

Glenn Research Center, Environmental Programs Manual

Chapter 13 - LEAD

NOTE: The current version of this Chapter is maintained and approved by the Environmental Management Office (EMO). The revision date for this chapter is October 2003. If you are referencing paper copies, please verify that it is the most current version before use. The current version is maintained on the Glenn Research Center <http://osat-ext.grc.nasa.gov/emo/pub/epm/epm-contents.pdf>. Approved by: EMO Chief, Michael Blotzer {[mailto: Michael.J.Blotzer@grc.nasa.gov](mailto:Michael.J.Blotzer@grc.nasa.gov)}

PURPOSE

This chapter establishes minimum requirements for handling, use, removal and disposal of all lead-containing materials at the NASA Glenn Research Center.

APPLICABILITY

This instruction is applicable to all personnel at Glenn Research Center and Plum Brook Station including, but not limited to, civil servants, contractor personnel, and students.

BACKGROUND

Lead exposure is one of the oldest known occupational hazards. Lead is harmful when inhaled or ingested. The absorption of large amounts of lead may cause diseases of the kidney as well as of the peripheral and central nervous systems. The effects of lead on the nervous systems range from mild behavioral symptom changes to fatal brain damage. Lead exposure can also result in impotence and sterility in men and decreased fertility in women. Without proper workplace hygiene practices, the lead on workers' clothing may expose their families at home. There have been instances of lead poisoning among children whose parents work in an environment with excessive amounts of lead.

Employees at Glenn may be exposed to lead through construction and maintenance activities that disturb lead based paints/primers (LBP) or other lead-containing materials. Exposures may also occur where lead-containing products are used, including, soldering and brazing operations and certain research operations. Airborne lead exposures are not a problem during soldering operations when the temperature remains below 500 C (932 F), as lead fume production is not significant below this temperature. Good housekeeping and personal hygiene practices must still be used in these operations to minimize the ingestion of lead. Local exhaust ventilation may still be needed to control exposure to other contaminants generated by these operations and to minimize lead exposures during grinding and polishing operations.

Extremely high exposures to lead occur during welding, cutting, and brazing of materials with lead based paints/primers (LBP) and when lead based paints/primers (LBP) is removed by abrasive blasting or grinding. Strict controls must be used during these operations to protect workers and to prevent lead contamination of the work area.

Strict occupational and environmental regulations govern the use, handling, and disposal of lead containing materials. The occupational airborne exposure limit is 50 micro-grams/m³ of air as an 8-hr time weighted average. At an action level of 30 micro-grams/m³ employers must establish a program that includes a lead compliance plan, employee training, exposure monitoring, and medical monitoring. Occupational health and safety regulations also require exposure monitoring, employee training, engineering and work practice controls, personal protective equipment, housekeeping, hygiene practices, and medical monitoring. Workers must be protected as if they were exposed above the permissible exposure limit unless exposure monitoring proves otherwise.

Environmental regulations include controlling and permitting releases of lead to the air and water, testing of lead-containing materials before disposal, and proper disposal of any lead-containing materials meeting the definition of hazardous waste.

POLICY

It is the policy of Glenn Research Center to comply with all applicable regulations regarding lead and to prevent illness to workers and damage to the environment from the use, removal, and disposal of lead. To accomplish this, all personnel must comply with the requirements of this chapter.

Lead-related work in construction and maintenance activities ranges from large lead remediation projects to small maintenance operations. In all cases, lead-related operations must be done within a controlled area using engineering and work practice controls that minimize worker exposure and prevent contamination of surrounding areas. The area will be posted with signs meeting OSHA requirements to restrict access to workers with the required personal protective equipment. Regulations governing worker protection must be strictly followed, including requirements for

- A competent person, defined by OSHA as someone capable of identifying existing and potential lead hazards in the surroundings or working conditions, who has authority to take prompt corrective measures
- A written lead compliance program that describes each lead activity; the engineering, work practice, and administrative controls; the air monitoring to procedures; and inspection schedules.

RESPONSIBILITIES

Environmental Compliance Team (ECT) & Waste Management Team (WMT)

Provides guidance on the requirements of Federal, State, and local environmental regulations; on any air, water, or soil pollution issues; and guidance and oversight on the disposal of lead-containing materials.

Industrial Hygiene Office (IHT)

- Provides guidance on the requirements of Federal, State and Local occupational health regulations.
- Maintains the Lead Compliance Program for civil servant operations.
- Evaluates civil servant employee exposures, recommends procedures to minimize exposures, and recommends employees for inclusion in a medical surveillance program.
- Maintains the facilities database of lead containing materials.

Medical Services

Manages and administers the medical surveillance program for civil servant employees exposed to lead.

Plum Brook Management Office (PBMO)

Develops and manages the Lead Compliance Program according to OSHA 29 CFR 1926.62(e) for Plum Brook.

Project Managers, Facilities Engineers, and Facilities Operations Personnel

- Identify lead based paints/primers (LBP's) and materials that may be disturbed in any renovation and maintenance activities.
- Ensure that bid specifications identify lead that may be disturbed in any renovation or maintenance activities and include requirements that the contractor comply with all applicable regulations and this instruction.
- Ensure that the contractor submittals include a site-specific health and safety plan that provides for an OSHA competent person, includes a Lead Compliance Plan, and meets all requirements of the OSHA lead standard.

COTR's (Overseeing projects involving Lead Abatement)

- Attend training necessary to meet the OSHA and EPA competent person requirements.
- Identify suspected lead-containing materials not identified in the scope of work during renovation and construction activities; arrange for testing of the suspect material; and, if the material does contain lead and will be disturbed during the project, ensure its removal by a qualified lead abatement contractor.

- Ensure that lead-related work is performed in accordance with the contractor's site-specific health and safety plan, all applicable regulations, IHT, and EMO guidance.
- Ensure that contractor exposure monitoring data meets the information requirements of the EMO lead task and exposure database and is submitted to the IHT.

Support Service Contractors

- Developing a health and safety plan that includes a lead compliance program for contractor operations.
- Providing copies of air monitoring results and task data to the IHT. (Note: Lead air monitoring data sheets are available from the IHT and may be used as a data sheet for adequate documentation.)

Research Personnel

Must note the use of lead on safety permit applications and contact the IHT when lead is to be used in projects that do not require a safety permit.

Supervisors

Notify the IHT of operations involving exposure to lead and enforce the use of engineering and work practice controls and personal protective equipment prescribed for the job.

Employees

Must properly use engineering and work practice controls and personal protective equipment specified for their operations.

REQUIREMENTS

It is the responsibility of all civil servants, tenants and support service contractors to ensure that Lead Containing Materials are removed or handled only by employees who are properly trained. Contractors and tenants must develop their own lead compliance plan.

This document provides the general procedures to reduce and control exposure to lead. Task information for procedures and controls for specific lead-related tasks must be developed by the supervisor using a lead task form that is available from the IHT. The procedures and controls are then reviewed by the IHT.

Employee Access

Copies of this program are maintained by IHT and are available on request.

Exposure Limits

The following table lists the maximum exposure limit and action level for airborne lead:

Action level (AL) 30 micro-grams/m³, 8 hr, TWA

Permissible exposure limit (PEL) 50 micro-grams/m³, 8 hr, TWA

Exposure Assessment

IHT air monitor monitoring must be in accordance with the NIOSH methods. Initial air monitoring must be done to determine if any employee may be exposed to lead above the PEL.

Monitoring frequency

- None if initial monitoring demonstrates exposures are less than the action level.
- Quarterly in exposures greater than the PEL.
- Every 6 months if exposures are greater than the action level but less than the PEL. That frequency may be reduced if two consecutive samples, 7 days apart are below the action level.

Additional monitoring is required if there has been a change of equipment, process, control, or personnel. Also, additional monitoring is required if a new task may result in more employees being exposed to lead at or above the action level or may result in employees already exposed at or above the action level being exposed above the PEL.

Presumed Exposure

Until sampling shows otherwise, employees performing certain tasks will be presumed to be exposed above the PEL and must be protected.

Personal Protective Equipment

Where engineering controls and work practices are not sufficient (or not yet implemented) to reduce exposures to or below the PEL or where employees are exposed to irritating lead compounds, the following personal protective equipment is required.

- Respiratory protection - The selection of the respirator is based on the IHT hazard assessment of a specific task. (Note: A respirator will be provided whenever an employee requests one, but anyone who wears a respirator must be included in the GRC Respiratory Protective Program.)
- Disposable protective coverall and head covering
- Gloves, hats, and shoes
- Safety eyewear.

Housekeeping

All surfaces shall be maintained as free of lead accumulation as practicable.

- Use a high-efficiency particulate air (HEPA) vacuum or wet wipe where possible.
- The use of compressed air to remove lead from dusty surfaces is strictly prohibited.

Hygiene Facilities

Employees who are exposed to lead levels above the PEL will be provided with hygiene facilities, including a change area and shower, where feasible, lunchroom facilities, and hand-washing facilities.

Hygiene Practices

No food or beverages, tobacco products, or cosmetic application shall be used or present in areas above the PEL.

Hands must be washed immediately at end of shift and before eating, drinking, using tobacco, or applying cosmetics.

No protective clothing will leave regulated areas.

When showers are not provided, workers must wash their hands and face at the end of the work shift.

HEPA vacuum will be utilized to vacuum protective clothing prior to removal.

Administrative Controls

If administrative controls are used as a means to reduce an employee's exposure time to lead, a job-rotation schedule will be established and implemented.

Medical Surveillance

Employees who are or who may be exposed to lead at or above the action level for more than 30 days in any 12 consecutive months will be included in the medical surveillance program. Also, employees who are occupationally exposed on any day above the action level may be included, upon request, in the medical surveillance program and employees may request multiple physician review if they feel it is necessary. Employees will be notified of the results of tests and examinations as part of the medical surveillance program.

Medical surveillance includes but is not limited to

- Annual medical examination blood test to establish lead level Physician written opinion
- Physician written opinion

The first medical examination under the surveillance program consists of biological monitoring and includes blood lead level and zinc protoporphyrin level.

A worker will be removed from the task causing the lead exposure when blood lead level is greater than 50 micrograms/dl and will not be returned to exposure until blood lead level is less than 40 micrograms/dl.

Signs

Warning signs will be posted in each work area where employees are being exposed to lead levels above the PEL. The wording on the signs should include

- WARNING
- LEAD WORK AREA
- POISON
- NO SMOKING OR EATING

TRAINING

Employees who work with lead but are exposed to less than the PEL are required to attend the general lead awareness training that meets the requirements of the GRC Hazard Communication Program.

Employees exposed to lead at or above the action level on any day require further training on the following subjects:

- Content of the lead in construction standard
- Nature of operations that may result in lead exposure
- Purpose and description of the medical surveillance program
- Awareness of medical removal program and protection
- Routes of exposure
- Toxicity, health effects, chelation therapy
- Possible engineering controls and work practices for tasks in which employees are involved
- Proper disposal methods

All employees who are required to use a respirator must be enrolled in the GRC Respiratory Protection Program.

RECORDKEEPING

A database of task descriptions, control techniques, and associated exposure levels will be maintained by the IHT. This database ensures worker protection by identifying procedures that minimize worker exposures, minimizes costs by identifying tasks and procedures that do not result in employee exposure to lead, and helps identify lead abatement methods that provide high-production levels without jeopardizing worker health and safety.

Medical Services will maintain medical surveillance and removal records. All records involving an employee are available, on request, to that employee.

DISPOSAL

All lead-containing materials will be collected and disposed of in accordance with environmental regulations. The Environmental Compliance Team (ECT) or Waste Management Team (WMT) may be contacted for assistance on proper disposal.

RECORDS

The EMO and IHT maintains the following records:

- Hazard Assessments
- Facilities Lead Database
- Lead Training Presentation
- Air Monitoring Database

REFERENCES

U.S. Department of Labor, Occupational Safety and Health Administration, 29 CFR 1910.252, Welding cutting and brazing; 1910.1025, Lead; 1926 Subpart C, General Safety and Health Provisions; 1926. 62 Lead; 1926.353, Ventilation and protection in welding, cutting and brazing; and 1926.354, Welding, cutting and heating in way of preservative coatings.

Housing and Community Development Act of 1992, Title 10.

U.S. Environmental Protection Agency, 40 CFR 261, Identification and Listing of Clean Air Act Amendments of 1990, Title III, Toxic Air Pollutants.

Safety and Assurance Directorate ([SAAD](#))

Environmental Management Office Chief: Michael Blotzer

Chapter Lead: Eugene DiSanto {<mailto:Eugene.DiSanto@grc.nasa.gov>}

Web Curator: Sandra Jacobson {<mailto:Sandra.Jacobson@grc.nasa.gov>}

Revision Date: October 2003