

Administrative Procedures

HMIS-PRO-SP-121

Heat Stress Control

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Change Summary

Description of Change

Procedure currently allows LM/FLS to perform step 4.2.10 but training does not provide content for them to perform all of the tasks (e.g. TWA).

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1.0 PURPOSE

This procedure establishes Hanford Mission Integration Solutions (HMIS) Industrial Hygiene (IH) program requirements for evaluating and controlling personnel heat stress (or heat-related illness) during work.

2.0 SCOPE

This Level 1 Administrative Procedure is applicable to HMIS employees, HMIS subcontractor employees and to visitors who may work in environments with a potential for [heat stress](#). Certain medical services are not within the scope of this document, including:

- Medical intervention for treatment of [heat strain](#) illness by the first aid provider or medical providers.
- Fitness-for-duty protocol or medical certification to perform work in [hot environments](#).

This procedure does not apply to Hanford Patrol or the Hanford Fire Departments training and emergency response operations. These organizations use tailored safety programs consistent with industry training and tactical practices as described in HMIS-PLN-SP-32219 (*10 CFR 851 HMIS Worker Safety and Health Program Description*), section 5.0 Safety and Health Standards. These programs include:

- HFD-PRO-ROT-61731, *HFD Training Program*

3.0 RESPONSIBILITIES

3.1 Line Management /First Line Supervisor

- Reviews work plans prior to releasing work to evaluate heat stress potential
- Ensures workers have monitoring and necessary training for heat stress mitigation

3.2 IH/Safety and Health (S&H) Professional

- Recommends mitigation techniques for heat stress
- Attends pre-job briefings to provide information on potential heat stress issues
- Conducts or assist with [WBGT](#) monitoring
- Assists with determining workload and work/rest regimens
- Collects data as necessary and ensures information is added to SWIHD
- May recommend personal protective equipment (PPE)

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3.3 Medical Contractor

- Assess employee capability to work in hot environments

4.0 INSTRUCTIONS**4.1 Heat Stress Identification and Heat Strain Prevention**

Actionee	Step #	Action
Line Management and/or First Line Supervisors	1.	<p>During work planning or scheduling and prior to releasing work, EVALUATE whether potential for heat stress exists.</p> <p>NOTE: <i>These evaluations should take into consideration work location temperatures (Seasonal Temperatures, Shaded Areas and Indoor Temperature), PPE, solar load (reflective surfaces/asphalt), work demand (Light, Medium, Heavy and Very Heavy Work) and radiant heat sources. Heat stress hazards should be included in the Job Hazard Analysis (JHA) or other hazard identification document.</i></p>
	2.	<p><u>IF</u> weather conditions change because of the time elapsed between the work planning and the time of work, <u>THEN</u> RE-EVALUATE the potential for heat stress.</p> <p>NOTE: <i>The following are conditions that can result in heat stress:</i></p> <ul style="list-style-type: none"> • <i>Anytime the air temperature of the work environment may contribute to heat load (Outdoor temperature is or is forecasted to be 85°F or above in level D PPE/indoor temperature is 90°F or above).</i> • <i>Humidity sources are introduced in the work area or abnormally high relative humidity.</i> • <i>Work is conducted near sources of radiant heat, such as asphalt, roof tops, steam pipes, boilers, heating vessels or reflective surfaces.</i> • <i>Personal Protective Equipment use (i.e. Tyvek coveralls, respiratory protection, or semi-permeable chemical suits).</i> • <i>High intensity and long duration work to include extended shift work.</i> • <i>Outdoor operation with high solar loads.</i> • <i>Work requires direct physical contact with hot object.</i>

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Actionee	Step #	Action
		<ul style="list-style-type: none"> • Work is performed in greenhouses, enclosures, or other environments with minimal air movement where heat can build up • Anytime impermeable suits are used.
Line Management and/or First Line Supervisors	3.	<u>IF</u> any of the conditions listed in 4.1.2 exist and the work can be rescheduled to eliminate the potential for heat stress, <u>THEN</u> CONDUCT work another time. (i.e., for summer work, reschedule the work during the morning or evening hours when temperatures are cooler).
	4.	<u>IF</u> any of the conditions listed in 4.1.2 exist and the work cannot be rescheduled to eliminate the potential for heat stress, <u>THEN</u> CONTACT Safety and Health to discuss the heat stress control options as necessary.
IH/Safety and Health Professional	5.	ASSIST line management in the identification and prevention of heat stress by participating in walk downs, design reviews, work planning, or the hazard analysis process.

4.2 Evaluating Heat Stress Conditions and Establishing Controls

Actionee	Step #	Action
Line Management, First Line Supervisors, Field Work Supervisors or Contractor supervisor	1.	<p>WORK with IH/Safety and Health (S&H) Professional to perform steps 4.2 6-17.</p> <p>NOTE: Course 110800, Heat Stress Monitor Training, may be given by safety and health professional and documented using form number A-6001-541, Course Completion Roster or as HAMMER training or CBT Course 052012, Heat Stress and WBGT Training For FWS/Supervisors/Leads. Line Management/Supervisor or Project Management is responsible for ensuring submittal of the record copy to Training Records. This training shall be performed on a yearly basis for line management or their delegate.</p>
	2.	Prior to collecting data and performing steps 4.2 6-9, 10-17, line management or delegate COMPLETE training course number 110800, Heat Stress Monitor Training. This training will include:

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Actionee	Step #	Action
		<ul style="list-style-type: none"> Training to this procedure (HMIS-PRO-SP-121, <i>Heat Stress Control</i>), specifically steps 4.2.6-9, 11-17. <p>NOTE: 4.2 Step 10 is only to be conducted by IH/S&H Professional.</p> <ul style="list-style-type: none"> Use of heat stress monitoring equipment To complete this course (110800, <i>Heat Stress Monitor Training</i>), the Heat Stress Monitor Trainee must be proficient in the use of this procedure (HMIS-PRO-SP-121, <i>Heat Stress Control</i>) for controlling heat stress and the use of heat stress monitoring equipment.
Line Management, First Line Supervisors, Field Work Supervisors or Contractor supervisor	3.	WORK with IH/S&H prior to beginning work to determine what engineering or administrative controls are required.
IH/S&H Professional	4.	<p><u>WHEN</u> heat stress conditions are identified, <u>THEN</u> WORK with project supervision to determine what actions are needed and recommend a course of action based on the provided information.</p> <p>NOTE: Line Management and IH/S&H will be notified prior to performing work in impermeable clothing.</p>
	5.	<p><u>IF</u> line management is to perform steps 4.2 6-9, 11-17, <u>THEN</u> DOCUMENT using one of the following options or equivalent:</p> <ul style="list-style-type: none"> Site form A-6004-062 Hazard analysis Work package
S&H Professional, IH, and/or Line Management, First Line Supervisors, Field Work Supervisors or Contractor supervisor	6.	DETERMINE clothing adjustment factor according to Table 3.
	7.	CLASSIFY workload category as light, moderate, heavy or very heavy according to type of activity performed (see Table 4).

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Actionee	Step #	Action
S&H Professional, IH, and/or Line Management, First Line Supervisors, Field Work Supervisors or Contractor supervisor	8.	<p>DETERMINE TLV for the specific workload (see Table 2).</p> <p>NOTE: <i>TWA's for work rates should be used when work demands vary within the hour. However, the metabolic rate for rest is already factored into the TLV's screening limits.</i></p>
	9.	<p>CONDUCT or INTERPRET work site WBGT monitoring as follows:</p> <p>NOTE: <i>The WBGT readings provided by the Hanford Meteorological Station (HMS) may be used if the worksite conditions are similar to the weather station monitoring location.</i></p> <ul style="list-style-type: none"> • CALL (509) 373-2716 - the HMS will relay the most recent reading; <p>OR</p> <ul style="list-style-type: none"> • VISIT HMS website and SELECT the nearest station with a WBGT monitor. Those stations are: <ul style="list-style-type: none"> ○ Station 21, 200 West ○ Station 13, 100 N ○ Station 6, 200 East ○ Station 11, 300 area ○ Station 30, HAMMER ○ http://www.hanford.gov/page.cfm/HMS/RealTimeMetData <p>NOTE: <i>HMS website reports in Pacific Standard Time (PST) only and does not change during daylight savings time.</i></p>
IH/S&H Professional	10.	<p><u>IF</u> work and/or rest environments are different, <u>THEN</u> CALCULATE hourly TWA, WBGT's.</p>
S&H Professional, IH, and/or Line Management, First Line Supervisors, Field Work Supervisors or Contractor supervisor	11.	<p>USE WBGT readings provided by the Hanford Meteorological Station (HMS) if the worksite conditions are similar to the weather station monitoring location, by using the following:</p> <ul style="list-style-type: none"> • CALL (509) 373-2716 - the HMS will relay the most recent reading; or

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Actionee	Step #	Action
		<ul style="list-style-type: none"> • VISIT HMS website and click on the nearest station with a WBGT monitor. Those stations are: <ul style="list-style-type: none"> ○ Station 21, 200 West ○ Station 13, 100 N ○ Station 6, 200 East ○ Station 11, 300 area ○ Station 30, HAMMER ○ http://www.hanford.gov/page.cfm/HMS/RealTimeMetData <p>NOTE: HMS website reports in Pacific Standard Time (PST) only and does not change during daylight savings time.</p>
S&H Professional, IH, and/or Line Management, First Line Supervisors, Field Work Supervisors or Contractor supervisor	12.	<p><u>WHEN</u> conducting site specific heat stress monitoring document, <u>THEN</u> USE information to establish work rest regimens in the Site Wide Industrial Hygiene Database (SWIHD) as required by HMIS-PRO-SP-409. Information to include is:</p> <ul style="list-style-type: none"> • WBGT Reading • Clothing adjustment factor (PPE) • Workload • Work rest regimens used • Description of the work environment <p>NOTE: HMIS OS&IH does not collect Met Station WBGT information; it is obtained through contact with the Met Station.</p>
	13.	<p><u>IF</u> a work/rest regimen is warranted, <u>THEN</u> NOTIFY Field Work Supervisor (FWS).</p> <p>NOTE: The outdoor WBGT reading being above the highest value on the <u>TLV</u> chart does not trigger a stop work. However, all continuous outdoor work will cease until the WBGT reading is within the <u>TLV</u> chart or other controls are implemented.</p>
	14.	<p>USE Table 2 and the information collected in steps 6-9 to make this determination.</p>

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Actionee	Step #	Action
Industrial Hygiene	15.	SUBMIT WBGT monitoring to the SWIHD per HMIS-PRO-SP-409.
	16.	<u>WHEN</u> site specific WBGT monitoring is performed by line management or construction personnel, <u>THEN</u> SUBMIT all monitoring data to Industrial Hygiene for recordkeeping
Industrial Hygiene	17.	ENSURE information is added to SWIHD.
		NOTE: <i>One week of documented heat stress monitoring with a work/rest regimen may be entered as one SWIHD report.</i>

4.2.1 Physiological Monitoring

Physiological monitoring is not a routine requirement and as such Safety and Health should be notified if the use of this monitoring method is desired for either standard work conditions or when conditions require the use of this evaluation method. Construction subcontractors that choose to use physiological monitoring must submit a monitoring plan to Industrial Hygiene for review prior to implementation. If no physiological monitoring program is approved, construction subcontractor is to follow steps 4.2 1-17 of this procedure.

NOTE: *Physiological monitoring is required when impermeable clothing is used.*

Physiological monitoring is a form of personal monitoring and as such, all monitoring information must be treated as Official Use Only (OUO). Ways to implement routine physiological monitoring:

- Continuous monitoring wearing a heart rate or temperature monitor,
- Intermittent monitoring using a finger pulse oximeter (or taking the pulse manually) or using a body or ear thermometer,

Use the guidance for physiological monitoring from the 2016 ACGIH TLV, and document physiological monitoring data as OUO. Recommend use of form A-6006-276. All data must be submitted to the SWIHD by Industrial Hygiene as required by HMIS-PRO-SP-409, *Exposure Monitoring, Reporting and Exposure Records Management*.

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4.3 Applying Heat Stress Control Strategies

Actionee	Step #	Action
Line Management	1.	ENSURE work performed in a hot environment is under the observation of a supervisor who knows the early signs/symptoms of heat illness and who can enforce the permissible work/rest regimen and other established controls.
	2.	ENSURE water/fluids are provided and accessible to employees as requested and whenever there is a potential for heat stress conditions to exist by using the following: <ol style="list-style-type: none"> a. ENCOURAGE workers to consume adequate quantities of water. <p>NOTE: <i>Recommended intake is 8 ounces (1 cup) of cool water every 15-20 minutes.</i></p> <ol style="list-style-type: none"> b. ENCOURAGE workers to drink prior to entering a controlled work zone. c. <u>IF</u> heat strain conditions exist in a radiological contamination area, <u>THEN</u> PROVIDE fluids in accordance with HMIS-MAN-RC-5173 <i>HMIS Radiological Control Manual</i>.
	3.	WORK with the safety and health representative to provide feasible engineering and administrative controls to reduce the potential for exposure to heat stress conditions.

NOTES:

- *Temperatures are at or in excess of 95° F, the use of forced air ventilation should not be used unless the ventilation air is cooled.*
- *Examples of engineering controls include insulation or shielding of hot equipment and surfaces, local exhaust ventilation, and forced ventilation of a work area.*
- *Examples of administrative controls include scheduling work for cooler parts of the day, rotating tasks among workers, and applying [work/rest regimens](#).*

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Actionee	Step #	Action
Line Management	4.	ADJUST employee's work schedule, workload, and work/rest regimen as prescribed by the Safety and Health professional.
	5.	PROVIDE a cool-down area adjacent to the hot environment .
		NOTE: <i>This can be a vehicle with the A/C on.</i>
	6.	WORK with the Safety and Health representative to provide personal protective equipment, cooling devices, and accessory equipment, such as insulated gloves, reflective clothing, cool ties, ice vests, vortex suits.
		NOTE: <i>The cooling medium in some ice vests/cool ties (especially gel) has caused or contributed to skin discomfort in sensitive individuals. Frequent and careful inspection of such devices is recommended.</i>
	7.	ENSURE that copies of records generated from heat stress evaluation and control are maintained and that physiological monitoring data is treated as OOU.
	IH/S&H Professional	8.
9.		As requested, ASSIST line management in purchase, issue, and use of cooling devices or other protective equipment.

4.4 Employee Awareness and Training

Actionee	Step #	Action
Line Management	1.	ENSURE that employees who are working in or supervising work in hot environments are trained in heat stress related topics. Training should address:
	a.	Identification of heat stress hazards, potential health effects and sources of exposure.

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Actionee	Step #	Action
		<ul style="list-style-type: none"> b. Predisposing factors and relevant signs and symptoms of heat injury and illness, including prior heat injury. c. Information on water intake replacement. d. How to minimize the potential for heat strain using control strategies such as work practices, engineering controls, and use of heat strain personal protective equipment. e. Potential for therapeutic drugs, over-the-counter medications, or social drugs (including alcohol) to increase the risk of heat injury or illness by reducing heat tolerance. f. Emergency procedures for heat-related illnesses.
Line Management	2.	ENSURE this training is conducted and DOCUMENT through a training course, safety meeting, or other appropriate method.
	3.	COMMUNICATE heat stress information to employees in pre-job briefings, and any time when work/rest regimens are established or changed.
IH/S&H Professionals	4.	PARTICIPATE in pre-job briefings or other processes communicating the hazards associated with heat stress conditions at the work site and the control methods to be used, as requested or when appropriate.
	5.	TRAIN management and employees in heat stress topics.
Employees	6.	PARTICIPATE in heat strain prevention activities, including training and pre-job briefings.
	7.	TAKE measures to avoid heat strain such as adequate water consumption.
	8.	RECOGNIZE signs and symptoms of heat strain .

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Actionee	Step #	Action
Employees	9.	<u>IF</u> adverse signs and symptoms of heat strain develop, <u>THEN</u> INFORM supervisors <u>AND</u> TAKE appropriate action, such as immediately exiting the work area.
	10.	RECOGNIZE that prior heat injuries increase the likelihood of developing a subsequent heat related injury and ENSURE that particular attention should be paid to Steps 7-9 above.

4.5 Medical Aspects of Heat Strain Control

Actionee	Step #	Action
Line Management	1.	REGOGNIZE work conditions that may require employees to be medically evaluated to work in a hot environment .
	2.	ENSURE first aid and emergency procedures for response to heat strain related illnesses are established and communicated to employees.
Medical Contractor	3.	As requested by line management, ASSESS employee's capacity to work in a hot environment and to wear prescribed personal protective equipment in hot environments.
	4.	PROVIDE medical treatment and intervention strategies, as appropriate.
IH/S&H Professional	5.	INVESTIGATE heat strain disorder cases as requested by the Safety Department Injury/Illness Investigation group.
	6.	PROVIDE results of heat strain <u>investigations</u> to line management.

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5.0 RECORD IDENTIFICATION

All records are generated, processed, and maintained in accordance with HMIS-PRO-RM-10588, *Records Management Processes*, or HMIS-PRO-RM-32281, *Electronic Records Management*, as applicable.

Table 1. Records Capture Table

Name of Record	Submittal Responsibility	Retention Responsibility
<i>WBGT Monitoring Field Log, A-6004-062</i> & supporting documentation which may include: Physiological Monitoring; Acclimation Documentation; Training Records	S&H personnel initiating monitoring	S&H personnel initiating monitoring / Site Wide Industrial Hygiene Database (SWIHD)
<i>Course Completion Roster, A-6001-541</i>	Line Management / Supervisor or Project Management	Line Management / Supervisor or Project Management / Training Records (IDMS)
<i>Physiological Monitoring – Pulse Rate Method, A-6006-276</i>	S&H personnel initiating monitoring	S&H personnel initiating monitoring / Site Wide Industrial Hygiene Database (SWIHD)

6.0 SOURCES**6.1 Source Requirements**

10 CFR 851, *Worker Safety and Health Program*

29 CFR 1910.1020, *Access to Employee Exposure and Medical Records*

American Conference of Governmental Industrial Hygienists (ACGIH), "Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices" (2016)

OSHA general duty clause, OSHA 29 CFR 1926.65 and 29 CFR 1910.120, *Hazardous Waste Operations and Emergency Response*

6.2 References

29 CFR 1926.10(a), General interpretations, *Safety and Health Regulations for Construction*, Bernard and Kenney, 1994

HMIS-OTHER-RC-5173, *HMIS Radiological Control Manual*

HMIS-PRO-RM-10588, *Records Management Processes*

HMIS-PRO-RM-32281, *Electronic Records Management*

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HMIS-PRO-SP-079, *Job Hazard Analysis*

HMIS-PRO-SP-409, *Exposure Monitoring, Reporting and Exposure Records Management*

NIOSH [2016]. NIOSH criteria for a recommended standard: occupational exposure to heat and hot environments. By Jacklitsch B, Williams WJ, Musolin K, Coca A, Kim J-H, Turner N. Cincinnati, OH: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, DHHS (NIOSH) Publication 2016-106. *Standard Operating Safety Guides*, EPA, 1992

6.3 **Forms**

Course Completion Roster, A-6001-541

Heat Stress Physiological Monitoring – Pulse Rate Method, A-6006-276

WBGT Monitoring Field Log, [A-6004-062](#)

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Appendix A. Glossary

cool down area	A rest area normally located as close to the worksite as possible, where workers can periodically enter to cool down after working in hot environments . As a guideline only, areas should be shaded and maintained cooler than the work area, preferably as close to 24° C (76° F) as possible.
core body temperature	Temperature of the internal core body. Both ACGIH and NIOSH cite a core body temperature of 100.4° F as the limit for daily, prolonged work under heat stress conditions. Measured in the field either by tympanic, skin, or oral temperature readings.
heat strain	Physiological response to heat stress recognized by: <ul style="list-style-type: none">• Increased core body temperature.• Increased heart rate.• Sweating. <p>If these responses are not controlled, these symptoms may progress and result in increased incidence of heat strain disorders and accident rates.</p>
heat stress	The total heat load on the body that results from exposure to external sources and from internal metabolic heat production due to physical work. It occurs when the body produces or gains more heat than it is capable of giving off or losing. Contributing environmental factors affecting the potential for heat strain include air temperature, humidity, radiant heat exchange, and air movement.
hot environment	A work area where one or more of the following factors may exist, creating the potential for heat strain : high temperature/humidity, sources of significant radiant heat, or use of protective clothing that impedes sweat evaporation.
Impermeable Clothing	Impermeable means not allowing fluid to pass through, Impermeable clothing are those ensembles worn for purposes of providing the employee protection against a liquid or vapor (e.g., limited-use water- or vapor-barrier clothing), or from an atmosphere/environment (e.g., encapsulating or Level A suit).
rest	A total cessation of work in the hot environment and relocation to a shaded environment to allow for cool-down between work periods. Personal protective equipment (PPE) should be removed (as possible) during rest periods.

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threshold limit values (TLVs) for heat stress	ACGIH values incorporate work exertion level, PPE in use, and WBGT temperatures to determine a work/rest regimen that permit nearly all workers to be repeatedly exposed to hot work environments without adverse health effects. TLVs are based on the assumption that nearly all fully clothed workers with adequate water and dietary salt intake should be able to function effectively under the given working conditions without exceeding a core body temperature of 38° C (100.4°F).
wet bulb globe temperature (WBGT)	Environmental temperature index used to assess the potential for heat strain. WBGT values may be measured with integrated equipment or calculated using readings from a globe thermometer, a natural (static) wet-bulb thermometer, and a dry-bulb thermometer.
work/rest regimen	The proportion of time that an individual spends working and resting during a hour duration, and is established based on the WBGT index, work activity level (workloads) exertion level, and personal protective equipment worn.

Appendix B. Identification of Potential Heat Stress Conditions

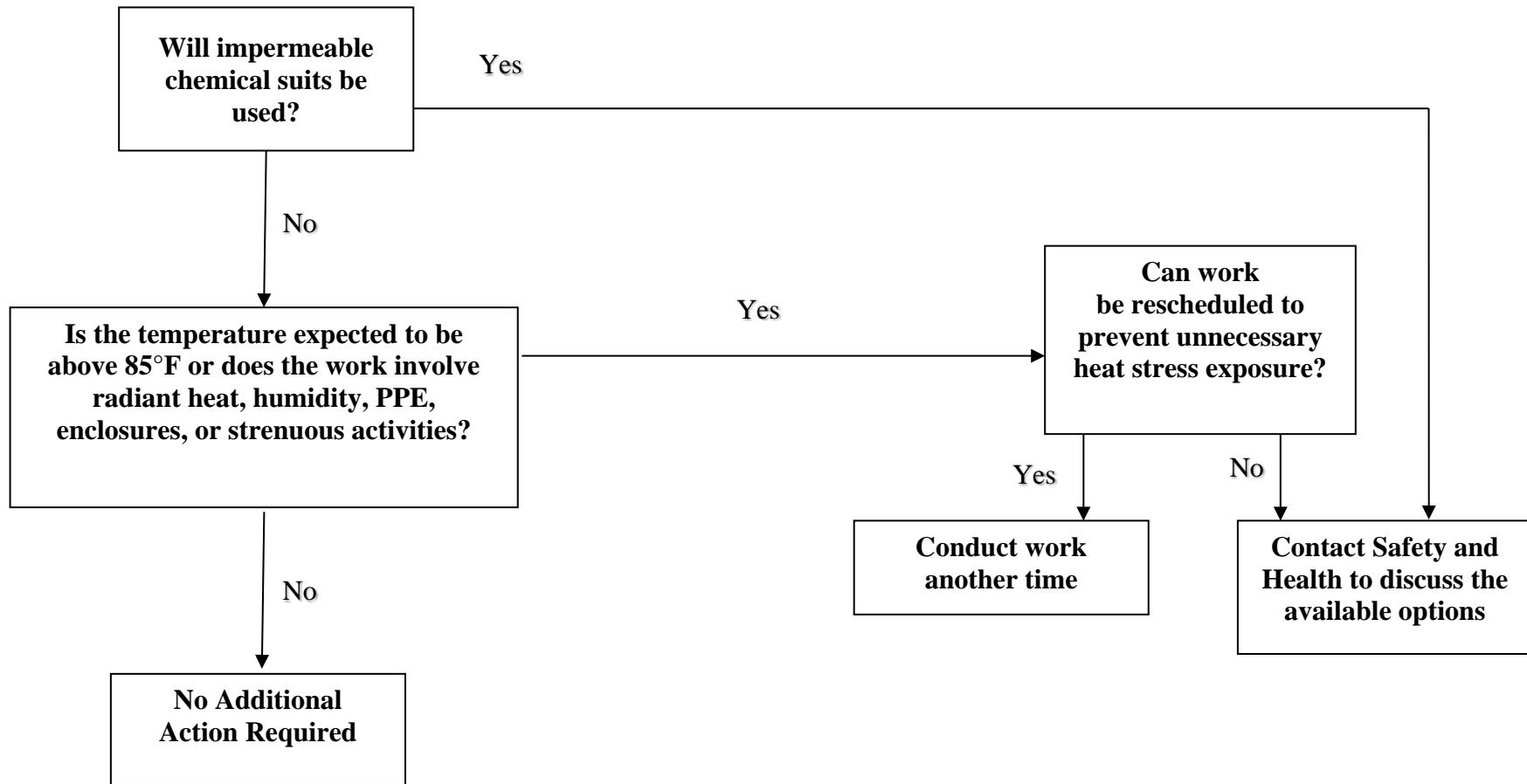


Figure 1. Identification of Potential Heat Stress Conditions

NOTE: See HMIS-PRO-SP-121 Section 4.1 for additional information.

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Table 2. Screening Criteria for Heat Stress Exposure

Allocation of Work in a Cycle of Work and Recovery	TLV WBGT Values in °F (Acclimatized)				Action Limit WBGT Values in °F (Unacclimatized)			
	Light	Moderate	Heavy	Very Heavy	Light	Moderate	Heavy	Very Heavy
100% Work	≤87.7	≤82.4	-	-	≤82.4	≤77.0	-	-
75% Work/ 25% Rest	87.8 – 87.8	82.5 – 84.2	≤81.5	-	82.5 – 83.3	77.1 – 78.8	≤75.2	-
50% Work/ 50% Rest	87.9 – 89.6	84.3 – 86.0	81.6 – 84.2	≤82.4	83.4 – 85.1	78.9 – 80.6	75.3 – 77.9	≤76.1
25% Work/ 75% Rest	89.7 – 90.5	86.1 – 88.7	84.3 – 86.9	82.5 – 86.0	85.2 – 86.0	80.7 – 84.2	78.0 – 82.4	76.2 – 80.6
Physiological Monitoring	≥90.6	≥88.8	≥87.0	≥86.1	≥86.1	≥84.3	≥82.5	≥80.7

Because of the level of documentation required to treat and maintain an employee as acclimated, the practice recommended by safety & health management is that all employees must be treated as unacclimated. However, if employee acclimation is needed for a particular work group or project contact the safety and health representative and they can work with safety and health management and the heat stress SME to develop an approved course of action.

To document that an employee has achieved acclimation they must spend at least 2 continuous hours working outside in 5 of the last 7 days or 10 of the last 14 days. This documentation must include each individual employee's name and the specific information relating to when the acclimation was achieved. In addition, all acclimation documentation must be treated as OOU information. Noticeable loss of acclimation can occur in as little as 4 days. Therefore, any employee who is absent from work for 4 consecutive days must be treated as unacclimated until re-acclimation can be re-established and documented. Absences from work include sick days, vacation, training, or other indoor activities. See the 2016 ACGIH *TLV/BEI* book and TLV Documentation for more information relating to employee acclimation.

NOTES:

- *WBGT* values are expressed in °F and represent thresholds near the upper limit of the metabolic rate category.
- If work and *rest* environments are different, hourly time-weighted averages (TWA) should be calculated and used. TWAs for work rates should also be used when the work demands vary within the hour.

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- Values in the table are applied by reference to the “[Work/Rest Regimen](#)” section of the Documentation and assume 8-hour workdays in a 5-day workweek with conventional breaks, as discussed in the Documentation. When workdays are extended, consult the “[Application of the TLV](#)” section of the Documentation.
- Because of the physiological strain associated with Very Heavy work among less fit workers regardless of [WBGT](#), criteria values are not provided for continuous work and for up to 25% [rest](#) in an hour. The screening criteria are not recommended, and a detailed analysis and/or physiological monitoring should be used.
- The Weather Station provides WBGT readings. These readings can be used as general guidance for most outdoor locations at Hanford. However, depending on worksite conditions, they may not be directly applicable for every worksite.

Table 3. Additions to Measured WBGT Values °F for Some Clothing Ensembles

Clothing Type	WBGT Addition*
Work Clothes (long sleeve shirt and Pants)	0
Cloth (woven material) overalls**	0
Double-Layer woven clothing***	5.4
SMS polypropylene coveralls	0.9
Polyolefin coveralls	1.8
Limited-use vapor-barrier coveralls	19.8

*These values must **not** be used for encapsulating suits, often called Level A. Clothing Adjustment Factors cannot be added for multiple layers. The coveralls assume that only modesty clothing is worn underneath, not a second layer of clothing.

**This value can also be used for a single pair of anti-C clothing with modesty clothing.

***This value can also be used for two pairs of anti-C clothing with modesty clothing.

Additional guidance on heat stress clothing correction factors can be found at:
(Location Redacted)

Table 4. Examples of Activities within Metabolic Rate Categories

Categories	Examples
Rest	Sitting
Light	Sitting with light manual work with hands or hands and arms, and driving. Standing with some light arm work and occasional walking.
Moderate	Sustained moderate hand and arm work, moderate arm and leg work, moderate arm and trunk work, or light pushing and pulling. Normal walking.
Heavy	Intense arm and trunk work, carrying, shoveling, manual sawing; pushing and pulling heavy loads, and walking at a fast pace.
Very Heavy	Very intense activity at fast to maximum pace.