

Environmental Health & Radiation Safety Policy

Chemical Hygiene Program

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Summary: The Temple University (TU) Chemical Hygiene Program (CHP) describes the processes and procedures which will be implemented by Temple University to minimize and reduce laboratory worker exposure to hazardous chemicals.

1. Program Description

Temple University (TU) Environmental Health and Radiation Safety (EHRS) has developed the Chemical Hygiene Program (CHP) to establish a program and standard procedures to minimize and reduce exposure to hazardous chemicals that laboratory workers handle while performing their daily job functions. This program provides a Chemical Hygiene Plan to comply with the Occupational Safety and Health Administration (OSHA) "Occupational Exposure to Hazardous Chemicals in Laboratories" Standard, 29 CFR 1910.1450.

2. Scope

The Chemical Hygiene Program applies to faculty, staff and students on all campuses engaged in the laboratory use of hazardous chemicals, including those covered under the Occupational Safety and Health Administration (OSHA) Standard 29 CFR 1910.45,

Occupational Exposure to Hazardous Chemicals in Laboratories, also referred to as the Laboratory Standard.

3. Responsibilities

Temple University supports the use of chemicals and other potentially hazardous materials for purposes of research, clinical and academic activities. The University is committed to ensuring the safety of its students, employees, volunteers, and visitors and to complying with all regulatory requirements, which impact its facilities and operations relating to the environment, health, and safety. University administration, faculty, staff, and students are asked to support this goal in all university activities. Temple University has designated the following specific responsibilities for developing and implementing the Chemical hygiene Program.

3.1. Deans, Associate Deans, Directors and Department Heads are responsible for adopting and implementing the procedures and guidelines within the CHP in laboratories under their administrative control.

3.2. Principal Investigators (PIs), Laboratory Supervisors/Managers and Instructors are responsible for ensuring that all the procedures and guidelines established in the CHP are strictly followed by all employees, collaborating researchers, visitors, and students under their supervision. Principal Investigators (PIs), Laboratory Supervisors/Managers, or Instructors must designate a Laboratory Safety Coordinator (LSC) that will act as a liaison with EHRS for all matters related to laboratory and chemical safety. Principal Investigators (PIs), Laboratory Supervisors/Managers, or Instructors will act as the LSC unless otherwise designated.

3.3. Laboratory Safety Coordinator (LSC) assist the laboratory in adopting requirements of the CHP to individual laboratories. Assigned duties may include acting as a point of contact with EHRS, providing information and consultation of CHP requirements, disseminating information published by EHS, facilitating audits, and conveying information and concerns to EHRS.

3.4. Laboratory Personnel are expected to follow all applicable practice and procedures contained in the HCP, complete designated training, and report

hazardous, unsafe laboratory conditions and near-misses' incidents to their PI, Supervisor/Manager, Instructor, LSC and/or EHRS.

3.5. Visitors & Volunteers are all persons entering a laboratory other than the authorized Temple University (TU) employees. Individuals in this category will be under the supervision of the host laboratory. The host is responsible for laboratory security during the visit, required training, notification of potential hazards, and the oversight of compliance with all applicable safety practices and procedures contained in the CHP. Additional University requirements may be necessary.

3.6. Minors are non-matriculating individuals less than eighteen years of age, who perform research-related activities in university laboratories and those who are visitors in labs strictly for observational purposes. Minors must be approved by EHRS, Human Resources, and Risk Management at least 60 days prior to entering and/or working in a laboratory. Refer to [EHRS-Fact Sheet-Minors in a Lab](#)

3.7. Environmental Health & Safety-Safety Committee (EHSSC) was established to assist and guide the University with the development and implementation of applicable Chemical and Occupational Safety programs. The EHSSC consist of representatives from colleges and departments with facilities and personnel that are affected by the programs and procedures applicable to Chemical and Occupational Safety. Responsibilities applicable to the CHP include, but not limited to:

- Assist and guide the Institutional Chemical Hygiene Officer (CHO) with the implementation of the CHP.
- Provide a mechanism or point of contact to distribute important information to departments with laboratories and personnel covered by the CHP.
- Support the CHO with the authority for the enforcement of the CHP

3.8. Environmental Health and Radiation Safety (EHRS) is responsible for administering and overseeing institutional implementation of the Chemical Hygiene Program (CHP). EHRS ensures the CHP meets relevant OSHA regulatory requirements, including the Chemical Hygiene Plan requirements under 29 CFR 1910.1450 (Lab Standard), and that the CHP presents information to prevent or minimize laboratory chemicals related injury and illness, to protect the quality of the workplace, and to protect the surrounding environment.

EHRHS advises the University community of its responsibilities with respect to laboratory health and safety issues, recommend appropriate corrective actions and programs, implements new health and safety programs, and serves as a liaison between TU and various external agencies and regulatory bodies.

EHRHS will designate an Institutional Chemical Hygiene Officer, with support from the EHSSC and other EHRHS personnel to oversee the Chemical Hygiene Program (CHP).

- inspections/audits by EHRHS or other authorized safety professionals.
- Contact EHRHS on any work-related injury/illness, exposure or near-miss incident involving hazardous chemicals.
- Ensure proper disposal of regulated chemical waste according to university procedures.
- Investigate the circumstances surrounding a workplace accident and take steps to avoid recurrence.
- Maintain compliance with Temple University policies and procedures.

4. Program Components

The Chemical Hygiene Program is intended to serve as an operational guide for the incorporation of prudent practices into the day-to-day use of chemicals within laboratories. It was developed and issued in general form, which must be adapted and supplemented, by particular departments, laboratories, and research groups to meet their specific needs.

The Chemical Hygiene Program is organized in a format that enables desired information to be quickly found and readily updated. The content of the Chemical Hygiene Program was developed directly from the requirements of the Laboratory Standard and includes the following information:

- Designation of the personnel responsible for the implementation of the Chemical Hygiene Program.
- Provisions for personnel training and sources of information.

- Hazard identification.
- Criteria that the employer will use to implement control measure to reduce individual exposure to chemicals. These measures include administrative controls, containment, engineering controls, procedural controls, and the use of personal protective equipment (PPE).
- Standard Operating Procedures (SOPs) relevant to the safety and health considerations that must be observed for the use of hazardous chemicals in the laboratory. Generic SOPs and/or Chemical Hazard Guidelines for handling of all hazardous chemical groups are included in the CHP. However, each laboratory group must develop and add specific SOPs that are appropriate for their particular use of chemicals.
- Personal exposure monitoring, when necessary.
- Provisions for medical consultation and examinations, when necessary.
- Circumstances under which a laboratory procedure must require prior approval before implementation.
- Provisions for additional personal protection for personnel working with carcinogens, reproductive toxins, and chemicals with high acute toxicity known as “particularly hazardous substances.”
- A requirement that chemical fume hoods and other protective equipment function properly and that measures be taken to ensure this.

5. Program Evaluation & Implementation

The Chemical Hygiene Program (CHP) at Temple University is continually evaluated to determine if areas for improvement exists.

5.1. Implementation

EHRM has effectively implemented the Chemical Hygiene Program across the Temple University Community. New laboratory groups covered by the Chemical Hygiene Program are routinely identified and incorporated into the program. EHRM works with covered laboratories to educate and implement the required elements of the program.

5.2. Performance Measures

EHR conducts periodic Laboratory Chemical Safety Audits (LCSA) of all covered labs to ensure compliance with the program. EHR reviews the results of each audit with the Principal Investigator (PI) and works collaboratively on corrective actions. Audit records are available in the EHR department for review.

On an annual basis, EHR will review audit data to identify violation trends. A plan to mitigate these trends will be developed and effectiveness tracked.

5.3. Program Review

This program will be reviewed annually and amended as necessary. When it becomes apparent that the plan is deficient, it will be revised.

Performance measures will be monitored for effectiveness at least annually.

6. Recordkeeping

The following records are maintained by Environmental Health and Radiation Safety (EHR): exposure monitoring, EHR audits, chemical incident reports, training records (except laboratory-specific), chemical inventories, Safety data Sheets (SDSs) and regulatory agency correspondence for activities managed by EHR. These records will be maintained by EHR for a minimum of three years or as required by regulation.

Additional records are required to be maintained by individual laboratories for specific activities not directly managed by EHR.

7. References

- OSHA-Occupational Exposure to Hazardous Chemicals in Laboratories-29 CFR 1910.1450
- OSHA-Hazard Communication-29 CFR 1910.1200
- Temple University Chemical Hygiene Program
- Temple University Chemical Waste Management Program

Appendix A-Glossary

Action Level- A concentration designated in the OSHA (29 CFR) part 1910 (or in the absence of an action level, the PEL) for which a specific substance, calculated as an eight-hour time-weight average, which initiates certain required activities such as exposure monitoring and medical surveillance.

ANSI- American National Standard Institute

CAS- Chemical Abstract Service

CDC- Center for Disease Control and Prevention

Chemical Hygiene Officer- The Chemical Hygiene Officer is an employee who is designed by the employer, and who is qualified by training or experience, to provide technical guidance in the development and implementation of the Chemical Hygiene Plan.

Corrosive Chemical- A chemical that produces destruction of skin tissue, namely, visible necrosis through the epidermis and into the dermis, in at least 1 of 3 tested animals after exposure up to a 4-hour duration. Corrosive reactions are typified by ulcers, bleeding, bloody scabs and, by the end of observation at 14 days, by discoloration due to blanching of the skin, complete areas of alopecia and scars.

Designated Area- An area that may be used for work with “select carcinogens”, reproductive toxins, or substances that have a high degree of toxicity. A designated area may be the entire laboratory, an area of a laboratory, or a device such as a chemical fume hood.

Developmental Toxicity- Adverse effect on the developing organism that may occur anytime from conception to sexual maturity. These effects may include spontaneous abortion, structural or functional defects, low birth weight, or effects that may appear later in life.

DOT- Department of Transportation

Embryotoxins- Embryotoxins, by definition, toxic to embryos. Embryotoxins are agents that kill, deform, retard the growth, or adversely affect the development of specific

functions in the unborn child and cause postnatal functional problems. Embryotoxins include mercury compounds, lead compounds, and other heavy metals, and organic compounds such as formamide.

EPA- Environmental Protection Agency

Flash Point- The temperature at which a particular organic compound gives off sufficient vapor to ignite in air.

GHS- Globally Harmonized System

Hazard Communication (HazCom)- HazCom is an OSHA standard for classifying chemicals to provide information on safe handling, storage, and use of hazardous chemicals, and communicating information on labels and on safety data sheets.

Hazardous Chemical- Any chemicals which is classified as a physical hazard or a health hazard, a simple asphyxiant, combustible dust, pyrophoric gas, or hazard not otherwise classified.

Health Hazard- Any chemical that is classified as posing 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, carcinogenicity, reproductive toxicity, specific target organ toxicity (single or repeated exposure), aspiration hazard or simple asphyxiant.

HEPA- High Efficiency Particulate Air

HMIS- Hazardous Material Information System

Laboratory- OSHA defines a laboratory as “a workplace where relatively small quantities of hazardous chemicals are used on a non-production basis.”

Laboratory Manager- A staff employee responsible for managing laboratory operations.

Laboratory Supervisor- A staff employee responsible for supervising laboratory personnel.

Laboratory Use of Hazardous Chemicals- the handling or use of such chemicals in which all of the following conditions are met:

- Chemical manipulations are carried out on a “laboratory scale”,
- Multiple chemical procedures or chemicals are used,
- The procedures involved are not part of a production process, nor in any way simulate a production process, and
- “Protective laboratory practices and equipment” are available and in common use to minimize the potential for employee exposure to hazardous chemicals.

Laboratory Workers- The Laboratory Workers referred to in the Lab Standard are employees. OSHA defines an employee as “ an individual employees in a laboratory workplace who may be exposed to hazardous chemicals in the course of his or her assignments.” An example of a Laboratory Worker would be a university teaching assistant, research assistant, or faculty members instructing an academic lab. OSHA does not consider students in academic laboratory classes to be workers. However, instructors are expected to ensure that students in academic laboratory classes adhere to the principles of the program. Also included are visiting professors and volunteers that might be working in a laboratory. Thus, Laboratory Supervisors must ensure that these groups that are in their laboratories are adequately instructed in safe laboratory procedures.

Lower Explosive limit (LEL)- The LEL is the minimum concentration (percent by volume) of the fuel in the air at which a flame is propagated when an ignition source is present.

Mutagens- Agents that cause change in the genetic material (DNA) of an organism and therefor increases the frequency of mutations above the natural background level. These mutations are passed along as the cell divides sometimes leading to defective cells or cancer. Because mutagens may cause cancer, mutagens are typically also carcinogens. Not all mutations are caused by mutagens. Spontaneous mutations occur due to error in DNA replication, repair, and recombination. Chemical mutagens include substances such as ethidium bromide used as a stain for DNA analysis.

NFPA- National Fire Protection Association

NIOSH- National Institute for Occupational Safety and Health

OSHA- Occupational Safety and Health Administration

Oxidizer- A chemical, other than a blasting agent or explosive as defined in 29 CFR 1910.109(s), that initiates or promotes combustion in other materials, thereby causing fire either of itself or through the release of oxygen or other gases.

Particularly Hazardous Chemicals/Substances- Chemicals that are a select carcinogen, a reproductive toxin, or a chemical having a high degree of acute toxicity. Personnel may only handle “particularly hazardous substances” in a containment (i.e., chemical fume hood or glove box) or a closed system (e.g., instrument plumbing, syringe, gavage, cannula, etc.). There must be an area designed for use by posting signs or barrier and there must be procedures for decontamination of the tools and area after use and provisions for waste removal.

Permissible Exposure Limit (PEL)- PELs are the regulatory limit or maximum concentration of a substance in the air that personnel can be exposed to without personal protective equipment or engineering controls (such as a chemical fume hood). These chemicals may also have a “skin designation” that prohibits skin contact.

Physical Hazard- Any chemical which is classified as posing one of the following hazardous effects: explosives, flammable (gases, aerosols, liquids, or solids), oxidizers (liquid, solid, or gas), self-reactive, pyrophoric (gas, liquid, or solid), self-heating, organic peroxides, chemicals corrosive to metal, gases under pressure, water reactives that emit flammable gases, or combustible solids.

Principal Investigator (PI)- The lead scientist that plans and/or conducts the laboratory research and assumes the overall responsibility for laboratory operations and project completion.

PPE- Personal Protective Equipment

Reproductive Toxicity- Adverse effects on the health of reproductive organs, endocrine system, or gametes (egg or sperm) from exposure to an exogenous agent. This exposure may result in effects such as menstrual dysfunction, impaired fertility, feminization/masculinization, or inability to maintain a pregnancy.

Reproductive Toxin- Any hazardous substance that damages reproductive organs and can cause sterility or birth defects. The OSHA definition of reproductive toxins are chemicals that cause ‘adverse effects on sexual function and fertility in adult males and females, as well as adverse effects on development of the offspring.’”

RTECS- Registry of Toxic Effects of Chemical Substances

SADT- Self-Accelerating Decomposition Temperature

SDS(s)- Safety Data Sheet(s)

Select Carcinogen- Any substance which meets one of the following criteria: it is regulated by OSHA as a carcinogen, it is listed under the category “known to be carcinogens” in the Annual Report on Carcinogens published by the National Toxicity Program (NTP) (latest edition), it is listed under Group 1 (“carcinogen to humans”) by the International Agency for Research on Cancer Monographs (IARC) (latest editions), or it is listed in either Group 2A or 2B by IARS 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: after inhalation exposure of six to seven hours per day five 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 after oral dosages of less than 50 mg/kg of body weight per day.

SOP(s)- Standard Operating Procedure (s)

Teratogens- Agents that can disturb or cause a malformation in the development of an embryo or fetus. Teratogens may cause a birth defect in the child or cause termination of the pregnancy.

UL- Underwriters Laboratories

UV- Ultraviolet