INDIANA UNIVERSITY

OFFICE OF THE EXECUTIVE VICE PRESIDENT
FOR UNIVERSITY ACADEMIC AFFAIRS
University Environmental Health and Safety

Heat Stress Program

September 25, 2014

1. INTRODUCTION

1.1. Purpose

Employees who are exposed to excessive heat or who work in hot environments may be at risk of heat stress. Various factors can contribute to heat stress such as air temperature, physical activity, individual susceptibility, radiant heat, humidity, air flow, and clothing type. Heat stress can result in heat stroke, heat exhaustion, heat cramps, or heat rashes. Indiana University Environmental Health and Safety (IUEHS) has developed this program to protect employees from heat-related illnesses while at work.

1.2. Scope

This program applies to all Indiana University employees who are exposed to or may become exposed to excessive heat during the course of their job duties.

2. AUTHORITY AND RESPONSIBILITY

2.1. **Environmental Health and Safety** is responsible for:

2.1.1. Assisting Departments in implementing the provisions of this program;
2.1.2. Revising and updating the program as necessary;
2.1.3. Validating program implementation;
2.1.4. Providing training and education resources regarding heat stress and illnesses; and
2.1.5. Performing heat stress exposure assessments for employees when necessary.

2.2. **Facility Services (FS) and/or Physical Plant (PP)** is responsible for:

2.2.1. Determining and reporting indoor heat index values to affected departments as specified in this program; and
2.2.2. Providing fans for air movement when applicable.

2.3. **Departments and Supervisors** are responsible for:

2.3.1. Ensuring employees are trained in identifying the signs and symptoms of heat-related illnesses;
2.3.2. Providing provisions for rest areas and accessible drinking water to employees;
2.3.3. Providing fans for air movement when applicable;
2.3.4. Monitoring the heat index and pursuing, implementing, and enforcing the proper protective measures for employees as specified in this program;
2.3.5. Notifying IUEHS of specialized job tasks or environments as defined in this program that require a heat exposure assessment;
2.3.6. Reporting the results of all heat stress monitoring to employees; and
2.3.7. Following their respective campus procedure for reporting occupational injuries and illnesses.

2.4. Employees are responsible for:

2.4.1. Working in accordance with the provisions of this program;
2.4.2. Understanding the signs and symptoms of heat-related illnesses;
2.4.3. Notifying the supervisor if conditions exist that may lead to heat-related illness; and
2.4.4. Notifying the supervisor if they begin to experience symptoms of heat-related illnesses.

3. PROGRAM ELEMENTS

3.1. Protecting Employees

IUEHS has developed protective criteria for employees based upon the heat index and other measures of heat stress exposure. The heat index combines both air temperature and relative humidity into a single index. The higher the heat index, the hotter the environment will feel, and the greater the risk that employees will experience heat-related illness. Individual susceptibility to heat-related illness can vary widely between employees. Employees gradually acclimatize when exposed to hot conditions for several weeks. When the heat index is high, special precautions are needed to protect un-acclimatized employees while they adjust to the heat, particularly on the first few days they are exposed to hot conditions. Supervisors should monitor employees closely for signs of heat stress during this period and they should adopt appropriate work-rest schedules for these employees, starting with longer rest periods that are reduced over a two week period. Re-acclimatization may also be necessary when employees are away from hot conditions for a few days.

3.1.1. Outdoor Environments

Outdoor temperatures become elevated during the summer months. IUEHS has divided heat index levels into four bands or risk levels that require specific protective measures when working outdoors (See Appendix A). Additional protective measures are necessary when one of the following risk factors are present: employees must wear heavy or non-breathable protective clothing (e.g. vapor barrier coveralls), employees work in direct sunlight, employees perform tasks that generate radiant heat (e.g. welding), or when employees perform prolonged strenuous activity. However, when a combination of these risk factors occur simultaneously, see Section 3.1.3. for additional precautions.

3.1.2. Office, Laboratory, and Housing Environments

The temperature in offices, laboratories, and housing may become elevated when equipment malfunctions and outdoor temperatures are high. When temperatures exceed 83 degrees Fahrenheit in office, laboratory, or housing environments, employees should contact FS and/or PP immediately. The heat index (i.e. calculated from temperature and humidity measurements) should be monitored by FS and/or PP closely during these conditions. IUEHS has divided heat index levels into two bands or risk levels that require specific protective measures when working in an office, laboratory, or housing environment (See Appendix B). Additional protective measures are necessary when one of the following risk factors are present: employees must wear heavy or non-breathable protective clothing (e.g. vapor barrier coveralls), employees perform tasks that generate radiant heat (e.g. welding), and when employees perform prolonged strenuous activity. However, when a combination of these risk factors occur simultaneously, see Section 3.1.3. for additional precautions.

3.1.3. Other Environments and Job Tasks

Indiana University has a very diverse set of work environments and job tasks. If the work environment or work condition is not specifically addressed in Section 3.1.1. or Section 3.1.2. or if an employee reports and/or experiences heat-related symptoms in a particular environment or during a specific job task, a Wet-Bulb Globe Temperature (WBGT)-based heat exposure assessment may be necessary to ensure safe work conditions or to identify

appropriate protective measures. If heat stress is identified as a concern by an employee or by IUEHS for a particular work environment or job task that is not addressed in Section 3.1.1. or Section 3.1.2., IUEHS will perform a heat exposure assessment for that specific work environment or job task. Utilizing the results of the heat exposure assessment and the most recent guidelines specified by the American Conference of Governmental Industrial Hygienists (ACGIH), IUEHS will provide specific recommendations and precautions for the specialized job task and/or environment.

3.2. Heat-Related Illnesses and Emergencies

If employees report or supervisors observe signs or symptoms of heat-related illness, stop all activity immediately. Heat stroke is a medical emergency. Call the designated emergent Medical Services provider for the respective campus immediately if an employee shows any signs of heat stroke. If an employee is believed to be experiencing heat-related symptoms, Appendix C provides a list of recommended actions. These recommended actions should only be used as a guide to respond appropriately to known or reported symptoms. In all cases of heat-related symptoms noted in Appendix C, employees should be referred to the appropriate Medical Services provider for the applicable respective campus. IUEHS should then be contacted prior to the continuation of work by other employees.

4. TRAINING AND RECORDKEEPING

Heat stress prevention training is available from IUEHS through E Training.

5. REFRENECES

- OSHA, Using the Heat Index to Protect Workers
- OSHA, Acclimatizing Workers
- OSHA, Protective Measures to Take at Each Risk Level
- OSHA, Preparing for and Responding to Heat-Related Emergencies
- National Weather Service (NWS) Weather Prediction Center
- American Conference of Governmental Industrial Hygienists (ACGIH), TLVs and BEIs (2013)

6. REVISIONS

New Document: September 25, 2014

APPENDIX A: OUTDOOR ENVIRONMENTS

Heat Index[A]	Risk Level	Protective Measures
84 - 91°F	Low	▪ Remind employees that drinking water is available; and ▪ Plan ahead for times when the heat index is higher, including heat stress prevention training. [B]If employees must wear heavy or non-breathable protective clothing, perform strenuous activity, work in the direct sunlight, or work with radiant heat sources, additional precautions are necessary to protect employees from heat-related illness.
91°F - 103°F	Medium	In addition to the protective measures listed above: ▪ [C]Remind employees to drink water often (about 4 cups/hour); ▪ Review heat-related illness topics with employees: how to recognize heat-related illness, how to prevent it, and what to do if someone gets sick; ▪ Schedule frequent breaks in cool, shaded or air conditioned areas; ▪ Acclimatize employees to conditions slowly (i.e. typically takes >2 weeks); and ▪ Set up buddy system/instruct supervisors to watch workers for signs of heat-related illness. [B]If employees must wear heavy or non-breathable protective clothing, perform strenuous activity, work in the direct sun, or work with other sources of radiant heat, additional precautions are necessary to protect employees from heat-related illness. ▪ Schedule activities at a time when the heat index is lower; ▪ Develop work/rest schedules (i.e. lighten the work load); and ▪ Monitor workers closely.
103°F- 115°F	High	In addition to the protective measures listed above: ▪ Alert employees of high risk conditions; ▪ [C]Actively encourage employees to drink plenty of water (about 4 cups/hour); ▪ Limit physical exertion (e.g. use mechanical lifts); ▪ Contact IUEHS to perform a heat stress assessment; ▪ Establish and enforce work/rest schedules; ▪ Adjust work activities (e.g., reschedule work, pace/rotate jobs); ▪ Use cooling techniques; and ▪ Watch/communicate with workers at all times. [B]When possible, reschedule activities to a time when the heat index is lower.
> 115°F	Very High	Reschedule non-essential activity for days with a reduced heat index or to a time when the heat index is lower. Move essential work tasks to the coolest part of the work shift; consider earlier start times, split shifts, or evening and night shifts. If essential work must be done, in addition to the protective measures listed above: ▪ Alert workers of extreme heat hazards; ▪ [C]Establish a water drinking schedule (about 4 cups/hour); ▪ Establish, enforce, and closely monitor work/rest schedules; and ▪ Conduct and establish protocols for physiological monitoring (e.g., pulse, temperature, etc). Stop work if essential control methods are inadequate or unavailable. Strenuous work tasks and those requiring the use of heavy or non-breathable clothing or impermeable chemical protective clothing should not be conducted when the heat index is at or above 115°F.

[A]Compare to the current heat index value given by National Weather Service (NWS) for the outdoor work location. If NWS observations are not available for the specific work location, use the heat index value for the nearest available city.

[B]Take steps at the next highest risk level to protect employees from the added risks.

[C]Under most circumstances, fluid intake should not exceed 6 cups per hour or 12 quarts per day. This makes it particularly important to reduce work rates, reschedule work, or enforce work/rest schedules.

APPENDIX B: OFFICE, LABORATORY, AND HOUSING ENVIRONMENTS

Heat Index[A]	Risk Level	Protective Measures
84°F-91°F	Low	▪ Facility Services (FS) and/or Physical Plant (PP) and/or the department should provide fans for air movement in occupied spaces; ▪ Close blinds and curtains where possible; ▪ Turn off nonessential lights; ▪ Provide and instruct employees to drink plenty of water; ▪ Since employees are not likely acclimated to these conditions, monitor employees closely; and ▪ Recommend that employees wear light-weight clothing if the indoor heat index remains elevated for more than one day. [B]If employees must wear heavy or non-breathable protective clothing, perform strenuous activity, or work with radiant heat sources, additional precautions are necessary to protect employees from heat-related illness.
> 91°F	Medium	▪ Follow applicable outdoor protective measures when the heat index exceeds 91°F in office, laboratory, or housing environments.

[A] Compare with the indoor heat index value calculated by Facility Services (FS) and/or Physical Plant (PP) personnel. FS and/or PP personnel should utilize the National Weather Service (NWS) heat index calculator to calculate the heat index value from the measured indoor air temperature and relative humidity level.
[B] Take steps at the next highest risk level to protect employees from the added risks.

APPENDIX C: HEAT-RELATED EMERGENCIES AND SYMPTOMS

Illness	Symptoms	*Recommended Actions
Heat stroke	▪ Confusion ▪ Fainting ▪ Seizures ▪ Excessive sweating or red, hot, dry skin ▪ Very high body temperature	▪ Call the emergent medical services provider for the campus (e.g. 911). While waiting for help: ▪ Place employee in cool, shaded or air conditioned area; ▪ Loosen clothing, remove outer clothing; ▪ Fan air on worker; cold packs in armpits; ▪ Wet worker with cool water; apply ice packs, cool compresses, or ice if available; ▪ Provide fluids (preferably water) as soon as possible; and ▪ Stay with employee until medical service arrives.
Heat exhaustion	▪ Cool, moist skin ▪ Heavy sweating ▪ Headache ▪ Nausea or vomiting ▪ Dizziness ▪ Light headedness ▪ Weakness ▪ Thirst ▪ Irritability ▪ Fast heart beat	▪ Have employee sit or lie down in a cool, shaded or air conditioned area; ▪ Give employee plenty of water or other cool beverages to drink; ▪ Cool employee with cold compresses/ice packs; and ▪ Refer the employee to the non-emergent medical services provider for your campus as soon as possible.
Heat cramps	▪ Muscle spasms ▪ Pain ▪ Usually in abdomen, arms, or legs	▪ Have employee rest in a cool, shaded or air conditioned area; ▪ Employee should drink water or other cool beverages; and ▪ Refer the employee to the non-emergent medical services provider for the respective campus as soon as possible.