

Arizona Division of Occupational Safety and Health

DIRECTIVE NUMBER: CPL 03-00-024

EFFECTIVE DATE: July 17, 2023

SUBJECT: State Emphasis Program – Outdoor and Indoor Heat-Related Hazards

ABSTRACT

- Purpose:** This instruction describes policies and procedures for implementing a State Emphasis Program (SEP) to protect employees from heat-related hazards and resulting injuries and illnesses in outdoor and indoor workplaces. This approach is intended to encourage early intervention by employers to prevent illnesses and deaths among workers during high heat conditions, such as working outdoors in a local area experiencing a heat wave, as announced by the National Weather Service. Early interventions include, but are not limited to, implementing water, rest, shade, training, and acclimatization procedures for new or returning employees.
- Scope:** This Instruction applies ADOSH-wide.
- References:** Arizona Revised Statute (A.R.S.) §23-403(A)
Arizona Field Operations Manual (FOM)
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I. Purpose

This Instruction describes policies and procedures for implementing a State Emphasis Program (SEP) to ensure that employees in high-hazard industries are protected from heat-related hazards, both indoors and outdoors, that may lead to serious illnesses, injuries, or death (*see* Appendix D for a list of heat-related illnesses). This SEP is to address high-hazard industries or activities in workplaces where this hazard is prevalent during high heat conditions, such as working outdoors in a local area experiencing a heat wave, as announced by the National Weather Service, or working indoors near radiant heat sources, such as iron and steel mills and foundries.

II. Scope

This Instruction applies ADOSH-wide.

III. ADOSH On-Site Consultation Programs.

The ADOSH On-Site Consultation Program will develop their own strategic approaches for addressing heat-related illness and injuries resulting from body heat generated by physical work that is performed in conditions of high ambient and/or radiant heat, especially when combined with humidity and inadequate cooling.

IV. Background.

The U.S. Department of Labor's Bureau of Labor Statistics (BLS) reports that between 2015 and 2019, environmental heat cases resulted in an average of 35 fatalities per year and an average of 2,700 cases with days away from work nationwide. The cause of death is often listed as a heart attack when the actual cause or aggravating cause may have been exposure to a heat-related hazard. Heat-related illnesses range from heat cramps to heat stroke, which can potentially lead to death. *See* Appendix D for a list of heat-related illnesses.

The National Weather Service (NWS) uses a heat index to classify environmental heat into four categories: Caution (80°F – 90°F HI), Extreme Caution (91°F – 103°F HI), Danger (103°F – 124°F HI), and Extreme Danger (126°F or higher HI), issued by the U.S. Department of Commerce's National Oceanic and Atmospheric Administration (NOAA), National Weather Service (NWS). *See* NWS webpage.

Acclimatization is a process by which a person gradually increases their exposure time to hot environmental conditions, causing beneficial physiological changes by properly regulating body temperature that minimizes heat-related illnesses. It is therefore essential for employers to train new or returning workers on heat-related hazards including heat stress, gradually increase their workloads, ensure more frequent breaks as they acclimatize to ambient conditions, and monitor them for signs of heat illness.

Heat-related fatalities are usually the result of exertional heat stroke, where physical activity in hot environments causes the body temperature to reach

104°F or higher (normal body temperature is around 98.6°F). Appendix D of this memorandum provides a list of serious heat-related illnesses, along with common signs and symptoms of exposure.

Heat-related illnesses and injuries can happen at almost any ambient temperature, especially in cases where workers perform moderate or higher physical activity, or wear heavy or bulky clothing or equipment, including personal protective equipment. Heat-related illnesses and injuries also generally occur when body heat generated by physical work is performed in conditions of high ambient heat, especially when combined with humidity and inadequate cooling. As mentioned above, combinations of heat and humidity are used to determine the commonly used “feels like” temperature (*i.e.*, heat index, or HI). The OSHA-NIOSH Heat Safety Tool app is a resource for finding the forecasted and current heat index.

The National Institute for Occupational Safety and Health (NIOSH) has published recommended occupational exposure limits and controls for heat stress. A NIOSH publication, *Criteria for a Recommended Standard: Occupational Exposure to Heat and Hot Environments*, outlines recommended environmental limits for physical work at which point engineering controls, preventative work, hygienic practices, and administrative or other control procedures should be implemented in order to reduce the risk of heat-related illnesses. NIOSH has a Recommended Alert Limit (RAL) and Recommended Exposure Limit (REL) based on the Wet-Bulb-Globe Temperature (WBGT).¹

For a listing of best practices on worker acclimatization visit the American Conference of Governmental Industrial Hygienists (ACGIH®) Action Limit (AL) for unacclimatized workers and a Threshold Limit Value (TLV®) for acclimatized workers, see Heat Stress and Strain: TLV® Physical Agents 2022 Edition, or latest edition, available at www.acgih.org.

The above alerts, advisories, and criteria can help to identify days in which a maximum heat temperature can result in increased risks of heat-related hazards.

V. SEP Goal.

The goal of this SEP is to reduce worker exposures to heat-related hazards that result in illnesses, injuries, and deaths, by inspecting industries and worksites, including worksites with radiant heat sources, where employees are exposed to heat-related hazards and have not been provided adequate protection that includes cool water, rest, cool areas, training, and acclimatization. These mitigation strategies are key in controlling the health hazards associated with heat exposures. ADOSH’s goal will be accomplished by a combination of compliance, outreach to employers, and compliance assistance.

VI. Program Procedures.

A. General.

¹ For resources discussing heat-related illnesses and common symptoms, see NIOSH *Criteria for a Recommended Standard: Occupational Exposure to Heat and Hot Environments*, DHHS (NIOSH) Publication Number 2016-106, February 2016.

To increase the likelihood of preventing heat-related illnesses and deaths and make efficient use of ADOSH resources, compliance safety and health officers (CSHOs) who are investigating for any purpose, shall open or refer a heat-related inspection for any hazardous heat conditions observed, recorded in the OSHA 300 logs or 301 Incident Reports, or where an employee brings a heat-related hazard(s) to the attention of the CSHO (such as, employees or temporary workers being exposed to high temperature conditions without adequate training, acclimatization or access to water, rest, and shade).

Furthermore, programmed inspections shall occur on any day that the NWS has announced a heat warning or advisory for the local area. See Appendix E for a description of these types of alerts, for which affected employers should be aware and take appropriate actions to protect their workers from heat hazards. Appendix A has a list of both outdoor and indoor industries that are known to have heat-related hazard incidents. During days of locally-issued heat warnings or advisories, establishment lists derived from Appendix A will be used for programmed inspections.

B. Site Selection.

1. Scheduling/Site Selection. Establishments for a programmed inspection must use neutral and objective selection criteria.

Any inspection that meets the conditions for a heat inspection and any heat-related severe injury report shall initiate an inspection, unless a physical inspection is not feasible. The list of industries can be found in Appendix A.

Appendix A Table 2, lists construction industries that are likely to have heat-related hazards. *ADOSH staff will use C-Target procedures to find active construction sites to add to their list of heat inspections for programmed inspections during days of locally issued heat warnings or advisories (see Appendix E).*

While traveling to worksites, CSHOs should be aware of circumstances where employees in the industries listed in Appendix A Table 2, are exposed to heat-related hazards.

Appendix A Table 3, lists non-construction industries with a history of heat-related incidents. ADOSH may use local knowledge to add these industries to the inspections list.

C. Inspection Scheduling.

Within a specified cycle, heat-related health inspections shall be scheduled, in accordance with the FOM, with the highest priority given to fatality inspections, and then to other unprogrammed inspections (*i.e.*, complaints and referrals) alleging employee exposure(s) to heat-related hazards.

1. Unprogrammed Inspections.

Fatalities/catastrophes, complaints, or referrals for any general industry, construction, or agriculture operation alleging hazardous exposures to heat (outdoors and/or indoors) shall be handled in accordance with the hierarchy of initiating inspections as outlined in the Arizona FOM Chapter 9, *Complaint and Referral Processing*, and Chapter 11, *Imminent Danger, Fatality, Catastrophe, and Emergency Response*, and in accordance with the specific procedures listed below:

a) Fatalities/Catastrophes.

Fatality incidents shall be prioritized for inspections.

b) Complaints and Referrals.

Allegations of potential worker exposures to heat (*e.g.*, insufficient controls in place such as access to water, rest, and/or shade), or involving workers suspected or confirmed of a heat-related illness, shall be given priority for on-site inspections.

2. Programmed Inspections

a) High-Hazard Industries

Appendix A lists high hazard industries with NAICS codes having among the highest numbers of BLS heat cases, incidence rates and BLS median days away from work for the years 2015-2020.

b) Site-Specific Targeting (SST)

If an establishment selected for inspection under this SEP is also selected under the current SST plan, where possible the SEP and SST plan inspections should be conducted concurrently. Refer to ADOSH Instruction, CPL 02-01-062, *Site-Specific Targeting (SST)* (or current version).

3. Whistleblower Protections

Workers requesting inspections, complaining of heat-related exposure, or reporting illnesses or retaliation, may be covered under one or more whistleblower protection statutes. Inform the workers of their protections from retaliation and refer them to the ADOSH website, for more information, including how to file a retaliation complaint.

4. Cooperative Programs

Employers participating in select cooperative programs may be exempt from programmed inspections. The CSHO should follow the procedures outlined in FOM Chapter, Program Planning, for further guidance if an ADOSH On-Site Consultation visit is in progress, or if the establishment is a participant in ADOSH's Voluntary Protection Programs (VPP) or the Safety and Health

Achievement Recognition Program (SHARP). Even if an employer is exempt from a programmed inspection, ADOSH may notify the employer in writing that they are required to comply with all applicable OSHA standards and the Employer's Duty.

D. Inspection Procedures and Case File Documentation

Programmed inspections under the SEP will be initiated concurrently with ADOSH outreach activities.

ADOSH will include additional information in its outreach efforts on the Heat SEP through webinars and conferences. The Division will continue to conduct outreach, throughout the SEP's course of implementation while responding to complaints, referrals, hospitalizations, and fatalities related to heat, and shall code such activities.

All inspections shall be conducted in accordance with the general provisions of the FOM. Other procedures related to scheduling and conducting inspections include the following:

1. ADOSH will assess the potential for heat-related illnesses, injuries, and deaths where heat-related hazards may exist in indoor work areas or at outdoor work areas on heat priority days when there is an alert from the National Weather Service (NWS). The procedures to assess heat conditions and workload are described in the OSHA Technical Manual (OTM), Section III, Chapter 4 – Heat Stress.

Inspections should be completed and citations, or Letter of Recommendation letters, if any, should be issued expeditiously to facilitate prompt abatement. After any type of inspection initiated under this SEP, where evidence of a potential A.R.S. § 23-403(A) violation is not present, an intervention with the employer should be conducted to identify and prevent potential heat-related illnesses. Heat hazard interventions are informational in nature and should include discussions with employers regarding taking proactive employee protection measures (e.g., easy access to cool water, cooling areas, and acclimatization) and providing heat posters and other outreach materials to mitigate the hazard.

2. During heat-related inspections, CSHOs shall:
 - a) Review OSHA 300 Logs and 301 Incident Reports for any entries indicating heat-related illness(es).
 - b) Review any records of heat-related emergency room visits and/or ambulance transport, even if hospitalizations did not occur, (this may require the use of a Medical Access Order).
 - c) Interview workers for symptoms of headache, dizziness, fainting, dehydration, or other conditions that may indicate heat-related illnesses, including both new employees and any

employees who have recently returned to work.

- d) Determine if the employer has a heat illness and injury program addressing heat exposure, and consider the following:
- Was there a written program?
 - How did the employer monitor ambient temperature(s) and levels of work exertion at the worksite?
 - Was there unlimited cool water that was easily accessible to the employees?
 - Did the employer provide additional breaks for hydration?
 - Were there scheduled rest breaks?
 - Was there access to a shaded area?
 - Did the employer provide time for acclimatization of new and returning workers?
 - Was a “buddy” system in place on hot days?
 - Were administrative controls used (earlier start times, and employee/job rotation) to limit heat exposures?
 - Did the employer provide training on heat illness signs, how to report signs and symptoms, first aid, how to contact emergency personnel, prevention, and the importance of hydration?
- e) Document conditions relevant to heat-related hazards, including:
- The heat index and additional weather data from that day, *e.g.*, heat alerts from the NWS, data from the OSHA-NIOSH Heat Safety Tool App, saving a screenshot on a mobile phone or tablet. Additional information may be needed for indoor heat investigations.
 - Observe and document current conditions and those at the time the incident occurred (for unprogrammed inspections), including:
 - Observed wind speed.
 - Relative humidity.
 - Dry bulb temperature at the workplace and in the shaded rest area.
 - Wet-bulb globe temperature at the workplace, (ensure the equipment has been properly

calibrated prior to use).

- Cloud cover (no clouds, 25%, 50%, 75%, 100%).
- The existence of any heat advisories, warnings, or alerts the previous days.

f) Identify activities relevant to heat-related hazards. These can include, but are not limited to:

- Potential sources of heat-related illnesses (*e.g.*, working in direct sunlight, a hot vehicle, or areas with hot air, near a gas engine, furnace, boiler, or steam lines).
- The use of heavy or bulky clothing or equipment, including personal protective equipment..
- Estimate workload exertions by observing the types of job tasks performed by employees and whether those activities can be categorized as moderate, heavy, or very heavy work, considering both average workload and peak workload..
- Duration of exposure during which a worker is continuously or repeatedly performing moderate to strenuous activities..

3. During a CSHO's travel to job sites, to conduct compliance assistance or self-referral inspections of outdoor work environments in plain view (*e.g.*, construction worksites, highway and bridge work, lawn care, and maintenance workers, etc.) where employees may be performing moderate or more strenuous work during heat priority days or working in direct sunlight (or other radiant heat sources) for extended periods of time. Observing potential heat-related hazards while traveling is particularly important for early intervention and prevention of heat-related incidents on construction sites, *see* Appendix A Table 2. Where there is no heat hazard present or where the employer has an adequate heat illness prevention program, the CSHOs should provide any additional relevant information.

4. Once an inspection has been scheduled for an identified establishment, and prior to opening the inspection, CSHOs shall conduct a search of the employer's citation and fatality/accident history in OSHA's Establishment Search Page or by using Salesforce to determine any prior heat-related issues.

5. The CSHO shall also determine whether the identified establishment is scheduled for any other programmed inspection (*e.g.*, SST, NEP, LEP, SEP). Whenever possible, inspections under this SEP should be carried out concurrently

with other programmed inspections.

6. At the opening conference, the CSHO will verify the correct NAICS code for the establishment with the employer and determine whether work practices that may result in worker exposures to heat-related hazards are present at the facility or worksite. The CSHO shall review the establishment's injury and illness logs (OSHA 300 and OSHA 300A) for three calendar years prior to the inspection and the current year-to-date to identify any work-related cases of heat illness.
7. If the inspection is initiated by an unprogrammed or follow-up activity, or the establishment is under another NEP, LEP, SEP the CSHO shall proceed to determine any additional alleged items or those covered by another emphasis program. The CSHO will also inform the employer and interviewed employees of their rights and responsibilities under A.R.S. § 23-425. If the unprogrammed activity that initiated this inspection included an allegation of retaliation, the CSHO shall refer this allegation to the ADOSH Whistleblower Discrimination Section.

If the CSHO determines during the walkaround or background research that workers may be performing tasks which include exposure to heat-related hazards, then they shall proceed with the inspection following the procedures in this SEP.

8. A review of any potential heat-related hazards should be included in any programmed or unprogrammed inspection where radiant heat sources exist in indoor work areas or at outdoor work areas on heat priority days.
9. CSHOs can use the OSHA-NIOSH Heat Safety Tool App as a resource. This App provides current and projected heat indices for that day at the current location. When conditions for previous days are needed, the NWS provides certified historic weather data to document past conditions. CSHOs should use nationally available tools assembled on the CSHO Resources intranet webpage to reconstruct data when appropriate on a particular day.
10. WBGT readings will be determined in accordance with procedures on conducting WBGT sampling and performing workplace assessments, OSHA Technical Manual (OTM), Section III, Chapter 4. WBGT sampling is considered a more accurate indicator of the effects of heat on individuals than dry bulb thermometer readings. Dry bulb thermometer readings measure air temperature only. As noted above, CSHOs should also conduct workload assessments through direct observation of work practices/operations and employee interviews. They should particularly note if heavy or bulky clothing or equipment is used.
11. If inspections occur on days different from the incident triggering

the complaint, referral, SIR, or fatality, CSHOs should obtain historic WBGT logs/records, if available. If records are not available, the OTM provides a method for calculating WBGT values using historic weather data available on the internet.

12. During any inspection, where other health or safety hazards have been alleged in a complaint or observed in plain view during the walkaround, CSHOs shall investigate as appropriate. Safety or health referrals may be made, subject to any current exemptions or limitations on such activity.
13. The CSHO will inform workers of their right to file a whistleblower complaint if they experience retaliation for providing assistance to ADOSH during an inspection, such as filing a safety and health complaint with ADOSH, reporting a work-related injury or illness, or complaining about exposure to heat-related hazards or any other workplace hazards to management. Any complaint of alleged retaliation shall be referred to the ADOSH Whistleblower Discrimination Section.
14. Citation Guidance: If sufficient evidence to issue an Employer's Duty, A.R.S. § 23-403(A) citation for heat-related hazards. Any proposed citation for a heat-related health hazard for both indoor and outdoor work activities shall be issued under the Employer's Duty when all elements of a violation have been established. CSHOs should document the relationship between the workplace operations and exposure(s) and the potential for heat-related illness(es), specifically focusing on all ambient conditions and activities that present heat-related hazards.
 - a) Ensure that the hazard is clearly and specifically set forth in the citation. Avoid solely describing an employer's failure to implement specific heat illness abatement measures as the hazard. A sample Alleged Violation Description (AVD) for a heat-related illness A.R.S. § 23-403(A) violation is located in Appendix B. A Letter of Recommendation (LOR) may be sent when all the elements of an Employer's Duty violation have not been established. A sample LOR is located in Appendix C.
 - b) Several OSHA standards may also be applicable to address worker protection in hot environments including, but not limited to, use of personal protective equipment, sanitation, medical services and first aid, and recordkeeping.
 - The Recordkeeping regulation at 29 CFR § 1904.7(b)(5) requires that employers record certain work-related injuries and illnesses. If a worker requires medical treatment beyond first aid, the worker's illness or injury must be recorded, such as unconsciousness or use of oxygen. However, if a worker merely requires first aid treatment for

the worker’s condition, the employer is not required to record the condition. For example, if a worker becomes unconscious, the worker’s condition must be recorded. However, if a worker is only instructed to drink fluids for relief of heat stress, the worker’s condition is not recordable. Refer to 29 CFR § 1904.7(b)(5) for an explanation of the difference between medical treatment and first aid. Recordkeeping issues must be handled in accordance with ADOSH Instruction, CPL 02-00-135.

- The Sanitation standards at 29 CFR § 1910.141, 29 CFR § 1926.51, and 29 CFR § 1928.110 require employers to provide cool potable water.
- The general construction safety training and education standards for construction at 29 CFR § 1926.21 and 29 CFR § 1926.20, requiring a Safety and Health Program, as well as frequent and regular safety and health inspections may also be applicable.

E. ADOSH Salesforce Coding Instructions.

All activities (*i.e.*, inspections, complaints, and referrals, etc.) and consultation requests/visits conducted under this SEP shall be coded with the new code, “HEATSEP”. The existing heat codes, “N-02-HeatGI, N-02-HeatCON, N- 02-HeatMI, N-02-HeatAG,” are also required in the Additional Code field for inspections.

Table 1, below, provides a summary of all heat related Salesforce codes.

Table 1. List of OIS codes for heat-related inspections and activities

<i>Salesforce Field</i>	<i>Salesforce Codes</i>	<i>Activity Type</i>
SEP	HEATSEP	All inspection and consultation activities conducted under this SEP (e.g., complaints, fatalities, referrals, inspections, visits).
Additional Code	N-02-HEATGI, N-02-HEATCON, N-02-HEATMI, N-02-HEATAG	These existing codes will continue to be used to track industry groups for all enforcement activities, and now also for compliance assistance.
General Duty Keyword	Heat	All heat-related violations and Letter of Recommendation

Compliance Assistance Activity Topic	Heat Illness Prevention	Existing topics for all heat-related compliance assistance activities will continue to be used. In addition, for task type “technical assistance” add additional codes as directed above.
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F. Outreach.

1. Offices.

ADOSH will conduct outreach programs concerning heat illnesses, including new guidance and the SEP.

2. Outreach efforts.

Outreach activities may include the following:

- a) Sharing information on the Heat SEP and available compliance assistance tools and resources, including no-cost ADOSH On-Site Consultation services available to small businesses. This information may be distributed in written form (e.g., via letter or email), or conveyed in webinars or presentations at conferences and other events to employers, employee groups, and unions in heat hazard industries such as, but not limited to those in Appendix A.
- b) Collaborating with agency stakeholders, including ADOSH cooperative program participants, to share information on the SEP and best practices or effective means of reducing or eliminating worker exposure to heat-related hazards.
- c) Building new stakeholder relationships with organizations that can help disseminate information to workers and employers in heat hazard industries.

Audiences for Outreach

- Local employers in high-hazard industries. *See also* targeted industries in Appendix A.
- Local companies and employer associations (e.g., trade associations, contractor groups, farm bureaus, local chambers of commerce) in industries such as, but not limited to those in Appendix A.
- Insurance companies.
- Arizona professional associations (e.g., local safety councils, local agriculture extensions).
- Temporary employment agencies providing employees

to targeted employers.

- Arizona newspapers, TV and radio stations, and trade magazines (these can help inform the public and hard-to-reach employers and communities).
- Arizona government (*e.g.*, health departments, departments of correction, emergency services, construction permitting agencies, and departments of transportation).
- Arizona suppliers of materials or services, equipment transportation companies, such as landscapers, and delivery services.
- Trade Associations and Union Halls
- The Southern Arizona Safety Council (SASC)
- Arizona Governmental Safety Association (AGSA)
- Arizona Roofing Contractors Association
- Home Builder Association of Central Arizona
- Associated General Contractors – Arizona Chapter
- Arizona Builders Alliance
- Southern Arizona Builders Alliance
- American Subcontractors Association
- Carpenters Local Union 1912
- Arizona Building and Construction Trades Council
- National Electric Contractors Association – Arizona Chapter
- Independent Electrical Contractors of Arizona
- Southern Arizona Safety Council
- Southeastern Arizona Contractors Association
- Northern Arizona Building Association
- Mechanical Trade Contractors of Arizona

- Solid Waste Association of North America – Arizona Chapter
- Arizona Food Marketing Alliance
- Arizona Milk Producers and Dairy Council
- Arizona Farm Bureau
- Arizona Wine Growers Association
- Western Growers Association
- Building Owners and Managers Association
- Arizona National Safety Council
- American Society of Safety Professionals – Arizona Chapter
- American Industrial Hygiene Association – Arizona Local Section
- Arizona Public Risk Management Association
- Professional Fire Fighters Association
- Arizona Rock Products Association
- Arizona Health Care Association
- Grand Canyon State Electric Cooperative Association
- Arizona Small Business Association
- National Federation of Independent Businesses – Arizona

d) ADOSH will develop an English and Spanish poster for water, rest, and shade and encourage employers to post for their employees. The poster will be located at <https://www.azica.gov/heatstress>.

G. Program Review.

To assess the effectiveness of this SEP, ADOSH will review the SEP within 12 months of issuance, to determine whether the policy contained herein will be continued, and take steps to assure its replacement with clear instructions, if needed, as soon as possible. The program review reports shall, at a minimum, address the SEP goal.

1. The number of employers covered by the inspections.
2. The number of workers removed from hazards.
3. Abatement measures implemented.
4. Number of violations related to specific targeted hazards.
5. Number of employees trained on heat stress.
6. Number of employers covered by an ADOSH Compliance or On-site Consultation visit.

Appendix A: Industries for the Heat SEP

Programmed inspections under this SEP shall occur on any day that the NWS has announced a heat warning or advisory for the local area (*see* Appendix E for a description of these types of alerts). This appendix includes three tables of industries (NAICS codes at the 4-digit level) with the following: 1) High numbers or high incidence rates of heat related illnesses from the Bureau of Labor Statistics (BLS) data; 2) Elevated number of days away from work (BLS) or high numbers of severe cases of heat-related illnesses, as indicated by death or hospitalization, from ADOSH severe injury reports made by employers; or 3) the highest number of heat-related Employer’s Duty A.R.S. §23-403(A) violations and LORs.

Table 1. Non-construction industries

2017 4-Digit NAICS Code	2017 NAICS Industry Sector Title
1121	Cattle Ranching and Farming
1151	Support Activities for Crop Production
2131	Support Activities for Mining
3118	Bakeries and Tortilla Manufacturing
3211	Sawmills and Wood Preservation
3241	Petroleum and Coal Products Manufacturing
3251	Basic Chemical Manufacturing
3272	Glass and Glass Product Manufacturing
3311	Iron and Steel Mills and Ferroalloy Manufacturing
3314	Nonferrous Metal (except Aluminum) Production and Processing
3315	Foundries
3323	Architectural and Structural Metals Manufacturing
3329	Other Fabricated Metal Product Manufacturing
3361	Motor Vehicle Manufacturing
3362	Motor Vehicle Body and Trailer Manufacturing
3363	Motor Vehicle Parts Manufacturing
3364	Aerospace Product and Parts Manufacturing
3365	Railroad Rolling Stock Manufacturing
3366	Ship and Boat Building
3369	Other Transportation Equipment Manufacturing
3371	Household and Institutional Furniture and Kitchen Cabinet Manufacturing
4239	Miscellaneous Durable Goods Merchant Wholesalers
4241	Paper and Paper Product Merchant Wholesalers
4242	Drugs and Druggists’ Sundries Merchant Wholesalers

4243	Apparel, Piece Goods, and Notions Merchant Wholesalers
4244	Grocery and Related Product Merchant Wholesalers
4245	Farm Product Raw Material Merchant Wholesalers
4246	Chemical and Allied Products Merchant Wholesalers
4247	Petroleum and Petroleum Products Merchant Wholesalers
4248	Beer, Wine, and Distilled Alcoholic Beverage Merchant Wholesalers
4249	Miscellaneous Nondurable Goods Merchant Wholesalers
4413	Automotive Parts, Accessories, and Tire Stores
4442	Lawn and Garden Equipment and Supplies Stores
4881	Support Activities for Air Transportation
4882	Support Activities for Rail Transportation
4883	Support Activities for Water Transportation
4884	Support Activities for Road Transportation
4889	Other Support Activities for Transportation
4921	Couriers and Express Delivery Services
4922	Local Messengers and Local Delivery
4931	Warehousing and Storage
5311	Lessors of Real Estate
5617	Services to Buildings and Dwellings (includes landscaping services, tree removal and tree trimming services)
5621	Waste Collection
5622	Waste Treatment and Disposal
5629	Remediation and Other Waste Management Services
6231	Nursing Care Facilities (Skilled Nursing Facilities)
7211	Traveler Accommodation
8111	Automotive Repair and Maintenance
8113	Commercial and Industrial Machinery and Equipment (except Automotive and Electronic) Repair and Maintenance
8114	Personal and Household Goods Repair and Maintenance

Table 2. Construction industries that are likely to have heat-related hazards

2017 4-Digit NAICS Code	2017 NAICS Industry Sector Title
2361	Residential Building Construction
2362	Nonresidential Building Construction
2371	Utility System Construction

2372	Land Subdivision
2373	Highway, Street, and Bridge Construction
2379	Other Heavy and Civil Engineering Construction
2381	Foundation, Structure, and Building Exterior Contractors
2382	Building Equipment Contractors
2383	Building Finishing Contractors
2389	Other Specialty Trade Contractors

Table 3. Industries

2017 4-Digit NAICS Code	2017 NAICS Industry Sector Title
1112	Vegetable and Melon Farming
1113	Fruit and Tree Nut Farming
2213	Water, Sewage and Other Systems (may be State or local jurisdiction)
4411	Automobile Dealers
4412	Other Motor Vehicle Dealers
4821	Rail Transportation (may be Federal jurisdiction)
4885	Freight Transportation Arrangement
4911	Postal Service
5611	Office Administrative Services
5612	Facilities Support Services
5613	Employment Services
5614	Business Support Services
5616	Investigation and Security Services
5619	Other Support Services
6117	Educational Support Services
7225	Restaurants and Other Eating Places
8112	Electronic and Precision Equipment Repair and Maintenance
9281	National Security and International Affairs (includes Customs and Border Patrol, and Transportation Security Administration)

Sources for injury and illness data:

- A. Bureau of Labor Statistics (BLS) Fatality cases 2015-2019 due to exposure to heat.
- B. BLS days away from work cases, incidence rates, and median days away from work 2015-2019 due to exposure to heat.

Appendix B: Sample Heat-related AVD

A.R.S. §23-403(A) Alleged Violation Description (AVD) language for heat-related hazard violations must specify the heat-related hazard with particularity, such as listing all sources of heat (e.g., environmental temperature measurements and information on any heat-generating equipment), all specific workplace conditions, activities or practices that expose employees to a likelihood of heat-related illnesses including related work exertions (e.g., performing moderate to very heavy roofing work, dumping heavy refuse bins while running behind a sanitation truck, wearing impermeable protective clothing, and unacclimatized), as applicable. The alleged heat-related hazard descriptions should not include the employer's failure to implement any specific abatement measures, such as acclimatizing workers to the heat; failure to provide cool drinking water, a cool shaded area, or air conditioning; or training workers on heat stress.

Example AVD:

On or about and at times prior to [*the date of the incident*], employees were exposed to the hazard of high ambient heat from [*list sources of and conditions of ambient heat, such as direct sun, boiler, steam, furnace, combustion engine*] during the performance of their job duties, including [*describe specific task(s) and duration of exposure*]. [*List the high temperatures or heat indexes for the days at issue, relative humidity, WBGT measurements and calculations, and any aggravating factors such as heavy or bulky clothing, direct sunlight, and level of workload activities. Include any NOAA heat advisory or alert that supports a high ambient hazardous heat conditions and WBGT if known*]. Such exposures are likely to lead to the development of serious heat-related illnesses such as, but not limited to, heat cramps, heat stress, heat exhaustion, and heat stroke. [*Describe any heat-related incidents/illnesses or signs and symptoms that may have occurred*].

The inspection case file should document any NWS local heat alerts, the reading on the OSHA-NIOSH Heat Safety Tool App (use the camera screenshot function to save the image of the reading), WBGT temperature if available, wind speed and direction, radiant heat, cloud cover, length of time the work was performed, and other sources of heat in the workplace. Additionally, document if any of the exposed employees were temporary workers, new hires, or employees returning from prolonged leave periods who were not acclimatized to the heat environment.

When listing availability of feasible abatement methods, document all potential measures that would have materially reduced or eliminated the hazard of heat-related illness, such as providing cool water, frequent rest breaks, cooling or cool shaded areas, gradually acclimatizing workers to heat, and access to first aid/prompt medical attention.

Any water or other fluids provided by the employer should be cool and provided in a location that is familiar to the employees, readily accessible to the work, easy to access, and in sufficient quantity for the duration of the work.

**Appendix C: Sample Heat-related
ADOSH Letter of Recommendation**

SAMPLE HAZARD ALERT LETTER

RE: ADOSH's Inspection No. []

Dear Employer:

An inspection of your workplace and evaluation of your OSHA recordkeeping logs at [location] on [date] disclosed the following workplace condition(s) which have been associated with the development of heat-related illnesses in workers:

[Describe the work performed for each task or job, including the type of PPE worn, the source of heat, WBGT and duration of the heat exposure, reading on the OSHA-NIOSH Heat Safety Tool App during the inspection, any heat notifications from the National Weather Service, and any other information relevant to workers' exposure to the risk of heat-related illness].

In the interest of workplace safety and health, I recommend that you voluntarily take the necessary steps to materially reduce or eliminate your workers' exposure to the conditions listed above, including, but not limited to, the following:

General Controls:

General controls include training, personal protective equipment (PPE), engineering, work practice, and administrative controls, health screening, and heat alert programs, (see also NIOSH Criteria Document, *Criteria for a Recommended Standard: Occupational Exposure to Heat and Hot Environments*, February 2016, page 7), available at: www.cdc.gov/niosh/docs/2016-106.

1. **Training:** Inform workers of the following (*Modify this list as appropriate for the specific situation*):
 - a. Hazards of heat-related illnesses.
 - b. How to avoid heat-related illnesses by recognizing and avoiding situations that can lead to heat-related illnesses.
 - c. Recognition of signs and symptoms of heat-related illnesses.
 - d. First aid procedures.
 - e. Employer's program to address heat-related illnesses.

2. **Personal Protective Clothing and Equipment:** (*CSHOs should recommend the appropriate PPE*).
 - a. Hats for work outdoors in the sun.

- b. For indoor work, loosely worn reflective clothing designed to deflect radiant heat, such as vests, aprons, or jackets.
 - c. Cooling vests and water-cooled/dampened garments may be effective under high temperature and low humidity conditions. However, be aware that cooling vests can become an insulator when they reach the body's temperature.
 - d. In environments where respirator usage is necessary, consult with an industrial hygienist to determine the appropriate clothing to prevent heat stress while still protecting the workers.
 - e. Consider the use of dermal patches for monitoring core temperature to better identify when workers need to be removed from the work area.
 - f. Consider the use of heart rate monitoring to better identify when workers need to be removed from the work area. Both sustained (180 bpm minus age) and recovery (120 bpm after a peak work effort) heart rates are recommended guidelines for limiting heat strain.
3. **Engineering Practice Controls:** *(CSHOs should consult the OSHA Technical Manual, Section III Chapter 4, for additional information).*
- a. Use air conditioning.
 - b. Increase general ventilation.
 - c. Provide cooling fans.
 - d. Run local exhaust ventilation where heat is produced (e.g., laundry vents).
 - e. Use reflective shields to block radiant heat.
 - f. Insulate hot surfaces (e.g., furnace walls).
 - g. Stop leaking steam.
 - h. Provide shade for outdoor work sites.
4. **Administrative and Work Practice Controls:** *(CSHOs should consult the OSHA Technical Manual, Section III Chapter 4, for additional information).*
- a. Schedule hot jobs for cooler parts of the workday; schedule routine maintenance and repair work during cooler seasons of the year when possible.
 - b. Provide adequate, cool drinking water on the worksite that is easily accessible and permit employees to take frequent rest and water breaks.
 - c. Use relief workers and reduce physical demands of the job.
 - d. Use work/rest schedules.
5. **Health Screening and Acclimatization:**
- a. Allow new workers to get used to hot working environments by using a staggered approach over 7-14 days. For example, new workers should begin work with 20% of the normal workload and time spent in the hot environment, and then gradually increase the time over a 7–14-day period. The same should be done for workers returning from an absence of three or more days, starting with 50% of the normal workload and time spent in the hot environment, then staging acclimatization over three consecutive days. Advise workers that certain medications can increase risk of heat stress. These include:
 - 1. Amphetamines – sometimes prescribed for narcolepsy or attention deficit hyperactivity disorder (ADHD).
 - 2. Diuretics - water pills.

3. Antihypertensives - blood pressure medication.
 4. Anticholinergics - for treatment of chronic obstructive pulmonary disease (COPD).
 5. Antihistamines - allergy medications.
- b. In addition, alert workers to the dangers of using illegal drugs and alcohol in hot work environments. Illegal amphetamines, such as methamphetamine, are particularly hazardous when heat stress is present.
 - c. Some conditions, such as pregnancy, fever, gastrointestinal illness, heart disease, and obesity, may increase the risk of heat-related illness. Advise workers to check with their doctors if they have any questions. (Please note: the employer is NOT entitled to know whether workers have these conditions, but only whether workers have any health conditions that limit their ability to perform their job duties. In some instances, workers with chronic conditions may need extra time to become acclimatized or may need other accommodations, such as more frequent breaks or restricted work.)
 - d. Encourage workers to consult a doctor or pharmacist if they have questions about whether they are at increased risk for heat-related illness because of health conditions they have and/or medications they take.

Sincerely,

[*name*]

Title

Additional Resources:

1. OSHA-NIOSH InfoSheet: Protecting Workers from Heat Illness, www.osha.gov/sites/default/files/publications/osha-niosh-heat-illness-infosheet.pdf.
2. CDC Workplace Safety and Health Topics: Heat Stress, www.cdc.gov/niosh/topics/heatstress.
3. NIOSH Criteria Document: Criteria for a Recommended Standard: Occupational Exposure to Heat and Hot Environments, February 2016, www.cdc.gov/niosh/docs/2016-106/.
4. American Conference of Governmental Industrial Hygienists (ACGIH®) Action Limit (AL) for un-acclimatized workers and a Threshold Limit Value (TLV®) for acclimatized workers, *see* Heat Stress and Strain: TLV® Physical Agents 2022 or latest edition. *See* ACGIH® website at www.acgih.org/.
5. NOAA/NWS Heat Safety webpage, www.weather.gov/safety/heat.

Appendix D: Description of Serious Heat-related Illnesses and Common Symptoms

The table below describes serious heat-related illnesses and common signs and symptoms. Please note that this list is not exhaustive.

Heat-Related Illnesses	Symptoms and Signs
Heat stroke	<ul style="list-style-type: none"> ● Confusion ● Slurred speech ● Unconsciousness ● Seizures ● Heavy sweating or hot, dry skin ● Very high body temperature ● Rapid heart rate
Heat exhaustion	<ul style="list-style-type: none"> ● Fatigue ● Irritability ● Thirst ● Nausea or vomiting ● Dizziness or lightheadedness ● Heavy sweating ● Elevated body temperature or fast heart rate
Heat cramps	<ul style="list-style-type: none"> ● Muscle spasms or pain ● Usually in legs, arms, or trunk
Heat syncope	<ul style="list-style-type: none"> ● Fainting ● Dizziness
Heat rash	<ul style="list-style-type: none"> ● Clusters of red bumps on skin ● Often appears on neck, upper chest, and skin folds
Rhabdomyolysis (muscle breakdown)	<ul style="list-style-type: none"> ● Muscle pain ● Dark urine or reduced urine output ● Weakness

Acute kidney injury (AKI)	<ul style="list-style-type: none">● Kidneys become damaged due to inadequate blood flow or a second mechanism is rhabdomyolysis of kidney muscle tissue.● Diagnosed by elevated blood creatinine levels. Urine output is also reduced.● May lead to kidney failure
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Appendix E: Warnings, Alerts, and Advisories Issued by the National Weather Service

The following types of warnings, alerts, and advisories may be issued by the U.S. National Oceanic and Atmospheric Administration (NOAA), National Weather Service (NWS) (*see* NWS webpage):

- **Heat Advisory—Take Action!** A Heat Advisory is issued within 12 hours of the onset of extremely dangerous heat conditions. The general rule of thumb for this Advisory is that the maximum heat index temperature is expected to be 100°F or higher for at least 2 days, and nighttime air temperatures will not drop below 75°F.
- **Heat Wave—Take Action!** A heat wave is forecast by NWS or a local news station. A heat wave is when the daily maximum temperature exceeds 95°F or when the daily maximum temperature exceeds 90°F and is 9°F or more above the maximum reached on the preceding days.
- **Excessive Heat Warning—Take Action!** An Excessive Heat Warning is issued within 12 hours of the onset of extremely dangerous heat conditions. The general rule of thumb for this Warning is that the maximum heat index temperature is expected to be 105°F or higher for at least 2 days and nighttime air temperatures will not drop below 75°F.
- **Excessive Heat Watches—Be Prepared!** Heat watches are issued when conditions are favorable for an excessive heat event in the next 24 to 72 hours. A Watch is used when the risk of a heat wave has increased but its occurrence and timing is still uncertain.
- **Excessive Heat Outlooks—Be Prepared!** Outlooks are issued when the potential exists for an excessive heat event in the next 3-7 days. An Outlook provides information to those who need considerable lead-time to prepare for the event.

Appendix F: Additional Resources

1. OSHA Publication 3905, Whistleblower: Recommended Practices for Anti-Retaliation Program, 2017.
2. OSHA Webpage, Heat Illness Prevention Campaign.
3. OSHA Webpage, Safety and Health Topic Page: Heat (all webpages also available in Spanish).
4. OSHA Poster, Prevent Heat Illness at Work (English), (Spanish).
5. OSHA Webpage, COVID-19 Guidance: The Use of Cloth Face Coverings while Working Outdoors in Hot and Humid Conditions, September 2020.
6. OSHA Publications: Heat Illness Prevention Fact Sheets, Wallet Cards, etc. (several also available in Spanish).
7. OSHA-NIOSH Info Sheet, OSHA 3438 – 2011, Protecting Workers from Heat Illness.
8. CDC, COVID-19 and Cooling Centers.
9. U.S. Environmental Protection Agency, Climate Change and Social Vulnerability in the United States: A Focus on Six Impacts, EPA 430-R-21-003, September 2021.

