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EHS-312, HEAT STRESS PROGRAM

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1.0 Introduction

1.1 Purpose

The purpose of this program is to serve as a guide in the protection of all Emory employees from extreme temperatures as prescribed in the Occupational Safety and Health Administration's (OSHA's) Technical Manual Section 3 Chapter 4 Heat Stress and the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV) and Biological Exposure Indices (BEI) Guide.

1.2 Scope

This program applies to all Emory University employees and students.

1.3 Definitions

EHSO. Environmental, Health and Safety Office

WBGT. Wet Bulb Globe Temperature is a composite temperature used to estimate the effect of temperature, humidity, wind speed (wind chill) and solar radiation on humans.

1.4 Responsibilities

Environmental Health and Safety Office (EHSO)

EHSO is responsible for the following:

- Development, implementation, and administration of the Heat Stress Program;
- Development and implementation of the workplace monitoring program;
- Development and implementation of the Heat Stress Training Program; and
- Reviewing, updating, and evaluating the overall effectiveness of the Heat Stress Program.

Directors, Supervisors, and Managers

Emory directors, supervisors, and managers have primary responsibility for:

- Management of the Heat Stress Program in their area(s);
- Enforcement of the Heat Stress Program in their area(s);
- Ensuring that all affected personnel are trained; and
- Informing EHSO when operations may lead to an extreme temperature situation.

Employees

Emory employees are responsible for:

- Complying with the rules set forth by this program.
- Completing required training.

1.5 Training Requirements

- EHSO is responsible for ensuring that heat stress training is provided to affected Emory employees periodically.
- The training will include the following:
 - Knowledge of the hazards of heat stress;
 - Recognition of predisposing factors, danger signs, and symptoms;
 - Awareness of first-aid procedures for, and potential health effects of, heat stroke;

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- Emory employee responsibilities in avoiding heat stress;
- Dangers of using drugs, including therapeutic ones, and alcohol in hot work environments;
- Use of protective clothing and equipment;
- Use of EHSO's interactive Heat Stress website; and
- Purpose and coverage of environmental and medical surveillance programs and advantages of worker participation in such programs

1.6 Recordkeeping Requirements

Exposure records required by this program are retained and made available in EHSO in accordance with [29 CFR 1910.1020](#). Training records are retained in EHSO.

1.7 Program Evaluation

Emory's Heat Stress Program will be evaluated every two years by EHSO and revised as necessary.

2.0 Decision Process

The decision process illustrated in Appendix 1 will be initiated if:

- A qualitative exposure assessment conducted by EHSO indicates the possibility of a high heat environment;
- There are reports of discomfort due to heat stress; or
- The professional judgment of EHSO indicates heat stress conditions.

3.0 Screening Criteria for TLV and Action Limit (AL)

University employees that are not acclimatized and work in areas having a Wet Bulb Globe Temperature (WBGT) at or above the action level as prescribed in Table 1.0 will be included in the Heat Stress Program until they become acclimatized. Table 1.0 is based on one hour of work.

Table 1.0 – Screening Criteria for Action Limit for Heat Stress Exposure in °F

ALLOCATION OF WORK IN A CYCLE OF WORK AND RECOVERY	LIGHT	MODERATE	HEAVY	VERY HEAVY
Continuous Work	82.4	77.0	---	---
45 minutes Work, 15 minutes Rest	83.3	78.8	75.2	---
30 minutes Work, 30 minutes Rest or Contact EHSO at 7-5922	85.1	80.6	77.9	76.1
15 minutes Work, 45 minutes Rest or Contact EHSO at 7-5922	86.0	84.2	82.4	80.6

University employees working in indoor areas having a WBGT at or above the TLV as prescribed in Table 2.0 will be included in both the Heat Stress and the Worker Monitoring Programs. Table 2.0 is based on one hour of work.

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Table 2.0 – Screening Criteria for TLV for Heat Stress Exposure in °F

ALLOCATION OF WORK IN A CYCLE OF WORK AND RECOVERY	LIGHT	MODERATE	HEAVY	VERY HEAVY
Continuous Work	86.0	80.0	---	---
45 minutes Work, 15 minutes Rest	87.8	84.2	81.5	---
30 minutes Work, 30 minutes Rest or Contact EHSO at 7-5922	89.6	86.0	84.2	82.4
15 minutes Work, 45 minutes Rest or Contact EHSO at 7-5922	90.5	88.8	86.9	86.0

University employees working outdoors will be included in both the Heat Stress and the Worker Monitoring Programs based on the outdoor conditions on the day work activities take place. Employees working outside should identify their heat stress using EHSO's Daily Heat Stress Guide which can be found on the EHSO website at www.ehso.emory.edu.

4.0 Potential Heat Stress Areas

The areas at Emory University that are currently considered potential heat stress areas are:

- All steam manholes
- Steam tunnels
- Roof Tops (summer months HVAC Mechanics)
- Landscapers (outside work in the summer)
- Oxford Grounds Workers (Summer Months)
- Chemistry Building Pit
- Metal Fabrication Shop of the Steam Plant
- Whitehead Mechanical Space (L83)
- McTyeire Hall Mechanical Space
- McTyeire Hall Lower Level Mechanical Space (B01)

5.0 Acclimatization

- The extent to which the human body can adapt to heat exposure is a physiological adaptation called acclimatization. Acclimatization requires the employee to work under the heat stress conditions for progressively longer periods.
- All Emory employees required to work in a heat stress environment will first be allowed to adapt to the higher temperature.
- Emory employees who are not acclimated to high heat environments should use Table 1.0 as indicated in Section 3.0.
- This process will be used only for Emory employees required to work in areas that are considered to be potential heat stress areas. The acclimatization process for new workers will include:
 - 20% exposure on day one;
 - 40% exposure on day two;
 - 60% exposure on day three;
 - 80% exposure on day four; and

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- 100% exposure on day five.
- For those Emory employees who have had experience in jobs where heat levels are high enough to produce heat stress the regimen will be:
 - 50% exposure on day one;
 - 60% exposure on day two;
 - 80% exposure on day three; and
 - 100% exposure on day four.

6.0 Fluid Replacement

- Cool (50° - 60°F) water will be made available to Emory employees working in extreme heat areas to encourage them to drink small amounts frequently (e.g. one cup every 20 minutes).
- Ample supplies of liquids will be placed close to the work area.

7.0 Controls

- Engineering Controls
 - All steam manholes will be provided with cool air when Emory employees are required to enter.
- Administrative Controls
 - To the extent possible:
 - All work in the steam manholes will be scheduled during the cooler part of the day;
 - All outside grounds work will be scheduled during the cooler part of the day;
 - Routine maintenance and repair will be scheduled during the cooler seasons of the year.
 - Relief workers will be utilized in order to allow Emory employees the required rest.
 - Work/Rest schedules shall be utilized as described in Section 6
 - The worker monitoring program shall be conducted as described in Section 8.0
 - Emory employees included in the program will undergo training as indicated in Section 1.5
- Personal Protective Equipment
 - All areas that are included in this Heat Stress Program will utilize auxiliary body cooling mechanisms. Examples of auxiliary body cooling systems are:
 - Ice vest
 - Wetted clothing
 - Water-cooled garments

8.0 Worker Monitoring Program

- EHSO will conduct personal monitoring on all Emory employees required to work in high heat areas for periods of thirty minutes or more.
- Monitoring will be done by checking the:
 - Heart rate – if the heart rate exceeds 110 beats per minute, the next work period will be shorted by one third and the same rest period will be

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- maintained.
- Recovery heart rate – checked by comparing the pulse rate taken at the beginning of the rest period (P_1) and comparing it to the pulse rate taken at 2.5 minutes (P_3) after the rest break starts.
 - Oral temperature – checked after work but before the University employee drinks water. If the oral temperature taken under the tongue exceeds 98.06°F, shorten the next work cycle by one third.

Table 3.0 – Heart Rate Recovery Criteria

Heart Rate Recovery Pattern	P_3	Difference between P_1 and P_3
Satisfactory Recovery	<90	N/A
High Recovery (Conditions may require further study)	90	10
No recovery (May indicate too much stress)	90	<10

9.0 References

- OSHA Technical Manual (OTM) - Section III: Chapter IV: Heat Stress
- ACGIH TLV and BEI Guide
- OSHA General Duty Clause, Section 5(a)(1)

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Appendix A: Decision Process for Inclusion in the Heat Stress Program

