Section 4 - Physical Hazards and Technical Work Locations

Background and Introduction

Purpose and scope

This section of the manual can be used by research staff to document safety information for physical hazards such as radiation sources, heal illness, equipment, or outdoor field work sites. This section applies to research uses of potentially hazardous equipment in research such as tractors, forklift/industrial truck, harvester, shop equipment (grinders, saws), all-terrain vehicles, orchard/picking ladders, pesticide application equipment, pack lines, stills, gins, mechanical threshing operations, and any another pressurized, motorized, or noise-generating equipment used in research.

This section can also be used as primary section for safety information for outdoor research activities, field work, and non-lab locations.

Physical Hazards

Employees who operate equipment or participate in processes that pose significant physical hazard must be trained to recognize the physical hazard and to use protective controls whenever required or recommended for the work. Significant hazards include but are not limited to hydraulic presses and equipment with high-pressure hydraulic fluid, autoclaves, drying overs, sonicators, microtomes, grinders, vehicles, and packline operations. Operating manuals for any hazardous equipment must be maintained for reference by users and used in training. SOPs for safe use of equipment and vehicles should be included in this section of the manual. See appendices 4b – 4e at the end of this section for template forms to document general research SOPs, job safety analyses, PPE hazard assessment, and shop safety plans.

Radiation Safety

Any use of radiation or radiation producing equipment requires specific authorization and approval form UC ANR EH&S. Any use of regulated radiation-producing equipment or radioactive materials must be conducted under specific authorization from the U.S. Nuclear Regulatory Commission that is maintained by a UC campus.

Currently, all radiation producing equipment at ANR is authorized through UC Davis Radiological Safety Program. UC ANR researchers who have active Radiological Use Authorizations (RUA) are responsible for maintaining compliance with all campus RUA requirements, including conducting or facilitating semi-annual leak test for hydroprobes and other sealed sources.

Contact UC ANR EH&S prior to any planned purchase of radiation producing equipment or radioactive materials.

Heat Illness

Principal investigators are responsible for identifying work processes which may pose a risk for heat stress and providing training and support as required under regulations. Employees are responsible for adhering to the location heat illness plan and IIPP, including maintaining a copy of the heat illness plan that is relevant to the research project/site at each outdoor work location where heat illness provisions may be required. If research involves exposure to temperatures above 80F, a copy of the current heat illness plan should be printed and added as an appendix in this section of the manual. See appendix 4a for a template which can be used to create a project-specific heat illness plan.

Heat illness prevention training resources

Access to UC heat illness prevention training online UC training course is available on the UC ANR safety website here: http://safety.ucanr.edu/Programs/Heat_Illness_Prevention/
(UC login required to access to UC Learning Center)

Outdoor, Remote, and Other Temporary Research Locations

The University of California has published a field research safety manual to provide guidance to research staff who work in outdoor and remote locations. If this manual is being implemented for projects that involve a significant amount of field work, relevant sections of the manual (or the entire manual) may be printed and added to this section as an appendix. Field research projects must have documented safety plans and procedures to cover emergency response, heat illness prevention, exposure to zoonotic disease and other hazards encountered in the work. Locations of nearby medical providers and plans for access to medical care are also required. See the UC Field Research Safety Manual for more guidance.

https://www.ucop.edu/environment-health-safety/_files/uc-field-research-safety-manual-2017-18-final-082318.pdf

Job Safety Analysis & Personal Protective Equipment Certification

Similar to biosafety and chemical safety SOPs that are used in labs, hazard assessments and safety information must be documented for any physical hazards unique to the lab environment. Additionally, physically hazardous research activities may occur in locations outside of the lab such as greenhouses and technical work rooms.

The Cal/OSHA Injury and Illness Prevention Program (IIPP) regulation (8 CCR §3203) and Personal Protective Equipment (PPE) regulation (8 CCR §3380) require employers to:

1) List the tasks and activities employees perform, assess the hazards and establish the required controls, and;

2) Establish and train employees on hazard assessment findings and required personal protective equipment (PPE), if any, for each task or activity.

Engineering and/or administrative controls should be the first choices for controlling hazards. PPE is the last resort. NOTE: Laboratory workers should use the Laboratory Hazard Assessment Tool (LHAT) for PPE hazard assessment.

Instructions for Completing Job Safety Analysis & Personal Protective Equipment Certifications

Forms for documenting a job safety analysis and PPE certification for physical hazards and technical work locations are included in appendices to this safety manual. Copies of completed JSA and PPE certifications should be retained in this section of the safety manual for easy access and reference by employees at the worksite.

Step 1: Select assessment category - Hazard assessments are conducted for areas (worksite), job activities/categories, tools, equipment or for individuals. For ease of assessment, grouping similar tasks, activities, tools and equipment into categories is highly recommended. The hazard evaluator must record the location, employee's name or position title that is being assessed, and sign and date the assessment form.

Step 2: Inform affected employees of the process - Involve affected employees in the assessment, if possible. Discuss the reasons for the assessment and the procedures being used to review the job procedures (tasks), potential hazards, and the PPE currently in use or needed.

Step 3: Part I - Job Safety Analysis

A. Identify activities (i.e. tasks, procedures, equipment/tool use) by interviewing supervisors, principal investigator, and other experienced employees. Activities can be general (i.e. "general office work") or specific (i.e. operating a table saw).
B. Consider and list the potential employee injury hazards of each activity, task, tool or equipment, such as:

    - Asphyxiation (i.e. confined spaces, oxygen deficient environments)
    - Chemical or biological exposure (i.e. inhalation, ingestion, skin contact, eye contact or injection – may be documented in LHAT of other assessments)
    - Compression (i.e. roll-over or pinching objects, caught in between objects)
    - Cuts/Penetration (i.e. sharp objects piercing foot/hand, needle sticks)
    - Dust/flying debris (i.e. grinding, chipping, sanding)
    - Electrical (i.e. shock, short circuit, arcing, static)
    - Fall (i.e. slip/trip, scaffolds, elevated heights, unprotected elevated edges)
    - Impact (i.e. falling/flying objects, struck by or against an object)
    - Noise (i.e. mechanical rooms, machines, cage washing, jackhammers)
    - Radiation (ionizing: i.e. X-rays, radio-isotopes)
    - Radiation (non-ionizing: i.e. UV/IR/light, lasers, welding, brazing, cutting, furnaces)
    - Temperature extremes (i.e. heat/cold)

C. Describe controls (training, SOPs, machine guarding, safe work practices, or administrative controls) to eliminate or minimize the potential risk of the hazard
D. Identify the need for PPE. If needed, complete Part II
E. Evaluator signs and dates the hazard assessment
F. Train employees on assessment findings and make assessment accessible
G. Update assessment when new hazards are introduced or identified

Step 4: Part II - PPE Hazard Assessment/Certification (If Needed)

After completing the Job Safety Analysis (Part I), if PPE is required for a certain activity, task, tool, or equipment, complete Part II.

Select the PPE per body part protected (i.e. safety glasses for eyes). Document the required PPE. For help with proper PPE selection, contact EHS@ucanr.edu or consult the UC Davis Safety Services PPE Selection guide (Appendix 1d).

The PPE Hazard Assessment/Certification procedure is as follows:

A. List activities identified in Part I as needing PPE
B. Identify the body part needing protection
C. Describe the required PPE (i.e. nitrile gloves, safety goggles)
D. Evaluator sign and date the certification statement
E. Review the PPE Hazard Assessment/Certification with affected employees
F. Provide PPE and train employees on the required PPE, proper use and maintenance
G. Document the training date and employee's printed name and signature
H. Make this document accessible to employees

Step 5: Revise and re-assess - Update departmental protocols with new or modified PPE requirements, when applicable. Conduct periodic reassessments to identify and evaluate:

- New equipment and processes
- Injury and illness reports
- Near-miss reports
- Accident records
- Suitability of previously selected PPE

Appendices and SOPs

Appendices

Appendix 4a - Heat Illness plan template

Appendix 4b - General Research Safety SOP template

Appendix 4c - Job Safety Analysis (JSA) from

Appendix 4d - PPE Hazard Assessment and Certification form

Appendix 4e - Shop Safety Plan Template

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