

HEAT AND COLD STRESS	Identifier: PRD-2107 Revision*: 10 Page: 1 of 9
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Subcontractors	Program Requirements Document	For Additional Info: http://EDMS	Effective Date: 08/28/23
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Manual: Subcontractor Requirements

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*The current revision can be verified on EDMS.

1. PURPOSE

This document provides requirements for evaluating work conditions that may result in heat or cold stress injuries/illnesses, and outlines mitigating steps for worker protection. This document describes requirements based on 10 *Code of Federal Regulations* (CFR) 851, Worker Safety and Health Program, and the American Conference of Governmental Industrial Hygienists publication “2016 Threshold Limit Values and Biological Exposure Indices.”

Subcontractors that do not have a heat/cold stress program that addresses the requirements of this document must follow MCP-2704, “Heat and Cold Stress”; contact the Subcontract Technical Representative or other designated contractor representative for a copy, or to request technical health and safety support for implementing heat/cold stress requirements.

2. APPLICABILITY

This document applies to all subcontractors working at the Idaho Cleanup Project (ICP) as specified in their contract with contractor. Stricter requirements may be imposed by subcontractors upon their employees or subtier contractors. The requirements of this document must be followed by subcontractors; however, the means of implementation may vary as determined by the subcontractor.

3. REQUIREMENTS

- 3.1 Subcontractors shall implement an effective process to monitor hazards associated with work under heat/cold stress conditions and protect workers from those hazards.
- 3.2 All work activities shall be reviewed for potential heat/cold stress hazards by reviewing the following information: anticipated/actual conditions at the work area, including ambient air temperature, air movement/wind speed, and humidity; the anticipated work rate for the planned activities; the personal protective equipment worn/used for the planned activities; and other relevant factors.
- 3.3 The subcontractor’s heat/cold stress program shall contain provision for contacting emergency medical assistance, verified workable at the start of each shift, and at least one person present at the jobsite shall be trained to administer emergency first aid to individuals suffering from heat/cold injury or illness.

HEAT AND COLD STRESS	Identifier: PRD-2107 Revision*: 10 Page: 2 of 9
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- 3.4 Subcontractors shall ensure that employees know the location of the designated rest/warm-up location and provide adequate cool water/warm drinks as appropriate, to encourage employees to maintain adequate hydration when working in heat/cold stress conditions.
- 3.5 Workers shall receive training that ensures knowledge and understanding of the following:
 - A. Recognition of the signs and symptoms of heat and cold stress
 - B. The concept of acclimatization to work in hot/cold environments
 - C. The importance of drinking plenty of water in heat/cold stress environments
 - D. Methods for reducing worker exposure to heat/cold, including:
 1. Work schedule adjustment
 2. Use of scheduled rest/warm-up intervals
 3. Use of dry, insulated clothing
 4. Avoiding contact with hot/cold surfaces, tools, etc.
 5. Monitoring self and co-workers for symptoms of heat/cold injury
 - E. How a worker's physical fitness, medical conditions, medications, and other personal factors can affect susceptibility to heat/cold stress injury/illness
 - F. The importance of self-identifying to supervision when you believe you are not fit for duty under heat/cold stress conditions.
- 3.6 Workers shall inform their supervisor of any heat/cold stress restrictions or medical limitations.
- 3.7 Workers shall inform their supervisor of any physical conditions that may impact their work performance in a hot or cold environment, including such conditions as illness, allergies, and hangovers.
- 3.8 When informed of a physical condition or medical restriction, subcontractor management/supervision shall refer the employee to the subcontractor's contract physician for evaluation as appropriate.
- 3.9 Work/rest and/or work/warm-up schedules shall be determined by subcontractor supervision for jobs conducted under heat/cold stress conditions, with the assistance of a safety and health professional, as needed.

HEAT AND COLD STRESS	Identifier: PRD-2107 Revision*: 10 Page: 3 of 9
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- 3.10 Work/rest schedules for heat stress conditions will be determined using ICP FRM-3234, “Work/Rest Schedule Determination,” in conjunction with Tables 1, 2, and 3 in Appendix D, Heat Stress Decision-Making Diagram, provides a decision-making diagram for the use of wet bulb globe temperatures (WBGT) values.
- 3.10.1 WBGT values may be obtained from monitoring, or from using the WBGT estimator tool (available on the contractor’s internal web Industrial Hygiene home page).
- 3.11 Subcontractor supervision shall determine work/warm-up schedules for cold stress conditions in accordance with Appendix A, Threshold Limit Values Work/Warm-up Schedule for Four Hour Shift, and Appendix B, Equivalent Chill Temperatures.
- 3.12 Subcontractor supervision shall review work/warm-up schedules with employees in the pre-job brief, and document the schedules on the work control document(s) covering the activities.
- 3.13 Subcontractor supervision shall determine the need to use a buddy system whereby each employee is designated to be observed by at least one other employee, and, when such a system is needed, will instruct affected workers on its use and document the system in the associated work control document.
- 3.14 Workers shall be directed by supervision to adhere to the pre-determined work/rest or work/warm-up schedule.

4. DEFINITIONS

See LST-27, “Glossary”

5. REFERENCES

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

PRD-2001, “Personal Protective Equipment”

6. APPENDIXES

Appendix A, Cooling Power of Wind Expressed as Equivalent Temperature

Appendix B, Threshold Limit Values – Work/Warm-up Schedule for Four-Hour Shift While Performing Moderate-to-Heavy Work Activities

Appendix C, Determination of Heat Stress Work/Rest Schedule

HEAT AND COLD STRESS	Identifier: PRD-2107 Revision*: 10 Page: 4 of 9
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Appendix A

Cooling Power of Wind Expressed as Equivalent Temperature

The cooling power of wind (°F)

Estimated wind speed (in mph)	Actual temperature reading (°F)											
	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
	Equivalent chill temperature (°F)											
Calm	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
5	48	37	27	16	6	-5	-15	-26	-36	-47	-57	-68
10	40	28	16	4	-9	-24	-33	-46	-58	-70	-83	-95
15	36	22	9	-5	-18	-32	-45	-58	-72	-85	-99	-112
20	32	18	4	-10	-25	-39	-53	-67	-82	-96	-110	-121
25	30	16	0	-15	-29	-44	-59	-74	-88	-104	-118	-133
30	28	13	-2	-18	-33	-48	-63	-79	-94	-109	-125	-140
35	27	11	-4	-20	-35	-51	-67	-82	-98	-113	-129	-145
40	26	10	-6	-21	-37	-53	-69	-85	-100	-116	-132	-148
(Wind speeds greater than 40 mph have little additional effect.)	LITTLE DANGER In < 1hr with dry skin. Maximum danger of false sense of security.			INCREASING DANGER Danger from freezing of exposed flesh within one minute.				GREAT DANGER Flesh may freeze within 30 seconds.				
	Trenchfoot and immersion foot may occur at any point on this chart.											

Equivalent chill temperature requiring dry clothing to maintain core body temperature above 36° C (96.8° F) per cold stress TLV.

HEAT AND COLD STRESS	Identifier: PRD-2107 Revision*: 10 Page: 5 of 9
-----------------------------	---

Appendix B

Threshold Limit Values^a – Work/Warm-up Schedule for Four-Hour Shift While Performing Moderate-to-Heavy Work Activities^b

Air Temp – Sunny Sky (Approx. °F)	No Noticeable Wind		5 mph Wind		10 mph Wind		15 mph Wind		20 mph Wind	
	Max. Work Period (min.)	No. of Breaks	Max. Work Period (min.)	No. of Breaks	Max. Work Period (min.)	No. of Breaks	Max. Work Period (min.)	No. of Breaks	Max. Work Period (min.)	No. of Breaks
-5 to -9	120	1	120	1	120	1	120	1	75	2
-10 to -14	120	1	120	1	120	1	75	2	55	3
-15 to -19	120	1	120	1	75	2	55	3	40	4
-20 to -24	120	1	75	2	55	3	40	4	30	5
-25 to -29	75	2	55	3	40	4	30	5	Non-emergency work should cease	
-30 to -34	55	3	40	4	30	5	Non-emergency work should cease		Non-emergency work should cease	
-35 to -39	40	4	30	5	Non-emergency work should cease		Non-emergency work should cease		Non-emergency work should cease	
-40 to -44	30	5	Non-emergency work should cease		Non-emergency work should cease		Non-emergency work should cease		Non-emergency work should cease	
-45 & below	Non-emergency work should cease		Non-emergency work should cease		Non-emergency work should cease		Non-emergency work should cease		Non-emergency work should cease	

a. TLVs apply only for workers in dry clothing.

b. Schedule applies to any 4-hour work period with moderate-to-heavy work activity, with warm-up periods of 10 minutes in a warm location and with an extended break (e.g., lunch) at the end of the 4-hour work period in a warm location. **For light-to-moderate work (limited physical movement): apply the schedule one step lower, that is, one step more conservatively.** For example, at -30°F with no noticeable wind, a worker at a job with little physical movement should have a maximum work period of 40 minutes with 4 breaks in a 4-hour period.

HEAT AND COLD STRESS	Identifier: PRD-2107 Revision*: 10 Page: 6 of 9
-----------------------------	---

Appendix C

Determination of Heat Stress Work/Rest Schedule

The following tables are for use with FRM-3234, “Work/Rest Schedule Determination.”

Table 1. Wet bulb globe temperatures (WBGT) clothing adjustment factors (CAFs) in °F.

Clothing Ensemble	CAF
Work clothes: a standard ensemble that includes cotton or cotton-blend shirt and pants or coveralls	0.0
Single set of Cloth Anti-Cs	3.0
Orange Fire Retardant Anti-Cs	7.0
Single layer Tyvek coveralls	6.0
Non-woven microporous coverall such as yellow Microguard MP, Tychem	8.0
Acid suit	15.0
Fully encapsulating suit/Level B suit	20.0
H/R 0 or 1 Arc-rated clothing consisting of untreated natural fiber (UNF) long-sleeved shirt and long pants, OR FR-rated long-sleeved shirt and long pants/UNF long pants, OR FR coveralls) + hardhat (no hood)	0.0
H/R 2 Arc-rated clothing consisting of long-sleeved shirt and long pants, OR FR coveralls over UNF pants + flash suit hood	3.5
H/R 3 Arc-rated clothing consisting of flash suit jacket and pants (multilayer) + flash suit hood	5.0
H/R 4 Arc-rated clothing consisting of long-sleeved shirt and pants + flash suit jacket and pants (multilayer) + flash suit hood	7.0

NOTES:

1. Use of a hood is accounted for in the clothing adjustment factors listed. If not specified as part of the ensemble, subtract 1.0 from all ensembles if the hood is eliminated.
2. All clothing ensembles include consideration of undergarments.
3. Clothing ensembles not identified within this table should be discussed with the area industrial hygienist for a determination of appropriate heat stress controls.
4. The area industrial hygienist has the authority to adjust CAF values as determined to be necessary.
5. Use Table 2 for multiple-layer protective clothing ensembles.

HEAT AND COLD STRESS	Identifier: PRD-2107 Revision*: 10 Page: 7 of 9
-----------------------------	---

Table 2. Multiple-layer clothing adjustment factors.

Clothing Adjustment Factors, for WBGT in °F	
For multiple layer ensembles where the CAF values are both <6, add 2 to the highest CAF value and use the resulting number for WBGT CAF adjustment.	
If any CAF value is ≥ 6 , use the values below to determine the effective CAF for WBGT adjustment.	
Difference in CAF Values	Add to CAF
0	3
1	3
2	3
3	2
4	2
5	2
6	2
7	2
8	2
9	1
10	1
11	1
12	1
≥ 13	0

Example 1: An employee wearing two sets of Anti-Cs would have an adjusted CAF value of 5.

Example 2: An employee wearing two sets of Anti-Cs and an acid suit would have an adjusted CAF value of 16, calculated as follows:

- Two sets of Anti-Cs have an adjusted value of 5 (Each anti-C has a CAF =3, both CAFs are <6; add 2 to 3 for a resulting CAF of 5); an acid suit has a value of 15.
- From Table 2, the difference in CAF values between the two sets of Anti-Cs (CAF =5) and the acid suit (CAF = 15) is 10 (15-5=10); find 10 in the left column – the corresponding “Add to CAF” value in the right column is 1.
- Add 1 to the highest CAF value of the two types of clothing, which is the acid suit with a CAF = 15, giving a total CAF of 16.
- Add 16 to the measured/estimated WBGT in the work environment; the resulting adjusted WBGT value is used to determine the work/rest schedule.

HEAT AND COLD STRESS	Identifier: PRD-2107 Revision*: 10 Page: 8 of 9
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Table 3. Work category guidelines.

Category	Example Activities	Site-Specific Examples
Light		
Work sustainable with ease for 8 hours.	Sitting w/moderate arm and leg movement	Inspections and surveys
	Standing w/light work at machine/bench, using mostly arms	Rigging activities
	Using a table saw	Electrical shop work
	Standing w/light to moderate work at machine/bench and some walking about	Carpenter shop work
Moderate		
Work sustainable for 8 hours with nominal breaks	Scrubbing in a standing position	Painting
	Walking about w/moderate lifting or pushing	Mopping floors
	Walking on level at 6 km/hr while carrying 3 kg weight load	Using and automatic buffer Insulation removal/installation
Heavy		
Work where breaks are required at least every hour	Carpenter sawing by hand	Moving furniture by hand
	Shoveling dry sand/soil	Scaffold erection, manual handling
	Intermittent heavy lifting with pushing or pulling (e.g., pick-and-shovel work)	
	Heavy assembly work on a noncontinuous basis	
Very Heavy		
Work where frequent breaks are required	Shoveling wet sand/soil	Shoveling out tank sludge

HEAT AND COLD STRESS	Identifier: PRD-2107 Revision*: 10 Page: 9 of 9
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Table 4. Screening criteria for heat stress exposure (WBGT values in °F) based on 1-hour work periods and consistent work rate.

Work/Rest, Per Hour ^c	Acclimatized Workers				Unacclimatized Workers			
	Light	Moderate	Heavy	Very Heavy	Light	Moderate	Heavy	Very Heavy
100% Work	85.1	81.5	78.8		81.5	77.0	72.5	
75% Work; 25% Rest	85.1 86.9	81.5 83.3	78.8 81.5		81.5 84.2	77.0 79.7	72.5 76.1	
50% Work; 50% Rest	87.0 88.7	83.4 85.1	81.6 83.3	81.5	84.3 86.0	79.8 82.4	76.2 79.7	77.0
25% Work; 75% Rest	88.8 90.5	85.2 87.8	83.4 86.0	81.5 85.1	86.1 87.8	82.5 84.2	79.8 82.4	77.0 79.7

TABLE 4 NOTES:

- Values in the table are based on 8-hour work shifts with normal breaks, e.g., midshift break and longer lunch break
- Values in the table do not represent continuous work nor do they address “very heavy work” performed by less fit workers. For these situations, consult with an ICP Industrial Hygienist.
- Work/rest periods represent proportionate time spent at each; three 5-minute rest intervals between three 15-minute work periods provides the same work/rest time as one 45-minute work period followed by a 15-minute rest break. Use the best schedule for the work demands and environmental conditions that provides the required work/rest ratio.

Table 5. Screening criteria for heat stress exposure (WBGT values in °F) for workers wearing the Rich Industries suit at AMWTP based on 1-hour work periods and consistent work rate.

Work/Rest, Per Hour ^c	Acclimatized Workers				Unacclimatized Workers			
	Light	Moderate	Heavy	Very Heavy	Light	Moderate	Heavy	Very Heavy
<i>Maximum total entry time, in hours^d</i>	<i>3.0</i>	<i>2.5</i>	<i>2.0</i>	<i>1.5</i>	<i>3.0</i>	<i>2.5</i>	<i>2.0</i>	<i>1.5</i>
100% Work	85.1	81.5	78.8		81.5	77.0	72.5	
75% Work; 25% Rest	85.1 86.9	81.5 83.3	78.8 81.5		81.5 84.2	77.0 79.7	72.5 76.1	
50% Work; 50% Rest	87.0 88.7	83.4 85.1	81.6 83.3	81.5	84.3 86.0	79.8 82.4	76.2 79.7	77.0
25% Work; 75% Rest	88.8 90.5	85.2 87.8	83.4 86.0	81.5 85.1	86.1 87.8	82.5 84.2	79.8 82.4	77.0 79.7

TABLE 5 NOTES:

- Values in the table are based on 8-hour work shifts with normal breaks, e.g., midshift break and longer lunch break.
- Values in the table do not represent continuous work nor do they address “very heavy work” performed by less fit workers. For these situations, consult with an ICP Industrial Hygienist.
- Work/rest periods represent proportionate time spent at each; three 5-minute rest intervals between three 15-minute work periods provides the same work/rest time as one 45-minute work period followed by a 15-minute rest break. Use the best schedule for the work demands and environmental conditions that provides the required work/rest ratio.
- If workers are wearing overpants, subtract 15 minutes (1/4 hour) from total entry time.