Chignik Weir SCUBA Diving Operational Plan, 2010

by

Todd J. Anderson

April 2010

Alaska Department of Fish and Game **Divisions of Sport Fish and Commercial Fisheries**

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Weights and measures (metric)

centimeter	cm
deciliter	dL
gram	g
hectare	ha
kilogram	kg
kilometer	km
liter	L
meter	m
milliliter	mL
millimeter	mm

Weights and measures (English)

cubic feet per second	ft^3/s
foot	ft
gallon	gal
inch	in
mile	mi
nautical mile	nmi
ounce	oz
pound	lb
quart	qt
yard	yd

Time and temperature

day	d
degrees Celsius	°C
degrees Fahrenheit	°F
degrees kelvin	K
hour	h
minute	min
second	s

Physics and chemistry

all atomic symbols	
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

General

Alaska Administrative Code	AAC
all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.
all commonly accepted professional titles	e.g., Dr., Ph.D., R.N., etc.
at	@
compass directions:	
east	E
north	N
south	S
west	W
copyright	©
corporate suffixes:	
Company	Co.
Corporation	Corp.
Incorporated	Inc.
Limited	Ltd.
District of Columbia	D.C.
et alii (and others)	et al.
et cetera (and so forth)	etc.
exempli gratia (for example)	e.g.
Federal Information Code	FIC
id est (that is)	i.e.
latitude or longitude	lat. or long.
monetary symbols (U.S.)	$, ¢
months (tables and figures): first three letters	Jan,...,Dec
registered trademark	®
trademark	™
United States (adjective)	U.S.
United States of America (noun)	USA
U.S.C.	United States Code
U.S. state	use two-letter abbreviations (e.g., AK, WA)

Measures (fisheries)

fork length	FL
mideye to fork	MEF
mideye to tail fork	METF
standard length	SL
total length	TL

Mathematics, statistics

all standard mathematical signs, symbols and abbreviations	
alternate hypothesis	H_A
base of natural logarithm	*e*
catch per unit effort	CPUE
coefficient of variation	CV
common test statistics	(F, t, χ^2, etc.)
confidence interval	CI
correlation coefficient (multiple)	R
correlation coefficient (simple)	r
covariance	cov
degree (angular)	°
degrees of freedom	df
expected value	*E*
greater than	>
greater than or equal to	≥
harvest per unit effort	HPUE
less than	<
less than or equal to	≤
logarithm (natural)	ln
logarithm (base 10)	log
logarithm (specify base)	$log_{2,}$ etc.
minute (angular)	'
not significant	NS
null hypothesis	H_O
percent	%
probability	P
probability of a type I error (rejection of the null hypothesis when true)	α
probability of a type II error (acceptance of the null hypothesis when false)	β
second (angular)	"
standard deviation	SD
standard error	SE
variance	
population	Var
sample	var

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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 2-15 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, devices, 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. Chad Bear, the Fish and Wildlife Technician III stationed in Chignik, will serve as the lead diver at the Chignik weir and will be assisted by the incumbent selected for the Assistant Area Management Biologist position. 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 2010 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 judgement, 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 1-800-478-5555 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 (1-800-478-9111 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) 264-1222 or (907) 276-1131, 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) 357-5400 or (907) 565-4600.

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 there after. 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_2 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.

TABLES

Table 1.–Proposed 2010 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	12	4 - 15	40	2.5
Weir Removal	Weir	4	4 - 15	30	2.5
Weir Maintenance	Weir	15-20	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^3
Water Vapor	Not Specified
Objectionable Odors	None

APPENDIX A: MISC. DIVE INFORMATION

Appendix A1.–Chignik weir checkout dive.

‘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

-continued-

__ 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

Appendix A2.–Diving emergency management procedures.

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)

Appendix A3.–American Academy of Underwater Sciences, Accident or Incident Reporting Form.

AMERICAN ACADEMY OF UNDERWATER SCIENCES

ACCIDENT OR INCIDENT REPORTING FORM

DATE & TIME OF ACCIDENT
MONTH/DAY/YEAR
Time _____ AM PM

IS THIS A FATALITY REPORT? ☐ YES ☐ NO
If yes, complete Fatality Report Form.

1. PATIENT NAME LAST FIRST MI

2. OCCUPATION

3. ADDRESS STREET CITY ST ZIP

4. PATIENT PHONE (HOME) - -

5. PATIENT PHONE (WORK) - -

6. COUNTRY (IF NOT USA)

7. AGE YRS

8. SEX M or F

9. HEIGHT FT IN

10. WEIGHT LBS.

11. HOME INSTITUTION

12. CERTIFIED DEPTH

13. DAN MEMBER?
Y - Yes
N - No

14. YEARS DIVING YEARS MONTHS

15. NUMBER OF DIVES MADE
Total
Previous 12 months

16. PREVIOUS DIVE ACCIDENTS
A - Possible DCS
B - DCS
C - AGE
D - Pul. barotrauma
E - None

17. CURRENT MEDICATIONS Y or N
Prescription
Non-prescription
List

18. CIGARETTE USE
A - Presently
B - In past
C - Never
Years Smoking
Packs per day

19. PREVIOUS MAJOR ILLNESSES/ SURGERY
(Provide up to 3 responses)
A - Chest-lung
B - Asthma
C - Chest-heart
D - Gastrointestinal/Abdomen
E - Brain
F - Spine/Back
G - Limb or joint of DCS site
H - Circulation/Blood
I - Neurologic/Nervous system
J - Muscle/Skeleton system
K - Eye
L - Mental/Emotional
M - Other _____
N - None

Past:
A - 2-6 months
B - 7-12 months
C - 1-3 years
D - 2-5 years
E - 6+ years

List and describe specific problems.

20. CURRENT HEALTH PROBLEMS WITHIN PREVIOUS 2 MONTH
(Provide up to 3 responses)
A - Chest-lung
B - Asthma
C - Chest-heart
D - Gastrointestinal/Abdomen
E - Brain
F - Spine/Back
G - Limb or joint of DCS site
H - Circulation/Blood
I - Neurologic/Nervous system
J - Muscle/Skeleton system
K - Eye
L - Mental/Emotional
M - Other _____
N - None

List and describe specific problems or additional current medications

ATTACH A WRITTEN REPORT DESCRIBING THE ACCIDENT OR INCIDENT

-continued-

DIVE ACCIDENT OR INCIDENT

21. DIVE PLATFORM
A - Shore
B - Small boat
C - Research Vessel

22. DIVE ACTIVITY (up to 2 responses)
A - Collecting
B - Photography
C - Installing Equip.
D - Servicing Equip.
E - Observing
F - Under instruction
G - Providing instruction
H - Other_____

23. ENVIRONMENT
A - Freshwater
B - Saltwater

24. ALTITUDE OF DIVE
A - Sea Level
B - > Sea Level but < 1000 ft
C - > 1000 ft.

25. Was this dive or dive series typical of your normal type of diving?
Y - Yes
N - No
IF NO, Explain_____

26. DIVER'S PERCEPTION OF TEMPERATURE
A - Cold
B - Hot
C - Comfortable

27. CURRENT STRENGTH
A - Strong
B - Moderate
C - Mild
D - None

28. AIR SUPPLY
A - Scuba Air
B - Surface Supply Air
C - Mixed gas
D - None/Breath-hold dive

29. AIR CONSUMPTION
A - Ran low
B - Out of air
C - Not a problem
D - Buddy breathing (not octopus)

30. BUOYANCY PROBLEM
Y - Yes
N - No

31. RAPID ASCENT
Y - Yes
N - No

32. WITHIN LIMITS-Y or N
Tables (which table_____)
or
Computer (type_____)

33. TYPE OF SUIT
A - Wet
B - Partial Wet
C - Dry
D - Lycra
E - Swim

34. EQUIPMENT USED ON DIVE: (please check all that apply)
Depth gauge
Timing device/watch
Buoyancy vest
BC Inflator hose in use
Decompression computer

35. EQUIPMENT MALFUNCTION:
A - None
B - Regulator
C - BC Vest
D - Weight belt
E - Dry suit
F - DC Computer
G - Inflator hose
H - Contaminated air supply
I - Equipment was not familiar to you.
J - Other
Reason:_____

36. TYPE OF DIVE
Y - Yes
N - No
Single
Repetitive

37. WOMEN, PLEASE RESPOND (up to 2 responses)
When the accident occurred, were you:
A - Menstruating
B - On birth control medication
C - Pregnant
D None of the above

38. DIVE LOCATION:
State, Province, or Island:_____
Country or nearest country:_____

39. How long ago was your last Dive Trip/Series?
Circle one:
Days Weeks Months

40. STRENUOUS EXCERCISE
Y - Yes
N - No
24 hours predive
During dive
6 hours postdive

41. PREDIVE HEALTH
A - Nausea/vomiting
B - Hangover
C - Diarrhea
D - Other
E - No Problem

42. ALCOHOL
Please check: Number of drinks, beers, or wine
None
Night Before
Predive
Between Dives
Post Dive

43. RECREATIONAL DRUG USE
Prior to, between, or after dive
Y - Yes
N - No

44. Do you consider yourself physically fit?
Y - Yes
N - No
Do you excercise on a weekly basis? (Y or N)
Days per week

45. FATIGUE OR LACK OF SLEEP PRIOR TO DIVE?
Y - Yes
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							
Any night dive? (How many)							
Any symptoms? (Y or N)							
A - All no stop dive(s) B - Any safety stop C - Any dive requiring decompression stops							
A - Multilevel (time divided) B - Square							
Deepest Dive (ft.)							

-continued-

DIVE ACCIDENT OR INCIDENT (con't)

47. DIVE PROFILE FOR DAY OF DIVE ACCIDENT

Computer NDL For Next Dive ___/___ Depth Time

	1st DIVE	2nd DIVE	3rd DIVE
GROUP LETTER			
SURFAC INT (MIN)			
DEC STOPS (MIN)	10' 20' 30'	10' 20' 30'	10' 20' 30'
DEPTH (FT)			
BOTTOM TIME (MIN)			

Computer NDL ___/___ Depth Time

	4th DIVE	5th DIVE	6th DIVE
GROUP LETTER			
SURFAC INT (MIN)			
DEC STOPS (MIN)	10' 20' 30'	10' 20' 30'	10' 20' 30'
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 & SYMPTONS

1st Symptom, 2nd Symptom, 3rd Symptom, 4th Symptom, 5th Symptom, 6th Symptom

- A - Pain
- B - Rash
- C - Itching
- D - Weakness
- E - Numbness/Tingling
- F - Dizziness/Vertigo
- G - Semi-consciousness
- H - Unconsciousness
- I - Restlessness
- J - Extreme fatigue
- K - Visual disturbance
- L - Speech disturbance
- M - **Headache**
- N - Paralysis
- O - Difficulty breathing
- P - Nausea/Vomiting
- Q - Hemoptosis/coughing blood from lungs
- R - Muscle twitching
- S - Convulsions
- T - Hearing loss
- U - Ringing ears
- V - Decreased skin sensation
- W - Bladder problem
- X - Bowel problem
- Y - Personality change
- Z - Difficulty walking standing
- 1 - Reflex change
- 2 - Other: _____

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

	A	L	R	B
1st Symptom				
2nd Symptom				
3rd Symptom				
4th Symptom				
5th Symptom				
6th Symptom				

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

53. SYMPTOM ONSET:

	HOURS	MINUTES	or	BEFORE SURFACING FROM DIVE
1st Symptom				
2nd Symptom				
3rd Symptom				
4th Symptom				
5th Symptom				
6th Symptom				

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

- Y - Yes
- N - No

If yes, which symptoms?

1st, 2nd, 3rd, 4th, 5th, 6th

Other

Explain _____

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.)

56. HOSPITAL TREATMENT ADMINISTERED

(Please check all that apply):

- ☐ None
- ☐ Oral fluids
- ☐ IV fluids
- ☐ Oxygen
- ☐ Steroids
- ☐ Anticoagulant
- ☐ Aspirin
- ☐ Other medication

_____

_____

57. RELIEF BEFORE CHAMBER TREATMENT?

☐
A - Complete
B - Partial
C - Temporary
D - None

58. IF ANY RELIEF OCCURRED, WHICH SYMPTOMS FROM #51 ABOVE?

(Please check):

- 1st ☐
- 2nd ☐
- 3rd ☐
- 4th ☐
- 5th ☐
- 6th ☐

59. PRE-CHAMBER RELIEF OCCURRED:

☐
A - Without first aid or medical care
B - Following first aid
C - Following pre-chamber hospital care
D - No relief occurred

CHAMBER TREATMENT

60. CHAMBER TREATMENT FACILITY LOCATION

CITY

STATE COUNTRY

Date & Time of Treatment

MONTH/DAY/YEAR

Time _____ AM PM

Name of hyperbaric facility

Treating doctor

Form Completed By

_____

61. TYPE OF CHAMBER

(please check)

Initial Treatment	Retreatment Chamber
☐ Monoplace	☐ Monoplace
☐ Dualplace	☐ Dualplace
☐ Multiplace	☐ Multiplace
☐ No chamber treatment given	

62. TOTAL DELAY FROM SYMPTOM ONSET TO RECOMPRESSION

HOURS or DAYS

63. INITIAL TREATMENT

☐
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

_____

_____

64. TABLE EXTENSIONS REQUIRED?

☐
Y - Yes
N - No

65. RELIEF AFTER INITIAL TREATMENT OF SYMPTOMS FROM # 51?

- 1st ☐
- 2nd ☐
- 3rd ☐
- 4th ☐
- 5th ☐
- 6th ☐

Please indicate:
A - Complete
B - Partial
C - Temporary
D - None

66. RETREATMENT GIVEN

(Provide up to 3 responses)

TABLE	NUMBER OF TREATMENTS
☐	
☐	
☐	

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

_____

67. RELIEF AFTER HYPERBARIC THERAPY COMPLETED?

☐
A - Complete
B - Partial
C - Temporary
D - Hyperbaric therapy not completed
E - None

68. RESIDUAL SYMPTOMS AFTER HYPERBARIC THERAPY COMPLETED?

☐
A - Pain only
B - Neurologic
C - Hyperbaric therapy not completed
D - None

69. DURATION OF RESIDUAL SYMPTOMS

(Circle one)

☐

DAYS

WEEKS

MONTHS

70. FINAL DIAGNOSIS:

☐
A - DCS I
B - DCS II
C - Air Embolism
D - Pulmonary Barotrauma
O - Other

_____

_____

_____