UNION CENTER FIRE COMPANY, INC.

ON-SCENE REHABILITATION PROGRAM FOR EMERGENCY INCIDENTS AND TRAINING EXERCISES

Program Operational Manual
Updated March 2013

UNION CENTER FIRE COMPANY, INC.
POLICY & PROCEDURE
SUBJECT: REHABILITATION AT EMERGENCY INCIDENTS & TRAININGS
EFFECTIVE DATE: 11-22-2008
REVISED: 03-25-2013
NUMBER: 2008-05

1.0 PURPOSE:

To ensure that the physical and mental condition of personnel operating at the scene of an emergency or training exercise does not deteriorate to a point that it negatively affects the health and safety of that responder or of fellow crew responders, or jeopardizes the safety and integrity of the emergency operation in which they are participating.

2.0 SCOPE:

This procedure shall apply to all emergency operations and training exercises where strenuous physical activity and/or exposure to heat or cold occurs.

3.0 RESPONSIBILITIES:

3.1. INCIDENT COMMANDER: The Incident Commander shall consider the circumstances of each incident and make adequate provisions early in the incident for the rehabilitation of all personnel operating at the scene. When warranted, the Incident Commander shall designate a Rehabilitation Unit Leader and establish a Rehabilitation Unit, and in consultation with the Rehabilitation Unit Leader shall identify the most suitable location for it.

3.2. REHABILITATION UNIT LEADER: The Rehabilitation Unit Leader shall be selected from among Med Team or Fire Company Officers, or qualified EMS personnel. The Rehabilitation Unit Leader's responsibilities shall include: wearing of the “Rehabilitation Officer” vest; recommending the location of the Rehabilitation Unit to the Incident Commander; securing and providing the necessary resources for rehabilitation; maintaining accountability; remaining with the Rehabilitation Unit at all times; and directing the operations of the Fire, EMS, and support personnel assigned to the Unit.

3.3. OFFICERS: All officers shall maintain an awareness of the condition of each crew responder operating within their span of control, and ensure that adequate steps are taken to provide for each responder's safety and health, including monitoring for signs of heat stress. The command structure shall be utilized to request relief and the reassignment of fatigued crews. Officers shall ensure that their crews report the Rehabilitation Unit at the proper intervals, and are properly checked in with the Rehabilitation Unit Leader.

3.4. PERSONNEL OPERATING ON SCENE: During an emergency incident or training evolution, all personnel operating on scene shall be encouraged to drink water and sports drinks, as appropriate to the duration of incident. All personnel shall advise their supervisor when they believe that their level of fatigue or exposure to heat or cold is approaching a level that could adversely affect themselves, their crew, or the operation in which they are involved. Personnel shall also remain aware of the health and safety of the other responders of their crew, and promptly inform their officer when crew responders require rehabilitation or relief from assigned duties.

3.5. REHABILITATION UNIT PERSONNEL: The Rehabilitation Unit shall consist of the Rehabilitation Unit Leader, non-firefighting fire department personnel, and any other EMS personnel assigned by Incident Command. Rehabilitation Unit Personnel shall report directly to the Rehabilitation Unit Leader. Their responsibilities shall include: checking incident personnel into, and tracking their progress through the Unit; measuring vital signs, blood

oxygen saturation and carboxyhemoglobin levels; monitoring for heat stress and other medical issues; and initiating emergency medical treatment and requesting transportation to hospital for personnel when this is indicated. Rehabilitation Unit Personnel shall inform the Rehabilitation Unit Leader when personnel require an extended period of rehabilitation, or emergency medical treatment and/or transportation to a hospital.

4.0 ESTABLISHMENT OF REHABILITATION UNIT:

The Incident Commander will establish a Rehabilitation Unit, and designate a Rehabilitation Unit Leader when conditions indicate that rest and rehabilitation are needed for personnel operating at an incident scene or training evolution. Rehabilitation should be considered during the initial planning stages of an emergency response or drill. However, the climatic or environmental conditions should not be the sole justification for establishing a rehabilitation area. Any activity/incident that is large in size, long in duration, and/or labor intensive will rapidly deplete the energy and strength of personnel and therefore merits consideration for rehabilitation.

4.1. LOCATION: The Incident Commander or Rehabilitation Unit Leader shall designate the location of the Rehabilitation Unit based on the following site characteristics, and shall determine whether the inflatable rehabilitation shelter is to be erected for this purpose, or whether a suitable building or alternative location is available that would be more suitable, given the particular circumstances of the incident:

4.1.1. It should be sufficiently removed from the operation such that personnel may safely remove their turnout gear and SCBA and receive some relief from the intense sights and sounds of the incident, yet, whenever possible, close enough to avoid the need for personnel to walk and excessive distance to reach it.

4.1.2. It should provide suitable protection from the prevailing environmental conditions. During hot weather, it should provide a cool, shaded area. During cold weather, it should provide a warm, dry area.

4.1.3. It should be free of exhaust fumes from apparatus, vehicles, or equipment (including those operating in the Rehabilitation Unit).

4.1.4. It should be large enough to accommodate multiple crews, based on the size of the incident.

4.1.5. It should be easily accessible by EMS units for support and transport.

4.1.6. It should be located away from spectators and media whenever possible.

4.2. RESOURCES: The Rehabilitation Unit Leader (or Logistics Chief in larger incidents) shall secure all necessary resources required to adequately staff and supply the Rehabilitation Unit. The supplies may include those listed below:

4.2.1. Fluids -- water, sports drinks, warms beverages, ice.

4.2.2. Food – crackers; energy bars; or soup, broth, or stew in hot/cold cups.

4.2.3. Cooling – misting fan, water and ice supply, and chairs for active cooling by forearm immersion.

4.2.4. Medical – Masimo Rad 57® pulse carboximeter, blood pressure cuffs and stethoscopes, oxygen administration devices, thermometers, automated external defibrillator (AED), and forms for appropriate records keeping.

4.2.5. Clothing -- dry firefighting gloves and hoods, shirts, winter hats.

4.2.6. Other -- shelter, fans, tarps, electrical supply lighting, etc.

4.2.7. Mutual aid -- additional staffing and vehicles as needed, through Command.

5.0 PROCEDURES/OBJECTIVES:

5.1. COOLING: A primary goal of rehabilitation should be the restoration of each responder's core body temperature. The most effective method of doing so is active cooling through forearm/hand immersion for at least 10 minutes. If equipment is available, this is the preferred method of cooling. Other methods involve passive cooling through hydration, removal of turnout gear, exposure to the misting fan, and rest.

5.2. HYDRATION: A critical factor in the prevention of heat injury is the maintenance of water and electrolytes. Fluids must be replaced during training and emergency incidents. Personnel should rehydrate with a minimum of eight ounces of fluid while their first SCBA cylinders are being changed. During heat stress, personnel should consume at least one quart of water per hour. After the first hour of strenuous activity, a commercially prepared sports drink should be consumed at about 40^{o}F. Rehydration is important even during cold weather operations, where, despite the outside temperature, heat stress may occur during firefighting or other strenuous activity when protective equipment is worn. Alcoholic, caffeinated, and carbonated beverages should be avoided before and during heat stress, because both interfere with the body's water conservation mechanisms.

5.3. NOURISHMENT: The Rehabilitation Unit may provide food at the scene of an extended incident when units are engaged for three or more hours. Energy bars and/or commercially-packaged cheese or peanut butter crackers may be initially used. A cup of soup, broth, or stew is highly recommended because it is digested much faster then sandwiches and fast-food products. In addition, foods such as apples, oranges, and bananas provide supplemental forms of energy replacement.

5.4. REST: Following the consumption of two 30-minute air bottles, or 45 minutes of work time without SCBA (e.g. grass fires or exterior overhaul), crews shall report for mandatory rehabilitation. These personnel shall be immediately placed in the rehabilitation area for rest and evaluation. In all cases, the objective evaluation of a responder’s fatigue level shall be the criteria for rehabilitation time. Rest shall not be less than ten minutes, and may exceed an hour as determined by the Rehabilitation Unit Leader. If needed, this may be accompanied by at least 10 minutes of active cooling. Crews shall not be released from the Rehabilitation Unit until they are adequately rested, evaluated, and/or released by the Rehabilitation Unit Leader.

5.5. RECOVERY: Personnel in the rehabilitation area should maintain a high level of hydration. They should not be moved from a hot environment directly into an air conditioned area because the body's cooling system can shut down in response to the external cooling. An air-conditioned environment is acceptable after cool-down period at ambient temperature with sufficient air movement. Certain drugs impair the body's ability to sweat, and extreme caution must be exercised if the responder has taken antihistamines such as Actifed or Benadryl, or has taken diuretics or stimulants.

5.6. MEDICAL EVALUATION: EMS should be provided and staffed by the most highly trained and qualified personnel on the scene. They shall examine and evaluate personnel, and make proper disposition (return to duty, continued rehabilitation, or medical treatment and transport to medical facility). Continued rehabilitation should consist of additional monitoring, providing rest, and providing fluids for rehydration. EMS personnel shall be assertive in an effort to find potential medical problems early, and shall assess the following vital signs of all personnel entering the Rehabilitation Unit:

5.6.1. Heart (Pulse) Rate -- The heart rate should be measured for 30 seconds as early as possible in the rest period. If a responder's heart rate exceeds **110 beats per minute**, a temporal temperature should be taken.

5.6.2. Blood Pressure – While there are no absolute criteria for fitness for returning to service, the Regional Emergency Medical Advisory Committee has established **160 mm hg** as the **maximum systolic,** and **100 mm hg** as the **maximum diastolic** blood pressures for this purpose. Significantly abnormal readings should be evaluated in the context of other physical signs and/or symptoms.

5.6.3. Temperature -- If the responder's temperature exceeds **100.6^{o}F** he/she should not be permitted to wear protective equipment. If it is below 100.6^{o}F and the heart rate remains above 110 beats / minute, rehabilitation time should be increased. If the heart rate is less than 110 beats / minute, the likelihood of heat stress is low.

5.6.4. Blood oxygen saturation and carboxyhemoglobin levels -- The responder's carbon monoxide (CO) blood saturation should be measured using the Masimo Rad 57® pulse carboximeter. Any responder whose COHb level **equals or exceeds 5%** shall not be released from rehabilitation. Conversely, a responder whose COHb level is below 5% may be released from rehabilitation if he or she otherwise meets the standards for release.

5.7. DOCUMENTATION: All medical evaluations shall be recorded on standard forms, along with the responder's name and complaints, and should be signed, dated, and timed by the Rehabilitation Unit Leader or his/her designee.

6.0 WHO MUST REPORT TO THE REHABILITATION UNIT:

6.1. WORKING INCIDENTS: Upon completion of an assignment in the hot zone, personnel shall report to the Rehabilitation Unit prior to requesting or undertaking additional assignments. The crew shall first obtain their entry tags from the Accountability Officer, and then report to the Rehabilitation Unit Leader or his/her designee. Crew responders shall undergo a mandatory rest and recovery period if they have used two full 30-minute air cylinders, if they have worked 45 minutes, or if command staff, a company officer, or a senior responder in charge of a crew directs the crew responders to do so. Personnel shall not report back to the manpower pool unless they have been evaluated and released by the Rehabilitation Unit.

6.2. LIVE FIRE TRAININGS: The above standards for working incidents shall apply to live fire trainings with the following exception: all working crews shall report to the Rehabilitation Unit upon completion of a working evolution, rather than after two full 30-minute air cylinders or 45 minutes of work time.

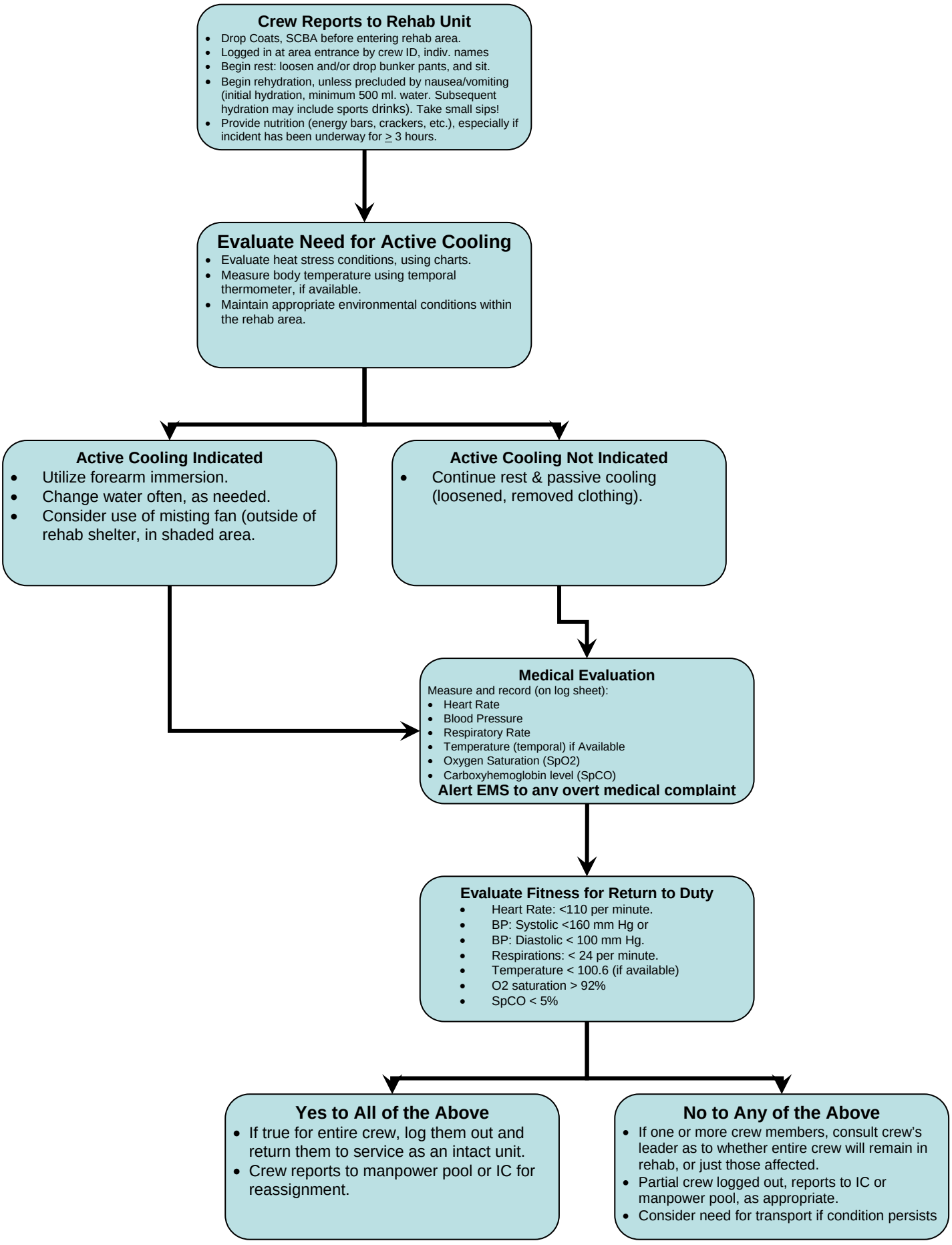
6.3. OTHER TRAININGS AND ACTIVITIES: The need to establish a Rehabilitation Unit will be determined by the Training Officer and Command staff prior to commencement of non-live-fire trainings or activities. Factors that may influence the determination include environmental conditions, tasks performed, use of SCBA, and duration of training. If a Rehabilitation Unit is required for the training activities, the objective evaluation of a participant's fatigue level shall be the criterion for a mandatory rest and recovery period. Upon completion of a training evolution, or after a maximum of 45 minutes of working time, all personnel will be evaluated for a mandatory rest and recovery period by Rehabilitation Unit Personnel, Officers, or Command staff. Any personnel requiring a rest and recovery period will be evaluated by Rehabilitation Unit Personnel staff before resuming participation in the training session.

7.0 ACCOUNTABILITY:

Personnel reporting to the Rehabilitation Unit shall enter and exit as a crew. If a crew responder is taken out of service, this shall be conveyed to Command. The remaining crew responders shall report to the manpower pool for their next assignment. Crews shall not leave the Rehabilitation Unit until authorized to do so by the Rehabilitation Unit Leader, or designee.

UNION CENTER FIRE CO., INC.

Process Flow within Rehabilitation Unit



Heat Stress Index

HUMIDITY

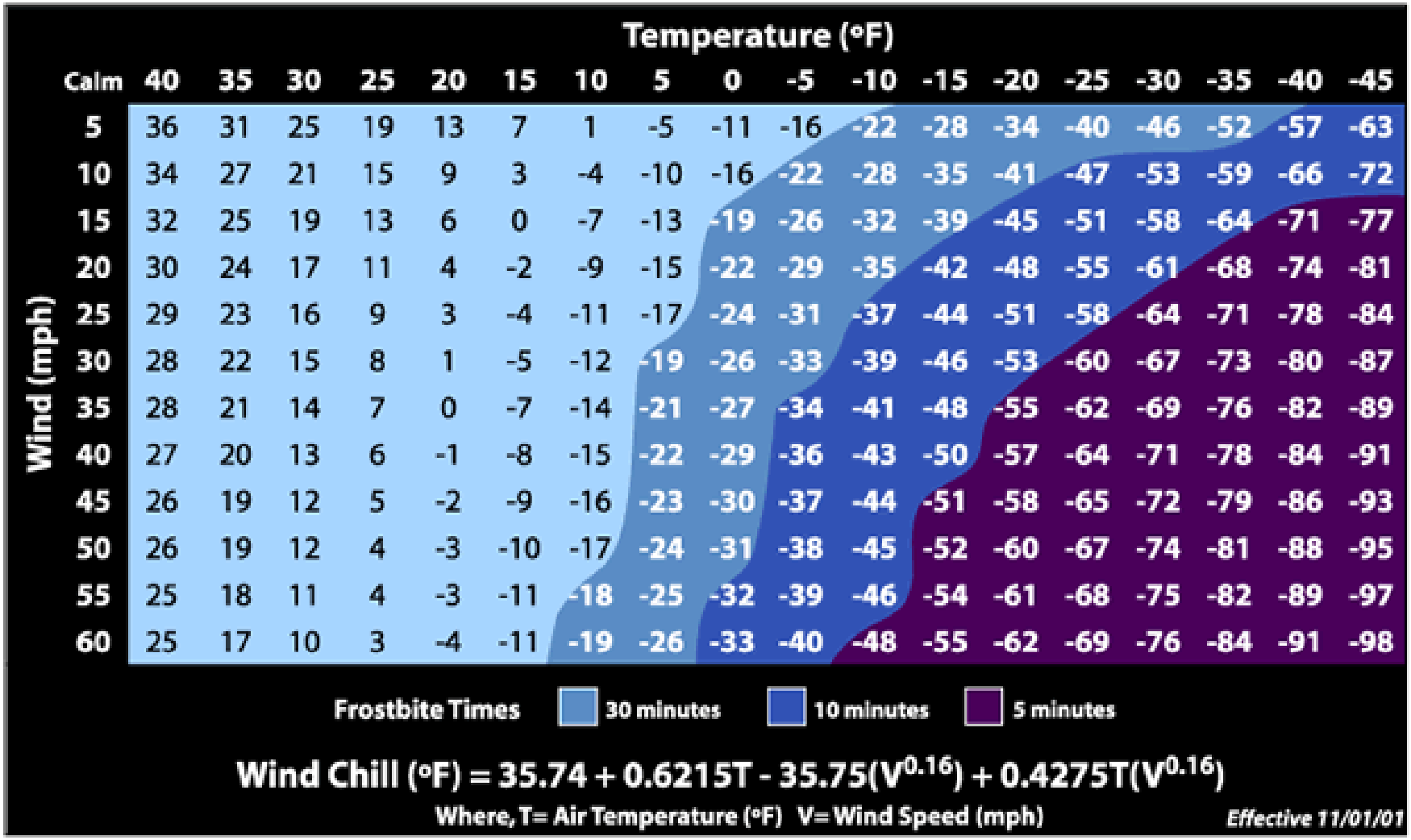
TEMPERATURE	10%	20%	30%	40%	50%	60%	70%	80%	90%
104	98	104	110	120	132				
102	97	101	108	117	125				
100	95	99	105	110	120	132			
98	93	97	101	106	110	125			
96	91	95	98	104	108	120	128		
94	89	93	95	100	105	111	122		
92	87	90	92	96	100	106	115	122	
90	85	88	90	92	96	100	106	114	122
88	82	86	87	89	93	95	100	106	115
86	80	84	85	87	90	92	96	100	109
84	78	81	83	85	86	89	91	95	99
82	77	79	80	81	84	86	89	91	95
80	75	77	78	79	81	83	85	86	89
78	72	75	77	78	79	80	81	83	85
76	70	72	75	76	77	77	77	78	79
74	68	70	73	74	75	75	75	76	77

NOTE: Add 10 degree Fahrenheit when protective clothing is worn.
Add 10 degrees Fahrenheit when in direct sunlight.

Heat Stress Index

HUMITURE DEG. F.	DANGER CATEGORY	INJURY THREAT
Below 60 Deg.	None	Little or no danger under normal circumstances
80-90 Deg.	Caution	Fatigue possible if exposure prolonged and there is physical activity
90-105 Deg.	Extreme Caution	Heat cramps and heat exhaustion possible if exposure is prolonged and there is physical activity
105-130 Deg.	Danger	Heat cramps or exhaustion likely, heat stroke possible if exposure is prolonged & there is physical activity
Above 130 Deg.	Extreme Danger	Heat stroke imminent !

Wind Chill Chart



$$\text{Wind Chill (°F)} = 35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})$$

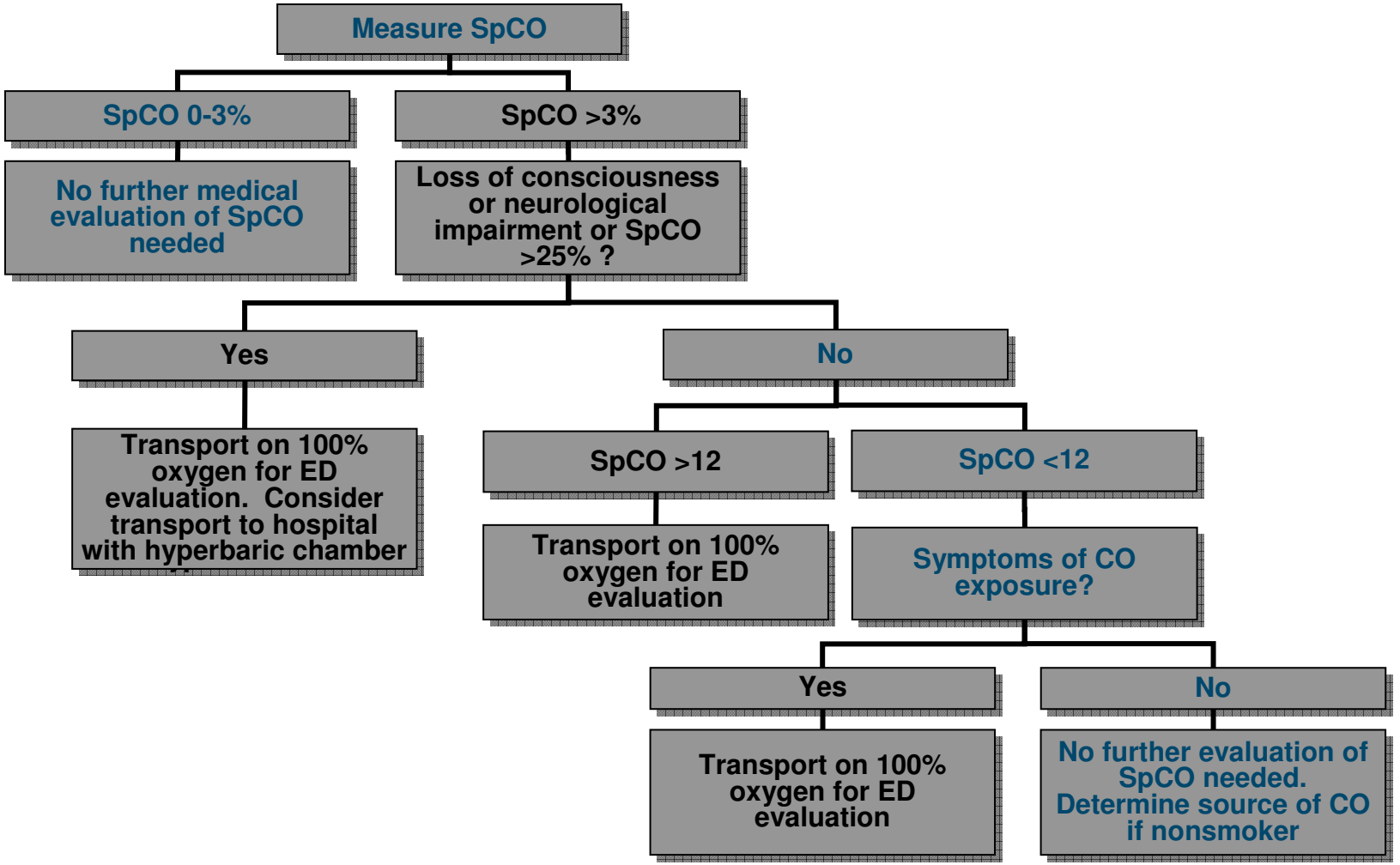
Where, T= Air Temperature (°F) V= Wind Speed (mph)

Effective 11/01/01

Table 3.4 Immersion Time Limits at Different Water Temperature and Immersion Depths

Water Temperature	Ankle-deep	Knee-deep	Waist-deep	Neck-deep
50 to 54 °F	7 hours; if raining, 3.5 hours	5 hours; if raining, 2.5 hours	1.5 hours; if raining, 1 hour	5 minutes
55 to 59 °F	8 hours; if raining, 4 hours	7 hours; if raining, 3.5 hours	2 hours; if raining, 1.5 hours	5 minutes
60 to 64 °F	9 hours; if raining, 4.5 hours	8 hours; if raining, 4 hours	3.5 hours; if raining, 2.5 hours	10 minutes
65 to 69 °F	12 hours; if raining, 6 hours	12 hours; if raining, 6 hours	6 hours; if raining, 5 hours	10 minutes
>70 °F	No limit	No limit	No limit	30 minutes

SpCO Triage Algorithm



Health effects from cabon monoxide exposure, by percentage of carboxyhemoglobin (COHb) in the blood

< 5	None
5-10	Slight headache, decreased exercise tolerance
10-20	Mild dyspnea on exertion, headache
20-30	Throbbing headache, mild nausea, some impaired judgment
30-40	Severe headache, nausea and vomiting, impaired judgment
40-50	Confusion and syncope
50-60	Syncope, coma, seizures
60-70	Coma, seizures, cardiorespiratory depression, death
>70	Failing hemodynamic status, death

Rad-57 CARBON MONOXIDE-COhb

READY REFERENCE CARD

COhb Level %	Signs & Symptoms	Pre-Hospital Treatment
0-4	Minor headache	Observe
5-9	Headache	100% Oxygen up to 4 hours
10-19	Dyspnea, Headache	100% Oxygen, transport
20-29	Headache, nausea, dizziness	100% Oxygen, ALS, transport, Consider HBO
30-39	Severe Headache, vomiting, ALOC	100% Oxygen, ALS, transport, HBO
40-49	Confusion, syncope, tachycardia	ABC's, 100% Oxygen, ALS. Air transport, HBO
50-59	Seizures, shock, apnea, coma	ABC's, 100 % Oxygen, ALS, Air transport, HBO
60-up	Coma, Death	ABC's, 100% oxygen, ALS, Air transport, HBO

REHAB UNIT

Company CHECK - IN / CHECK - OUT

CREWS OPERATING ON THE SCENE: ______________________________

____

Crew Name	PERSONS	TIME IN	TIME OUT

Crew Name	PERSONS	TIME IN	TIME OUT

EMERGENCY INCIDENT REHABILITATION REPORT

INCIDENT: ____________________

DATE: ____________________

Who's Incident (UCFD or Mutual Add District): ____________________

Responder's Name / Crew	Time(s)	Time / #Bottles	BP	Pulse	Resp	Skin	SpO2	SpCO	Temp	Complaints / Condition	Transport ? (YES or NO) / Which Hospital