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Occupational Health Programs Manual – Chapter 25

Chemical Hygiene Policy w/Change 2 (9/30/2015)

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Change Record

Revision	Effective Date	Expiration Date	C-25, Change Request #	Description
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Change 2	9/30/2015	5/14/2017	N/A	Administrative change to remove hyperlinks.

***Include all information for each revision. Do not remove old revision data. Add new rows to table when space runs out by pressing the tab key in the last row, far right column.*

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Chapter 25—Chemical Hygiene Policy

Note: The current version of this chapter is maintained and approved by the Safety and Health Division (SHeD). The last revision date of this chapter was June 2014. The current version is located on the Glenn Research Center intranet within the BMS Library. Approved by Chief of Safety and Health Division.

1.0 PURPOSE

This chapter establishes NASA Glenn Research Center's (GRC's) policy for the laboratory-scale use and handling of hazardous chemicals. The guidelines for the specific procedures and practices to address this policy are found in NASA GRC's Chemical Hygiene Plan. The plan details that all employees of GRC at Lewis Field and Plum Brook Station, tenant employees, and resident support services contractors involved in the laboratory-scale use of hazardous chemicals are to be informed that their lives or health may depend on their knowledge of the chemicals they use or work with, on following proper handling procedures, use of engineering controls, and on wearing appropriate protective apparel and equipment.

2.0 APPLICABILITY

This chapter is applicable to all NASA GRC civil servants, tenants, and resident support services contractor personnel engaged in the laboratory use of hazardous chemicals. A Chemical Hygiene Plan has been established as part of this policy to assure Center compliance with the Occupational Safety and Health Administration (OSHA) Regulation 29 Code of Federal Regulations (CFR) 1910.1450, Occupational Exposure to Hazardous Chemicals in Laboratories. The Safety and Health Division (SHeD) administer the Chemical Hygiene Plan. Implementation of the plan is the responsibility of each laboratory line manager or supervisor.

3.0 BACKGROUND

On January 31, 1990, OSHA issued the final rule 29 CFR 1910.1450, Occupational Exposure to Hazardous Chemicals in Laboratories. This chapter prescribes the Center's policy with regard to that directive.

4.0 POLICY

It is the policy of GRC to protect the lives and health of employees who work with hazardous chemicals in laboratories by providing adequate laboratory facilities, equipment, training, personal protection, and environmental surveillance of their workplace. The GRC shall follow the requirements of:

- OSHA, 29 CFR 1910.1450, Occupational Exposures to Hazardous Chemicals in Laboratories, as revised
- Executive Order 12196, Occupational Safety and Health Provisions for Federal Employees

Related chapters include Environmental Programs Manual, Chapter 3, Water Pollution Control; Chapter 4, Air Pollution Control; Chapter 5, Management of Hazardous Waste & Resource Conservation & Recovery Act.

Related Occupational Health Programs Manual chapters include Chapter 3, Hearing Conservation; Chapter 4, Respiratory Protection Program; Chapter 7, Local Exhaust Ventilation; Chapter 12, Indoor Environmental Quality, and Chapter 20, Hazard Communication Policy. More information on these specific areas is found in their respective chapters.

5.0 RESPONSIBILITIES

5.1 Safety and Health Division Chief

- Ensures a qualified individual is identified as the Chemical Hygiene Officer, to carry out the responsibilities set forth in the Chemical Hygiene Plan, by the organization tasked with implementation of Chemical Hygiene Policy.
- Assures the availability of resources and technical support necessary for establishing, executing, reviewing, and maintaining the Chemical Hygiene Plan, in compliance with OSHA 29 CFR 1910.1450

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- Appoints a technically qualified individual as the Operations Program Lead to oversee the Chemical Hygiene Officer, Industrial Hygiene Staff, and Medical Services Staff's execution of the Chemical Hygiene Plan

5.2 Occupational Health Program Lead

- Provides Civil Servant oversight of the Chemical Hygiene Officer's establishment of the Chemical Hygiene Plan
- Oversees the coordination of the Chemical Management Staff, the Industrial Hygiene Staff, and the Medical Services Staff as they administer the Chemical Hygiene Plan
- Oversees the performance of Medical Services for testing and monitoring of selected employees, as required
- Oversees the industrial hygiene review of the laboratory standard operating procedure (LSOP) and hazard assessment programs

5.3 Chemical Hygiene Officer

- Establishes, administers, and maintains the Chemical Hygiene Plan in coordination with all appropriate GRC personnel
- Ensures that appropriate warning placards, signs, and labels are provided or arranged for and are in place at designated laboratory areas, as necessary
- Is responsible for the overall safe operation of chemical laboratories connected with assigned program
- Determines the types and levels of training requirements for GRC, tenant, and resident support services contractor employees involved in the laboratory use of hazardous chemicals as part of the assigned program
- Ensures that all who need to enter chemical laboratories (employees, contractors, visitors, maintenance, janitorial, etc.) have been properly trained prior to being allowed actual entry into those laboratories
- Coordinates with Industrial Hygienist Staff for training in the proper use of personal protective equipment (PPE)
- Ensures that Facilities Division be involved in the Risk Assessment process, before any equipment is purchased
- Provides technical guidance on implementation of the Chemical Hygiene Plan

5.4 Chemical Management Staff

- Provides for chemical-specific training to laboratory workers, annually or when requested by the line supervisor
- Audits each area with an LSOP to ensure compliance of the Chemical Hygiene Plan (If a discrepancy is found, a written statement is sent to the Lab, area supervisor, and to the Chemical Hygiene Officer. A follow-up inspection will be conducted and the offending area will have two additional unprompted inspections within 1 year of the offending occurrences.)
- Provides technical guidance to laboratory line managers or supervisors on developing LSOPs and on proper storage and handling of hazardous chemicals
- Oversees the chemical hygiene aspect of the building inspection program

5.5 Medical Services Staff

- Maintains medical records, as required
- Provides information on medical testing available to the laboratory worker
- Provides medical training to appropriate groups

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5.6 Industrial Hygiene Staff

- Reviews and approves LSOPs when chemical exposure assessment is required.
- Conducts or oversees chemical exposure assessments

5.7 Laboratory Line Managers or Supervisors of Employees Who Work With Laboratory-Scale Amounts of Hazardous Chemicals

- In conjunction with the Chemical Hygiene Officer, determine the types and levels of training requirements for the GRC, tenant, or resident support services contractor employees involved in the laboratory use of hazardous chemicals within the assigned laboratory work area
- Ensure that the Chemical Hygiene Plan is implemented
- Develop any LSOP, under the technical guidance of Chemical Management, for laboratory processes
- Ensure that workers, including summer and temporary staff, know and follow the chemical hygiene rules, know that protective equipment is available and in working order, and know that appropriate training has been provided
- Provide regular, formal chemical hygiene and housekeeping inspections, including routine inspections of protective and emergency equipment
- Know the current legal requirements concerning regulated substances
- Determine the required protective laboratory practices and equipment
- Ensure that facilities and training for use of any material being ordered are adequate
- Ensure that ownership of hazardous materials is transferred to appropriate personnel during retirement or employee separation events

5.8 Laboratory Workers

- Responsible for following the requirements in the Chemical Hygiene Plan, LSOPs, and safety permits
- Identify chemical hazards, use engineering controls and PPE when required, and ensure proper disposal of chemicals when no longer needed
- Ensure best practices for chemical procurement and usage are followed, including procuring the smallest amount feasible, consideration of green purchases, attention to storage requirements of chemicals, and transfer of chemicals to appropriate personnel during retirement or employee separation

5.9 SHed Plum Brook Station Team Lead

- In conjunction with the Chemical Hygiene Officer, assures compliance with the OSHA Laboratory Standard in the laboratories located at Plum Brook Station

6.0 REQUIREMENTS (29 CFR 1910.1450 AND NASA PROCEDURAL REQUIREMENT (NPR) 1800.1C)

All aspects of the GRC Chemical Hygiene Policy are required to assure compliance with OSHA 29 CFR 1910.1450, NPR 1800.1C, and Executive Order 12196. The requirement of the GRC Chemical Hygiene Policy is enacted through the GRC Chemical Hygiene Plan.

6.1 Employee Protection (CFR 1910.1450)

Employees using hazardous chemicals, as defined in CFR 1910.1450, shall have the equipment and systems in place to protect employees from health hazards including exposure limits, including but not limited to

- PPE, which is available to each individual such as gloves, safety glasses, and lab coats
- PPE, which is available to each facility or laboratory such as eyewash fountains, safety showers, and fire extinguishers

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- Training, including training on proper use of PPE, fire extinguishers, spills and other exposure routes, and safe handling of chemicals

6.1 - The SHeD verification procedure to ensure compliance with the requirements listed in this section shall be accomplished through a programmatic-assessment review of LSOPs, chemical management's laboratory inspections, fire protection training records and GRC's HazCom and PPE Training Records.

6.2 Accessibility (CFR 1910.1450)

The Chemical Hygiene Plan shall be readily available to all employees and employee representatives.

6.2 - The SHeD verification procedure to ensure compliance with the requirements listed in this section shall be accomplished by ensuring that the Chemical Hygiene Plan is posted on the SHeD Manual web page.

6.3 Laboratory Standard Operating Procedures (LSOPs) (CFR 1910.1450)

LSOPs shall be relevant to safety and health considerations when using hazardous chemicals. LSOPs shall be laboratory and operation specific. Each laboratory must have a distinct LSOP for each operation. Additional guidance on LSOPs can be found in the Chemical Hygiene Plan and the specific LSOP.

6.3 - The SHeD verification procedure to ensure compliance with the requirements listed in this section shall be accomplished by reviewing and updating the LSOPs annually.

6.4 Exposure Reduction (CFR 1910.1450)

The Chemical Hygiene Plan shall contain criteria that GRC will use to determine and implement control measures to reduce employee exposure to hazardous chemicals including engineering controls, PPE, and hygiene practices. Additional controls will be in place for known extremely hazardous chemicals.

6.4 - The SHeD verification procedure to ensure compliance with the requirements listed in this section shall be accomplished through a programmatic-assessment review of LSOPs, chemical management's laboratory inspections, GRC's HazCom and PPE Trainings.

6.5 Engineering Controls and/or Laboratory Design (CFR 1910.1450)

- Ventilation and fume hoods.—Maintenance plans ensuring that fume hoods and other protective equipment are functioning properly and specific measures shall be taken to ensure proper and adequate performance of the equipment. Please refer to Chapter 7 of the Occupational Health Programs Manual, Local Exhaust Ventilation (LEV) for additional guidance.
- Other local ventilation areas.—Guidance on use and maintenance of ventilated storage cabinets and canopy hoods.

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- Special ventilation areas.—Guidance and maintenance for glove boxes, isolation rooms, and other scrubber treatment areas.

6.5 - The SHeD verification procedure to ensure compliance with the requirements listed in this section shall be accomplished by ensuring that Chapter 7 of the OHPM is reviewed and updated according to SHeD guidelines and that ventilation stickers/tags have been reviewed and are up-to-date.

6.6 Training (CFR 1910.1450)

The Chemical Hygiene Plan defines content and frequency of supervisor training and ensures that information and training provisions are in place. It also defines content and frequency of employee training and ensures that information and training provisions are in place.

6.6 - The SHeD verification procedure to ensure compliance with the requirements listed in this section shall be accomplished by reviewing HCDD training records for the annual LSOP training.

6.7 Special Projects (CFR 1910.1450)

Special projects are particular laboratory operations, procedures, or activities that require approval prior to implementation. These are addressed through the use of the Laboratory Permits and Risk Assessment program, as defined in the Chemical Hygiene Plan.

6.7 - The SHeD verification procedure to ensure compliance with the requirements listed in this section shall be accomplished through a programmatic-assessment review of LSOPs, chemical management's laboratory inspections, Safety Permits, Hazardous Operations and Job Hazard Analyses.

6.8 Occupational Medical Program (NPR 1800.1C)

The Chemical Hygiene Plan provides guidance for the regular surveillance of personnel that either routinely come into contact with hazardous materials or are a part of a specific medical program that requires surveillance beyond the routine program.

The Laboratory Line Manager or Supervisor shall provide all employees who work with hazardous chemicals an opportunity to receive medical attention, including any follow-up examinations, which the examining physician determines to be necessary.

6.8 - The SHeD verification procedure to ensure compliance with the requirements listed in this section shall be accomplished through a programmatic-assessment review of medical surveillance lists by Industrial Hygiene.

6.9 Hazardous Substance Special Protections (NPR 1800.1C)

Provisions shall be in place for additional employee protection for work with particularly hazardous substances including allergens, embryo toxins, moderately chronic, highly acute toxicity materials, nanomaterials, and highly chronic toxicity materials.

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The aim of these additional procedures is to minimize exposure to these toxic substances by any route using all reasonable precautions. These additional procedures are appropriate for substances with moderate chronic toxicity and highly chronic toxicity.

6.9 - The SHeD verification procedure to ensure compliance with the requirements listed in this section shall be accomplished by ensuring that the Chemical Hygiene Plan and LSOP's are reviewed and updated on an annual basis.

6.10 Review (CFR 1910.1450)

NASA GRC shall review and evaluate the effectiveness of the Chemical Hygiene Plan at least annually and update as necessary.

6.10 - The SHeD verification procedure to ensure compliance with the requirements listed in this section shall be accomplished by ensuring that a programmatic assessment of the Chemical Hygiene Plan is completed on an annual basis.

7.0 RECORDS

NASA GRC Chemical Hygiene Plan.—Maintained by Chemical Management.

Copies of LSOPs.—Maintained by each Chemical Laboratory Line Manager or Supervisor.

Record LSOPs.—Maintained by Chemical Management in eRoom system.

Training records for civil servants.—Maintained by the Human Capital Development Division.

Training records for affected employees.—Maintained by the Human Capital Development Division.

Training records for affected employees.—Maintained by tenant organizations.

8.0 REFERENCES

Document number	Document name
GLM-QS-8500.1A	Environmental Programs Manual, Chapter 3, Water Pollution Control
GLM-QS-8500.1A	Environmental Programs Manual, Chapter 4, Air Pollution Control
GLM-QS-8500.1A	Environmental Programs Manual, Chapter 5, Management of Hazardous Materials, Hazardous Wastes and Universal Wastes for Reuse, Recycling or Disposal
GLM-QS-1800.1	Occupational Health Programs Manual, Chapter 20, Hazard Communication Policy
GLM-QS-1800.1	Occupational Health Programs Manual, Chapter 3, Hearing Conservation Program
GLM-QS-1800.1	Occupational Health Programs Manual, Chapter 4, Respiratory Protection Program
GLM-QS-1800.1	Occupational Health Programs Manual, Chapter 7, Local Exhaust Ventilation
GLM-QS-1800.1	Occupational Health Programs Manual, Chapter 12, Indoor Air Quality
CFR 1910.1450	Occupational Exposures to Hazardous Chemicals in Laboratories

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Executive Order 12196	Occupational Safety and Health Provisions for Federal Employees
NPR 4100.1D	NASA Procedural Requirement, Materials Inventory Management Manual
NPR 1800.1C	NASA Procedural Requirement, NASA Occupational Health Program Procedures

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APPENDIX A—DEFINITIONS AND ACRONYMS

Chemical Hygiene Plan.—A written program developed and implemented by Chemical Management of the Glenn Research Center (GRC) Safety, Health and Environmental Division, which sets forth procedures, equipment, personal protective equipment, and work practices that (a) are capable of protecting employees from the health hazards presented by hazardous chemicals used in that particular workplace and (b) meet the requirements of Section 2.0 of this document. This written program applies to employees of all organizations at GRC involved in the laboratory use of hazardous chemicals.

Code of Federal Regulations (CFR)

Employee.—Any GRC civil servant, tenant, or resident support services contractor employee who may be exposed to hazardous chemicals in his or her assigned laboratory work area under normal operating conditions or in foreseeable emergencies.

GRC civil servant employee.—A federal employee directly employed by NASA.

Tenant employee.—An employee of a co-located organization not directly involved in NASA activities. Examples are employees of the United States Army at Lewis Field and employees of the Department of Agriculture and Department of the Interior at Plum Brook Station.

Resident support services contractor employee.—An employee of any organization contracted by NASA to provide service in support of NASA operations. A list of support service contractors can be located at <http://www.grc.nasa.gov/Doc/contract.htm>.

Flammable liquid.—A flammable material can be a solid, liquid, or gas. The United States Occupational Health and Safety Administration (OSHA) defines a flammable liquid as “any liquid having a flash point below 100 °F (37.8 °C), except any mixture having components with flash points of 100 °F (37.8 °C) or higher, the total of which make up 99 percent or more of the total volume of the mixture. Flammable liquids shall be known as Class I liquids.”

Glenn Research Center (GRC)

Hazardous chemical.—A chemical for which there is statistically significant evidence based on at least one study conducted in accordance with established scientific principles that acute or chronic health effects may occur in exposed employees.

Health hazard.—Includes chemicals that are carcinogens, toxic, or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatotoxins, nephrotoxins, neurotoxins, agents that act on the hematopoietic systems, and agents that damage the lungs, skin, eyes, or mucous membranes.

Laboratory scale.—Work with substances in which the containers used for reactions, transfers, and other handling 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.

Laboratory standard operating procedure (LSOP).—A set of written procedures explaining how to safely work with hazardous chemicals typically found in a laboratory environment.

Laboratory-type hood.—A device located in a laboratory, enclosed on five sides with a movable sash or fixed partial enclosure on the remaining side, constructed and maintained to draw air from the laboratory and to prevent or minimize the escape of air contaminants into the laboratory; it allows chemical manipulations to be conducted in the enclosure without insertion of any portion of the employee’s body other than hands and arms.

Walk-in hoods with adjustable sashes meet the above definition provided that the sashes are adjusted during use so that the airflow and the exhaust of air contaminants are not compromised, and employees do not work inside the enclosure during the release of airborne hazardous chemicals.

Laboratory use of hazardous chemicals.—The handling or use of such chemicals in which all of the following conditions are met:

1. Chemical manipulations are carried out on a laboratory scale
2. Multiple chemical procedures or chemicals are used

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3. The procedures involved are not part of a production process, nor in any way simulate a production process
4. Protective laboratory practices and equipment are available and in common use to minimize the potential for employee exposure to hazardous chemicals

Local exhaust ventilation (LEV)

(Material) Safety Data Sheet ((M)SDS).—A document provided by the manufacturer or importer of a hazardous chemical or prepared by Glenn researchers that identifies a hazardous material and provides information about the associated physical and health hazards. Although MSDSs vary in both format and content, all must contain the following information: product identification, manufacturer’s name and address, hazardous ingredients information, physical and chemical characteristics, fire and explosion hazard data, reactivity data, health hazard data, precautions for safe handling and use, and control measures.

Occupational Safety and Health Administration (OSHA).—A Federal agency responsible for establishing and enforcing standards for exposure of workers to harmful materials in workplace atmospheres, and other matters affecting the health and well-being of industrial and laboratory personnel.

NASA Procedural Requirement (NPR)

National Institute for Occupational Safety and Health (NIOSH).—Part of the Centers for Disease Control and Prevention, U.S. Public Health Service, and U.S. Department of Health and Human Services.

Personal protective equipment (PPE).—PPE refers to those items that can be worn to protect an individual from various hazards. PPE can refer to hearing protection, eye and face protective equipment, whole-body coverings, gloves, foot protection, and respiratory protection. PPE should only be used as a last resort or when engineering and administrative controls (i.e., work practices, protocols, and standard operating procedures) are insufficient to control the hazard. PPE should not be relied upon to be your primary defense against chemical or other hazards.

Physical hazard.—A chemical for which there is scientifically valid evidence that it is a combustible liquid, compressed gas, explosive, flammable, organic peroxide, oxidizer, pyrophoric, unstable (reactive), or water reactive.

Protective laboratory practices and equipment.—Those laboratory procedures, practices, and equipment accepted by laboratory health and safety experts as effective, or that the employer can show to be effective, in minimizing the potential for employee exposure to hazardous chemicals.

Safety and Mission Assurance Directorate (SMAD)

Safety and Health Division (SHeD)

Workarea.—For the purposes of Chemical Hygiene, this is a laboratory within the Lewis Field Center, Plum Brook Station, or an associated off-site facility where the “laboratory use of hazardous chemicals” occurs. It is a workplace where relatively small quantities of hazardous chemicals are used on a nonproduction basis. It is identified on a Laboratory Standard Operating Procedure by specific building number and room number. Other locations where hazardous chemicals are used but are outside the scope of “laboratory use of hazardous chemicals” fall under the requirements of the Hazard Communication Policy and Program (Chapter 20 of the Occupational Health Programs Manual and the HAZCOM Program).