CAUTION — persons with heart problems or those on a low sodium diet who work in hot environments should consult a medical professional about what to do under these conditions. Salt replacement should not be considered for any of the above illnesses unless advised by a health care practitioner.

For additional information and assistance, contact:

» Your local MSHA office

» Metal/Nonmetal Mine Safety and Health
Arlington, Virginia
202-693-9630

» Coal Mine Safety and Health
Arlington, Virginia
202-693-9510

» Pittsburgh Safety and Health
Technology Center
Pittsburgh, Pennsylvania
412-386-6901

U.S. Department of Labor
Mine Safety and Health Administration
Visit our Web site at www.msha.gov

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HEAT INDEX
% Relative Environmental Temperature in °Fahrenheit

Humidity	70	75	80	85	90	95	100	105	110	115	120
0%	64	69	73	78	83	87	91	95	99	103	107
10%	65	70	75	80	85	90	95	100	105	111	116
20%	66	72	77	82	87	93	99	105	112	120	130
30%	67	73	78	84	90	96	104	113	123	135	148
40%	68	74	79	86	93	101	110	123	137	151	
50%	69	75	81	88	96	107	120	135	150		
60%	70	76	82	90	100	114	132	149			
70%	71	77	85	93	106	124	144				
80%	71	78	86	97	113	136					
90%	71	79	88	102	122						
100%	72	80	91	108							

For example: *A temperature of 90°F combined with a humidity reading of 90 percent can yield a heat index reading of 122°F. If full sun exposure is added to the temperature/humidity mix, the heat index can rise even higher.* ***Note – Keep in mind the following cautionary guidelines for heat indexes:***

94° to 104°F – Heat cramps or heat exhaustion is possible.
105° to 130°F – Heat cramps or heat exhaustion is likely; heat stroke is possible.
131°F or higher – Heat stroke is highly likely.

Heat Stress

Health Hazard Information Card HH-20

Heat stress is a dangerous condition that causes reduced energy, slowed reaction times, distraction from the task, decreased efficiency, increased risk of accidents, and overall loss of productivity.

Muggy weather (high temperatures and humid air) and a hot environment underground are the two main causes of heat stress to mine workers.

Body heat (about 90 percent) is produced in the torso area. Since heat travels from hot to cold, body heat is carried away by the movement of cooler outside air. As the body works harder, more internal heat is generated. The body reacts by dilating blood vessels and sweating. Sweat evaporates from skin, in warm dry air, cooling the body very effectively. **But**, as humidity rises, perspiration cannot evaporate, as the air is already saturated. With no further natural mechanisms to release heat, the body can develop heat stress reactions.

The range of heat-related effects – in order of severity, symptoms, methods of prevention, and treatment are:

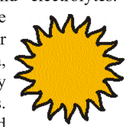
- **Heat rash**, also known as prickly heat, is likely to occur in hot, humid environments where sweat is not easily removed from the skin by evaporation and the skin remains wet most of the time. The sweat ducts become plugged and a skin rash soon appears. Loose garments and good personal hygiene are the best prevention.

- **Heat fatigue** occurs when workers unaccustomed to prolonged heat exposure are particularly susceptible to mental and/or psychological strain. Great effort should be made to moderate the heat in the work areas, or to reduce workers' time in hot places, or to acclimatize (gradually accustom to heat) workers. If work in hot places cannot be abated, then the strain can be minimized if acclimatization is spread over a 5 to 7-day period. With each succeeding daily exposure, the body becomes more acclimated to the heat. The key to adaptation is fluid intake – 8 ounces every fifteen minutes, one quart an hour, two gallons during an 8-hour shift.

- **Heat syncope** is a sudden dizziness experienced after exercising in the heat. Symptoms are cool, moist skin, weakened pulse, and feeling faint, but body temperature remains normal.

- **Heat cramps** are painful spasms of the muscles following strenuous activity and profuse sweating. The skin is moist and cool, body temperature is mostly normal, and the pulse is normal to slightly raised. These cramps may occur during or after work hours and can be relieved by drinking lightly salted liquids or commercially available liquids containing electrolytes.

- **Heat exhaustion** is caused by the loss of large amounts of fluid and electrolytes. A worker may experience extreme weakness or fatigue, giddiness, nausea, or headache. The victim may vomit or lose consciousness. The skin is clammy and moist, the complexion is pale or flushed, and the body temperature is normal or only slightly elevated.



If you suspect someone is suffering from heat exhaustion,

DO:

- ✓ Remove the victim from the heat.
- ✓ Apply cool wet cloths.
- ✓ Fan the victim, but STOP if goose bumps or shivers develop.
- ✓ Give water if victim is conscious.
- ✓ Seek medical attention if there's no improvement.

DON'T:

- ✗ Give any stimulant, alcohol, or cigarettes.
- ✗ Apply ice directly to the skin.
- ✗ Allow the victim to become so cold that shivering starts.
- ✗ Leave the victim alone.

Heat stroke can be LIFE-THREATENING! It occurs when the body's temperature regulatory system fails. A heat stroke victim's skin is hot and usually dry, red, or spotted. Body temperature is usually 104 degrees Fahrenheit (40 degrees Celsius) or higher and the victim is mentally confused, delirious, or perhaps in convulsions. Immediate first aid and medical care are necessary to prevent permanent brain damage or death. A person with signs or symptoms of heat stroke requires immediate hospitalization. If heat stroke is suspected,

DO:

- ✓ Remove the victim from the heat.
- ✓ Remove victim's clothing.
- ✓ Place him/her in a cool bath, if possible, or apply cool compresses to the body.
- ✓ Seek medical attention immediately.

DON'T:

- ✗ Give fluids.
- ✗ Give aspirin or any other medications to lower the fever.
- ✗ Give any stimulant, alcohol, or cigarettes.
- ✗ Apply ice directly to the skin.
- ✗ Allow the victim to start shivering.
- ✗ Leave the victim alone.

To avoid heat-stress illness, management needs to:

- ✓ have plenty of fluids available (for drinking and for cooling body temperatures by sponging off);
- ✓ arrange for workers' gradual acclimatization;
- ✓ allow more rest breaks in cool, shady areas; and
- ✓ ensure that an adequate number of employees are trained in and available to give first aid.

To avoid heat-stress illness, workers need to:

- ✓ drink fluids often;
- ✓ gradually build up tolerance for warmer conditions;
- ✓ stay fit; don't overestimate personal fitness levels;
- ✓ be mindful of any medical conditions that may affect heat tolerance;
- ✓ be aware of the effects of any medications being taken; and
- ✓ dress appropriately within the guidelines of safety.