

Section 34

Exposure to Hazardous Chemicals in Laboratories

34.1 Scope

This section establishes requirements for Bureau of Reclamation facilities where employees are engaged in “laboratory use” of hazardous chemicals in accordance with Federal Occupational Safety and Health Administration (OSHA) 29 CFR 1910.1450, *Occupational Exposure to Hazardous Chemicals in Laboratories*.

34.2 General Requirements

34.2.1 Program Application

Laboratory use applies to handling or using hazardous chemicals when the conditions below are met:

- chemical procedures are carried out on a “laboratory scale” basis,
- multiple chemical procedures or hazardous chemicals are used,
- procedures involved are not part of a production process, or simulate a production process, and
- protective laboratory practices and equipment are available to minimize the potential for employee exposure to hazardous chemicals.

34.2.2 Facilities Meeting Laboratory Use

When paragraph 34.2.1, *Program Application* of this Reclamation Safety and Health Standard (RSHS) applies, it shall supersede laboratory requirements of all other OSHA health standards in Federal OSHA 1910, subpart Z, except as follows:

- for any OSHA health standard, only the requirement to limit employee exposure to the specific permissible exposure limit (PEL) shall apply, unless that standard states otherwise,
- where the action level (AL) is routinely exceeded (or in the absence of an AL, the PEL), for an OSHA regulated substance with exposure monitoring and medical surveillance requirements, then paragraphs 34.7, *Employee Exposure Determination* and 34.8, *Medical Examinations and Consultation* of this RSHS apply, and/or
- any OSHA health standard prohibiting eye and skin contact.

34.3 Responsibilities

34.3.1 Area Office Managers

34.3.1.1 Shall provide resources to implement and maintain the procedures within this section.

34.3.2 First-Line Supervisors

- 34.3.2.1** Shall provide resources and support for the implementation of this section.
 - 34.3.2.2** Shall select a Chemical Hygiene Officer (CHO) to provide technical guidance for developing the Chemical Hygiene Plan (CHP).
 - 34.3.2.3** Shall coordinate with the CHO to provide training according to paragraph 34.4.1, *Initial Training* of this RSHS, for employees in laboratory areas where they have potential exposure to hazardous chemicals.
 - 34.3.2.4** Shall provide the appropriate engineering controls and personal protective equipment (PPE) for employees in laboratory areas where they have potential exposure to hazardous chemicals.
 - 34.3.2.5** Shall ensure the job hazard analysis (JHA) and/or standard operating procedure (SOP) documents use the hierarchy of controls for each chemical process and are reviewed with employees prior to use.
 - 34.3.2.6** Shall ensure engineering control malfunctions are immediately reported and repaired before placing the equipment back into service.
 - 34.3.2.7** Shall coordinate with the CHO and the regional/local industrial hygienist (IH) to review if any laboratory employees are using hazardous chemicals that meet Federal OSHA standards requiring monitoring and if exposure levels could exceed the AL (or in the absence of an AL, the PEL).
- 34.3.3 Regional Safety Managers**
- 34.3.3.1** Shall assist in providing the necessary resources to develop, establish, and maintain an effective CHP, when requested
- 34.3.4 Regional/Local Industrial Hygienists**
- 34.3.4.1** Shall provide technical assistance to the first-line supervisor and CHO on topics such as exposure monitoring, medical surveillance, training, respirator selection, fit-testing, and engineering control(s) evaluation.
- 34.3.5 Chemical Hygiene Officers**
- 34.3.5.1** Shall coordinate with the first-line supervisor and, if needed, with the local hazard materials coordinator to ensure employees understand proper chemical handling, storage, transportation, and disposal requirements.
 - 34.3.5.2** Shall coordinate with the first-line supervisor to provide initial and ongoing CHP training for all laboratory employees.

- 34.3.5.3** Shall conduct periodic laboratory inspections ensuring laboratory employees have stored and labeled chemicals properly, the appropriate PPE is available and in good condition, safety data sheets are available for all hazardous chemicals in the laboratory, and engineering controls are working properly.
- 34.3.5.4** Shall coordinate with the first-line supervisor to develop and implement the CHP.
- 34.3.5.5** Shall review the CHP annually, make any updates, and ensure employees are provided training on any changes.

34.3.6 Employees

- 34.3.6.1** Shall complete training according to paragraph 34.4.1.
- 34.3.6.2** Shall review the JHA and/or SOP(s) before conducting the job task(s).
- 34.3.6.3** Shall use required PPE and engineering controls outlined in the JHA and/or SOP(s).
- 34.3.6.4** Shall immediately inform their first-line supervisor and/or CHO of any engineering controls in the laboratory that are not functioning properly.
- 34.3.6.5** Shall only perform job tasks using hazardous chemicals they are trained to use.
- 34.3.6.6** Shall ensure containers in the laboratory are labeled properly and shall properly handle, transport, and dispose of hazardous chemicals according to the CHP.
- 34.3.6.7** Shall immediately report any exposure signs or symptoms of the hazardous chemicals they use to their first-line supervisor and/or CHO.
- 34.3.6.8** Shall complete medical exams outlined in paragraph 34.8, *Medical Examinations and Consultation* of this RSHS, and RSHS Section 32, *Respiratory Protection Program*, if respiratory protection is or will be used.

34.3.7 Human Resources Officers

- 34.3.7.1** Shall work in coordination with regional medical coordinators to obtain and maintain medical examination results and employee exposure monitoring records in the employee's medical folder according to 29 CFR 1910.1020(d)(1), *Access to Employee Exposure and Medical Records*, the Privacy Act of 1974 (P.L. 93-579), and provide the regional/local IH, CHO, and/or first-line supervisor with the clearance results as requested.

34.4 Training

34.4.1 Initial Training

First-line supervisors shall conduct and/or coordinate employee training on the hazardous chemicals in their work area(s) and any new job tasks(s) where there is potential for exposure to hazardous chemicals. At a minimum, training shall include the following elements:

- contents of the laboratory standard and its appendices,
- location and availability of the CHP,
- permissible exposure limits for (PELs) for OSHA regulated substances or recommended exposure limits for other hazardous chemicals where there is no applicable OSHA standard,
- signs and symptoms associated with exposures to hazardous chemicals used in the laboratory,
- location and availability of known reference materials on the hazards, safe handling, storage, and disposal of hazardous chemicals found in the laboratory including, but not limited to, the safety data sheets received from the chemical supplier,
- measures workers can take to protect themselves from these hazards, such as appropriate work practices, emergency procedures, and personal protective equipment to be used, and
- applicable details of the CHP.

34.4.2 Refresher Training

The first-line supervisor and/or CHO shall determine the frequency of refresher training. Any employees found not following the practices and/or procedures in the CHP, JHA(s), and/or SOP(s) shall receive refresher training from the first-line supervisor and/or CHO on the correct practices and/or procedures prior to resuming work with hazardous chemicals within the scope of this section.

34.5 Reclamation Recordkeeping

All training records shall be kept in the Department of the Interior's approved repository and managed in accordance with the Information Management Handbook as referenced in Reclamation Manual Directive and Standard, RCD 05-01, *Information Management*.

34.6 Chemical Hygiene Plan

The first-line supervisor in coordination with the CHO shall develop and implement the CHP that includes the following elements:

- SOPs relevant to safety and health considerations for each activity involving the use of hazardous chemicals,
- criteria used to determine and implement control measures to reduce exposure to hazardous materials (e.g., engineering controls, substitution, administrative controls, PPE, and hygiene practices), with particular attention given to selecting control measures for extremely hazardous chemicals/materials,

- procedures to ensure fume hoods and other engineering controls are functioning properly within the manufacturer's recommendations,
- training elements covered in paragraph 34.4.1,
- criteria to determine if and when a particular laboratory operation, procedure, or activity requires approval from the first-line supervisor and/or CHO prior to implementation,
- names of employees responsible for implementing the CHP, including the assignment of a CHO,
- any additional employee protection for working with particularly hazardous substances including select carcinogens, reproductive toxins, and substances that have a high degree of acute toxicity (i.e., using designated areas, containment devices, safe removal of contaminated wastes, and decontamination procedures), and
- requiring that the CHO must review and evaluate the effectiveness of the CHP at least annually and make updates as necessary.

34.7 Employee Exposure Determination

34.7.1 Initial Monitoring

The first-line supervisor and/or CHO shall coordinate with the regional/local IH to perform monitoring for employees with the potential for exposure to any hazardous chemicals that meet Federal OSHA standards requiring monitoring, if there is reason to believe that exposure levels may routinely exceed the AL (or in the absence of an AL, the PEL).

34.7.2 Periodic Monitoring

If the initial monitoring in paragraph 34.7.1, *Initial Monitoring*, of this RSHS indicates an employee exposure is over the AL (or in the absence of an AL, the PEL), then the first-line supervisor and/or CHO, in coordination with the regional/local IH, must immediately implement exposure monitoring and termination of monitoring provisions of the appropriate Federal OSHA standard.

34.7.3 Employee Notification of Monitoring Results

The regional/local IH shall coordinate with the first-line supervisor and/or the CHO to contact affected employees in writing within 15 working days after receiving any monitoring results.

34.8 Medical Examinations and Consultation

The first-line supervisor shall provide all laboratory employees who work with hazardous chemicals an opportunity to receive medical attention, including any follow-up examinations that the examining physician determines necessary, under the following circumstances:

- when an employee develops signs or symptoms associated with a hazardous chemical they have been exposed to in the laboratory,
- if exposure monitoring indicates an employee exposure level is routinely above the AL (or in the absence of an AL, the PEL) for an OSHA regulated substance that has exposure monitoring and medical surveillance requirements, then the

regional/local IH must establish medical surveillance according to that particular standard for the affected employee(s), and

- whenever an event takes place in the work area such as a spill, leak, explosion, or other occurrence resulting in the likelihood of a hazardous exposure, the affected employee(s) must be provided an opportunity for a medical consultation to determine the need for a medical examination.

34.8.2 Medical Examinations and Consultations

The first-line supervisor, in coordination with the CHO, employees, and/or regional/local IH, shall ensure a licensed physician performs or directly supervises all medical examinations and consultations without cost to the employee, without loss of pay or use of leave (annual or sick), and at a reasonable time and place.

34.9 Hazard Identification, Assessment, and Safety Measures

34.9.1 Hazard Identification and Assessment

The first-line supervisor, in coordination with the CHO and/or regional/local IH, shall conduct a hazard assessment for their laboratory, and at a minimum, include the following:

- identifies the chemicals used covering the different laboratory procedures and determine if any laboratory conditions or employee tasks could create or increase a hazard,
- evaluates the hazards of the chemicals used in the procedures (e.g., toxic, physical, reactive, flammable, explosive, and biological hazards),
- identifies appropriate controls to minimize risk, such as engineering controls, administrative controls, and PPE, and
- identifies and document emergency procedures to take in the event of an accident.

34.9.2 Safety Measures

34.9.2.1 Hierarchy of Controls

The first-line supervisor and/or CHO shall review the JHA identifying the appropriate controls below to reduce employee exposures below the AL, and/or PEL, when performing job tasks using Federal OSHA regulated substances:

- local exhaust systems and fume hoods,
- general laboratory ventilation,
- chemical substitution to less hazardous chemicals,
- specific laboratory procedures outlined in the CHP or laboratories procedure manual,
- identification of relevant SOPs,
- PPE specific to each hazard, ensuring the PPE fits properly and the employee is trained in its use, removal, storage, maintenance, and disposal per manufacturer specifications, and
- emergency procedures and equipment.

34.10 Pre-job Briefing and Planning Requirements

34.10.1 JHA

The first-line supervisor and/or CHO shall complete and review a JHA with employee(s) prior to the job task(s) identifying hazards, their controls, and necessary PPE to ensure that the exposure associated with the activity is minimized.

34.11 Personal Protective Equipment (PPE)

First-line supervisors and/or CHO shall provide and train employees in the use of required PPE to eliminate or minimize the risk of exposure to hazardous chemicals in the laboratory.

34.11.1 Respiratory Protection

Employees shall use respiratory protection and adhere to the requirements in the RSHS Section 32 when:

- exposure to a Federal OSHA regulated substance exceeds the AL or PEL if an AL has not been established,
- engineering and work practice controls are not adequate to reduce exposures below the AL or below 50 percent of the PEL, and
- when interim protection measures are in place during an exposure assessment.

34.11.2 Additional PPE Selection

Refer to RSHS Section 8, *Personal Protective Equipment*, for selection, use, and maintenance requirements for additional PPE identified in the JHA.

34.12 Definitions

Action level	A concentration designated in Federal OSHA 29 CFR part 1910 for a specific substance, calculated as an 8-hour time-weighted average, which initiates certain required activities such as exposure monitoring and medical surveillance.
Chemical Hygiene Officer	An employee, selected by their first-line supervisor, that is qualified by training or experience to provide technical guidance in the development and implementation of the provisions of the Chemical Hygiene Plan.
Chemical Hygiene Plan	A written program stating policies, procedures, and responsibilities to protect employees from the health hazards associated with the hazardous chemicals used in their work area.
Hazardous chemical	Any chemical classified as a health hazard or simple asphyxiant in accordance with Federal OSHA 1910.1200, <i>Hazard Communication</i> .

Health hazard	A chemical classified as having one of the following hazardous effects: Acute toxicity (any route of exposure), skin corrosion or irritation, serious eye damage or eye irritation, respiratory or skin sensitization, germ cell mutagenicity, carcinogenetic, reproductive toxicity, specific target organ toxicity (single or repeated exposure), or aspiration hazard.
Laboratory	A facility where the "laboratory use of hazardous chemicals" occurs. A workplace where small quantities of hazardous chemicals are used on a non-production basis.
Laboratory scale	Working with substances where the containers used for reactions, transfers, and other handling of substances are designed to be easily and safely manipulated by one person. "Laboratory scale" excludes those workplaces whose function is to produce commercial quantities of materials.
Permissible exposure limit	Maximum upper exposure legal limit to a hazardous substance exposure that an employee can be exposed to in an 8-hour period.
Physical hazard	A chemical classified as having one of the following hazardous effects: explosive, flammable (gases, aerosols, liquids, or solids), oxidizer (liquid, solid, or gas), self-reactive, pyrophoric (gas, liquid, or solid), self-heating, organic peroxide, corrosive to metal, gas under pressure, when in contact with water emits flammable gas, or combustible dust.
Select carcinogen	A select carcinogen is any substance meeting the following criteria: <ul style="list-style-type: none">• regulated by Federal OSHA as a carcinogen,• listed under the category, "known to be carcinogens" in the Annual Report on Carcinogens published by the National Toxicology Program (NTP) latest edition,• listed under Group 1, "carcinogenic to humans" by the International Agency for Research on Cancer Monographs latest editions,• listed in either Group 2A or 2B by IARC or under the category, "reasonably anticipated to be carcinogens" by NTP, and causes statistically significant tumor incidence in experimental animals in accordance with any of the following criteria: (1) after inhalation exposure of 6-7 hours per day, 5 days per week, for a significant portion of a lifetime to dosages of less than 10 mg/m³, after repeated skin application of less than 300 (mg/kg of body weight) per week, or (2) after oral dosages of less than 50 mg/kg of body weight per day.

34.13 References

Federal OSHA 29 CFR 1910.1450, *Occupational Exposure to Hazardous Chemicals in Laboratories*. <https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.1450>

Federal OSHA Fact Sheet, *Laboratory Safety – Chemical Hygiene Plan*.

<https://www.osha.gov/sites/default/files/publications/OSHAfactsheet-laboratory-safety-chemical-hygiene-plan.pdf>

Federal OSHA 29 CFR 1910 Subpart Z. Toxic and Hazardous Substances. 1910.1200 - Hazard Communication.

Federal OSHA 29 CFR 1910. Subpart H.- Hazardous Materials 1910.106 - Flammable Liquids