1 Status

1.1 Update of existing policy, effective 06/03/11.

2 Purpose

2.1 Cianbro work environments often include team member exposure to adverse temperature conditions. Exposure to heat and cold extremes can be disastrous. Heat stress and frostbite are serious business and require prior planning and hazard elimination. This policy is designed to help you identify and prevent extreme body temperature changes.

3 Applicability

3.1 This policy applies to all subsidiary companies and departments of The Cianbro Companies.

3.2 All organizations are required to comply with the provisions of this policy and procedure. Any deviation, unless spelled out specifically in the policy, requires the permission of the Corporate Safety Officer or designee.

4 Definitions

4.1 Acclimatization: The process of adjusting to a chronic change in the environment.

4.2 Apparent Temperature: A measure of relative discomfort due to combined heat and high humidity.

4.3 Papule: A solid and usually small elevation of the skin. They often occur in clusters and can accompany rashes.

5 Policy

5.1 Prior to any work in hot or cold environments a hazard analysis will be developed in our daily activity plan for these extreme life threatening conditions. The plan must meet the requirements contained within this policy.

6 Responsibilities

6.1 Corporate Safety is responsible for maintaining this document.

6.2 The top Cianbro manager of the job site is responsible for the implementation of this policy on the project.
7 Exposure to Heat and Cold Index

7.1 Heat Stress Emergencies

7.1.1 The best thing about heat stress is that it can be prevented. All it takes is a little education and effort. Whether it is on hot, humid days with no breeze, warm inside working areas, or in confined spaces, anyone can be affected by the heat. When you anticipate heat stress to be a factor, have team members complete the heat stress medical questionnaire SD1072 available out on Cianbro.net>Standard Operating Procedures - on the SOP. The questionnaire and heat acclimatization schedules are available out on Cianbro.net. The questions take very little time to answer, are easy to complete and will provide you with information to help you know what to look out for and what to do for individual team members. Some tips to help you avoid heat emergencies are as follows:

- Address heat stress in the activity plan.
- For apparent temperatures of 95°F or above specified mandatory breaks are required.
- Train team members to recognize the symptoms of a heat illness and what to do if they experience any of the symptoms.
- Select light colored clothing and cover as many exposed areas as possible.
- Wear a ventilated hat whenever possible. Cianbro hard hats are designed to allow circulation underneath.
- Drink at least 1-2 cups of water every 20 minutes and stay away from alcoholic/caffeinated beverages and salt tablets. Carbohydrate-electrolyte beverages such as Gatorade or Sqwincher can be used.
- Keep in good physical condition and maintain a reasonable diet (avoid eating large or heavy meals before or during work) if heat stress is a concern.
- If you begin to feel faint, Stop! Rest in a cool place out of the sun. If possible, limit activities that are in direct sunlight.
- Look at creative ways to cool work area such as fans, tarps for shade, PAPR's, etc.
- If you choose to lie in the sun or need to work in the sun, be sure to wear a sunscreen and limit your exposure time. Don’t forget to reapply as directed by the manufacture.
- Use general ventilation to dilute hot air with cooler air (generally cooler air that is brought in from the outside). Portable or local exhaust systems may be more effective or practical in smaller areas.
- Increase airflow using fans. Changes in airflow can help team members stay cooler because it will increase the exchange of heat between the skin surface and the surrounding air. Do not use this method if temperatures exceed 95°F and the relative humidity is 100%: increasing airflow under these conditions will increase risk of heat stress.
- Shielding can be used to reduce radiant heat. Polished surfaces make the best barriers, although special glass or metal mesh surfaces can be used if visibility is a problem. The surface of the shield should be kept clean to maintain its effectiveness.
7.1.2 Heat Stroke
Heat stroke is life threatening. The victim's temperature control system, which produces sweating to cool the body, stops working. The body temperature can rise so high that brain damage or death may result if the body is not cooled quickly.

Signs and Symptoms - any one or combination of the following:
- Oral temperature above 103°F
- Severe headache
- Irrational behavior, confusion
- Fast, shallow breathing
- Red, hot, dry skin
- Fast, weak pulse
- Vomiting
- No sweating
- Dilated pupils

Treatment:
- Call for medical assistance immediately
- Move the person to a cool place
- Have the person lie down with feet slightly elevated (8 to 12 inches)
- Loosen tight clothing
- Remove perspiration-soaked clothing
- Apply cool wet towels to the skin
- Fan the person
- If the person is conscious, give SMALL (4 oz. every 15 minutes) amounts of cool water to drink

Note: If the person refuses water, vomits or starts to lose consciousness
- Place the person on their side
- Continue to cool the person by using ice or cold packs on their wrists, ankles, groin and neck and in their armpits.

Regardless of team member's protests, no team member suspected of being ill from heat stroke should be sent home or left unattended unless a physician has specifically approved such an order.

7.1.3 Heat Exhaustion
Heat exhaustion is less dangerous than heat stroke. It typically occurs when people exercise heavily or work in a warm, humid place where body fluids are lost through heavy sweating.

Signs and Symptoms - any one or combination of the following:
- Cool, moist, pale, grayish or red skin
- Heavy sweating
- Dilated pupils
- Headache
- Nausea
- Dizziness, weakness and exhaustion

Treatment:
Follow same procedures as listed for heat stroke. Without prompt care, heat exhaustion can quickly become heat stroke.

7.1.4 Heat Cramps
Heat cramps generally result from the loss of body fluid and salt from heavy sweating that creates an electrolyte imbalance.

Signs and Symptoms:
- Spasms or muscular pains usually in the abdomen or legs.

Treatment:
- Move the person to a cooler place and give small amounts of water.
- Lightly stretch, gently massage the cramped area.
7.1.5 Heat Rash (Prickly Heat)
Heat rashes are the most common problem in hot work environments.

Signs and Symptoms:
- Red pimples/papules

Treatment:
- Wear loose clothing to help prevent it.
- Change damp clothing immediately.
- Use drying lotions on areas to prevent infection. Once the individual returns to a cool environment, heat rashes will eventually disappear.

7.1.6 Heat Fatigue

Signs and Symptoms:
- Impaired performance
- Irritable
- Impaired mental performance

Treatment:
- Remove person to cooler place
- Frequent rest time in cool, shaded area
- Increase water intake

7.2 Worker Monitoring Programs

Personal monitoring can be done by checking the heart rate, recovery heart rate, oral temperature, or extent of body fluid loss. Any one of the following team member monitoring programs can be implemented on a job site where there is a potential for heat illnesses to develop. See the heat stress medical questionnaire SD1072 available on Cianbro.net> Standard Operating Procedures - on the SOP

Checking Heart Rate: To check the heart rate, count the radial pulse (located on your wrist) for 30 seconds at the beginning of the rest period. If the heart rate exceeds 110 beats per minute, shorten the next work period.

Recovery Heart Rate: The recovery heart rate can be checked by comparing the pulse rate taken at 30 seconds ($P_1$) with the pulse rate taken at 2.5 minutes ($P_3$) after the rest break starts. These two pulse rates can be interpreted using Table 1- Heat Rate Recovery Criteria. Please see 9.1 Appendix A for further information.

7.3 Cold Emergencies

On days with low temperatures, high winds, and humidity anyone can suffer from the extreme cold especially if they are wet. Severe cold exposure can be life threatening. Some tips that can help avoid cold related emergencies are as follows:

- Wear quality multi-layered clothing as opposed to one heavy garment.
- Wear dry clothing.
- Avoid alcoholic beverages - consumption of alcohol increases the chances of hypothermia.
- Select quality footwear - footwear should not be tight - wear thin layers of socks.
- Look at creative ways to warm the work area such as tarps to reduce wind, enclosed-ventilated area heaters, etc. Stay away from open flames such as burn barrels, etc.

7.3.1 Hypothermia

Hypothermia is life threatening. It occurs when the entire body cools because its ability to keep warm fails. If not caught early, the victim gradually becomes clumsy and has trouble holding things. If left too long, the victim experiences a decreasing pulse and breathing rate. The team member will die if care is not given.

Signs and Symptoms:
- Shivering
- Dizziness
- Numbness
- Confusion
• Glassy Stare
• Weakness
• Impaired Judgment
• Impaired Vision
• Drowsiness
• Loss of Consciousness

Treatment:
• Gently move the person to a warm place.
• Monitor airway, breathing and circulation.
• Remove any wet clothing and dry the person.
• Warm the person by wrapping him or her in blankets or by putting on dry clothing (passive rewarming).
• If the person is alert/ fully conscious, give him or her warm liquids to drink that do not contain alcohol or caffeine.
• Hot water bottles or chemical hot packs may be used when they are wrapped in a towel or blanket before applying.
• Warm up their body slowly. Do not warm the person too quickly, such as by immersing them in warm water. Rapid warming may cause dangerous heart rhythms.
• Give CPR if needed.

7.3.2 Frostbite
Frostbite is the most common cold related injury. Ice crystals form within the tissues of the body and most commonly affect the ears, nose, chin, cheeks, fingers and toes. The ice crystals restrict blood flow to the affected area. Frostbite can lead to loss of fingers, hands, arms, toes, feet and even legs.

Signs and Symptoms:
• Lack of feeling in the affected area
• Skin slightly flushed and appears waxy
• Skin color changes to white, grayish yellow or grayish blue
• Painful in early stages, becomes numb in later stages
• Frostbitten part feels cold to the touch
• Large blisters may form

Treatment:
• Bring the victim indoors if possible
• Handle the area gently; DO NOT rub the frostbitten area
• Cover the affected area with dry extra clothing/blankets or loosely bandage with dry, sterile gauze
• If possible, re-warm the frostbitten area by immersing it in lukewarm water -- DO NOT USE HOT WATER! Do not allow frostbitten area to touch the container.
• If the person's fingers or toes are frostbitten, place dry, sterile gauze between them to keep them separated
• If blisters develop, avoid breaking them
• Seek medical attention immediately

7.4 Wind Chill

Wind chill gets its name from the combined effect of cold temperature and wind. How does this happen? Well, the wind strips a layer of relatively warm air that forms just above the surface of your skin (which heats this layer of air). The faster the wind, the greater the loss of this “warm” air (there is a limit though – wind speeds in excess of 60 mph have very little additional effect on this process).

A wind chill chart was developed in Antarctica during the early 1940s. While care should be exercised whenever the wind chill temperature is below 32°F, the concern magnifies when the chill dips below 0°F. Frostbite can occur with a wind chill temperature below -30°F. There is one thing to keep in mind. The wind chill chart should be considered a guideline because it does not account for the individual’s metabolism, state of nourishment and alcoholic
consumption—all of which affect the body’s rate of heat loss. Exercise increases your metabolism and may help you keep warm during a windy, cold day. However, if your exercise involves skiing 30 mph down the side of a mountain, then your body’s motion is creating its own additional wind chill. Skiers should use extra caution and protect all exposed skin.

Wind Chill Table

**Some information used in this safety policy and procedure was taken from the American Red Cross Workplace First Aid workbook.**

8 Budget / Approval Process

8.1 Not Applicable

9 Related Documents

9.1 See attachments

9.2 Documents available on Cianbro.net>Standard Operating Procedures - on the SOP

| Heat Stress Medical Questionnaire & Analysis | SD1072 |
### Heart Rate Recovery Criteria

<table>
<thead>
<tr>
<th>Heart Rate Recovery Pattern</th>
<th>$P_3$</th>
<th>Difference Between $P_1$ and $P_3$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Satisfactory Recovery</td>
<td>&lt;90</td>
<td></td>
</tr>
<tr>
<td>2. High Recovery (Conditions require further study)</td>
<td>&gt;90</td>
<td>&lt;10</td>
</tr>
<tr>
<td>3. No Recovery (May indicate too much stress)</td>
<td>&gt;90</td>
<td>&gt;10</td>
</tr>
</tbody>
</table>

Oral Temperature: Oral temperature can be checked with a clinical thermometer after work but before the team member drinks anything. If the oral temperature taken under the tongue exceeds 99.6°F, shorten the next work cycle by one-third.

Body Fluid Loss: Body fluid loss can be measured by weighing the worker on a scale at the beginning and end of each workday. The time weighed in and out should be the same each day. The worker's weight loss should not exceed 1.5% of total body weight in a workday. If a weight loss exceeding this amount is observed, fluid intake should increase and person should not be placed into a hot environment until the percentage decreases below 1.5.
### Heat Index Environmental Temperature (°F)

<table>
<thead>
<tr>
<th>Relative Humidity</th>
<th>Apparent Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>0%</td>
<td>64°  69°  73°  78°  83°  87°  91°  95°  100°  105°  110°  115°  120°</td>
</tr>
<tr>
<td>10%</td>
<td>65    70    75    80    85    90    95    100   105   111   116</td>
</tr>
<tr>
<td>20%</td>
<td>66    72    77    82    87    93    99    105   112   120   130</td>
</tr>
<tr>
<td>30%</td>
<td>67    73    78    84    90    96    104   113   123   135   148</td>
</tr>
<tr>
<td>40%</td>
<td>68    74    79    86    93    101   110   123   137   151</td>
</tr>
<tr>
<td>50%</td>
<td>69    75    81    88    96    107   120   135   150</td>
</tr>
<tr>
<td>60%</td>
<td>70    76    82    90    100   114   132   149</td>
</tr>
<tr>
<td>70%</td>
<td>70    77    85    93    106   124   144</td>
</tr>
<tr>
<td>80%</td>
<td>71    78    86    97    113   136   157</td>
</tr>
<tr>
<td>90%</td>
<td>71    79    88    102   122   150   170</td>
</tr>
<tr>
<td>100%</td>
<td>72    80    91    108   133   166</td>
</tr>
</tbody>
</table>

### Apparent Heat Stress Risk with Physical Activity and/or Prolonged Exposure

- **90° - 100°**: Heat cramps or heat exhaustion possible.
- **101°-129°**: Heat cramps or heat exhaustion is likely. Heat stroke is possible.
- **130° and up**: Heat stroke is highly likely.