

## **4.9 LEAD EXPOSURE CONTROL**

### **Introduction**

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Lead exposure that leads to serious health effects can occur on the job, at home or at play. Lead can affect almost every organ and system in your body. The most sensitive is the central nervous system. Lead also damages kidneys and the reproductive system. The effects are the same whether it is breathed or swallowed.

Young and unborn children are more vulnerable to lead poisoning than adults. A child who swallows large amounts of lead may develop blood anemia, severe stomachache, muscle weakness and brain damage. At very low levels of exposure, lead can affect a child's mental and physical growth. Unborn children can be exposed to lead through their mothers. Harmful effects include premature births, smaller babies, decreased mental ability in the infant, learning difficulties and reduced growth in young children.

Controlling exposure to lead requires the coordinated efforts of several program staffs within the park. This section is divided into two subsections based primarily on the at-risk population. Section 4X.1 focuses on worker protection requirements and is driven primarily by the Occupational Safety and Health Administration (OSHA) construction and general industry regulations. The protection of housing and building occupants and requirements for lead-based paint management are contained in Section 4X.2. This section has its basis in Environmental Protection Agency (EPA) and Department of Housing and Urban Development (HUD) regulations.

In practice, the requirements and responsibilities presented within these subsections are often intertwined and interdependent. Lead exposure control must be well coordinated between divisions in order to protect all at-risk populations.

### **National Park Service Lead Exposure Control Policy**

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A program of lead management and worker and facility occupant exposure protection will be implemented in each park where lead hazards exist.

### **Scope**

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Subsection 4X.1 applies to all circumstances where an employee or volunteer may be occupationally exposed to lead and includes all construction work (regulated under 29 CFR 1926.62) and non-construction exposures (regulated under 29 CFR 1910.1025). Section 4X.2 applies to lead-based paint hazards in all residences and public buildings owned or managed by the park. These sections are not mutually exclusive.

## References

1. 24 CFR 35, Lead-Based Paint Poisoning Prevention in Certain Residential Structures, Subparts C and D
2. 29 CFR 1910.1025. Lead Exposure in General Industry
3. 29 CFR 1926.62, Lead Exposure in Construction
4. 29 CFR 1910.1200, Hazard Communication
5. HUD. 1998. Technical Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing, Department of Housing and Urban Development
6. 40 CFR 745, Lead-Based Paint Activities
7. NPS-36 Government Furnished Housing Management Guideline
8. NPS 76 Housing Design and Rehabilitation Guideline.
9. NPS. 1997. Health Hazards of Asbestos, Lead and Radon Gas in National Park Service Housing, Interim Issue, July 25, 1997
10. EPA. 2001. Protect Your Family From Lead in Your Home. EPA747-K-99-001

**Caution:** In addition to the regulatory citations listed here, park management must be familiar with, and comply with, applicable regulations of state and local jurisdictions. Refer to your park and regional risk management and hazardous materials program managers for local guidance.

## Definitions

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*Abatement* means measures designed to permanently reduce or eliminate lead hazards or lead-based paint from residential or public buildings.

*Public Building* means a structure which is generally accessible to the public, including but not limited to schools, daycare centers, museums, airports, hospitals, stores, convention centers, government facilities, office buildings and any other building which is not an industrial building or residential building. Industrial buildings and warehouses are excluded.

*Competent person* means a person designated by the park who is capable of identifying existing and potential lead hazards in the surroundings or working conditions and who has authorization to take prompt corrective measures to eliminate them.

*Permissible Exposure Level (PEL)* means the maximum allowable airborne exposure to which unprotected workers may be exposed to lead. The PEL for lead is 50 ug/m<sup>3</sup> as an eight-hour time-weighted average (TWA).

*Action Level* means employee exposure, without regard to the use of respirators, to an airborne concentration of lead of 30 micrograms per cubic meter of air (30 ug/m<sup>3</sup>) calculated as an eight-hour TWA. Worker exposure at the action level triggers worker protection and compliance requirements, including employee training and biological (blood) monitoring.

*Lead-Based Paint Hazard* means a condition of unacceptable risk to occupants of residences and public buildings. The following are lead-based paint hazards as defined by HUD and EPA.

- Two (2) square feet of deteriorated paint on interior components such as walls, ceiling, doors.
- >10 square feet of exterior components.
- >10% deteriorated paint on interior/exterior components with small areas such as sills and trim.
- Caution: Some jurisdictions regard any deteriorated lead-based paint as a lead-based paint hazard.

*Lead-Based Paint Activities* means any construction, alteration, painting, demolition, renovation, repair or maintenance of any residential or public buildings (including preparation and cleanup) that, by using or disturbing lead-containing material or soil, may result in significant lead exposure of adults or children occupying residences or public buildings. Work meeting this definition invokes EPA and HUD occupant protection and lead-based paint activities certification regulations. However, it should be noted that all construction work that could expose workers to lead are regulated under 29 CFR 1926.62.

*Lead-Based Paint* is paint containing at least 0.5 percent or 5000 ppm lead by weight or 1.0 milligram per square centimeter (mg/cm<sup>2</sup>) of paint film surface area. Occupant protection requirements are triggered at lead concentrations at these levels or greater in paint films in housing and public buildings.

*Lead-Containing Paint* means any paint containing lead in any amount detectable by current laboratory methods (for example: OSHA method ID-121, atomic absorption spectroscopy or OSHA method ID-125G, ICP-MS). Worker protection regulations are triggered by the presence of any detectable level of lead in paint. Note that in 1978 the Consumer Product Safety Commission-banned consumer paint products containing more than 0.06% lead. Although not lead-based paint, enough lead may exist in these products to trigger OSHA worker protection and exposure assessment requirements.

## Controlling Worker Exposure to Lead

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### Program Elements

#### 1. *Lead Hazard Identification.*

- a. *Prior to Lead Construction Activities.* Determine whether lead exists in construction material or surface coatings prior to beginning any maintenance, remodeling, renovation or abatement activity where there is a possibility of disturbing lead. For compliance with OSHA worker protection requirements, sampling for lead identification must be conducted by an experienced industrial hygienist, certified lead-based paint inspector, certified lead supervisor or competent person who has received training in sample collection. Lead-based paint identification and hazard assessment in housing must be conducted by a certified lead inspector or risk assessor.
- b. *Non-Construction Activities.* Lead hazards in non-construction activities will be identified through implementation of the Park's Occupational Exposure Assessment (see section 4.1), Job Hazard Analysis (see section 3.1) and Hazard Communication (see section 4.4) programs.

#### 2. *Characterization of Worker Exposure.*

Worker exposure to lead must be characterized whenever workers might disturb lead in the course of their maintenance, remodeling, repair or abatement work or when there is a potential for exposure to lead in non-construction activities. Unprotected exposure may not exceed 50 ug/m<sup>3</sup> on an eight-hour TWA. Exposures greater than 30 ug/m<sup>3</sup> TWA will necessitate implementation of protective measures and the requirements. Specific exposure assessment monitoring requirements are found in Appendix A.

#### 3. *Written Exposure Control Plan.*

A written exposure control plan must be prepared and implemented prior to beginning any construction job or work task where exposures may reach the PEL of 50 ug/m<sup>3</sup> TWA. The written program will describe each activity and specific responsibilities and measures used to reduce exposure and achieve compliance with worker protection program elements. Appendix B provides specific requirements for written exposure control plans as well as a sample plan.

4. *Lead Safe Work Practices.*

Engineering and work practice controls, including administrative controls, must be used to reduce and maintain employee exposure to lead at or below the permissible exposure limit to the extent feasible. Lead safe work practices and prohibited activities are provided in Appendix C. Appendix F provides strategies for administrative and work practice controls for reducing lead exposure at indoor and outdoor weapons firing ranges.

5. *Respiratory Protection and Protective Clothing and Equipment.*

When engineering and administrative controls cannot adequately reduce exposure to below the PEL or when conducting target tasks (see Appendix A) without a negative exposure assessment, employees must be provided respirators and appropriate protective work clothing and equipment that prevent contamination of the employee and the employee's garments and ensure their use. Employees may choose to use a powered air-purifying respirator (PAPR) rather than a negative pressure air-purifying respirator. When respirators are required, PAPRs must be provided if requested by the employee as long as the PAPR will provide adequate protection.

6. Provide Biological Monitoring (Blood Testing), Medical Surveillance and Medical Removal.

- a. Biological monitoring (blood testing for blood lead level and zinc protoporphyrin must be provided to any worker whose exposure exceeds the Action Level exposure (30 mg/m<sup>3</sup>).
- b. Initial medical surveillance (physician's examination) will be made available to any worker who may be exposed above the action level for 30 days or more in a 12-month period.
- c. Workers with blood lead levels greater than 50 ug/dl must be removed from lead-hazardous work. During this period, employment and compensation will be protected.

7. *Lead Hazard Communication, Employee Information, Training and Certification.*

- a. Inform employees of the location of lead-based paint hazards and communicate the hazards of lead exposure to building occupants prior to remodeling and renovation activities involving the disturbance of lead.

- b. All maintenance workers required to perform maintenance, remodeling or renovation which might result in the disturbance of lead at a level greater than the Action Level must receive training in lead exposure hazards, compliance requirements and lead-safe work practices.
- c. All workers conducting lead-based paint abatement or involved in large construction or renovation projects in housing or public buildings will receive lead worker training and certification according to state regulations of the state in which the work is being conducted if a state program exists, or EPA regulations if there is not state certification program. All supervisors of such projects will receive training and certification as lead work supervisors.
- d. Risk assessments in residences and public buildings will only be performed by individuals trained and certified as a lead risk assessor according to the regulations of the state in which the work is being conducted (if a state program exists) or EPA regulations (if there is not a state certification program).
- e. Lead paint inspections of residences and public buildings must be performed by individuals trained and certified as lead inspectors according to the regulations of the state in which the work is being conducted (if a state program exists) or EPA regulations (if there is no state certification program).
- f. Abatement projects in residences and public buildings must be designed by a certified lead supervisor or certified lead planner/project designer.
- g. Contractors will be informed of all known or presumed lead-based paint and lead hazards prior to beginning work on park-owned or managed facilities or structures.
- h. All employees potentially exposed to lead during non-construction activities must receive training in accordance with 29 CFR 1910.1025 and the park's hazard communication program.

#### 8. *Waste Disposal.*

Lead-containing debris or construction wastes may require special handling and disposal as hazardous waste. Generally, debris containing lead residue must be sampled and tested using the Toxicity Characteristic Leaching Procedure (TCLP) to characterize its waste status. Debris passing the test may be considered construction debris, while debris that fails the test must be disposed of as hazardous waste. Caution: some states require the use of different testing procedures necessitating a different interpretation. Refer to your hazardous waste program manager for guidance on requirements of your local jurisdiction.

## 9. *Record-Keeping.*

Parks must maintain the following records related to lead activities:

- a. Exposure Assessment – all monitoring and data used in conducting an assessment (i.e., dates, number, duration, tasks, location and results of sampling procedures) must be maintained for at least 30 years.
- b. Objective Data for Monitoring Exemptions – information demonstrating that a particular product, material, procedure, operation or activity cannot release lead dust or fumes at or above the Action Level must be maintained for at least 30 years. Objective data can be obtained from industry-wide studies or exposure assessments.
- c. Medical Surveillance – physician’s written opinion, results of biological monitoring and any other records prescribed by 29 CFR 1926.62 (n) must be maintained for the duration of employment plus 30 years.
- d. Medical Removal – all information pertaining to removal of an employee from a current exposure to lead must be maintained for the duration of employment. This information must include the date of each occasion the employee was removed as well as the corresponding date the employee returned, the cause of removal and statements explaining how the removal was handled.
- e. Training records and lead-based paint certifications must be maintained for the duration of employment plus one year.
- f. All records must be made available upon request to the affected employees, former employees and their designated representatives.

## **Lead-Based Paint Risk Management in Housing, Public Buildings and Other Structures**

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### *Program Elements*

#### 1. *Use of Lead-Based Paint.*

Paint containing greater than 600 ppm lead must not be used on park buildings or recreational equipment and structures such as playground equipment and picnic tables. Lead-based paints must not be used on industrial equipment and structures when a suitable substitute is available.

## 2. *Lead Hazard Identification.*

Parks must determine the existence of lead hazards and evaluate the risk of exposure to building occupants by identifying pre-1960 and pre-1978 housing. Information on housing construction dates may be readily obtained from the DOI Quarters Program Manager (housing database). There is a greater probability that pre-1978 housing will contain lead-based paint. That probability becomes even greater for pre-1960 housing. Paint or surface coatings on or in residential dwellings constructed after 1978 may be presumed to be free of lead-based paint. Because the Consumer Product Safety Commission (CPSC) ban on lead in paint did not extend to commercially used industrial products, lead-based paint may be found in buildings other than residences and structures, such as tanks, bridges and towers built after 1978.

## 3. *Disclosure of Lead Hazards.*

Parks must inform occupants of all pre-1978 housing owned or managed by the park of the risks of lead exposure in the dwelling prior to occupancy. Disclosure must include the location of lead-based paint known or presumed to exist in the dwelling, a statement that pre-1978 buildings may contain lead-based paint hazards, and a copy of the lead hazard information pamphlet "Protect Your Family from Lead in Your Home."

## 4. *Exposure Risk Evaluation*

- a. Parks will conduct lead exposure risk assessments in all child-occupied housing and childcare facilities constructed before 1978 according to the requirements of HUD Guidelines, Chapter 5, Risk Assessment. Blood lead testing will be provided for children (age 6 and below) and pregnant females occupying NPS-owned or managed housing when a risk assessment shows the existence of lead risks as defined in HUD guidelines or applicable state or local childhood lead poisoning prevention regulations. If a child's blood lead level is elevated (10 ug/dl – a level associated with adverse effects in children according to Centers for Disease Control and Prevention (CDC)), an investigation will be conducted using the protocol in HUD Guidelines, Chapter 16, Investigation and Treatment of Dwellings Housing Children with Elevated Blood Lead Levels. State childhood lead poisoning reporting and follow-up requirements must be followed.
- b. Prior to remodeling and renovation of pre-1978 housing, when the cost of such work will be greater than \$5,000 annually, a risk assessment must be conducted in accordance with 40 CFR 745.227(d) (See detailed protocol in HUD Guidelines, Chapter 5).
- c. Lead-based paint risk assessments and inspections in residences must be conducted only by state or EPA-certified lead risk assessors and inspectors.



5. *Lead-Based Paint Hazard Control.*

Conduct control measures to correct lead-based paint hazards in residences and public buildings whenever they are identified or prior to disposal of housing. Controls include the following: stabilizing deteriorated paint, making all horizontal surfaces smooth and cleanable, correcting friction and impact surfaces, and covering bare soil. Controls are completed when clearance is achieved in accordance with 24 CFR 35.1340.

6. *Protecting Building Occupants During Lead Activities.*

- a. Occupants of housing must be notified prior to conducting maintenance, remodeling, renovation, abatement, or lead hazard reduction when the cost of such work will be greater than \$5,000 annually and must be provided a copy of the lead hazard information pamphlet "Protect Your Family from Lead in Your Home."
- b. Occupants of housing and public buildings must be protected from exposure to lead during maintenance, remodeling, renovation or abatement activities following specific worksite preparation measures (see Appendix C).
- c. Clearance. Residences and public buildings in which maintenance, remodeling, renovation or abatement activities have taken place will be cleared for resumed occupancy as prescribed in Appendix C, Table 4, Clearance Requirements. Clearance of lead-based paint activities in residences and child play areas will be performed by a Certified Lead Risk Assessor, Certified Lead-Based Paint Inspector or Certified Lead-Based Paint Monitor (Certifications in accordance with 40 CFR 745). Clearance in public buildings and for work conducted on other facilities and structures may be performed by an experienced industrial hygienist, Certified Lead Supervisor or an appropriately trained competent person.

7. *Real Property Disposal.*

Prior to disposal of residential property constructed prior to 1978, a lead-based paint risk assessment and a lead-based paint inspection must be performed following protocols presented in HUD Guidelines, Chapter 5, Risk Assessment and Chapter 7, Lead-Based Paint Inspection.

All lead-based paint hazards identified in housing constructed before 1960 must be abated prior to disposal of the property. After completion of abatement activities, clearance inspection and environmental sampling must be achieved according to the requirements of 40 CFR 745.227. Prior to disposal of residential property constructed after 1959 but before 1978, the results of risk assessment and building inspection must be made available to prospective purchasers of the property.

## 8. *Considerations for Historic Structures.*

Historic structures used as residences or dwellings, which may be classified as public buildings, must be maintained free of lead-based paint hazards (refer to definition of lead-based paint hazards in this section). Occupants of residences and public buildings will be protected from lead-based paint hazards and from lead exposure during maintenance, preservation, abatement or other construction activities according to the requirements of this section. This work must be conducted in compliance with the worker protection requirements of this section and 29 CFR 1926.62

Maintenance and renovation of historic buildings may be restricted by pertinent federal, state and local historic preservation regulations. However, occupant and worker protection requirements may not be waived, thus limiting the use of such structures.

## Appendix A: Worker Exposure Assessment

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### Initial Exposure Assessment

Worker exposure to lead must be assessed and characterized whenever workers might disturb lead during the course of maintenance, remodeling, repair or abatement work. Unprotected exposure may not exceed 50 ug/m<sup>3</sup> as an 8-hour time-weighted average (TWA). Exposures greater than 30 ug/m<sup>3</sup> TWA – the action level that prompts protective measures and requires the implementation of biological monitoring, employee training and periodic exposure monitoring. Exposure characterization may be accomplished by one of three methods – personal exposure monitoring, objective and historical data, and trigger tasks.

1. *Personal Exposure Monitoring* is the primary method of exposure assessment and provides the most accurate measure of exposure. Sampling and analysis is conducted following National Institute of Occupational Safety and Health (NIOSH) Methods and consist of full-shift samples (at least seven hours). Other methods may be used under the direction of a professional industrial hygienist.
2. *Objective and Historical Data*
  - a. *Historical data.* The park may rely on previous lead exposure monitoring results if they were obtained within the past 12 months during work operations conducted under workplace conditions closely resembling the processes, type of material, control methods, work practices and environmental conditions.
  - b. *Objective Data.* The park may rely on objective data instead of implementing initial exposure monitoring. Objective data must demonstrate that a particular product or material containing lead or a specific process, operation or activity involving lead cannot result in employee exposure to lead at or above the Action Level during processing, use or handling. A determination of the nature and relevancy of objective data should be made by a professional industrial hygienist.
3. *Trigger Tasks.* When conducting any of the tasks listed in Table A-1, exposures must be assumed, as indicated, in the absence of personal exposure monitoring or objective data.

**Table A-1 Trigger Tasks**

<b>When these activities are conducted:</b>	<b>Assume that the worker's exposure level is:</b>	<b>And require respirators that provide at least this assigned protection factor:</b>
<ul style="list-style-type: none"> <li>• Manual demolition, scraping and sanding</li> <li>• Heat gun use</li> <li>• Use of HEPA filtered local exhaust-equipped tools</li> </ul>	50-500 ug/m3 (up to 10 times PEL)	APF $\geq$ 10 (tight-fitting half-face APR with HEPA or N100 filters, or PAPR with loose fitting hood and HEPA or N100 filters operating in continuous flow mode.)
<ul style="list-style-type: none"> <li>• Rivet busting</li> <li>• Use of non-HEPA equipment</li> <li>• Clean-up of dry abrasive blast residue</li> </ul>	500-2500 ug/m3 (up to 50 times PEL)	APF $\geq$ 50 (tight-fitting full-face piece APR or PAPR)
<ul style="list-style-type: none"> <li>• Abrasive blasting</li> <li>• Welding or torch cutting, in way of lead</li> </ul>	>2500 ug/m3 (greater than 50 times PEL)	APF >50 (any air-supplied respirator with tight-fitting face piece operating in the pressure demand mode.)

APF = Assigned protection factor  
 APR = Air purifying respirator  
 PAPR = Powered air purifying respirator

**Follow-Up Worker Exposure Assessment**

Periodic follow-up personal air sampling must be conducted according to the following schedule:

<b>When:</b>	<b>Then:</b>
Initial monitoring, historic or objective data shows that exposure is less than the Action Level (<30ug/m3)	No additional sampling is required unless changes in work activity occur.
Initial monitoring shows that exposure is equal to or greater than the action level, but below the PEL (30-50 ug/m3)	Monitor at least every six months until two consecutive samples taken at least seven days apart are below the action level.
Initial monitoring shows that exposure is greater than the PEL ( $\geq$ 50 ug/m3)	Monitor at least quarterly until two consecutive samples at least seven days apart are less than the action level
Historical monitoring data is greater than 12 months old	Conduct initial exposure monitoring and prescribed follow-up.

## **Appendix B: Written Exposure Control Plan**

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Prior to beginning tasks where employees may be exposed to lead above the PEL, the park must establish and implement a written exposure control plan to achieve compliance with 29 CFR 1910.1025 and 29 CFR 1926.62.

Written plans must include at least the following:

- A description of each activity in which lead is emitted (e.g., equipment used, material involved, controls in place, crew size, employee job responsibilities, operating procedures and maintenance practices).
- A description of the specific means that will be employed to achieve compliance, and where engineering controls are required, engineering plans and studies used to determine methods selected for controlling exposure to lead.
- A report of the technology considered in meeting the PEL.
- Air monitoring data which documents the source of lead emissions.
- A detailed schedule for implementation of the program, including documentation such as copies of purchase orders for equipment, construction contracts, etc.
- An administrative control schedule required by paragraph (e)(4) of this section, if applicable.
- A description of arrangements made among contractors on multi-contractor sites with respect to informing affected employees of potential exposure to lead and with respect to responsibility for compliance with this section as set-forth in 29 CFR 1926.16.
- Other relevant information.

The compliance program must provide for frequent and regular inspections of job sites, materials and equipment to be made by a competent person.

Written programs must be submitted upon request to any affected employee or authorized employee representatives and must be available at the worksite for examination by OSHA representatives.

Written programs must be revised and updated at least every six months to reflect the current status of the program.

## Sample Lead Exposure Control Plan

### Your National Park

#### 1. *Scope.*

This program defines the requirements and procedures for achieving compliance with the permissible exposure limit (PEL) for lead (50 ug/m<sup>3</sup> as an 8 hour TWA) in accordance with 29 CFR 1926.62

#### 2. *Activities.*

- a. *a. Removal of thermoplastic traffic striping from pavement.* This will be accomplished using a model 873 Bobcat with a Universal Planer AP 450 II planer attachment, and secondarily with a small mobile walk-behind planer resembling a lawn mower. This equipment will be used to physically breakup the thermoplastic traffic striping and deposit it behind the machine in a windrow of dry debris. This activity will require one operator.
- b. *Debris collection.* A vacuum pavement sweeper will be used to collect dry striping debris. Periodically the debris must be removed from the sweeper's discharge hopper and loaded into disposal drums. Filters will not be shaken during unloading. Dry brushing will be kept to a minimum. Compressed air will not be used to clean hopper. Shoveled debris will be placed, not thrown, into drums. Unloading will not be conducted in the vicinity or upwind of designated eating or hygiene areas, or where other workers or bystanders may be exposed to drifting dust. Debris will be misted with amended water to reduce airborne dust generation during shoveling and brushing when it will not hinder equipment operation and maintenance. Debris will be misted as it is loaded into drums. Drums will be closed when not being filled. All hazardous material resulting from this contract will be disposed of at the previously approved Class 1 disposal facility at Sweethome, SD, under the Your Park's EPA ID Number ABC1234567. This activity will require one operator.
- c. *Traffic control.* Traffic will be controlled using two flaggers and one pilot car and driver.
- d. *Tab application.* Temporary marker tabs will be applied to the pavement after striping debris is removed. Two laborers will be required for this activity.
- e. *Duration.* This compliance plan will be in effect for the duration of the job which is anticipated to be three days.

### 3. *Methods of Compliance.*

The traffic striping activity is a mobile operation conducted under variable field conditions.

- a. *Equipment.* Equipment used for this activity is standard for the industry. HEPA-filtered local exhaust system technology is not available for this application. Equipment will be maintained according to the manufacturer's recommendations to ensure most effective operation.
- b. *Operating Procedures and Personal Protection.* Control of exposures will be accomplished primarily through the use of personal protective clothing and equipment and strict implementation of hygienic work practices.

### 4. *Exposure assessment.*

- a. Air monitoring data that documents the level of lead emissions resulting from these activities is not available. Personal exposure monitoring representative of workers with greatest potential exposure will be conducted during the activity according to the following schedule.
  - 1) Bobcat – planer operator. Full-shift breathing zone.
  - 2) Pavement sweeper operator. Full-shift breathing zone.
  - 3) Hopper clean-out. Full-shift breathing zone.
  - 4) Flaggers. No monitoring.
  - 5) Pilot car driver. No monitoring.
  - 6) Tab applicators. No monitoring.
- b. Air monitoring will occur on the first day of the activity and will be conducted by an independently contracted Industrial Hygienist [AirServ Environmental, 34 Howard St, Minneapolis, MN, (234) 456-6789].
- c. Sampling may be conducted of thermoplastic striping material to determine its lead content. At least three samples of each material type to be removed will be collected and analyzed for lead content by a NVLAP certified laboratory. Bulk samples will consist of all layers of material to be removed. If analysis determines that lead is not detectable, a negative exposure potential will be assumed and air monitoring will not be conducted.
- d. Until air monitoring results are available or a negative exposure potential can be assumed based on lead content of the material to be removed, exposures in excess of 500 ug/m<sup>3</sup>, but less than 2500 ug/m<sup>3</sup> will be assumed. (Guidance provided in 29 CFR1926.62 – reference power tool cleaning without dust collection systems and cleanup activities where dry expendable abrasives are used.)

5. Exposure control. Until bulk sampling or air monitoring results demonstrate a negative exposure, the following equipment will be provided and used.
  - a. *Respiratory protection and personal protective equipment.* The following equipment will be worn by the Bobcat-planner operator, pavement sweeper operator and sweeper hopper cleaner during removal, sweeping and hopper cleaning operations.
    - 1) Full-face air purifying or powered-air purifying respirators equipped with N-100 filters. Use of respirators will be in accordance with Your Park's written respiratory protection program and meet the requirements of 29 CFR 1910.134.
    - 2) Reusable cotton or disposable coveralls.
    - 3) Coveralls will not be worn off the work site. Street clothes will be protected from contamination. A clean changing site will be designated. If reusable, they will be laundered and provided clean each week. Laundry facilities will be notified that clothing is contaminated with lead dust in accordance with 29 CFR 1926.62.
    - 4) Additional personal protective equipment such as safety shoes, eye protection, reflective vests, hard hats and other, may be required, but are not presented in this lead-compliance program.
  - b. *Housekeeping.* Heavy accumulation of dust on clothing and equipment will be removed by HEPA-filtered vacuums or by wet wiping. Dry sweeping, dry brushing and compressed air will not be used to clean equipment. Every effort will be made to minimize accumulations of dust on equipment and to prevent dust from becoming airborne.
  - c. *Hygiene facilities and practices.*
    - 1) Food and beverages will not be consumed in the work area. Tobacco products will not be used in the work area. Cosmetics will not be applied in the work area.
    - 2) An eating area will be designated outside of the work area. Workers will remove surface dust from protective clothing prior to entering the eating area.
    - 3) Hand-washing facilities will be provided. Workers will wash their hands and face prior to eating, drinking, smoking or applying cosmetics, and at the end of the work shift.



- d. Signs. Signs that read “Warning, Lead Work Area, Poison, No Smoking or Eating,” in a language understood by all workers, will be posted on the Bobcat-planer and pavement sweeper.
  - e. Biological monitoring. Blood sampling and analysis will be conducted for lead and zinc protoporphyrin levels for the Bobcat-planer operator, pavement sweeper operator and sweeper hopper cleaner prior to beginning striping removal activities. This blood sampling and analysis will be conducted by Your Park’s medical services provider, Federal Occupational Health, (555) 810-1214.
6. *Training.* All employees covered by this compliance program will receive training that communicates the hazards of lead exposure and work practices and requirements for the minimization of exposure. Training will review the contents and requirements of this compliance program and Appendix A, 29 CFR 1926.62, Substance Data Sheet for Occupational Exposure to Lead. Training will be conducted prior to initiation of work and in a language understood by all workers.
7. *Competent Person.* Your Park has designated \_\_\_\_\_ as the competent person with responsibility for implementing the provisions of this program in the field.
8. *Implementation Schedule.* Implementation schedule is provided as an attachment to this plan. The schedule provides documentation of the implementation of this compliance program. Documentation will include copies of training records, purchase orders and service contracts.

<sup>1</sup>Note: Competent Persons are required by 29 CFR 1926 for construction operations. The competent person must possess the training to recognize workplace hazards including lead related hazards and the authority to make corrections to situations posing unacceptable risk to workers. For lead-based paint activities, this role may be served by a certified lead-based paint supervisor adequately training in construction safety topics pertinent to the work at hand.

## **Appendix C: Safe Practices for Worker and Occupant Protection**

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### Summary of lead worker compliance requirements

Action required at the Action Level of 30 ug/m<sup>3</sup> of air:

1. Periodic air sampling
2. Biological monitoring
3. Training

Additional action required at the PEL:

4. Written compliance program
5. Provide respiratory protection (including a respiratory protection program)
6. Provide protective clothing including coveralls, gloves, hats, shoes, face shields, etc.
7. Provide hygiene facilities including change areas, at least hand-washing facilities and showers where feasible, eating facilities, enforce mandatory hand-washing practices if showers are not feasible, etc.
8. Utilize work practices including engineering controls that are addressed in the compliance program
9. Provide warning signs.

### Prohibited practices

The following practices are prohibited:

- Open-flame burning or torching
- Abrasive blasting without HEPA vacuum local exhaust
- Machine sanding or grinding without HEPA vacuum local exhaust
- Heat guns at temperatures over 1100°F
- Dry scraping (exception around electricity or for very small areas such as nail holes)

- Methylene chloride-based strippers
- Paint stripping in a poorly ventilated space using a volatile stripper that is a hazardous substance.

### Respiratory Protection

Respirators must be used when an employee's exposure to lead exceeds the PEL. A respirator will be provided to employees requesting a respirator when exposure is less than the PEL following guidance for the voluntary use of respirators in Section 4.X Respiratory Protection. Employees must be provided a powered air-purifying respirator when respirators are required and they choose to use such a respirator and as long as it will provide adequate protection. Filtering face pieces will not be used for lead work.

### Personal Protective Equipment

When employees are exposed to lead above the PEL they must be provided and be required to use the following personal protective equipment:

- Coveralls or similar full-body work clothing.
- Gloves, hats and shoes or disposable shoe coverlets.
- Face shields, vented goggles.

Protective clothing must be cleaned at least weekly, or daily when employees are exposed to lead at levels over 200 ug/m<sup>3</sup> (TWA). Protective clothing must be removed at the completion of a work shift. Designated change areas must be provided whenever personal protective equipment is required. Clean areas will have separate storage facilities for protective work clothing and equipment and for street clothes so that cross-contamination is prevented. Employees will not leave the workplace wearing any protective clothing or equipment that is required to be worn during the work shift.

Seal lead contaminated clothing or equipment in plastic bags to prevent release of lead and inadvertent exposure. Inform, in writing, any person who cleans or launders protective clothing or equipment of the potentially harmful effects of exposure to lead. Bags must be labeled with the following warning:

Caution: Clothing contaminated with lead. Do not remove dust by blowing or shaking. Dispose of lead contaminated wash water in accordance with applicable local, state or federal regulations.

Do not remove lead dust from protective clothing or equipment by blowing, shaking or any other means that disperses lead into the air.

### Housekeeping

Surfaces will be kept as clean and free of dust and debris as possible. Floors and other surfaces where lead accumulates will be cleaned using a HEPA-equipped vacuum cleaner or wet cleaning methods that minimize the likelihood of lead becoming airborne. Do not dispose of waste water in residential sinks, bathtubs or yards.

Compressed air must not be used without an effective local exhaust ventilation system designed to contain the airborne dust created by the compressed air. Shoveling, dry or wet sweeping, and brushing should not be used. Do not dispose of waste in residential trash.

### Hygiene Facilities and Practices

Do not consume food or beverages, use tobacco products, or apply cosmetics in work areas.

Shower facilities must be provided, where feasible, for use by employees whose airborne exposure to lead is above the PEL.

Hand washing facilities must be available and used by employees to wash their hands and face prior to eating, drinking, smoking or applying cosmetics.

Lunchroom facilities or eating areas must be as free as practicable from lead contamination and must be available for employees whose airborne exposure to lead is above the PEL. Employees will not enter lunchroom facilities or eating areas with protective work clothing or equipment unless surface lead dust has been removed by vacuuming, downdraft booth or other cleaning methods that limit dispersion of lead dust.

Worksite Preparation and Occupant Protection

**Table C-1. Interior Worksite Preparation Levels (not including windows)**

DESCRIPTION	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4
<b>Typical Applications</b>	Dust removal and any abatement or interim control method disturbing no more than 2 ft2 of painted surface per room.	Any interim control or abatement method disturbing between 2 and 10 ft2 of painted surface per room	Same and level 2	Any interim control or abatement method disturbing more than 10 ft2 per room
<b>Time limit per dwelling or public building space</b>	One work day	One work day	Five work days	None
<b>Occupant location</b>	Inside dwelling, but outside work area. Occupant must have lead-safe passage to bathroom, at least one living area, and entry/egress pathways. Alternately, occupant can leave the dwelling during the work day.	Same as level 1	Outside the dwelling, but can return in the evening after day's work and cleanup are completed. Occupant must have safe passage to bathroom, at least one living area and entry/egress pathways upon return. Alternately, Occupant can leave until all work all work is completed.	Outside the dwelling for duration of project, but cannot return until clearance has been achieved.
<b>Containment and Barrier System</b>	Single layer of plastic sheeting on floor extending 5 feet beyond the perimeter of the treated area in all directions. No plastic sheeting on doorways is required, but a low physical barrier such as furniture, wood planking to prevent inadvertent access by occupant is recommended. Children should not have access to plastic sheeting (suffocation hazard.)	Two layers of plastic on entire floor. Plastic sheet with primitive airlock flap on all doorways. Doors secured from inside the work area need not be sealed. Children should not have access to plastic sheeting (suffocation hazard.)	Two layers of plastic sheet with primitive airlock flap on all doorways to work areas. Doors secured from inside the work area need not be sealed. Overnight barrier should be locked or firmly secured. Children should not have access to plastic sheeting (suffocation hazard.)	Two layers of plastic on entire floor. If entire unit is being treated, cleaned and cleared, individual room doorways need not be sealed. If only a few rooms are being treated, seal all doorways with primitive air-lock flap to avoid cleaning entire dwelling. Doors secured from inside the work area need not be sealed.

DESCRIPTION	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4
<b>Warning Signs</b>	Required at entry to room but not on building (unless exterior work is also underway).	Same as Level 1	Posted at main and secondary entryways, since resident will not be present to answer the door.	Posted at building exterior near main and secondary entryways.
<b>Ventilation System</b>	Dwelling ventilation system turned off, but vents need not be sealed with plastic if they are more than 5 feet away from the surface being treated. Negative pressure zones are not required, unless large supplies of fresh air must be admitted into the work area to control exposure to other hazardous substances such and solvent vapors.	Turned off and all vents in room sealed with plastic. Negative pressure zones are not required, unless large supplies of fresh air must be admitted into the work area to control exposure to other hazardous substances such as solvent vapors.	Same as level 2	Same as level 2
<b>Furniture</b>	Left in place uncovered if furniture is more than 5 feet from working surface. If within 5 feet, furniture should be sealed with a single layer of plastic or moved for the paint treatment. No covering is required for dust removal.	Removed from work area. Large items that cannot be moved can be sealed with a single layer of plastic sheeting and left in work area.	Same as level 2	Same as level 2

DESCRIPTION	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4
<b>Cleanup</b>	HEPA vacuum, wet wash and HEPA vacuum all surfaces and floors extending 5 feet in all directions from the treated surface. For dust removal work alone, a HEPA vacuum and wet wash cycle is adequate. Also wet wash and HEPA vacuum floor in adjacent areas used as pathway to work area. Do not store debris inside the building overnight; transfer to a locked secure area at the end of each day.	HEPA vacuum, wet wash and HEPA vacuum all surfaces in the room. Also wet wash and HEPA vacuum floor in adjacent areas used as pathway to work area. Do not store debris inside dwelling overnight; use a secure locked area.	Remove top layer of plastic from floor and discard. Keep bottom layer of plastic on floor for use on the next day. HEPA vacuum, wet wash and HEPA vacuum all surfaces in room. Also wet wash and HEPA vacuum floor in adjacent areas used as pathway to work area. Do not store debris inside dwelling overnight; use a secure locked area.	Full HEPA vacuum, wet wash and HEPA vacuum cycle, as detailed in chapter 14.

**Table C-2. Exterior Worksite Preparation Levels (Not including windows)**

DESCRIPTION	LEVEL 1	LEVEL 2	LEVEL 3
<b>Application</b>	Any interim control or abatement method disturbing less than 10 ft <sup>2</sup> of exterior painted surface per dwelling. Also includes soil control work.	Any interim control or abatement method disturbing 10 to 50 ft <sup>2</sup> of exterior painted surface per dwelling. Also includes soil control work.	Any interim control or abatement method disturbing more than 50 ft <sup>2</sup> of exterior painted surface per dwelling. Also includes soil control work.
<b>Time limit per dwelling or public building space</b>	One day	None	None
<b>Occupant location</b>	Inside dwelling but outside work area for duration of project until cleanup has been completed. Alternatively, occupant can leave until all work has been completed. Occupant must have lead-safe access to entry/egress pathways.	Relocated from dwelling during work-day, but may return after daily cleanup has been completed.	Relocated from dwelling for duration of project until final clearance is achieved.

DESCRIPTION	LEVEL 1	LEVEL 2	LEVEL 3
<b>Containment and Barrier system</b>	One layer of plastic on ground extending 10 ft beyond the perimeter of working surfaces. Do not anchor ladder feet on top of plastic (puncture the plastic to anchor ladders securely to ground). For all other exterior plastic surfaces, protect plastic with boards to prevent puncture from falling debris, nails, etc, if necessary. Raise edges of plastic to create a basin to prevent contaminated runoff in the event of unexpected precipitation. Secure plastic to side of building with tape or other anchoring system (no gaps between plastic and building). Weight all plastic sheets down with two-by-fours or similar objects. Keep all windows within 20 ft of working surfaces closed, including windows of adjacent structures.	Same as level 1	Same as level 1
<b>Playground Equipment, Toys, Sandbox</b>	Remove all movable items to a 20 ft distance from working surfaces. Items that cannot be readily moved to a 20 ft distance can be sealed with taped plastic sheeting.	Same as level 1	Same as level 1
<b>Security</b>	Erect temporary fencing or barrier tape at a 20 ft perimeter around working surfaces (or less if distance to next building or sidewalk is less than 20 ft). If an entryway is within 10 ft of working surfaces, require use of alternative entryway. If practical, install vertical containment to prevent exposure. Use a locked dumpster, covered truck or locked room to store debris before disposal.	Same as Level 1	Same as level 1
<b>Signs</b>	Post warning signs on the building and at a 20ft perimeter around building (or less if distance to next building or sidewalk is less than 20 ft).	Same as level 1	Same as level 1
<b>Weather</b>	Do not conduct work if wind speeds are greater than 20 miles per hour. Work must stop and cleanup must occur before rain begins.	Same as Level 1	Same as Level 1
<b>Clean up</b>	Do not leave debris or plastic out overnight if work is not completed. Keep all debris in secured area until final disposal.	Same as level 1	Same as level 1
<b>Porches</b>	One lead-safe entryway must be made available to occupants at all times. Do not treat front and rear porches at the same time if there is not a third doorway.	Front and rear porches can be treated at the same time, unless unprotected worker must use the entryway.	Same as level 2



**Table C-3. Window Treatment of Replacement Worksite Preparation**

<b>Appropriate Applications</b>	Any window treatment or replacement.
<b>Occupant Location</b>	Remain inside dwelling but outside work area until project has been completed. Alternatively, leave until all work has been completed. Occupants must have access to lead-safe entry/egress pathway.
<b>Time Limit Per Dwelling or Public Building Space</b>	None
<b>Containment and Barrier System</b>	One layer of plastic sheeting on ground or floor extending 5 feet beyond perimeter of window being treated/replaces. Two layers of plastic taped to interior wall if working on window from outside. If working from the inside, tape two layers of plastic to exterior wall. If working from inside, implement a minimum Interior Worksite Preparation Level 2. Children cannot be present in an interior room where plastic sheeting is located due to suffocation hazard. Do not anchor ladder feet on top of plastic (puncture the plastic to anchor ladders securely to ground). For all other exterior plastic surfaces, protect plastic with boards to prevent puncture from falling debris, nails, etc. is necessary. Secure plastic to side of building with tape or other anchoring system (no gaps between plastic and building). Weigh all plastic sheets down with two-by-fours or similar objects. All windows in dwelling should be kept closed. All windows in adjacent dwellings that are closer than 20 ft to the work area should be kept closed.
<b>Signs</b>	Post warning signs on the building and at a 20-ft perimeter around building (or less if distance to next building or sidewalk is less than 20 feet). If window is to be removed from inside, no exterior sign is necessary.
<b>Security</b>	Erect warning signs on the building and at a 20-ft perimeter around building (or less if distance to next building or sidewalk is less than 20 feet). Use a locked dumpster, covered truck or locked room to store debris before disposal.
<b>Weather</b>	Do not conduct work if wind speeds are greater than 20 miles per hour. Work must stop and cleanup must occur before rain begins, or work should proceed from the inside only.
<b>Playground Equipment, Toys, Sandbox</b>	Removed from work area and adjacent areas. Remove all items to a 20 ft distance from dwelling. Large, unmovable items can be sealed with taped plastic sheeting.
<b>Cleaning</b>	If working from inside, HEPA vacuum, wet wash and HEPA vacuum all interior surfaces within 10 ft of work area in all directions. If working from the exterior, no cleaning of the interior is needed, unless the containment is breached. Similarly, no cleaning is needed on the exterior if all work is done on the interior and the containment is not breached. If containment is breached, then cleaning on both sides of the window should be performed. No debris or plastic should be left out overnight if work is not completed. All debris must be kept in a secure area until final disposal.

**Table 4. Minimum Clearance Requirements<sup>1</sup>**

SCOPE OF WORK	TYPE OF FACILITY	CLEARANCE REQUIREMENT
Maintenance, renovation, lead hazard reduction or abatement at greater than de minimis levels <sup>2</sup>	Residences and child play areas	Visual inspection, dust sampling, reporting in accordance with 24 CFR 35.1340 and 40 CFR 745.227
Maintenance, renovation, lead hazard reduction or abatement at or less than de minimis levels	Residences and child play areas	Visual inspection, dust sampling, reporting in accordance with 24 CFR 35.1340 and 40 CFR 745.227
Maintenance, renovation, lead hazard reduction or abatement at greater than de minimis levels	Public Buildings	Visual inspection required, dust sampling recommended
Maintenance, renovation, lead hazard reduction or abatement at greater than de minimis levels	Public Buildings	Visual inspection
Maintenance, renovation, lead hazard reduction or abatement	All other facilities and structures	Visual inspection

<sup>1</sup>Parks must comply with clearance requirements of states and local jurisdictions when they are more stringent than federal requirements.  
<sup>2</sup>De minimis levels. Safe work practices are not required when maintenance or hazard reduction activities do not disturb painted surfaces that total more than:

- (1) 20 square feet (2 square meters) on exterior surfaces;
- (2) 2 square feet (0.2 square meters) in any one interior room or space; or
- (3) 10 percent of the total surface area on an interior or exterior type of component with a small surface area. Examples include window sills, baseboards and trim.

## **Appendix D: Biological Monitoring, Medical Surveillance & Medical Removal**

### Biological Monitoring

Biological monitoring, which consists of blood lead level and blood zinc protoporphyrin sampling and analysis, must be provided at no cost to employees engaged in construction work when they are exposed at any time above the action level and to employees engaged in non-construction work when exposed above the Action Level for 30 days or more in any 12-month period. The frequency of monitoring is as follows:

<b>WHEN EMPLOYEE EXPOSURE IS:</b>	<b>CONDUCT BIOLOGICAL MONITORING:</b>	
greater than the action level for less than 30 days/year as the result of construction activities	once – initial testing only – unless result > 40 ug/dl	
greater than the action level more than 30 days/year as a result of construction activities	every 2 months for 6 months and then every 6 months unless > 40 ug/dl	
greater than the action level more than 30 days/year as a result of non-construction activities	Every 6 months unless >40 ug/dl	
<b>WHEN:</b>	<b>CONDUCT BIOLOGICAL MONITORING:</b>	
blood test results are greater than 40 ug/dl	every 2 months until 2 consecutive test results are < 40 ug/dl	
employee is on medical removal	monthly during removal period	
any blood lead test results are greater than 50 ug/dl.	within 2 weeks	

Employees must be notified of test results by the park in writing within five working days of the park receiving biological monitoring results.

### Medical Surveillance

The Park must make a medical surveillance program conducted under the supervision of a licensed physician available to any worker exposed to lead above the action level for 30 days or more per year. Medical surveillance must be available at no cost to employees. An initial medical surveillance (exam) must be made available to any worker who may be exposed to lead above the Action Level for 30 days or more per 12-month period. Follow-up medical exams will be made available when the following occur:

- When blood test results are >40 ug/dl at any time during the past 12 months.
- When an illness is discovered that might get worse if the worker is exposed to lead. Exams must be provided as soon as possible if the employee displays symptoms of lead intoxication or if the employee demonstrates difficulty breathing while using a respirator.

- When the employee is pregnant.
- When an employee desires medical advice on the effects of current or past lead exposure on fertility and pregnancy.
- As medically appropriate for each employee either removed from exposure to lead due to a risk of sustaining material impairment to health, or otherwise limited pursuant to a final medical determination.

Procedures for Medical Examinations

1. Parks will provide the examining physician with:
  - a. A copy of 29 CFR 1926.62 and all of its appendices.
  - b. A description of the affected employee's duties as they relate to the employee's exposure.
  - c. The employee's exposure level or anticipated exposure level to lead and to any other toxic substances.
  - d. A description of any personal protective equipment used or to be used.
  - e. Prior blood lead determinations.
  - f. All prior written medical opinions concerning the employee in the employer's possession or control.
2. Medical Surveillance Exams will be conducted consistent with the requirements of 29 CFR 1926.62 (j), Medical Surveillance. This section of the CFR describes specific requirements for required examinations that are to be followed.
3. The park will provide for the review and examination requirements of a second physician's opinion if the employee advises the park of his or her intention to seek a second opinion, and takes steps to make an appointment with a physician within 15 days of notification of the initial physician's determination or notification of the right to a second opinion. Employees will be advised of their right for a second physician opinion whenever a medical surveillance exam is required to review any findings, determinations or recommendations of the initial physician and conduct any examinations, tests or consultation necessary to facilitate the review. If differences in the findings, determinations or recommendations of the second physician differ from those of the initial physician, then the park and the employee must assure that efforts are made for the two physicians to resolve any disagreement

in accordance with the requirements of 29 CFR 1910(j). The park must provide the foregoing information to a second or third physician conducting a medical examination or consultation upon request either by the second or third physician, or by the employee.

Written medical opinions

The park must obtain and furnish the employee with a copy of a written medical opinion from each examining or consulting physician which contains only the following information:

1. The physician's opinion as to whether the employee has any detected medical condition, which would place the employee at increased risk of material impairment of the employee's health from exposure to lead.
2. Any recommended special protective measures to be provided to the employee or limitations to be placed upon the employee's exposure to lead.
3. Any recommended limitation upon the employee's use of respirators, including a determination of whether the employee can wear a powered air purifying respirator if a physician determines that the employee cannot wear a negative pressure respirator.
4. The results of the blood lead determinations.

In addition, the park must instruct each examining and consulting physician to:

1. Not reveal either in the written opinion or orally, or in any other means of communication with the employer, findings, including laboratory results, or diagnoses unrelated to an employee's occupational exposure to lead.
2. Advise the employee of any medical condition, occupational or nonoccupational, which dictates further medical examination or treatment.

If therapeutic or diagnostic chelation is to be performed, the park must assure that it be done under the supervision of a licensed physician in a clinical setting with thorough and appropriate medical monitoring and that the employee is notified in writing prior to its occurrence.

### Medical Removal and Employment Protection

Employees must be removed from work having an exposure to lead at or above the action level, consistent with 29 CFR 1910.62(k), when any of the following conditions occur:

1. Blood sampling tests indicate that the employee's blood lead level is at or above 50 ug/dl.
2. Medical determination results in a medical finding, determination or opinion that the employee has a detected medical condition, which places the employee at increased risk of material impairment to health from exposure to lead.

During the medical removal period (up to 18 months for each removal occasion), the park must maintain the total normal earnings, seniority and other employment rights and benefits of an employee, including the employee's right to his or her former job status.

The employee must be returned to their former job status when two consecutive blood sampling tests indicate that the employee's blood lead level is at or below 40 ug/dl or for an employee removed due to a medical determination, when a subsequent final medical determination results in a determination or opinion that the employee no longer has a detected medical condition, which places the employee at increased risk of material impairment to health from exposure to lead.

## Appendix E: Summary of Training Requirements

TYPE OPERATION	TYPE PERSONNEL	TYPE ACCREDITATION/CERTIFICATION REQUIRED	INITIAL TRAINING REQUIREMENT	RECERT OR REFRESHER & LENGTH	REGULATORY CITATION
Identification of lead hazards in residences and public buildings; conducting lead-based paint inspections and risk assessments	Industrial Hygienist, Safety Professional, Engineer, Environmental Specialist, Facilities Maintenance Staff	Certified Lead-based Paint Inspector; Certified Lead-based paint Risk Assessor	40 hour course (24 hour-Inspector; 16 hour Risk Assessor)	Varies with state	40 CFR 745
Identification of lead hazards, collection of bulk samples for lead identification for OSHA compliance.	Industrial Hygienist, Safety Professional, Engineer, Environmental Specialist, Facilities Maintenance Staff	None	Training sufficient to develop competences such as Lead-based paint supervisor or project monitor courses.	Sufficient to maintain competence	29 CFR 1910.1025 29 CFR 1926.62
Prepare lead abatement plans for residences and public housing.	Industrial Hygienist, Safety professional, Engineer	Certified Lead-based Paint Project Designer	8 hours	Varies with state	40 CFR 745
Conducting abatement of lead-based paint in residences and public buildings.	Construction workers, maintenance personnel	Certified Lead-based Paint Worker	16-24 hours	Varies with state	40 CFR 745
Supervising or serving as competent person for abatement of lead-based paint in residences and public buildings	Construction supervisors, maintenance supervisors	Certified Lead-based Paint Supervisor or Supervisor/Project Monitor	32 hours	Varies with state	40 CFR 745
Conducting building maintenance where lead-based paint or other lead hazards exist.	Facilities maintenance staff, plumbers, electricians, carpenters	None	8 hours OSHA "action level training" for all workers exposed at or above the AL.	Annual, no specified time requirement. May vary with state.	29 CFR 1926.62 29 CFR 1910.1200
Perform clearance inspection and environmental sampling at the completion of lead activities in residences and public buildings	Industrial Hygienist, Safety Professional, Engineer, Environmental Specialist, Facilities Maintenance Staff	Certified lead-based paint Inspector, certified lead-based paint risk assessor or, certified lead-based paint project monitor		Varies with state	29 CFR 745

TYPE OPERATION	TYPE PERSONNEL	TYPE ACCREDITATION/CERTIFICATION REQUIRED	INITIAL TRAINING REQUIREMENT	RECERT OR REFRESHER & LENGTH	REGULATORY CITATION
Perform clearance inspection at non-residential or non-public building work sites	Industrial Hygienist, Safety Professional, Engineer, Environmental Specialist, Facilities Maintenance Staff	None	Lead-based paint supervisor or lead-based paint project monitor recommended	Sufficient to maintain competence	RM50B
Employees occupying public buildings	Office Staff, other employees	None	Awareness training and information	Annual, no specified time requirement	29 CFR 1910.1200
Occupying residences	Family housing occupants	None	Disclosure and informational pamphlet	Notification prior to remodeling	40 CFR 74524 CFR 35
Competent person for non-residential or non-public buildings construction projects.	Construction supervisors, maintenance supervisors	Non	Certified lead-based paint supervisor or equivalent recommended. Training sufficient to function as construction site competent person	Sufficient to maintain competence	29 CFR 1926.6229 CFR 1926.16
Conducting custodial activities where lead-based paint or other lead hazards exist.	Facilities Maintenance staff, custodial staff, housekeepers	None	Awareness training including contents of 29 CFR 1910.1025 Appendices A & B	Annual, no specified time requirement	29 CFR 1910.120029 CFR 1910.1025
Conduct worker exposure assessment	Professional Industrial Hygienist, Safety Professional	None, Certified Industrial Hygienist, Certified Safety Professional recommended	Training sufficient to develop competence in workplace exposure assessment	Sufficient to maintain competence	29 CFR 1910.102529 CFR 1926.62
Conduct personal exposure monitoring of workers	Professional Industrial Hygienist, Safety Professional, Environmental Specialist, Facilities Maintenance Staff	None	Training sufficient to develop competence in workplace exposure monitoring procedures	Sufficient to maintain competence	29 CFR 1910.102529 CFR 1926.62

**Note:** Training, accreditation, and certification programs for lead-based paint activities required under Title X of the Toxic Substances Control Act are implemented by the states or by EPA in the absence of a state program. Parks must certify their workers in the state in which the work is to be conducted.



## **Appendix E: Guidelines for Lead Exposure at Firing Ranges**

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### Lead Dust In A Firing Range

- Exploding primers containing lead styphnate and the friction from lead slug against the gun barrel create airborne lead.
- High lead dust levels can accumulate inside indoor ranges with inadequate ventilation.
- Slugs hitting the bullet trap, walls, floors or ceiling of the range also create lead dust.
- Airborne lead dust can concentrate in outdoor ranges, depending on weather conditions.
- Spent bullets and settled dust can contaminate both indoor and outdoor ranges.
- Improperly cleaning the range also can cause settled dust to become airborne.

### You Can Take It Home With You

High levels of lead dust in firing ranges can settle on the bodies and clothes of employees and shooters. The dust can then be carried to their cars and homes, where it can be a hazard to their children.

### Other High Lead Dust Sources

Bullet loading creates a fine dust that is very difficult to clean. Melting lead to cast bullets produces a fume, which can remain airborne for several hours. The dust from these activities is readily inhaled, and can contaminate household surfaces. Never load bullets or melt lead in an unventilated area, inside the home or anywhere children may frequent.

### Steps To Minimize Lead Absorption

- Make sure the range is correctly ventilated and that the ventilation system is working properly.
- At the range, wash your hands and face before eating, drinking or smoking.
- Wash hands and face before leaving the range.

- Wash range clothes separately from the rest of the family's clothes.
- Always load bullets in a ventilated area.
- Do not load bullets in the home or in areas where children frequent.
- Do not allow children into the bullet loading area.
- Keep the bullet loading area clean by using detergent.

## **How Can Lead Dust Exposure Be Reduced?**

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### *What A Range Owner Should Do*

The Occupational Safety and Health Administration (OSHA) has established a standard for lead (29 CFR 1910.1025) which covers shooting range employees. This regulation sets a "Permissible Exposure Limit" (PEL) for airborne lead of 50 micrograms per cubic meter (mcg/m<sub>3</sub>), averaged over an eight-hour day.

However, the range owner should reduce the lead exposure to both employees and shooters to as low a level as possible.

Instructors are especially at risk because they spend more time on the firing range. The range instructor has the greatest potential long-term exposure to lead.

A separate booth, with its own tempered and filtered air supply, can be installed in the range. The construction will not reduce lead exposures to other range users, but it will reduce the range instructor's lead exposure.

An effective ventilation system produces a smooth airflow pattern. Poorly designed ventilation systems produce eddies and re-circulation that can carry fumes and dusts emitted from weapons to the area behind the firing line. Re-circulation and channeling air flow can be caused by various structures in the firing range, such as:

- Overhead barriers
- Sound barriers
- Booth walls
- Light fixtures
- Poorly located air inlets
- Even the shooters

It is very important that a ventilation system that serves the range area be completely separated from any ventilation for the rest of the building. The exhaust air from the range should not feed into air supplies for offices, meeting rooms or other businesses.

The planned use of a firing range should determine the design of the ventilation system. Improper use or maintenance of a firing range or the ventilation system can defeat the purpose of the ventilation system and increase the lead contamination.

Avoid the use of angled backstops with sand traps.

Although they are somewhat inexpensive, sand traps can generate a large amount of airborne lead dust and require frequent cleaning.

Escalator backstops and their variations, which trap bullets and their fragments, generate less dust and are easier to clean. Also, the waste lead can be sold to a recycler without having to be separated from sand.

Indoor firing ranges require frequent cleaning. Walls, floors, ceilings and bullet traps must be cleaned regularly. Frequent cleaning prevents settled dust from becoming an airborne inhalation hazard from people using the range or from air circulation.

It is essential to use appropriate methods in cleaning a firing range.

1. DO NOT DRY SWEEP!
2. Use a vacuum cleaner equipped with a high efficiency particulate air (HEPA) filter to remove lead-contaminated dust.
3. If a vacuum cleaner with a HEPA filter is not available, then a wet cleaning method must be used.
4. Anyone cleaning a range must wear appropriate protective equipment. This includes an approved respirator, protective clothing and shoes.
5. To reduce the possibility of bringing lead dust into their homes, the employees cleaning the range need to shower and change clothes before leaving the site.
6. Work clothing must be disposable or laundered separately to prevent contaminating the home.

Copper or nylon-clad bullets and non-lead primers (such as manitol hexanitratetetracene) can significantly reduce the amount of airborne lead discharged in firing.

Sometimes, this substitution alone can reduce lead exposure to the point that no further range alterations are necessary.

In cases where it is necessary to use conventional primers, use this ammunition loaded with jacketed bullets.

## **4.10 OCCUPATIONAL MEDICAL SCREENING AND SURVEILLANCE**

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Medical screening and medical surveillance are two fundamental strategies for optimizing employee health. Although the terms are often used interchangeably, they are quite distinct concepts. Medical screening is, in essence, only one component of a comprehensive medical surveillance program. The fundamental purpose of screening is early diagnosis and treatment of the individual. Thus it has a clinical focus. The fundamental purpose of surveillance is to detect and eliminate the underlying causes such as hazards or exposures of any discovered trends. Thus it has a prevention focus. Both can contribute significantly to the success of work-site health and safety programs.

Screening is a method for detecting disease or body dysfunction before an individual would normally seek medical care. Screening tests are usually administered to individuals without current symptoms, but who may be at high risk for certain adverse health outcomes.

Surveillance is the analysis of health information to look for problems that may be occurring in the workplace that require targeted prevention. Thus it serves as a feedback loop to park management. Surveillance may be based on a single case or sentinel event, but more typically uses screening results from the group of employees being evaluated to look for abnormal trends in health status. Surveillance can also be conducted on a single employee over time. Review of group results helps to identify potential problem areas and the effectiveness of existing work-site preventive strategies.

### **National Park Service Occupational Medical Screening and Surveillance Policy**

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National Park Service work environments and occupational activities can expose personnel to hazardous chemical, physical and biological agents with the potential for disease or injury. Parks will provide occupational medical screening and surveillance to identify work-related diseases or conditions through baseline and periodic examinations at an early stage when modifying the exposure or providing medical intervention could arrest disease progression or prevent recurrences.

#### **Scope**

This section addresses criteria for inclusion of employees in medical screening and surveillance. It does not attempt to prescribe specific physical examination or testing protocols. Where agent-specific screening and surveillance protocols are prescribed by OSHA regulation or sections of DM 485 and RM50B, they will be used. This program applies to all National Park Service employees and volunteers exposed to hazardous agents. Employee medical standards and optional employee health promotion programs are not covered in this section.