="checkbox"/> B - Regulator <input type="checkbox"/> C - BC Vest <input type="checkbox"/> D - Weight belt <input type="checkbox"/> E - Dry suit <input type="checkbox"/> F - DC Computer <input type="checkbox"/> G - Inflator hose <input type="checkbox"/> H - Contaminated air supply <input type="checkbox"/> I - Equipment was not familiar to you. <input type="checkbox"/> J - Other Reason: _____		<b>36. TYPE OF DIVE</b> <input type="checkbox"/> Y - Yes <input type="checkbox"/> N - No <input type="checkbox"/> Single <input type="checkbox"/> Repetitive	<b>37. WOMEN, PLEASE RESPOND</b> (up to 2 responses) When the accident occurred, were you: <input type="checkbox"/> A - Menstruating <input type="checkbox"/> B - On birth control medication <input type="checkbox"/> C - Pregnant <input type="checkbox"/> D - None of the above	
<b>38. DIVE LOCATION:</b> State, Province, or Island: _____ Country or nearest country: _____		<b>39. How long ago was your last Dive Trip/Series?</b> <input type="checkbox"/> Days <input type="checkbox"/> Weeks <input type="checkbox"/> Months Circle one:		<b>40. STRENUOUS EXERCISE</b> <input type="checkbox"/> Y - Yes <input type="checkbox"/> N - No <input type="checkbox"/> 24 hours pre-dive <input type="checkbox"/> During dive <input type="checkbox"/> 6 hours post-dive	
<b>41. PREDIVE HEALTH</b> <input type="checkbox"/> A - Nausea/vomiting <input type="checkbox"/> B - Hangover <input type="checkbox"/> C - Diarrhea <input type="checkbox"/> D - Other <input type="checkbox"/> E - No Problem	<b>42. ALCOHOL</b> Please check: <input type="checkbox"/> None    Number of drinks, beers, or wine: _____ <input type="checkbox"/> Night Before    _____ <input type="checkbox"/> Pre-dive    _____ <input type="checkbox"/> Between Dives    _____ <input type="checkbox"/> Post Dive    _____	<b>43. RECREATIONAL DRUG USE</b> Prior to, between, or after dive <input type="checkbox"/> Y - Yes <input type="checkbox"/> N - No	<b>44. Do you consider yourself physically fit?</b> <input type="checkbox"/> Y - Yes <input type="checkbox"/> N - No Do you exercise on a weekly basis? (Y or N) <input type="checkbox"/> # Days per week _____	<b>45. FATIGUE OR LACK OF SLEEP PRIOR TO DIVE?</b> <input type="checkbox"/> Y - Yes <input type="checkbox"/> N - No	

**46. DIVE SERIES**

Please fill in all that apply up to and including your last dive. If you skipped a day please leave that day blank

	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
Total # of dives	<input type="checkbox"/>						
Any night dive? (How many)	<input type="checkbox"/>						
Any symptoms? (Y or N)	<input type="checkbox"/>						
A - All no stop dive(s)	<input type="checkbox"/>						
E - Any safety stop	<input type="checkbox"/>						
C - Any dive requiring decompression stops	<input type="checkbox"/>						
A - Multilevel (time divided)	<input type="checkbox"/>						
B - Square	<input type="checkbox"/>						
Deepest Dive (ft.)	<input type="text"/>						

-continued-

**DIVE ACCIDENT OR INCIDENT (con't)**

**47. DIVE PROFILE FOR DAY OF DIVE ACCIDENT** Computer NDL For Next Dive

	1st DIVE	2nd DIVE	3rd DIVE
GROUP LETTER			
SURFAC INT (MIN)			
DEC STOPS (MIN)			
DEPTH (FT)			
BOTTOM TIME (MIN)			

  

	4th DIVE	5th DIVE	6th DIVE
GROUP LETTER			
SURFAC INT (MIN)			
DEC STOPS (MIN)			
DEPTH (FT)			
BOTTOM TIME (MIN)			

**PRE-CHAMBER INFORMATION**

**48. INITIAL CONTACT WAS:**

A - DAN Emergency  
 B - DAN Non-emergency  
 C - Hospital emergency room  
 D - Emergency medical service  
 E - US Coast Guard  
 F - Physician  
 G - Dive instructor/shop  
 H - Other: \_\_\_\_\_

**49. Total delay from symptom onset to contacting DAN or other medical help:**

HOURS   or DAYS

**50. FLYING OR INCREASED ELEVATION AFTER DIVING AND PRIOR TO TREATMENT?**

A - Commercial airliner  
 B - Unpressurized aircraft  
 C - Med Evac Flight  
 D - Mountain elevation  
 E - Does not apply

Hours post dive (flew or went into elevation)

elevation (in feet)

**51. SIGNS & SYMPTOMS**

1st Symptom <input type="checkbox"/>	A - Pain	R - Muscle twitching
2nd Symptom <input type="checkbox"/>	B - Rash	S - Convulsions
3rd Symptom <input type="checkbox"/>	C - Itching	T - Hearing loss
4th Symptom <input type="checkbox"/>	D - Weakness	U - Ringing ears
5th Symptom <input type="checkbox"/>	E - Numbness/Tingling	V - Decreased skin sensation
6th Symptom <input type="checkbox"/>	F - Dizziness/Vergo	W - Bladder problem
	G - Semi-consciousness	X - Bowel problem
	H - Unconsciousness	Y - Personality change
	I - Restlessness	Z - Difficulty walking
	J - Extreme fatigue	1 - Reflex change
	K - Visual disturbance	2 - Other: _____
	L - Speech disturbance	
	M - Headache	
	N - Paralysis	
	O - Difficulty breathing	
	P - Nausea/Vomiting	
	Q - Hemoptosis/coughing blood from lungs	

**52. LOCATION:** Block A = location of symptom  
 Then please check ( / )  
 L = Left R = Right B = Bilateral/Both Sides

1st Symptom <input type="checkbox"/>	A	L	R	B	A - Head	S - Abdomen
2nd Symptom <input type="checkbox"/>					B - Face	T - Buttock
3rd Symptom <input type="checkbox"/>					C - Sinus	U - Groin
4th Symptom <input type="checkbox"/>					D - Eyes	V - Hip
5th Symptom <input type="checkbox"/>					E - Ears	W - Entire leg
6th Symptom <input type="checkbox"/>					F - Neck	X - Thigh
					G - Shoulder	Y - Knee
					H - Entire arm	Z - Calf
					I - Upper arm	1 - Shin
					J - Elbow	2 - Ankle
					K - Forearm	3 - Foot
					L - Wrist	4 - Toes
					M - Hand	5 - Trunk
					N - Fingers	6 - Generalized
					O - Chest	7 - Other
					P - Back	
					R - Upper back	
					D - Lower back	

**53. SYMPTOM ONSET:**

	HOURS	MINUTES	or	BEFORE SURFACING FROM DIVE
1st Symptom	<input type="text"/>	<input type="text"/>		<input type="checkbox"/>
2nd Symptom	<input type="text"/>	<input type="text"/>		<input type="checkbox"/>
3rd Symptom	<input type="text"/>	<input type="text"/>		<input type="checkbox"/>
4th Symptom	<input type="text"/>	<input type="text"/>		<input type="checkbox"/>
5th Symptom	<input type="text"/>	<input type="text"/>		<input type="checkbox"/>
6th Symptom	<input type="text"/>	<input type="text"/>		<input type="checkbox"/>

**54. ANY OF THE SYMPTOMS FROM #51 PRIOR TO THE LAST DIVE?**

Y - Yes  
 N - No

If yes, which symptoms?

1st  Other

2nd  Explain \_\_\_\_\_

3rd  \_\_\_\_\_

4th

5th

6th

**55. FIRST AID ADMINISTERED BEFORE HOSPITAL OR CHAMBER HELP WAS RECEIVED?**

Y - Yes  
 N - No

Oxygen

Aspirin

Oral fluids

Head down position/Trendelenburg

If oxygen was received was delivery by

A - Demand valve  
 B - Freeflow valve  
 C - Don't know

-continued-

**PRE-CHAMBER INFORMATION (cont.)**

<p><b>56. HOSPITAL TREATMENT ADMINISTERED</b> (Please check all that apply):</p> <table style="width:100%;"> <tr> <td><input type="checkbox"/> None</td> <td><input type="checkbox"/> Steroids</td> </tr> <tr> <td><input type="checkbox"/> Oral fluids</td> <td><input type="checkbox"/> Anticoagulant</td> </tr> <tr> <td><input type="checkbox"/> IV fluids</td> <td><input type="checkbox"/> Asprin</td> </tr> <tr> <td><input type="checkbox"/> Oxygen</td> <td><input type="checkbox"/> Other medication</td> </tr> </table>	<input type="checkbox"/> None	<input type="checkbox"/> Steroids	<input type="checkbox"/> Oral fluids	<input type="checkbox"/> Anticoagulant	<input type="checkbox"/> IV fluids	<input type="checkbox"/> Asprin	<input type="checkbox"/> Oxygen	<input type="checkbox"/> Other medication	<p><b>57. RELIEF BEFORE CHAMBER TREATMENT?</b></p> <p><input type="checkbox"/> A - Complete  <input type="checkbox"/> B - Partial  <input type="checkbox"/> C - Temporary  <input type="checkbox"/> D - None</p>	<p><b>58. IF ANY RELIEF OCCURRED, WHICH SYMPTOMS FROM #51 ABOVE?</b> (Please check):</p> <p>1st: <input type="checkbox"/>          2nd: <input type="checkbox"/>          3rd: <input type="checkbox"/>          4th: <input type="checkbox"/>          5th: <input type="checkbox"/>          6th: <input type="checkbox"/></p>
<input type="checkbox"/> None	<input type="checkbox"/> Steroids									
<input type="checkbox"/> Oral fluids	<input type="checkbox"/> Anticoagulant									
<input type="checkbox"/> IV fluids	<input type="checkbox"/> Asprin									
<input type="checkbox"/> Oxygen	<input type="checkbox"/> Other medication									
<p><b>59. PRE-CHAMBER RELIEF OCCURRED:</b></p> <p><input type="checkbox"/> A - Without first aid or medical care  <input type="checkbox"/> B - Following first aid  <input type="checkbox"/> C - Following pre-chamber hospital care  <input type="checkbox"/> D - No relief occurred</p>										

**CHAMBER TREATMENT**

<p><b>60. CHAMBER TREATMENT FACILITY LOCATION</b></p> <p style="text-align: center;">CITY</p> <p>STATE                      COUNTRY</p> <p>Date &amp; Time of Treatment</p> <p>MONTH/DAY/YEAR                      Time                      AM PM</p> <p>Name of hyperbaric facility</p> <p>Treating doctor</p> <p>Form Completed By</p>	<p><b>61. TYPE OF CHAMBER</b> (please check)</p> <table style="width:100%;"> <tr> <td>Initial Treatment</td> <td>Retreatment Chamber</td> </tr> <tr> <td><input type="checkbox"/> Monoplace</td> <td><input type="checkbox"/> Monoplace</td> </tr> <tr> <td><input type="checkbox"/> Dualplace</td> <td><input type="checkbox"/> Dualplace</td> </tr> <tr> <td><input type="checkbox"/> Multiplace</td> <td><input type="checkbox"/> Multiplace</td> </tr> <tr> <td><input type="checkbox"/> No chamber treatment given</td> <td></td> </tr> </table>	Initial Treatment	Retreatment Chamber	<input type="checkbox"/> Monoplace	<input type="checkbox"/> Monoplace	<input type="checkbox"/> Dualplace	<input type="checkbox"/> Dualplace	<input type="checkbox"/> Multiplace	<input type="checkbox"/> Multiplace	<input type="checkbox"/> No chamber treatment given		<p><b>62. TOTAL DELAY FROM SYMPTOM ONSET TO RECOMPRESSION</b></p> <p>HOURS                      or                      DAYS</p>
Initial Treatment	Retreatment Chamber											
<input type="checkbox"/> Monoplace	<input type="checkbox"/> Monoplace											
<input type="checkbox"/> Dualplace	<input type="checkbox"/> Dualplace											
<input type="checkbox"/> Multiplace	<input type="checkbox"/> Multiplace											
<input type="checkbox"/> No chamber treatment given												
<p><b>66. RETREATMENT GIVEN</b> (Provide up to 3 responses)</p> <table style="width:100%;"> <tr> <td>TABLE</td> <td>NUMBER OF TREATMENTS</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table> <p>A - USN TT4          B - USN TT5          C - USN TT6          D - USN TT6A          E - HART Protocol          F - KINDWALL Protocol          G - 45 fsw 90 min          H - 33 fsw 120 min          I - Other</p>	TABLE	NUMBER OF TREATMENTS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<p><b>67. RELIEF AFTER HYPERBARIC THERAPY COMPLETED?</b></p> <p><input type="checkbox"/> A - Complete  <input type="checkbox"/> B - Partial  <input type="checkbox"/> C - Temporary  <input type="checkbox"/> D - Hyperbaric therapy not completed  <input type="checkbox"/> E - None</p>	<p><b>63. INITIAL TREATMENT</b></p> <p><input type="checkbox"/> A - USN TT4  <input type="checkbox"/> B - USN TT5  <input type="checkbox"/> C - USN TT6  <input type="checkbox"/> D - USN TT6A  <input type="checkbox"/> E - HART Protocol  <input type="checkbox"/> F - KINDWALL Protocol  <input type="checkbox"/> G - 45 fsw 90 min  <input type="checkbox"/> H - 33 fsw 120 min  <input type="checkbox"/> I - Other</p>		
TABLE	NUMBER OF TREATMENTS											
<input type="checkbox"/>	<input type="checkbox"/>											
<input type="checkbox"/>	<input type="checkbox"/>											
<input type="checkbox"/>	<input type="checkbox"/>											
<p><b>69. DURATION OF RESIDUAL SYMPTOMS</b></p> <p>(Circle one)</p> <p><input type="checkbox"/> DAYS  <input type="checkbox"/> WEEKS  <input type="checkbox"/> MONTHS</p>	<p><b>68. RESIDUAL SYMPTOMS AFTER HYPERBARIC THERAPY COMPLETED?</b></p> <p><input type="checkbox"/> A - Pain only  <input type="checkbox"/> B - Neurologic  <input type="checkbox"/> C - Hyperbaric therapy not completed  <input type="checkbox"/> D - None</p>	<p><b>64. TABLE EXTENSIONS REQUIRED?</b></p> <p><input type="checkbox"/> Y - Yes  <input type="checkbox"/> N - No</p>										
		<p><b>65. RELIEF AFTER INITIAL TREATMENT OF SYMPTOMS FROM # 51?</b></p> <p>1st: <input type="checkbox"/>          2nd: <input type="checkbox"/>          3rd: <input type="checkbox"/>          4th: <input type="checkbox"/>          5th: <input type="checkbox"/>          6th: <input type="checkbox"/></p> <p>Please indicate:          A - Complete          B - Partial          C - Temporary          D - None</p>										
	<p><b>70. FINAL DIAGNOSIS:</b></p> <p><input type="checkbox"/> A - DCS I  <input type="checkbox"/> B - DCS II  <input type="checkbox"/> C - Air Embolism  <input type="checkbox"/> D - Pulmonary Barotrauma  <input type="checkbox"/> O - Other</p>											