SUSTAINING SOLDIER HEALTH AND PERFORMANCE IN HAITI:

GUIDANCE FOR SMALL UNIT LEADERS

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FOREWORD

U.S. military forces deployed to Haiti will encounter an unfamiliar climate, disease risks, and potential military stresses. There will be psychological burdens due to witnessing poverty and violence, at a level unknown in the U.S. This handbook is intended as a guide and reference for unit Commanders and NCOs. It includes pointers for sustainment of health and performance throughout predeployment, deployment, operations, and redeployment. It addresses a broad range of important health issues including: nutrition hydration, managing work and environmental exposure, avoiding disease hazards, and maintaining morale in the face of human suffering.

Members of the U.S. Army Medical Research and Materiel Command (USAMRMC) prepared this handbook of preventive medicine guidance to assist unit leaders deploying to Haiti. It draws heavily upon knowledge gained by USAMRMC medical researchers over the past fifty years in laboratory and field observations made by personnel accompanying troops deployed around the world in training, peacekeeping, and combat operations.

This document is not intended to replace policy and doctrine established by Headquarters, Department of the Army, Training and Doctrine Command, Forces Command, Atlantic Command, or contained in Technical Bulletins and other official publications, but to make this Command's "lessons-learned" available in an expeditious manner.

We encourage users to provide critical comments and examples of their own "lessons-learned" during operations in Haiti to:

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KEY PREVENTIVE MEDICINE MEASURES

Predeployment:

- Start taking malaria prevention pills
- Get required immunizations (Recommended list page 9)
- Pack 6-month supply of prescription medication
- Pack individual skin and eye protection (such as insect repellent, sunglasses, sunscreen and lip balm)
- Treat uniforms and mosquito netting with insect repellent
- Maintain physical fitness
- Review SOP for water discipline, work/rest cycles, sleep discipline, field sanitation, and buddy aid/first aid
- Pack 6-month supply of personal hygiene products
- Provide education on Haitian culture and current situation
- Establish buddy system for health maintenance and psychological support
- Bring 2 pairs of glasses; do not plan to wear contact lenses
- Pack cold weather hear and extra canteen

Deployment:

- Continue taking malaria prevention pills
- Minimize sleep loss
- Avoid alcohol, caffeine, nicotine, and carbonated beverages
- Schedule and ear regular meals
- Drink plenty of fluids
- Apply insect repellent and sunscreen before landing
- Emphasize safety; accidents and heat injury are common during early phases
- After landing, pace work, seek shade, and immediately rehydrate

Operations:

- Continue taking malaria prevention pills
- Assume all water, beverages and food from non-US military sources are contaminated
- Enforce mandatory drinking schedules and carry water at all times
- Do heavy work and physical fitness training during the cooler parts of the day
- Schedule and eat regular meals
- Enforce sleep discipline
- Enforce use of DEET and Permethrin insect repellent
- Defecate only in constructed latrines or designated areas
- Bathe or shower daily if possible
- Sleep under a mosquito net
- Avoid contact with wild and domestic animals
- Don’t bathe, swim, or wade in unapproved water sources
- Keep soldiers informed
- Schedule recreation
- Schedule regular stress debriefings
- Emphasize safety at all times
- Maintain HIV/AIDS awareness

Redeployment:

- Continue taking malaria prevention pills for four weeks
- Conduct stress reduction briefings
- Report any illness to medical professionals
- Prepare for reunion with family

INTRODUCTION

The success of a unit depends upon keeping its members fit and healthy.

The political, environmental, and socioeconomic conditions in Haiti today have led to large numbers of impoverished and malnourished people and have created a innumerable health hazards. The specific risks encountered will vary with the mission, but all deployed personnel will be exposed to real health risks during service in Haiti. If these hazards are allowed to affect unit personnel, they will seriously degrade the unit's ability to perform its mission.

This guide is designed to help unit leaders accomplish their mission by providing information on how to sustain soldiers' health and fitness while deployed in Haiti. It provides an aid to identify anticipated health hazards and describes some actions that can be taken to minimize the effects of these hazards. Because it is designed specifically to meet the needs of non-medical units, the guide does not provide detailed medical information.

The guide is organized to be both a predeployment planning resource and a reference during operations. It provides information to understand and identify hazards and provides guidance for disease prevention and control. The guide is best utilized by reading it in its entirety before deployment and then using it as a reference during operations.

HAITI

A. THE COUNTRY AND THE PEOPLE

Haiti is the second oldest independent country in the Western Hemisphere and is the oldest

black republic in the world. It was established in 1804 by the only successful country-wide slave rebellion in history. However, Haiti, even after independence from France, was ruled by a succession of dictators. From one of the richest agricultural lands in the Americas In colonial times, Haiti has become the poorest country in the Western hemisphere. It is unable to produce enough food to adequately feed its population, most of whom are moderately malnourished. Life expectancy is short and infant mortality is high, about 12% of children dying before their first birthday. One third of all children die before their Th birthday.

The population of Haiti today is about 6,100,000 people. 75% of the population live in rural areas, concentrated on small family plots in the few areas suitable for agriculture. In these areas, the population density is very high, increasing the problems of disease exposure and spread. Although the official language is French, the principal spoken language is Creole, used by about 90% of the people. About 50% of the population is illiterate.

Most Haitians are Christian but have woven elements of the traditional African religions into their current religious practices. This is the practice of "Voodoo." The term "voodoo" which Americans have come to think of as something dangerous or secret, merely refers to an Important and open part of Haitian religious life.

The nation's capital, **Port-Au-Prince,** is the largest city and the commercial center of the country. It has an estimated population of 750,000 people. A large percentage of these people live in shacks and in extreme urban poverty. These parts of the cities have no sanitation or potable water and the residents of these neighborhoods have high rates of infection with tuberculosis and HIV. Other cities are **Cap-Haitians** (64,000) on the northern coast, **Gonaives** (34,000) on the east coast **and Les Cayes** (34,000) on the southern coast of the island.

B. GEOGRAPHY AND CLIMATE

The country of Haiti is about the size of Maryland and covers the western third of the island of Hispaniola which it shares with the Dominican Republic. It is bordered by water on three sides, the Atlantic Ocean on the north and by the Caribbean Sea on the west and south. The Dominican Republic forms its eastern and only land border with another country. The island of Hispaniola is about halfway between Cuba and Puerto Rico; the Windward Strait separates it from Cuba which is only 50 miles away. Haiti itself is a mountainous country, made up primarily of two rugged mountain chains extending from the Dominican border westward to form northern and southern peninsulas around an ocean gulf **(Golfe de la Gonave).** The mountain chains are separated by a small central plain which contains **Port au Prince,** which lies on the gulf. Additional small areas of flat agricultural land are found in the midst of the northern mountain chain and along the north coast. About two-thirds of the country is mountainous. The highest mountain is **Morne de la Selle** (8959 feet, 2715 meters). Altitudes in the northern mountains range from 2000 to 4000 feet and in the southern mountains 4000 to 8900 feet. The terrain in the mountains is steep and eroded with deep gullies covered with a mixture of dense forest and open slope.

Haiti's rivers and streams arise in the mountains. Their flow depends on rainfall and ranges

from torrential to totally dry. Flash flooding during rains is a significant hazard. The country's largest river, the **Artibonite,** is navigable for part of its length before it empties into the **Golfe de la Gonave.** The coast has many natural harbors most of which have good anchorage for the small craft used by fisherman.

The climate of Haiti depends on season, terrain and location. Most rainfall occurs between April and November with a lull during June and July. Because the rain is brought by Northeast trade winds, heavy rainfall occurs in the northern mountains and plains and on the peaks of the southern mountains. The central plain, including Port au Prince receives moderate rainfall (53 inches, 130 cm per year). Hurricanes with torrential rain and destructive wind are a threat in the late summer and fall.

The lowland areas of Haiti have a tropical climate. The temperature along the coasts averages about 81°F (27°C) with very little variation between summer and winter. The mountains are significantly cooler (61°F, 16°C) and routinely experience frost during the winter months.

C. THE UNITED STATES OCCUPATION (1915-34)

Due to civil disturbances and lack of a stable friendly government, the United States occupied and ruled Haiti by means of a military government between 1915 and 1934. During the occupation, a number of infrastructure development projects were accomplished that made real material improvements to the country and the people. These included road and bridge building, disease control, establishment of schools, and the development of a communications infrastructure. The status of Port-au-Prince as the major city and trading center in today's Haiti is largely the result of the changes made during the occupation. However, despite the material improvements and good intentions of the U.S. military occupation forces, resentment of the foreign occupation led to protests and several notorious episodes in which scores of Haitian civilians were killed by the US Army and/or Marines. Among some of the population there is still resentment against the U.S. for the severity (and occasional brutality) of the former occupational forces. When the final U.S. service members left in 1934, a Haitian military elite was left in charge which reverted to the typical dictatorial style characterizing Haitian government since colonial times.

INFECTIOUS DISEASE HAZARDS

Both the sources of many infectious diseases and the conditions to spread these diseases are widespread in Haiti. Large numbers of people living in crowded unsanitary conditions increase the risk of epidemics. U.S. soldiers are particularly vulnerable because they have not been

exposed to many of these diseases and have not developed immunity to them. In all major military conflicts involving U.S. troops during this century, the leading cause of soldier hospitalization has been infectious disease.

Many infections not only seriously affect individual soldiers but rapidly degrade the mission capability of entire units. For these reasons, great care is needed to prevent infectious diseases. Fortunately, effective countermeasures exist for most of the diseases encountered in Haiti, so leaders and soldiers can control the risk of infection. Many of these diseases, even some of the potentially life-threatening ones, begin with flu-like symptoms, including headache, muscle aches, and fever. Therefore, **flu-like symptoms should be treated seriously**.

A. DISEASES FROM FOOD AND WATER CONSUMPTION

1. Problems with Contaminated Food and Water.

The most common condition is simple diarrhea with frequent, watery stools and abdominal cramping for 3 to 5 days. Other diseases, like typhoid, can be severe, even life-threatening. Parasites (amoebas, giardia, tapeworms, etc.) consumed in water or undercooked food, especially meat and fish, can cause prolonged diarrhea. Diarrhea, especially with vomiting or fever, can cause dehydration.

2. Control Measures to Prevent Food and Waterborne Illness.

These measures are key to preventing illnesses from consumption of food and water. Units that do not follow strict guidelines and procedures will develop diarrheal illnesses.

a. Drink water or beverages only from approved U.S. military water points, which are properly treated and tested. Be aware that even bottled water can be contaminated unless it is from an approved source.. If in doubt, soldiers should treat water in their canteens with iodine tablets. **Assume all ice is contaminated**.

b. **Consume food only from approved U.S. military sources**. Perishable food must be refrigerated, adequately cooked and served steaming hot. Dairy products, milk, butter, cheese or yogurt from unapproved sources are particularly hazardous. Soldiers eating only standard military rations (e.g., MREs or tray packs) are at low risk for diarrheal disease.

c. Follow proper field sanitation procedures for disposal of waste and maintenance of latrines.

d. Practice good personal hygiene. Wash your hands to protect yourself and others from infectious diseases. Do not bathe, swim or wash clothes in local waters such as rivers and ponds.

e. Do not add beverage flavorings to bulk water supplies because they block the action of water disinfectants.

f. Leaders must know who will check their water. When water is found to have insufficient chlorine, it must be considered contaminated and be redisinfected. Disinfection of water in canteens is done with iodine tablets (NSN 6850-00-985-7166). Disinfection of water in Lyster Bags or 5 gallon cans is done with Chlorine Ampules (Chlorine Kit, Water Purification, Type 1, NSN 6850-00-270 6225). Disinfection of water in 400 gallon water trailers is done with Calcium Hypochlorite Powder (Calcium Hypochlorite, 6 ounce jar, NSN 6810-00-255-0471).

3. Care and First Aid for Diarrheal Disease.

a. Individuals with severe or prolonged diarrhea or vomiting should be medically evaluated.

b. Dehydration is an important concern in all diseases causing diarrhea and vomiting. To prevent dehydration, special efforts should be made to assure adequate fluids and salts are consumed. If A rations are available, the ingredients can be obtained from field kitchens. See Appendix A for fluid replacement recipe.

B. DISEASES FROM INSECTS

1. Problems with Insects.

a. Biting flies and insects must be considered as carriers of disease and steps should be taken to control their numbers and prevent biting.

b. Many insects thrive in Haiti and are capable of spreading diseases to soldiers. Several of these diseases are serious and some, such as malaria, can be fatal if not treated. Examples of insects and types of disease they transmit include:

Mosquitoes - Malaria, Dengue, Yellow Fever, Encephalitis
Biting midges - Mansonellosis
Lice and Fleas - Typhus

c. Almost all these illnesses cause severe flu-like symptoms with fever, muscle aches, weakness and headaches. Other signs or symptoms may include rashes, swollen lymph nodes, joint pain, shaking chills, sweats, nausea or vomiting.

d. Malaria, one of the most common diseases in Haiti, causes recurrent fever, shaking chills and sweats alternating with fever-free periods. Malaria is always a serious illness and can be fatal. Malaria prevention measures will be essential to maintaining the health of soldiers in Haiti.

2. Control Measures to Prevent Diseases from Insects.

a. Prevention of diseases transmitted by biting insects depends on personal protective measures and area insect control. If used rigorously, these measures should provide protection against biting insects.

b. Clothing should be pretreated before deployment. Clothing repellant, permethrin aerosol (NSN 6840-01-278-1336) should be applied to the BDU until the uniform appears wet and reapplied after every 5 washings. Bed netting should also be treated before deployment with permethrin in the same fashion as the BDU. Treating the bed netting is crucial because some insects are small enough to penetrate the untreated webbing.

c. Repellent skin lotion, DEET, extended duration (NSN 6840-01-284-3982), should be applied to exposed skin and to the first 3 inches of skin under the uniform. The skin repellant is effective up to 12 hours, so it should be applied at least 2 times per day and more often if washed off by rain or sweat.

d. Clothing and bedding should be shaken out and checked before use.

e. Sleeping surfaces should be off the ground and bed netting should be used.

Malaria Prevention

Because of the common occurrence of Malaria in Haiti and because of its potentially life threatening effects, all personnel will be required to take one of the following medicines to prevent Malaria:

Chloroquine will be taken once a week while in country and for 4 weeks after returning. This applies to all personnel who can tolerate the medicine and are not on flight status.

For those who cannot tolerate Chloroquine, **Doxycycline** will be taken once daily while in country and for 4 weeks after returning.

Effective Malaria prevention requires taking the prescribed preventive medication, applying insect repellent on the skin, uniforms and bed netting, and sleeping under bed netting.

f. Wear blouse trousers and shirts properly to prevent insect bites. Trouser legs should be tucked inside the boots. Tucking trouser legs inside socks increases protection against ticks.

g. Periodic buddy checks for ticks and other biting insects are extremely important, especially when moving cross country in brush or grass. Ticks should be removed from the skin by firmly grasping the head of the tick with a pair of tweezers and removing the tick with a gentle steady pull.

h. Insect breeding areas such as pools of water in old tires, cans, buckets and ditches should be drained. Additional measures to control insects include good personal hygiene, proper disposal of garbage and human waste, and keeping food and water covered.

C. DISEASES FROM ANIMALS

1. Problems of Diseases from Animals.

A number of diseases can be transmitted directly from animals to soldiers. Dogs, cats, other domestic and wild animals may transmit **Rabies** directly through bites and scratches. If a soldier is infected with Rabies and does not receive anti-Rabies shots immediately, the disease is always fatal. Consequently, animal bites or scratches must be evaluated by medical personnel.

Several other diseases that can be indirectly spread from animals to humans are relatively common in Haiti. Diseases such as **Brucellosis, "Q" fever,** and **Anthrax** are found in goats, sheep and cattle. Infection may result from consumption of local milk and other dairy products, from breathing dust-like particles from infected animals, their feces or skins, and direct contact with animal tissues, urine or blood. These diseases cause headache, fever, chills, sweating, and body aches plus other more specific symptoms.

2. Control Measures to Prevent Diseases from Animals.

Avoid contact with domestic or wild animals. **Camp pets should be forbidden.** Avoid contact with meat, hides, carcasses of dead animals, blood, urine or animal wastes. Soldiers should not work or live in sheds, huts, pens or other areas where livestock have been housed.

3. Care of Diseases from Animals.

As with other infectious diseases, medical evaluation should be obtained as soon as possible after the onset of symptoms. If timely medical attention is received, most animal diseases that can be spread to man, even Rabies, are preventable or treatable.

D. DISEASES FROM OTHER PEOPLE

1. Respiratory tract infections. such as colds, flu, strep throat and sinusitis, are common even in warm climates, especially in crowded living conditions. Although these infections are relatively mild, they affect many soldiers at once and can have a serious impact on military readiness. Respiratory diseases are second only to diarrheal diseases as a cause of lost duty time. To control respiratory disease transmission, crowding in living spaces should be minimized, soldiers should sleep head to foot and good ventilation should be maintained. These measures should also help prevent the spread of more serious diseases such as **tuberculosis** which is common in Haiti.

2. **Meningitis** is spread through direct contact with droplets from the nose and throat of infected people. It can be rapidly fatal. The meningococcal vaccine given to U.S. soldiers

protects against the types of meningitis that most often cause epidemics in Haiti. The same personal protective measures that prevent respiratory infections also prevent the spread of meningitis.

3. **Sexually transmitted diseases,** including gonorrhea, syphilis, genital warts, herpes, hepatitis B infection, and infection with the AIDS virus (HIV), all occur frequently in Haiti. Abstinence is the best way of preventing sexually transmitted diseases, but prophylactics (condoms) reduce the risk of infection if sexual relations occur. Since many of these diseases are serious, a physician should be consulted if genital discomfort, sores (painful or painless), or unusual discharge develop.

HIV - AIDS HAZARD

Infection with the HIV virus, which causes AIDS, is very common in the Haitian people. The best current estimates are that 70% of prostitutes have HIV infection and that 6-8% of healthy appearing young adults (18-35) have HIV infection.

Soldiers can be exposed to HIV through unprotected sex or other contact with body fluids from infected people.

Service members deployed to Haiti must constantly aware of the hazard HIV represents and instructed in self-protection.

Sexual abstinence is the best means of Protection. Condoms provide some, but not absolute, protection .

Service members should not come into contact with blood or other body fluids without protection. Use medical gloves to handle sick or injured Haitians.

4. **Hepatitis,** a liver disease, can be caused by several types of viruses. Serum hepatitis (due to either type B or type C hepatitis viruses) is spread by sexual contact, blood transfusion, or contaminated needles and medical instruments. Epidemic hepatitis (due to either type A or type E viruses) is spread from person to person through contaminated water or food. Both forms of hepatitis cause fever, intestinal symptoms and jaundice (yellow skin). When a person is infected with one of these viruses, many weeks may pass before any symptoms emerge. Hepatitis B vaccine is protective and is required for Army medical personnel. Other measures to protect against Hepatitis B include wearing gloves and other protective cover when exposed to blood or

body fluids, avoiding sexual contact and immediate washing of hands and other body parts that have come in contact with body fluids. Immune serum globulin (ISG) protects only against hepatitis A. It does not protect against the other forms of hepatitis (hepatitis B, C or E). Booster doses of ISG are needed every three months to maintain protection. Since Hepatitis A and E are acquired from contaminated food and water, they can be prevented by the same measures used to prevent any of the other food and waterborne diseases (see Section A in this part of the guide). **Hepatitis prevention is critical** since no type of viral Hepatitis is treatable.

E. DISEASES FROM CONTACT WITH SOIL AND WATER

1. **Hookworms** enter the body from the soil by penetrating bare skin (such as bare feet). **Roundworms and whipworms** enter through the mouth when a soldier swallows tiny bits of soil containing worm eggs. All of these worms can cause intestinal (gut) disease and other symptoms, such as coughing or red snake-like trails under the skin. To prevent these diseases, soldiers should be cautioned not to walk bare foot and not to lie down and expose skin to the soil. They should not eat local food and must carefully wash hands and eating utensils.

2. **Snail fever (schistosomiasis)** is caused by microscopic worms found in fresh water and can affect many organ systems. Worms enter the body by penetrating skin exposed to infested water.

To avoid snail fever, soldiers should not bathe, swim or wade in streams, rivers, ponds, canals, stock tanks or other body of freshwater, unless it is known to be adequately treated chemically. When military operations require fording any body of freshwater, some protection is provided by tucking trousers tightly into the boots and by covering as much skin as possible. The burrowing parasites may also be rubbed from the skin by immediately drying exposed areas with a towel or cloth.

3. **Mud fever (Leptospirosis)** is contracted primarily by skin contact with water, mud or surfaces contaminated with infected urine of a variety of wild and domestic animals. The disease can cause sudden headache, chills, severe muscle aches, and bloodshot eyes. This disease can be prevented by avoiding contaminated water. If water must be entered, boots and clothing provide some element of protection.

F. SKIN DISEASES AND OTHER CONDITIONS

1. The climate of Haiti can predispose soldiers to skin disease. The heat, wind and dust may cause the skin to become dry, chapped, scaly, and cracked. Exposed skin is particularly vulnerable to drying conditions. The humidity combined with sweating and chafing can result in irritation, breakdown, and erosion of the skin, especially in the groin, abdominal folds, armpits, under breasts and where the backpack or load bearing equipment rubs (ruck burn). Abrasions on elbows, knees and feet can lead to cellulitis. All skin conditions predispose soldiers to bacterial and fungal infections and increase the risk of heat illness.

2. Accumulation of sweat in socks and friction from boots may cause blisters which leave the

feet particularly vulnerable to infection. Special attention should be given to keeping the feet clean and dry. Feet should be warmed and dried at least three times each day. Frequent changes to dry socks are especially important

3. Personal hygiene to protect the skin is important~ Hand washing and bathing or showering are important and should be done as often as practical. If bathing is not possible, areas that sweat should be cleaned with a wash cloth at least daily. Uniforms, including underwear, should be kept as clean and dry as possible. If skin becomes dry or cracked, a non-irritating moisturizing cream can be used. Areas of skin that become moist, irritated or sore should be dried and treated with powders such as talc. Persistent redness, wetness or pain may represent a skin infection and should be evaluated medically.

4. If persistent rashes occur in moist areas such as the groin, under breasts or on the feet medical evaluation should be obtained. Women who develop vaginitis should consult a physician. Anyone who develops a persistent sore especially with red streaks or swollen Lymph nodes should seek medical attention.

VACCINES AND OTHER PREVENTIVE MEASURES

A. Many vaccines are available to prevent infectious diseases. The U.S. military requires certain vaccinations (immunizations) routinely and others for specific deployments or operations At the time of this writing (August 1994), U.S. MEDCOM guidance on the immunizations required for Haiti is as follows:

1. Immune Serum Globulin (ISG): first dose predeployment and a booster dose every 3-5

months to prevent Hepatitis A

2. **Tetanus-Diphtheria**: last dose within 10 years
3. **Oral Polio**: **primary** 3 dose series, plus one adult booster
4. **Influenza**: annually
5. **Typhoid**: either
   ORAL: 4 capsule series, 1 every other day, within 5 years
   SHOTS: 2 basic doses plus booster within 3 years
6. **Yellow Fever**: last dose within 10 **years**
7. **Measles:** record of at least one shot if born after 1956
8. **Hepatitis B**:
   AMEDD: complete three shot series
   non-AMEDD: optional with command

NOTE: Individual commands and other Services may require additional testing and vaccination.

All of these vaccines are approved by the FDA and none are experimental. Medical personnel are responsible for screening shot records and administering vaccinations. Soldiers must take responsibility for making sure shot records are up to date and that they receive the required immunizations.

B. Screening soldiers for **Tuberculosis** (TB) by skin testing before and 3 months after deployment is strongly recommended.

C. A single dose of **Meningitis vaccine** in adulthood is recommended. Most enlisted service members will have received this vaccine during basic training.

D. Exposure to childhood diseases such as measles, mumps, rubella, chicken pox and polio is possible in Haiti. Soldiers who are unsure whether they are immune should check with medical personnel .

E. Prophylactic (Preventive) Medications. The only preventive medications recommended for Haiti are for Malaria - these are either **chloroquine** for most soldiers or **doxycycline** for those having special reasons not to take chloroquine. See Section B (Diseases From Insects).

PLANT, INSECT, SNAKE AND ANIMAL HAZARDS

A great many native plants and animals in Haiti can cause significant harm to soldiers, ranging from minor wounds and rashes to rapidly fatal poisoning. The threat is magnified for US military personnel who may be unfamiliar with native species and unaware of their potential danger.

Soldiers should avoid contact with unfamiliar plants and animals.

A. PLANTS

1. Problems with Plants. Many plants in Haiti have thorns which can puncture the skin introduce poison into the skin or cause infection. Other plants can cause rashes just by touching the skin. **Contact with smoke from the burning of some Haitian plants can cause skin rashes and damage to the lungs.** Many plants will cause poisoning if chewed or swallowed.

2. Control Measures. The best way to prevent injury from harmful plants is to avoid being exposed to them. Clothing can serve as a protective barrier for the skin. Clothing can also be a source of exposure if it is not properly cleaned after contact with poisonous plants. Clothing can be adequately decontaminated with careful soap and hot water washing. Unfamiliar plants should never be placed on the skin. If injury or poisoning from plants occurs, the soldier should report for medical evaluation immediately.

B. INSECTS, SPIDERS AND SCORPIONS

1. Problems with Insects, Spiders & Scorpions. There are numerous poisonous centipedes scorpions and spiders, including black and brown recluse spiders and tarantulas in Haiti. The effect of their poisons can range from severe pain and ulceration of skin and muscle to rapid death. These small and inconspicuous creatures are likely to be encountered around buildings, tents and bunkers. In addition, the coastal waters contain poisonous jellyfish and sea urchins. Hives and swarms of stinging insects (bees, wasps, hornets) are a significant hazard.

2. Control Measures. Prevention of injury from poisonous insects, scorpions and spiders is achieved by avoiding contact. This means extra vigilance in areas where these creatures live. Military personnel should avoid sleeping on the ground and should carefully shake out their boots, uniforms and bedding before use to eliminate any animals that may have crawled in. Hives of stinging insects should be managed by Entomology Teams or other trained personnel. Individuals with allergic reactions to stinging insects should report their allergy to unit medical personnel before deployment.

3. Care for Insect, Spider & Scorpion Bites. Any soldier receiving a bite or sting should see medical personnel immediately. First aid measures that should be taken while seeking medical care include icing the wound (only if uncontaminated ice and water are available). If the injury is on an extremity, it should be immobilized and the individual should be kept at rest. Tourniquets or cutting the wound to suck out the poison are not helpful and may cause harm.

4. Care for Insect Stings. Multiple stings or allergic reactions to stings require immediate medical intervention. Hives, collapse or wheezing are particularly dangerous signs. First aid includes use of uncontaminated ice on the sting and getting medical help.

C. SNAKES

1. Problems with Snakes. Haiti has no poisonous snakes. However, snakes bites even from non-poisonous species are prone to infection.

2. Control Measures. Soldiers should not handle or play with snakes. Avoid areas where snakes may be found. Snakes are territorial and will remain in the area of a bivouac set up on their nest.

3. Care of Snake Bites. If bitten by a snake, the individual should get medical evaluation. First aid consists of immobilizing the arm or leg that has been bitten and keeping the soldier at rest. Tourniquets and attempts to open the bite wound can cause more harm than good and should not be attempted.

D. WILD AND DOMESTIC ANIMALS

1. Problems with Wild & Domestic Animals. Wild and domestic animals represent a serious health risk through bites, scratches, goring or other trauma, or by simple contact. Rats and mice attracted to human shelters and waste dumps may carry plague and other serious diseases. Rabies is a common problem in dogs and cats. Livestock, goats in particular, may carry anthrax as well as other serious diseases. Veterinary care is almost non-existent in Haiti, so all animals, wild or domestic, should be considered diseased and dangerous.

2. Control Measures. Because of the possibility of acquiring serious disease or receiving traumatic injury from animals in Haiti, soldiers should avoid contact with both wild and domestic animals. Sanitary disposal of food and other waste material will help to avoid attracting animals and insects. It is also important to protect water supplies from animals. Animals and birds will drink from the taps of water containers and contaminate water supplies. Although US military personnel are known for making pets of various animals while deployed, the magnitude of the health threat requires that this practice must be forbidden.

3. **Care of Animal Bites & Scratches.** First aid for bites and scratches from animals should include cleaning the wound with soap and uncontaminated water. Because of the possibility of rabies, **immediate medical care should be obtained for even seemingly insignificant bites or scratch wounds.**

ENVIRONMENTAL HAZARDS

Haiti has a diverse climate and topography which will expose service members to heat, cold and high altitude. Heat will be a threat in the coastal and interior plains and during physical activity in the mountains. Altitude will be a threat in mountain operations over 5000 feet. Cold will be a threat in the mountains during the winter months.

A. HOT WEATHER

The hot climate of Haiti degrades physical performance and places each soldier at risk for heat illness. The risk of heat illness depends on physical activity, hydration, heat acclimatization, clothing, load carried, terrain, and climatic conditions. Leaders must watch their soldiers carefully for signs of distress in the heat and adjust work/rest schedules, work rates and water consumption according to conditions.

In very hot conditions, sweating is the only mechanism for heat loss. Water must be consumed to replace the body's loss of sweat. If the body water lost through sweating is not adequately replaced, dehydration will follow. Dehydration will lead to heat illness.

1. Problems due to Hot Weather.

a. Heat Stress Heat, high humidity and exposure to the sun all tend to increase body temperature and increase water requirements, primarily through loss of body water as sweat. Sweat rates can be high even when the skin looks and feels dry, since sweat evaporates very quickly in dry air.

b. Dehydration cancels the benefits of heat acclimatization, increases the risk of heat illness, reduces work capacity, appetite, and alertness. The greater the dehydration the more severe the effects.

c. Thirst is a poor indicator of dehydration. Soldiers do not sense when they are dehydrated and usually do not replace body water losses, even when drinking water is readily available. Soldiers under stress in hot environments will exhibit "voluntary dehydration". They maintain themselves about 1.5 quarts below their ideal hydration status without any sense of thirst. *Soldiers* must *consciously* remind *themselves,* or be *reminded.* to *replace water lost to* sweat. *Ensuring* regular consumption of *fluids is* the *responsibility* of the *unit leader*. ***Guidelines for* water *replacement* are *provided* at *Appendix B.***

d. Heat degrades mental performance as well as physical performance. Rested, well-trained soldiers working on sedentary tasks should be able to work normally in the heat for up to four hours, after that mental performance will steadily deteriorate. Tasks which require sustained attention (e.g., watching radarscopes, sentry duty) will be affected more quickly. Performance in the following jobs will be affected by heat stress: monotonous, repetitive, or boring tasks; tasks which require attention to detail and short-term memory (e.g., calculations, map plotting, coding messages, etc.); tasks which must be done quickly or according to a fixed schedule; tasks which require arm-hand steadiness; command and control tasks where confusion and misinformation are common. Reaction times and decision times are slower in the heat.

e. Heat Illness.

The following heat illnesses will be a constant risk in Haiti.

1) Heat Rash: a skin rash most commonly found on clothed areas of the body. Heat Rash can

impair body heat loss and degrade performance for many days after it's disappearance. Heat rash can be avoided by practicing good hygiene and keeping skin clean and dry.

2) Sunburn impairs body heat loss, degrades performance and increases the risk of heat casualties. Sunburn can be avoided by protecting skin with clothing and sunscreen. Emphasize the importance of hats and long sleeves.

3) Heat Cramps are severe muscle cramps primarily in the abdomen, legs, and arms, due to excessive salt and water losses. Heat cramps most often occur in soldiers who are not acclimatized to the heat or during sudden heat waves. Heat cramps can be avoided by acclimatization, maintaining proper nutrition and hydration.

4) Heat Exhaustion occurs during work in the heat and appears as marked fatigue and weakness, nausea, dizziness, fainting, vomiting, mild changes in mental function (e.g., disorientation, irritability) and elevated temperature. Heat exhaustion can be avoided by employing appropriate work rest cycles and maintaining full hydration (see Appendix B).

5) Heat Stroke can include all of the above signs and symptoms but is more severe and can be fatal. The victim is usually disoriented or unconscious.

2. Control of Problems due to Hot Weather.

The key to preventing heat illness and sustaining performance is knowledge of the environmental conditions. Leaders must have accurate weather information for their specific location. Heat illness prevention guidance is based on Wet Bulb Globe Temperature (WBGT) readings (GTA 8-5-45). Guidance is **approximate.** It was developed assuming that soldiers would be fully acclimatized, physically fit, fully hydrated and rested. If soldiers are not fully acclimatized, adequately fed, rested and hydrated, the amount of cooling and rest provided during each work period needs to be increased.

a. Acclimatization/Physical Fitness:

1) Attain the best possible physical fitness and heat acclimatization prior to deployment. Maintain adequate levels of physical fitness after deployment with maintenance programs tailored to the environment. Physically fit troops acclimatize to heat more rapidly than those less fit.

2) Units on alert, or identified for future deployment, should emphasize their physical training program and state of heat acclimatization (e.g., spend more time exercising in the heat where possible).

3) Significant acclimatization to heat can be attained in 4-5 days. Full heat acclimatization takes 7-14 days with 2-3 hours per day of carefully supervised exercise in the heat. Increase physical activity each day until full acclimatization is achieved.

Acclimatization requires that progressively more physical activity be performed each day. During the first two days of heat *exposure, light activities such as recreation activities (e.g., softball) would be appropriate. By the third day of heat exposure, 2-mile unit nuns at the pace of the slowest participants are feasible. Leaders should gradually increase the intensity of exercise each day working up to an appropriate physical training schedule adapted for the environment.*

4) Acclimatization does NOT reduce, and may actually increase water requirements. Heat acclimatization increases sweating to enhance the evaporative cooling capacity of the body. Increased sweating requires additional water consumption.

IT IS DANGEROUS AND INAPPROPRIATE TO TRY TO REDUCE WATER CONSUMPTION.

5) Soldiers may *have a few days of increased salt* requirements upon initial deployment *because sweat is salty prior to acclimatization. Complete consumption of rations with use of salt packets* IS essential *to provide an adequate salt* intake. **Salt supplementation is not appropriate** unless *medically* indicated and supervised *by* medical personnel.

6) Maintenance-level PT programs should be conducted in the evening or at night when WBGT readings for your location do not exceed accepted guidelines.

WBGT guidelines do not accurately forecast illness rates under conditions of high humidity. **Humidity levels over 75% contribute to an increased risk of heat injury.**

Hydration:

1) Leaders must understand the critical importance of maintaining hydration. Almost any contingency *of* military operations will interfere with the maintenance of hydration.

2) Leaders should monitor hydration status *by* noting the color and volume of a soldier's urine. Soldiers should be taught that the lighter the urine color, the better hydrated; and that ***dark yellow urine is a sure indicator that fluid consumption should be increased***

3) Establish mandatory drinking schedules which replace water lost by sweating. Use the tables provided in Appendix B to match the environmental and operational demands to the water requirement.

The body normally absorbs water at the rate of 1.0 to 1.2 quarts per hour. A reasonable upper limit for a total consumption estimate for a 12 hour work day is 12-15 quarts. Since sweat rates

during work in the heat can often exceed 1 quart per hour, it is obvious that a rigorously enforced drinking *schedule must be followed to ensure maintenance of hydration.*

4) Plan operations to provide water resupply points at a maximum interval of every three hours. One-hour intervals are more desirable. Carry as much water as possible when separated from approved sources of drinking water. Insure soldiers always have at least one full canteen in reserve; know when and where water resupply will be available. Soldiers can live longer without food than without water.

Provide cool *water (60-70°F, 16-21 °C) by shading, insulating, and camouflaging water buffaloes or by using small mobile chillers. Water bags will keep water as cool as the prevailing wet bulb temperature, although part of the bag's water will be lost to the process of evaporative cooling.*

5) Minimize voluntary dehydration by making flavored, cool water accessible in a comfortable place, and providing enough time to drink and eat. Water with flavoring added should be tested for adequate disinfection before use. Flavoring in individual canteens should be avoided; it increases the risk of contamination and illness.

6) Carbohydrate/electrolyte beverages (sports drinks) are not required, and if used should not be the only source of liquid. For healthy soldiers, these beverages generally provide no advantage over water, however, they can promote greater drinking because of their flavor.

7) Drinking water does more good than splashing it on the skin. Water splashed on the skin is wasted water; it might briefly improve comfort, but does little to sustain performance and avoid heat illness.

8) Additional useful information can be found in FM 10-52, Water Supply in Theaters of Operations, 11 JUL 90.

c. Work/Rest Cycles:

1) Leaders must review procedures for the management of work/rest cycles and the critical need for maintaining adequate water consumption. **Establish work/rest schedules using the recommendations in Appendix B.**

2) Body temperatures can rise very rapidly due of the combination of excessive heat and sustained activity. To prevent a dangerous increase in body temperature, minimize heat production by reducing work pace and increasing rest periods. In very hot and humid conditions, reducing physical activity may be the only way to prevent dangerous rises in body temperature.

d. Reduce Exposure to Heat:

1) Whenever possible, plan to perform heavy work in the early morning or evening. Avoid the heat of the day.

2) Provide shade whenever possible; use canvas, ponchos, or parachutes, and allow for free air circulation .

3) Declining mental performance may not be noticed by soldiers; plan shorter work shifts double check work and calculations, and slow work pace.

4) Resting on hot ground increases heat stress; the more body surface in contact with the ground, the greater the heat stress. The ground heated by the sun is hot, usually 30-45 degrees hotter than air, and may reach 150°F (66°C) when air temperature is 120°F (49°C).

5) Soldiers often become dehydrated while traveling, especially if the trip is long. Water discipline is as important during travel as any other time. **Soldiers must be provided fresh drinking water immediately upon arrival in country.**

e. Clothing, Equipment and Supplies:

1) Uniforms should be worn to protect against sun, wind and insects. Wear the uniform properly, tuck in the trousers and roll down sleeves. Use hats, head cloths and sunscreen.

Heat *strain* will be *reduced* by *shielding the body from the sun. Wearing the Hot Weather. Battle Dress Uniform reduces* water *requirements* by *limiting heat gain.*

2) Change socks when they become soaked with sweat.

Prolonged wear *of* wet *socks can lead to foot injury (e.g., increased risk of blisters). Sweat accumulation in the boot can* be *reduced* by *wearing a sock that is absorptive and thick enough to "wick" moisture away from the foot and toward the top of the boot where evaporation can occur.*

3) Because clean clothing protects better and prevents skin rashes, whenever possible, wash clothing and air-dry or sun-dry.

3. First Aid for Heat Illness.

a. One heat casualty is usually followed by others. The occurrence of a heat casualty should be considered a warning that the entire unit may be at immediate risk:

AS SOON AS THE FIRST HEAT CASUALTY OCCURS,
ASSESS THE STATUS OF THE WHOLE UNIT.

b. Watch for signs of overheating which are: inability to work, red or flushed face, confusion or disorientation, fainting or collapse. It is always better to take care of a problem early. When in doubt, treat as a heat illness.

c. At the first evidence of heat illness, have the soldiers stop work, get into the shade, and rehydrate. Early intervention is important. Sick soldiers who are not taken care of early become more serious casualties.

d. Immediately get heat-stricken soldiers into shade and remove any heavy clothing. If they are alert and not vomiting, have them slowly drink water. They will probably need at least 3 quarts. The water should be cool but not cold. If enough disinfected water is available, wet the skin or T shirt and fan the casualty for cooling.

e. Although mild signs and symptoms may be controlled by rest, shade and water, **leaders should always seek medical evaluation for heat casualties.**

f. If incoherent or unconscious and hot, the soldier may have heat stroke or some other serious illness and must be given the highest priority for medical evacuation. Cooling the skin with cool or iced water is the quickest way of reducing body temperature.

g. For heat cramps, rehydration should be done with liquids that contain some added salt or electrolytes. If the victim can drink, give **slowly** no more than 1.5 quarts per hour using either salted water (1-2 teaspoons or packets of table salt per quart) or the oral rehydration solution described in Appendix A.

B. MOUNTAINOUS TERRAIN

While deployed to mountainous regions in Haiti, soldiers can be affected through lower oxygen in the air at higher elevations ("thin air"), and through steep and rugged terrain features. "Thin air" is a popular term used to describe reduced available oxygen caused by lower barometric pressure at increased altitude. Soldiers' bodies adjust (acclimatize) to the "thin air" by increasing breathing, heart rate, and red blood cells as well as decreasing total body fluid. When the body does not adequately adjust, soldiers experience altitude illnesses.

1. Problems with Mountainous Terrain.

The "thin air" in the mountains can cause altitude illness, disrupt sleep, and decrease physical and mental work capabilities.

a. Acute Mountain Sickness:

As many as 25% of soldiers who travel from low areas to mountains over 5,000 ft (1500 m) will develop Acute Mountain Sickness (AMS) during the first few days. The symptoms of AMS are similar to a "hangover" from drinking too much alcohol, and include headache, nausea, general weakness, and fatigue. Some soldiers may get sick enough to vomit. AMS starts 12-24 hours after arriving in the mountains. The illness will go away by itself in 1-3 days as the body adjusts to lower oxygen availability. Hard physical work during the first few days in the

mountains increases the risk of getting AMS. Being in good physical condition does not prevent it. Although AMS is not usually dangerous to a soldier's health, there is a very rare possibility that soldiers could develop a dangerous excess of fluid in their brain or lungs called "high altitude edema" which could be fatal if not treated. AMS does affect performance and, thereby, affect mission success or failure.

b. Poor Sleep

Another frequent altitude-related health problem in the mountains of Haiti is poor sleep. Soldiers may experience "bad" dreams, and episodes where they stop breathing for 15 -30 seconds while they are sleeping. Poor sleep makes soldiers tired and affects their concentration the next day.

c. Reduced Physical Capability

As a result of the "thin air", soldiers will experience a small decrease in ability to do hard physical work. Their work capacity will recover somewhat over several weeks as their bodies adapt. Likewise, performance of some mental tasks and the ability to concentrate also may be decreased, but will also recover with time.

d. Falls and Other Hazards

Rugged terrain and steep slopes in the mountains of Haiti can cause falls and other accidents. The risk of falling is especially great because the "thin air" can cause soldiers to be less careful in their activities. Soldiers can get cuts, bruises, sprains, broken bones and head injuries from falling in the mountains. Some of these injuries may be serious enough to cause death or adversely affect ability to perform duties. Lightning is a serious hazard on exposed mountain slopes. Flash floods in mountain gullies are a hazard during times of rain.

e. Dehydration

Dehydration is common in mountain operations because of the body's response to altitude, the heavy exertion of mountain travel and the increased breathing required by the reduced oxygen. Dehydration will reduce physical performance, appetite, endurance and alertness.

2. Control of Problems in Mountainous Terrain.

a. The best way to prevent altitude illnesses is to allow the body to gradually adapt to the "thin air". This can be accomplished by maintaining a slow rate of climb, or by resting for a day and a night at 5,000 ft (1500 m) before continuing to higher elevations.

b. If possible, physical activity should be limited during the first 24 to 48 hours in the mountains because it increases the risk of getting acute mountain sickness.

c. Soldiers who are prone to getting severe symptoms of altitude illness may be helped by taking acetazolamide (Diamox®) before starting up into the mountains. Side effects of acetazolamide include tingling sensations in the fingers, toes and lips. It also causes carbonated beverages such as soda-pop to taste unpleasant. At the relatively low altitudes in Haiti, it is probably unnecessary for most soldiers. Acetazolamide should only be used under medical supervision.

d. Soldiers going into the mountains should maintain adequate hydration by drinking plenty of liquids. Leaders should periodically assess hydration by checking urine color and darkness.

e. Soldiers and their leaders should take altitude-related decreased work capacity in planning work details, training and operations. Extra caution and a system of double-checking mental tasks may help prevent mistakes from decreased mental performance.

f. Soldiers must be extra cautious and vigilant to the danger of falling when walking, running or climbing in the mountains. Recreational rock or mountain climbing should be discouraged because it is not mission-essential and increases the risk of lost-duty-time injuries. Extra caution and appropriate specialized techniques should be used when rescuing injured personnel to prevent injury to the victim and rescuers.

3. First Aid for Altitude Illness.

a. Soldiers with Acute Mountain Sickness (AMS) should avoid physical exertion and not go higher in the mountains until recovery. If symptoms are severe or the soldier is vomiting, medical evaluation is necessary.

b. Soldiers who have a worsening headache, trouble walking, confusion, shortness of breath or worsening cough may have one of the life-threatening altitude illnesses or other serious condition. They should be evacuated immediately to lower altitude for medial evaluation and treatment.

C. COLD WEATHER

Although Haiti is a Caribbean island, in the higher altitudes of the northern and southern mountains, particularly in rain and during winter, significant cold exposure is possible. Soldiers operating in these areas should be prepared for nights with subfreezing temperatures and periods of prolonged wet and cold.

1. Problems with Cold Weather.

a. Cold Stress.

When cold weather draws heat form the body heat faster than the body’s ability to produce and

retain heat, body temperature decreases. To slow body heat loss, the body has responses which decrease blood flow to the arms, legs and skin. Although these responses protect the internal organs, the decreased blood flow to the hands leads to **blunted sensations of touch and pain and loss of dexterity and agility**. This can impair ability to perform manual tasks. Also, the diminished blood flow increases susceptibility of the hands, feet, ears, etc. to cold injuries.

When cold stress is particularly severe, the body uses shivering as an emergency response to try to keep body temperature up. Shivering is disabling and is a sign of serious impending cold injury.

Cold weather is often accompanied by wind, rain, snow and ice, which can worsen the effects of cold. For any given air temperature, the potential for body-heat loss, skin cooling and decreased body temperature is increased by wind and wetness.

b. Dehydration

Cold unpalatable rations, heavy work and sweating in the cold lead to dehydration, which reduces skin blood flow, and increases susceptibility to cold injury.

c. Cold Injuries

Cold injuries are a risk whenever soldiers are required to train or operate in cold conditions.

All cold injuries are serious and threaten life and limb. The serious cold injuries include:

1) Trenchfoot develops when skin of the feet and legs is allowed to remain cold and wet for prolonged periods (12 hours or longer). Numbness and a feet feeling like walking on cotton are the first signs. Soldiers whose feet do not get feeling and circulation back immediately on rewarming may have trenchfoot and need immediate medical evaluation.

2) Frostbite is actual freezing of skin. The skin becomes numb and turns a grey or waxy-white color. It is ice-cold to the touch and feels stiff or woody.

3) Hypothermia is a life-threatening condition in which body temperature falls below 95°F. Body temperature can fall even when air temperatures are above freezing if conditions are windy clothing is wet, and/or the individual is inactive. The first signs of developing hypothermia might include confusion, bizarre behavior and withdrawal from group interaction. Victims of hypothermia may be unconscious, with nearly undetectable breathing and pulse.

Factors that increase the risk of cold injury include: cold, wind, rain, sustained operations, inadequate shelter, inactivity (e.g. sentry duty), wetland operations, inadequate training and fitness, prior cold injury, poor clothing & equipment, illness, injury, fatigue, dehydration and undernutrition.

2. Control Measures for Problems of Cold Weather.

a. Operational Guidance

1) Humans do not acclimatize to cold weather as well as they acclimatize to hot weather. Proper training before deploying into cold-weather regions is more important for prevention of cold injuries than repeatedly being exposed to cold temperatures.

2) High levels of physical fitness are beneficial for soldiers participating in cold-weather operations. Maintain adequate physical fitness after deployment with maintenance programs tailored to the environment.

3) Minimize periods of inactivity in cold conditions.

4) Minimize the risk of cold injuries in fighting positions, sentry points and observation points by placing pads, sleeping bags, tree boughs, etc inside these positions to allow occupants to insulate themselves from wet ground.

5) Susceptibility to cold injuries can be minimized by maintaining proper hydration and nutrition,

6) Avoiding alcohol, caffeine and nicotine.

7) A general recommendation for soldiers participating in cold-weather operations is to consume about a half a quart (half a canteen) of water with breakfast, lunch, dinner and before going to sleep at night, with an additional half quart drunk every hour during the workday (more if the work is strenuous enough to cause the individual to sweat) for **a total of at least 5-6 quarts per day**.

8) Feet, hands and exposed skin must be kept dry. **Feet are particularly vulnerable and extra foot care is required for cold-weather operations.** Feet should be washed, dried and dusted with a dry, antifungal powder (NSN 6505-01-008-3054) daily. Socks must be changed whenever they become wet from exposure to rain or snow, or from excess sweat. This may require changing into **dry socks at least 3 times daily**. Extra socks can be air dried and then carried under BDU's to warm.

9) Prolonged exposure to cold rainy conditions risks hypothermia and trenchfoot. Dry shelter reduces the risk considerably and allows rewarming.

b. Clothing and Equipment:

1) Windproof clothing greatly reduces windchill effects. Wind-chill temperatures only estimate the danger of cooling the **exposed** flesh of **inactive** persons.

2) Keep clothing **C**lean to maintain insulation, avoid **O**verheating to avoid sweating, use **L**ayers to permit clothing flexibility and keep clothing **D**ry. (Remember C-O-L-D)

3) Sleeping bags should be shaken out before using to add air to the lining, which improves its insulation. Layers of tree boughs or mats under the sleeping bag help prevent heat loss to the ground. The head should not be put inside the sleeping bag, since moisture from the breath will accumulate in the bag. Air out the sleeping bag as often as possible to evaporate moisture.

4) Chapped lips and skin can be prevented through the use of lip balm (Cold Climate Lipstick, Antichap, NSN 6508-01-277-2903) and limiting exposure of skin to the environment. Skin moisturizing lotion may help the skin retain water.

3. First Aid for Cold Injuries.

a. Cold numb feet or hands should be rewarmed and dried immediately. If sensation and circulation do not return normally, the soldier should be evacuated for evaluation and treatment. During evacuation, prevent further cold exposure and remove wet, constrictive clothing. Cover the injury with layers of loose warm clothing (pain and blisters may develop). **Do not** pop blisters, apply lotions or creams, massage, expose to extreme heat or allow victim to walk on the injury.

b. Frozen skin should be rewarmed by skin-to-skin contact if there is no chance of refreezing. The injury should be protected form cold and the casualty evacuated.

c. In cold, wet conditions, soldiers who are shivering, withdrawn or confused may have hypothermia. They should be brought into shelter and continuously supervised while put in warm, dry clothing and blankets. Any casualty in cold wet conditions should be protected form hypothermia before and during evacuation by providing dry warm covering.

OCCUPATIONAL AND OPERATIONAL HAZARDS

Physically fit, well-trained, and well-led soldiers can succeed under the harshest circumstances.

Soldiers deployed for duty in Haiti are at high risk for stress reactions. There is a high potential for frustration due to civil disorder and the indigenous people’s quality of life in the Haiti. Experiencing frustration and stress reactions are normal, expected behavior found when people are placed In unusual or catastrophic situations. Adverse reactions can be reduced by providing soldiers with accurate mission specific information, preparation for cultural and situational differences, and preparation for exposure to traumatic events.

A. OPERATIONAL STRESS.

Soldiers need to mentally prepare for deployment. If they do not know details of their mission responsibilities, as well as the tactical situation, additional stress will occur.

1. Problems with Operational Stress.

The most common source of stress among soldiers is ambiguity concerning the mission and

length of deployment. Soldiers, asked to perform several possible missions, including peace-making peace-keeping and humanitarian missions, face unique stressors. Restoration of democracy and civil order will take time. The fact that U.S. presence will not immediately improve the situation has the potential to be frustrating and demoralizing.

Peace-making missions include the potential for combat involving U S personnel. Killing can cause a soldier to feel guilty, even when it is an armed enemy. Conversely; after being involved in several such incidents, the soldier may feel guilty about not feeling distressed. Leaders should expect individual soldiers to react strongly to the death of other unit members, especially if death is the result of sudden attacks, sniper attacks, or friendly fire incidents. Stress reactions may appear as confusion, withdrawal, and appearing emotionally exhausted.

When soldiers deploy, they leave behind their non-unit emotional support system. Families and civilian social groups (such as, church groups, athletic clubs, etc.) are no longer immediately available for emotional support during periods of stress. Lack of emotional support can lead to withdrawal, belligerence, or other combat stress behaviors.

Stress is increased by living in close quarters (aircraft, vehicles, tents, etc.) with other personnel. In addition, boredom during the operation is often an issue. Deployment interrupts daily routines, places individuals in unfamiliar surroundings, and discourages normal precautions for preventing injuries and diseases. The risk of accidental injuries, such as motor vehicle crashes, increases under these conditions.

Occasionally, soldiers experience a single critical event that produces a reaction so strong that it is persistently relived through recurrent memories, daydreams, nightmares, or flashbacks. Soldiers who have experienced a critical incident may have difficulty sleeping, be hyperalert, startle easily, or try to avoid places, sights, smells and people associated with the incident. They may not be able to express emotions easily and may feel detached from other members of the unit.

After returning home, soldiers are often expected to return to duty quickly as though "nothing has changed." Until they talk to nondeploying personnel, soldiers may not recognize how much they have changed. Other soldiers (who did not deploy) may not understand how the deploying soldier feels upon returning. This can leave the soldier feeling isolated and alienated.

2. Countermeasures for Operational Stress.

a. Educate soldiers.

Rumors are common before deployment. Accurate information should be provided to soldiers and their families so they have appropriate expectations and will be psychologically prepared. Transmission of information from the chain of command should be scheduled on a routine basis so that soldiers will learn to rely on official sources, rather than rumor. Information about

mission background, the rules of engagement, the length of deployment, the culture of the country of deployment, the disease threat, etc. will give soldiers a concrete focus for plans and actions.

b. Continue training.

Training for current and future missions should not stop in country. Well-learned and practiced skills are less disrupted by stress. Realistic training builds confidence, improves cohesion and prevents boredom. Training can counteract the strong feelings which may erupt when soldiers are confronted with noncombatants who have been abused by various warring factions.

c. Live as a team.

Soldiers should be encouraged to handle issues (lack of privacy, personality conflicts, alienation, etc.) early, openly and as a team. A simple self-check and buddy-check system can identify and reduce the incidence of stress and increase overall unit effectiveness.

d. Maintain unit cohesion.

Cohesive, well-disciplined units have fewer severe stress reactions. Methods to improve teamwork and unit effectiveness will also prevent stress reactions. Soldiers should routinely debrief each other after an operation, and discuss what they saw and how they felt. Soldiers who have strong emotional reactions to traumatic events should be treated as soldiers, not as casualties, and kept with the unit.

e. Manage contacts with the injured, dead, and dying.

Soldiers who are caring for the seriously ill and wounded should have opportunities to take regular breaks away from the action. Soldiers who handle the dead should attempt to insulate themselves from the task. They should not look at faces and not learn names or other personal information about the victims. Soldiers should put mental and physical barriers between themselves and the dead and finish the job quickly. Soldiers who say they cannot handle such duty should be excused. Soldiers should work in pairs; experienced soldiers should be paired with inexperienced ones.

f. Schedule recreation.

Maintaining physical fitness and engaging in recreational activities reduces stress. Recreational activities which include units of other cooperating nations' forces will also serve to introduce soldiers to each other, prevent friction, and reduce hostility.

h. Deliver mail.

Leaders should ensure that the unit's system for distributing mail is quick, efficient and effective. In particular, pay vouchers should be distributed in a timely manner.

I. Allow decompression time.

Upon redeployment to their home station, soldiers need time to relax and adjust to normal routines. Units should encourage soldiers to take leave.

B. FAMILY MATTERS

1. Problems with Family Separation

Deployment is a time of anxiety for many families. The need to write wills, prepare powers of attorney, etc. and efforts to plan for all potential disruptions during the deployment is at best a sobering experience. Families who know significant events are imminent, such as the birth of a child or the death of a parent, have special needs. Separation due to deployment creates a more emotional family situation with greater needs for reassurance and confidence. Family members may express their fear by acting angry or resentful.

Unresolved domestic problems distract the soldier. Single soldiers, newlyweds, and single parents need to make different adjustments to deployment than those who have had time to evolve stable unit relationships and adequate family support. Soldiers will be concerned about the adequacy of the resources available to their families during their absence. Women soldiers may feel additional pressure to defend their decision to leave their families and serve in the Army. Recent mothers may experience extended post-partum depression. Soldiers often will not be able to explain emotions caused by family-related stress. They may be irritable, nervous, inattentive and have difficulty sleeping.

Soldiers returning from stressful duty often expect their families and friends to be just like they were when the soldier left. Families and friends change as they adjust to the absence of the soldier. They may become more self-reliant or they may begin to depend on another family member or friend. Clothing fashions change, and children grow. Therefore, even the personal appearance of friends and family may be different. Some soldiers may feel confused and disoriented.

2. Countermeasures for Family Problems.

a. Make family members self-sufficient.

Insure that families have the information and skills they need to manage their own and the soldier's personal affairs. Discuss routine responsibilities and the handling of minor emergencies. Build confidence by practicing these skills before the soldier deploys. Soldiers must be patient and mature. Soldiers who normally find it difficult to express their care and concern, should work

to find simple ways to reassure family members.

b. Contact family support groups.

Soldiers should introduce their family members to available support groups (parents of soldiers, spouses of both genders and children of all ages should be included). Leaders should insure that support group members understand the need to provide support to those who need it most, regardless of rank, shyness, or distance from post.

c. Keep families and friends informed.

Efficient and effective official lines of communication with the home-base rear detachment should be established promptly. Soldiers should be encouraged to write home. Unofficial communication, such as a unit newsletter written by deployed soldiers, can be effective in reducing rumors back home and families' fears about their loved one's living and working conditions.

d. Plan reunions.

Soldiers should discuss how they will talk with family members about what they have seen and felt, how family members may have changed while they have been apart, and the likelihood that families will not understand what the soldiers have experienced. Units that establish relationships with relief workers or local nationals should plan ways to reestablish communication with them after the return home.

e. Maintain networks.

Family support groups should not dissolve when soldiers come home. They can be useful in helping families deal with reunion stress.

C. FATIGUE

Soldiers do more work, and perform better when they are rested. Mental or cognitive performance is affected by sleep loss earlier than physical performance. Sleepy soldiers do not always think clearly, plan effectively, or follow procedures correctly. A 25% decline in effectiveness can be expected for every 24 hours without sleep. Performance on monotonous or repetitive tasks is degraded first. Symptoms of sleep loss include extreme sleepiness, lapses in attention, irritability, lack of initiative, susceptibility to accidents and decreased attention to self-care. All soldiers are affected by sleep loss, but leaders and command/control personnel who deal with many cognitive tasks and complex decision making are most vulnerable. Soldiers who are rested are less susceptible to disease and heal more quickly when injured.

Soldiers' perceived need for sleep will increase between the hours of 1430 to 1700 and again in a more pronounced way, from 0100 to 0500. If soldiers stay awake through the night, they will experience changes of decreased mood. attitudes and motivation from 0100 to 0500. The greatest

deficits in attention. reasoning and mental performance are likely to occur during this time.

2. Countermeasures for Fatigue

a. Manage work/rest schedules.

Once at their destination, soldiers should sleep under conditions that maximize the amount of rest they get. Sleep is improved by providing familiar surroundings, mild temperatures, darkness, quiet, space to lie down, a padded surface, and sleeping areas separate from the work site.

For soldiers who will be assigned to work or fight at night, several days to a week of operating at night and sleeping during the day are recommended to allow for circadian rhythm adjustments to new work schedules. The greatest disruption in night fighter performance is usually attributable to poor quality day-time sleep, which tends to be intermittent and restless. Command attention should be given to ensuring night fighters have adequate time for day-time sleep and to providing the best possible conditions to permit that sleep to be restful.

b. Minimize sleep loss.

Six to eight hours of sleep in each 24 hr day are optimal. Reasonable levels of productivity can be maintained for 2 to 4 days with four to five hours sleep per night. Taking naps of 1 to 2 hrs when safely permissible should be encouraged. Even 10 to 15 minute power naps are often helpful.

Sleep discipline SOPs should include provisions for recovery from sleep loss. Twelve hours of rest (including at least 8 hours of sleep) are needed after 36-48 hours of being continuously awake. Two to three days of rest or light duty (including at least 8-10 hours sleep per day) are required to restore optimum performance after 72-96 hours of being continuously awake.

D. ACCIDENTS AND INJURIES

1. Problems with Accidents and Injuries.

Accidents and Non-Combat injuries result in many fatalities and many days of limited duty These accidents are all largely preventable. Previously identified causes of accidents during deployment include:

a. Abandonment of safety practices during the early phases of deployment result in a higher frequency of accidents and non-combat injuries.

b. Primitive roads and total lack of traffic control increase the likelihood of motor vehicle accidents.

c. Athletic injuries resulting from both physical training and recreation are a large source of

preventable injury.

d. Improper grounding procedures for electrical equipment and antennas may result in electrocution.

e. Improper handling of weapons and ordnance (both U.S. and leftover ordnance from previous conflicts) causes injuries.

f. Failure to wear proper eye protection against the sun and against operational hazards increase the rates of eye injury.

2. Control Measures.

a. Plan unit missions and work with safety in mind.

b. Train unit personnel in proper use of equipment and safety procedures.

c. Establish system to identify potential sources of accidents.

d. Stress adherence to safety standards and procedures. **Emphasizing safety will enhance unit readiness and efficiency.**

e. Designate safety personnel.

f. Emphasize motor vehicle safety: i.e., safety belts and restraints, horseplay, speed limits.

g. Avoid overtraining and minimize aggressiveness in sports.

h. Enforce weapon safety procedures. Establish and enforce ordnance handling and disposal policies.

I. Make appropriate eye protection available and ensure proper usage.

NUTRITION: FOOD and WATER

Good feeding practices in the field maintain and enhance physical performance and morale and significantly contribute to mission accomplishment. Military leaders must ensure that soldiers know the importance of food and water. Unit leaders should watch to see what their personnel are eating or failing to eat. Do not assume that a meal issued is a meal fully consumed. Leaders should monitor food service areas to see which foods are being eaten and which are being discarded. It is difficult to fix a problem which is not recognized. Control the use of "pogey-bait" and non-issue food. These items should not be considered as a replacement for more nutritious rations.

Meals should also be considered for motivational and morale purposes. Leaders should try to

establish regularly scheduled meal times, even when MREs are the only food. Food intake is almost always higher at scheduled meals compared to impromptu meals. Additionally, soldiers tend to eat more when they are in a social group for meals. Hot meals will improve morale and increase food intake. If possible, try to schedule at least one hot meal per day.

A. FOOD

1. Problems with Food.

a. Although appetite decreases in operations, the number of calories required to function increases. Additionally, soldiers often voluntarily reduce food intake when deployed to the field due to poor ration palatability, menu boredom, lack of water, lack of designated meal periods, lack of time to prepare meals, anxiety, and other factors. Lack of appetite is particularly a problem during the first few days of hot weather operations.

b. Almost half of the daily fluid intake is consumed during mealtimes. Food can also be a significant source of water and decreased food intake is usually accompanied by decreased water intake. There is also an increased water loss associated with using body tissue to make up for low food intake. Decreased food intake will contribute to dehydration.

c. Inadequate food intake and weight loss will impair physical and mental performance and increases the risk of infection.

d. Inadequate food intake may result in salt deficiency and increases the risk of heat illness.

2. Control Measures for Food.

a. Accentuate the positive aspects of the rations; food and water are tactical weapons. Attempt to schedule meal times, even when MREs are the only food. Soldiers tend to eat more when eating in small groups.

b. MREs and other military rations will provide all the salt required in the heat. Soldiers can add some salt to their food to insure adequate salt intake during the initial 7 days of heat acclimatization. Do not allow the use of salt tablets unless recommended and supervised by medical personnel.

c. Do not allow non-issue food to replace more nutritious rations.

d. It is important to provide protection from sand and dust during meal preparation. This will avoid many diarrheal diseases.

e. **Do NOT allow service members to store any MRE component if the component's packet has been opened.**

B. WATER

1. Problems with Water.

a. Water requirements are increased in hot environments due to high sweat rates. Thirst is not a good indicator of adequate fluid intake. Even mild dehydration can affect physical performance, mood and appetite, and will increase the risk of heat illness.

b. All water must be considered contaminated and must be adequately treated before consumption to prevent water-borne illnesses.

2. Control Measures.

a. Maintain adequate hydration. Plain, cool (60-70°F, 16-21°C) water is an ideal beverage for maintaining adequate hydration. Flavored cool water is voluntarily consumed in larger amounts than plain water. Any type of beverage consumed will help soldiers meet their water requirements (e.g., Kool-aid, sports drinks, juice, decaffeinated coffee, soft drinks, lemonade, soup, milk).

b. Do not add beverage flavoring directly to bulk water storage containers. They reduce the effectiveness of water disinfectants.

c. Alcohol or caffeine beverages will increase urination and dehydration. Carbonated beverages may reduce fluid intake due to the feeling of fullness.

DO NOT ALLOW CONSUMPTION OF LOCAL WATER OR ICE.

C. WATER SUPPLY

1. Problems with Water Supply.

a. Many problems surround the production, delivery and maintenance of drinkable water. All of the problems can be avoided by proper planning and strict adherence to established procedures.

b. During initial deployment phases, the chlorination of water will likely contribute to voluntary dehydration until soldiers get used to the taste. Added to this will be the increased requirements for water due to the heat. As may be seen in Appendix B, personnel will require as much as 15 quarts of water per day just to replace water lost through sweat.

c. **None of the water in Haiti can be considered safe**. All local water supplies are likely to be infected with bacteria, viruses, and parasites which will cause numerous diseases, especially diarrhea.

d. Flooding, poor hygienic and waste disposal practices will increase the contamination. Mere contact with contaminated water can cause disease (i.e., Schistosomiasis) through penetration of the skin by waterborne parasites.

DO NOT USE LOCAL WATER FOR ANYTHING.

Consider all local, non-U.S. military water supplies to be contaminated. This means that even water for washing, shaving and all other purposes must be disinfected prior to use.

2. Control Measures for Water Supply.

a. Use only water from approved U.S. military water points. Even this water should be checked by the individual unit for contamination.

b. Secure all water sources; treat water and water supplies as you would any critical tactical resource. Be sure of your water supply: it is the most basic need in hot climates.

c. Animals will attempt to lick the spouts from any water source. This may contaminate the spout and infect the next person drinking from it. Protect water sources from animals.

d. Ice made in Haiti should be considered contaminated because the disinfectant will be frozen out of the solution during the freezing process. Field ice and local ice should be considered dangerous and not consumed or used to cool water.

It is extremely important not to provide food (such as left over MRE items) to severely malnourished people. Make donations through established relief organizations.

TIPS FOR GETTING ALONG IN HAITI

Be informed; learn about the Haitian culture and current situation.

Leftover MRE's and other food items should be donated to local food collection agencies for distribution by relief organizations. A premature introduction of high energy, high protein food to malnourished people, particularly children, can be dangerous.

Haitians at all levels are very sensitive to how they are treated by foreigners, commonly called "blanc". If you treat them with warmth and consideration, they will respond with enthusiasm and friendship. There is no innate hostility towards "blanc".

Eye contact is important and it is not avoided as in some other countries.

Humor plays an important role in social interactions. Smiling and laughing are essential to successful relations.

It is important to recognize the presence of each person in a social encounter, either with a handshake or a nod.

Haitians appreciate good manners. Learn some basic terms such as "bon jour" to greet someone before 1200 hours, "bon soir" to greet someone anytime and "merci" to express thanks.

APPENDICES

APPENDIX A: RECIPES FOR REPLACEMENT FLUID

APPENDIX B: HOT WEATHER WORK/REST and WATER CONSUMPTION RECOMMENDATIONS

Use of Work-Rest and Water Consumption Tables

APPENDIX A

RECIPES FOR REPLACEMENT FLUID

Field Expedient Recipes

a) Fluid replacement: Add to a 1 quart canteen of water: 1 MRE table salt packet (4.0 grams of NaCl) and 1 MRE packet of beverage base powder (28 grams of sugar).

b) Potassium replacement: After prolonged vomiting and diarrhea have occurred potassium replacements may be beneficial. The MRE cocoa beverage powder is a good source of potassium. Add to a 1 quart canteen of water: 2 MRE cocoa beverage packets (60 grams of sugar, 1.7 grams of KCL equivalent).

Garrison Recipe

One cup (8 ounces) of fruit juice (orange or apple) with one half teaspoon of sugar or honey and a pinch of salt, followed by one cup of water with a quarter teaspoon of baking soda added. Drink this combination until thirst is quenched.

Medic Recipe (Prepared by Medical Personnel)

Add to 1 liter (1 quart) of water 3.5 gram table salt (NaCl), 2.5 gram baking soda ($NaHCO_3$), 1.5 gram potassium salt (KCL), and 20.0 gram sugar (glucose) and drink as

APPENDIX B

HOT WEATHER WORK/REST and WATER CONSUMPTION RECOMMENDATIONS

Use of Work-Rest and Water Consumption Tables

a. In contrast to the guidance provided in FM 21-10, the tables provided here contain guidance tailored for dry environments. The tables also contain guidance for a wider variety of work intensities (very light to heavy) and clothing ensembles than is normally provided. Remember that these are average guidelines derived from a mathematical model which was developed from actual measurements in a large population of test subjects. Individual requirements and capabilities may vary widely. It is more important that leaders understand the trends (and underlying principles) presented in the tables than that they follow the guidance exactly. THE TABLES ARE NOT INTENDED TO BE A SUBSTITUTE FOR COMMON SENSE.

b. Be aware that the charts sometimes recommend hourly drinking of larger amounts of water than can possibly be absorbed during an hour. The maximum sweating rate (approx. 2.1 qts/hr), which is closely related to the maximum water requirement, is higher than the rate of water absorption from the gut (approx. 1.5 qts/hr). Whenever input of water fails to keep up with output of sweat the body will become progressively dehydrated. This can be tolerated for limited periods of time (at a penalty in health and performance), but eventually the deficit must be made up. LEADERS SHOULD PLAN FOR AN EXTENDED REST AND REHYDRATION PERIOD WHENEVER THE TABLES ADVISE DRINKING MORE THAN 1.5 QUARTS PER HOUR.

The following recommended work/rest cycle and water consumption tables are applicable only to soldiers who are:

(1) Adequately hydrated to begin with (not dehydrated by more than 2% of body weight).

(2) Fully acclimatized (7-12 days working in the heat).

(3) Adequately rested (6 hours sleep the previous sleep period).

KEY TO TABLES B-1 TO B-5

WBGT - Wet Bulb Globe Temperature (°F)
Ta - Ambient Temperature (dry bulb -°F)
VL - Very Light Work Intensity
L - Light Work Intensity
M - Moderate Work Intensity
H - Heavy Work Intensity
DBDU - Desert Battle Dress Uniform
NL - No Limit (continuous work possible)
NF - Work/rest cycle not feasible (see Maximum Work Time - Table B-4)

Table B-1: Work Intensities of Military Tasks

WORK INTENSITY	ACTIVITY	WORK INTENSITY	ACTIVITY
VERY LIGHT	Lying On Ground Standing in Foxhole Sitting In Truck Guard Duty Driving Truck	**MODERATE**	Walking Loose Sand 2.3 mph No Load Walking Hard Surface 3.5 mph No Load Calisthenics Walking Hard Surface 3.5 mph 20 kg Load Scouting Patrol Pick and Shovel Crawling Full Pack Foxhole Digging Field Assaults
LIGHT	Cleaning Rifle Walking Hard Surface 2.3 mph No Load Walking Hard Surface 2.3 mph 20 kg Load Manual of Arms Walking Hard Surface 2.3 mph 30 kg Load		
Note: The work activities in each work rate category have different degrees of exertion which are ranked in order of difficulty. When using work-rest recommendations leaders should always take these differences into account and use increased proportions of rest for more strenuous activities.		**HEAVY**	Walking Hard Surface 3.5 mph 30 kg Load Walking Hard Surface 4.5 mph No Load Emplacement Digging

Number of Minutes of Work per Hour in Sustained Work/Rest Cycle

			Desert BDU				DBDU + Flak Vest				Aircrew Flight Suit			
WBGT	**Ta**	**RH**	**VL**	**L**	**M**	**H**	**VL**	**L**	**M**	**H**	**VL**	**L**	**M**	**H**
82	82.9	75	NL	NL	NL	25	NL	NL	NL	29	NL	NL	NL	31
86	87.1	75	NL	NL	33	21	NL	NL	NL	25	NL	NL	NL	27
88	89.2	75	NL	NL	29	18	NL	NL	37	23	NL	NL	39	24
90	91.3	75	NL	NL	25	16	NL	NL	32	20	NL	NL	34	21
98	99.7	75	NL	NF	NF	NF	NL	16	6	NF	NL	17	6	NF
100	109	50	NL	NF	NF	NF	NL	23	10	5	NL	20	9	5

This table provides, for four levels of work intensity (see table B-1) the number of minutes work per hour in work rest schedules tailored to the conditions specified. Spend the remainder of the hour in rest. This table was prepared using the prediction capability of the USARIEM Heat Strain Model. Assumptions used in generating this table include: 1) Troops fully hydrated rested and acclimatized; 2) Windspeed = 5.5 meters/sec; 3) Clear skies (full solar load); 4) Heat casualties < 5%. This guidance should not be used as a substitute for common sense or experience. Individual requirements may vary greatly. Appearance of heat casualties is evidence that the selected work-rest cycle is inappropriate for the conditions.

Table B-3

Water Requirements to Support Sustained Work/Rest Cycles [Qts/Hr]

			Desert BDU				DBDU + Flak Vest				Aircrew Flight Suit			
WBGT	**Ta**	**RH**	**VL**	**L**	**M**	**H**	**VL**	**L**	**M**	**H**	**VL**	**L**	**M**	**H**
82	82.9	75	0.4	0.7	1.2	0.9	0.3	0.6	1.0	1.0	0.3	0.5	0.9	0.9
86	87.1	75	0.5	0.8	1.0	0.9	0.4	0.7	1.2	0.9	0.4	0.7	1.0	1.0
88	89.2	75	0.6	0.9	1.0	1.0	0.5	0.8	1.0	1.0	0.5	0.8	1.0	1.0
90	91.3	75	0.7	1.0	1.0	1.0	0.6	0.9	1.0	1.0	0.6	0.8	1.0	1.0
98	99.7	75	1.2	NF	NF	NF	1.0	1.1	1.1	NF	1.1	1.2	1.2	NF
100	109	50	1.3	NF	NF	NF	1.1	1.3	1.3	1.3	1.2	1.3	1.3	1.3

Amounts listed are required to support work/rest schedules in Table B-2; drinking should be divided over the course of each hour. Use Table B-5 to determine water required to support maximum continuous work times shown in Table B-4. This guidance was prepared using the USARIEM Heat Strain Model; assumptions used in generating this table include: 1) Troops fully hydrated, rested and acclimatized: 2) Windspeed = 5.5 meters/sec; 3) Clear skies (full solar load); 4) Heat casualties < 5%. This guidance should not be used as a substitute for common sense or experience. Individual requirements may vary greatly. Appearance of heat casualties is evidence that the selected work-rest cycle is inappropriate for the conditions.

Table B-4:

Maximum Continuous Work Times [minutes]

			Desert BDU				DBDU + Flak Vest				Aircrew Flight Suit			
WBGT	**Ta**	**RH**	**VL**	**L**	**M**	**H**	**VL**	**L**	**M**	**H**	**VL**	**L**	**M**	**H**
82	82.9	75	NL	NL	NL	61	NL	NL	NL	76	NL	NL	NL	83
86	87.1	75	NL	NL	104	51	NL	NL	NL	63	NL	NL	NL	69
88	89.2	75	NL	NL	85	46	NL	NL	135	57	NL	NL	209	62
90	91.3	75	NL	NL	71	42	NL	NL	99	51	NL	NL	116	55
98	99.7	75	NL	78	41	27	NL	105	46	31	NL	102	46	31
100	109	50	NL	77	41	27	NL	125	50	34	NL	112	49	33

This table provides, for four levels of work intensity (see Table B-1) the maximum number of minutes work that can be sustained in a single work period without exceeding a greater than 5% risk of heat casualties. This table was prepared using the prediction capability of the USARIEM Heat Strain Model. Assumptions used in generating this table include: 1) Troops fully hydrated rested and acclimatized; 2) Windspeed=5.5 meters/sec; 3) Clear Skies; 4) Heat casualties < 5%. The guidance should not be used as a substitute for common sense or experience. Individual requirements may vary greatly. The appearance of heat casualties is evidence that the safe limits of work time have been reached.

Table B-5

Water Requirements for Maximum Continuous Work [Qts/Hr]

			Desert BDU				DBDU + Flak Vest				Aircrew Flight Suit			
WBGT	**Ta**	**RH**	**VL**	**L**	**M**	**H**	**VL**	**L**	**M**	**H**	**VL**	**L**	**M**	**H**
82	82.9	75	0.4	0.7	1.2	1.7	0.4	0.6	1.1	1.6	0.3	0.6	1.0	1.4
86	87.1	75	0.5	0.9	1.4	2.0	0.5	0.8	1.3	1.8	0.5	0.7	1.2	1.7
88	89.2	75	0.6	1.0	1.5	2.0	0.6	0.9	1.4	1.9	0.5	0.8	1.3	1.8
90	91.3	75	0.7	1.1	1.7	2.0	0.6	1.0	1.5	2.0	0.6	0.9	1.4	1.9
98	99.7	75	1.3	1.8	2.0	2.0	1.1	1.6	2.0	2.0	1.2	1.6	2.0	2.0
100	109	50	1.4	1.8	2.0	2.0	1.2	1.6	2.0	2.0	1.3	1.7	2.0	2.0

Amounts listed are required to support continuous work times in Table B-4; drinking should be divided over the course of each hour. If water requirement is 2.0, sweat loss is greater than maximum water absorption during an hour, and troops will become increasingly dehydrated regardless of amount drunk; leaders should plan for an extended rest and rehydration period at work completion. This table was prepared using the prediction capability of the USARIEM Heat Strain Model; assumptions used in generating estimates include: 1) Troops fully hydrated, rested and acclimatized: 2) Windspeed = 5.5 meters/sec; 3) Clear skies (full solar load); 4) Heat casualties < 5%. This guidance is not a substitute for common sense or experience. Individual requirements may vary greatly. Appearance of heat casualties is evidence that the selected work-rest cycle is inappropriate for the conditions.

APPENDIX C

TIPS FOR MEASUREMENT OF WET BULB GLOBE TEMPERATURES (WBGT)

a. WBGT measurements must be made at a point 4 ft above ground level.

b. If the WBGT Kit (NSN 6665-01- 109-3246) is used, care must be taken to ensure that the natural wet bulb is clean as well as wet. Sand and grit can affect the measurement made with this instrument; be sure to clean and wash it regularly.

c. If the Wet Globe Temperature (WGT) Kit (i.e. Botsball; NSN 6665-01-103-8547) is used, a correction procedure is required (Ref. message SGPS-PSP 23 May 1990):

WBGT = 0.8 X WGT I 0.2 X Dry Bulb

where Dry Bulb may be measured by removing the dial thermometer from the WGT Botsball and reading the air temperature after 3 minutes (shading the sensor from direct sunlight).

References

FM 10-52, Water Supply in Theaters of Operations. 11 JUL 90

FM 20-31, Electric Power Generator in the Field. 9 OCT 87

FM 21-10, Field Hygiene and Sanitation, 22 NOV 88

TB MED 507, Occupational and Environmental Health Prevention, Treatment and Control of Heat Injury, 25 JUL 80

TRADOC PAM 525-11, Near Term Water Resources Management. 15 JUN 81

GTA 8-5-45, Heat Injury Prevention and First Aid, AUG 85