USACHPPM

U.S. Army Center for Health Promotion and Preventive Medicine (Provisional)

Just the Facts

Lead Facts: An Information Packet

U.S. Army Center for Health Promotion and Preventive Medicine (Provisional)
Lead Team
Aberdeen Proving Ground, Maryland 21010-5422

USACHPPM (Prov) Technical Guide 203
Lead Facts: An Information Packet

1. PURPOSE. This technical guide (TG) was designed to provide information about lead. The information is intended to help U.S. Army installations develop a personnel team to manage lead programs. The guidance herein adheres to Army lead policy.

2. AUDIENCE. This TG is for installation lead teams or personnel involved in identifying and reducing or eliminating lead sources to minimize risks from lead. This includes the departments of public works, inspectors, risk assessors, preventive medicine activities, healthcare providers, industrial hygienists, radiation protection officers, and housing occupants.

3. USING THIS TECHNICAL GUIDE.

a. This TG may be used to supplement Army policy guidance on lead. The fact sheets contained within address a variety of lead issues, including sampling, waste disposal, testing, worker protection, medical monitoring, elevated blood-lead levels, and interim controls.

b. The design of this TG allows for many different uses. The fact sheets may be used separately for information dissemination to target audiences or for training purposes. The entire TG may be used to develop standing operating procedures, or for general guidance.

THE LEAD FACT SHEETS

U.S. Army Center for Health Promotion and Preventive Medicine
(Provisional)

Just the Facts

93-001-1294

Points of Contact for Lead Issues

◆ Installation Lead Team

◆ Information

◆ Subject Matter Experts

The U.S. Army Center for Health Promotion and Preventive Medicine (Provisional) [USACHPPM (Prov)] has established a Lead Team to respond to questions or concerns you may have regarding your installation lead program. This fact sheet lists the USACHPPM (Prov) Lead Team subject points of contact for lead issues.

The people listed can address a variety of lead issues, including sampling, waste disposal, testing, worker protection, medical monitoring, elevated blood-lead levels, and interim controls.

- Direct Support Activities (DSAs)

USACHPPM (Prov) DSA-North
Mr. Kevin Sheff, DSN 923-6205 or (301) 677-6205

USACHPPM (Prov) DSA-South
Dr. Albert Liabastre, DSN 572-2826 or (404) 752-2826

USACHPPM (Prov) DSA-West
MAJ Michael Testa, DSN 943-8881 or (303) 361-8881

Waste Characterization and Disposal
Mr. Thomas Runyon, DSN 584-3651 or (410) 671-3651

Soil Sampling and Remediation
Mr. Thomas Runyon, DSN 584-3651 or (410) 671-3651

Lead in Drinking Water
Mr. Patrick Monahan, DSN 584-3919 or (410) 671-3919

Mr. Kenneth Lancellotti, DSN 584-3919 or (410) 671-3919

Interim Controls and In-Place Management of Lead
CPT Richard Wright, DSN 584-2559 or (410) 671-2559

Ms. Victoria Belfit, DSN 584-2488 or (410) 671-2488

Lead Training and Certification
Ms. Andrea Russiello, DSN 584-3928 or (410) 671-3928

Worker Protection
CPT Richard Wright, DSN 584-2559 or (410) 671-2559

Mr. Stephan Graham, DSN 584-2559 or (410) 671-2559

Paint Sampling
CPT Richard Wright, DSN 584-2559 or (410) 671-2559

Ms. Jennifer Houser, DSN 584-2559 or (410) 671-2559

Laboratory Analysis
Mr. David Rosak, DSN 584-2637 or (410) 671-2637

Ms. Lynn Boyd, DSN 584-2637 or (410) 671-2637

Lead-Bearing Dust Sampling
CPT Richard Wright, DSN 584-2559 or (410) 671-2559

Mr. Thomas McNeil, DSN 584-2488 or (410) 671-2488

Mr. Thomas Runyon, DSN 584-3651 or (410) 671-3651

Medical Monitoring
MAJ James Martin, DSN 584-2714 or (410) 671-2714

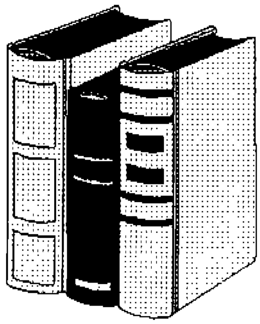
USACHPPM (Prov) Lead Program Administrator
Ms. Victoria Belfit, DSN 584-2488 or (410) 671-2488

USACHPPM (Prov) Lead Team Coordinator
MAJ W. Michael McDevitt, DSN 584-2488 or (410) 671-2488

U.S. Army Center for Health Promotion and Preventive Medicine (Provisional)
USACHPPM (Prov) Lead Team
Aberdeen Proving Ground, Maryland 21010-5422
DSN 584-2488 or Commercial (410) 671-2488
email: mchbmis@aeha1.apgea.army.mil

Just the Facts
93-002-1294
U.S. Army Center for Health Promotion and Preventive Medicine (Provisional)

A Bibliography of References for Lead Management



This fact sheet provides a listing of various documents that contain information about lead. The information is intended to help the installation lead team develop a lead-management program at the installation level.

Because policy and guidance change rapidly, the U.S. Army Center for Health Promotion and Preventive Medicine (Provisional) [USACHPPM (Prov)] Lead Team plans to update this fact sheet periodically so that installation lead teams can be aware of the most current lead information. [Note: USACHPPM (Prov) is the former U.S. Army Environmental Hygiene Agency (USAEHA).]

In the near future, we expect publication of several documents containing additional Department of the Army (DA) guidance on installation lead programs. Among those documents are references such as AR 200-1, Environmental Protection and Enhancement, April 1990; DA Pamphlet 200-1, Handbook for Environmental Impact Analysis, April 1975; and AR 420-70, Buildings and Structures, May 1992.

- **Installation Lead Team**
- **Information**
- **Regulations, Policies, and Protocols**

Public Law and Code of Federal Regulations

Public Law 102-550, Housing and Community Development Act of 1992, 28 October 1992: Title X, Residential Lead-Based Paint Hazard Reduction Act of 1992 (42 USC 4851).

Title 24, Code of Federal Regulations (CFR), Part 35, Subtitle A (4-1-92 Edition), Subpart E, Elimination of Lead-Based Paint Hazards in Federally-Owned Properties Prior to Sale for Residential Habitation.

Title 29, CFR, Ch. XVII (7-1-91 Edition), Part 1910.1025, Lead.

Title 29, CFR, Part 1926.62, Lead Exposure in Construction; Interim Final Rule, May 4, 1993.

Title 40, CFR, Part 141, National Primary Drinking Water Regulations, Subpart I, Control of Lead and Copper, July 1, 1993.

Title 40, CFR, Part 261, Identification and Listing of Hazardous Waste, July 1, 1993.

Title 40, CFR, Part 262, Standards Applicable to Generators of Hazardous Waste, July 1, 1993.

U.S. Army Center for Health Promotion and Preventive Medicine (Provisional)
USACHPPM (Prov) Lead Team
Aberdeen Proving Ground, Maryland 21010-5422
DSN 584-2488 or Commercial (410) 671-2488
email: mchbmis@aeha1.apgea.army.mil

Policies/Protocols

Memorandum, Office of the Secretary of Defense, 24 November 1992, subject: Lead-Based Paint (LBP) - Risk Assessment, Associated Health Risk in Children, and Control of Hazards in DoD Housing and Related Structures.

Memorandum, Office of the Assistant Secretary, 28 April 1993, subject: Lead-Based Paint Policy Guidance.

Memorandum, Assistant Chief of Staff for Installation Management, DAIM-FDF-B, 5 November 1993, subject: Policy Guidance - Lead-Based Paint and Asbestos in Army Properties Affected by Base Realignment and Closure.

Memorandum, Department of the Navy, Navy Environmental Health Center, 7 March 1993, subject: Hazard Assessment of Lead-Based Paint in Navy Housing, with enclosure entitled Lead-Based Paint Risk Assessment Protocol.

Memorandum, Department of the Air Force, Office of the Chief of Staff, HQ USAF/CC, 24 May 1993, subject: Air Force Policy and Guidance on Lead-Based Paint in Facilities.

OSHA Instruction CPL 2-2.58, U.S. Department of Labor, Assistant Secretary for Occupational Safety and Health, Office of Health Compliance Assistance, December 13, 1993, subject: 29 CFR 1926.62, Lead Exposure in Construction; Interim Final Rule—Inspection and Compliance Procedures.

U.S. Department of Housing and Urban Development, Public and Indian Housing, September 1990 (pages 87, 89 and A14-111 revised May 1991), Lead-Based Paint: Interim Guidelines for Hazard Identification and Abatement in Public and Indian Housing.

U.S. Department of Housing and Urban Development, Public and Indian Housing, Notice PIH 92-44 (PHA), September 30, 1992, subject: Lead-Based Paint (LBP) Risk Assessment Protocol.

U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control, October 1991, Preventing Lead Poisoning in Young Children.

U.S. Environmental Protection Agency, Office of Ground Water and Drinking Water, Lead and Copper Rule Guidance Manual, Volume I: Monitoring (September 1991) and Volume II: Corrosion Control Treatment (September 1992).

USAEHA Technical Guides and Technical Reports

Technical Guide 182, December 1990, Lead Alert: Health Hazards of Lead-Glazed Pottery.

Technical Guide No. 198, June 1993, A Commander's Guide to Childhood Lead Poisoning Prevention/Lead-Based Paint Management Program on DOD Installations.

Interim Final Report, Lead-Based Paint Contaminated Debris, Waste Characterization Study No. 37-26-JK44-92, May 1992 - May 1993.

Video

Lead Testing in Paint Soil and Dust, developed under contract with Oak Ridge Associated Universities for USAEHA.

Obtaining References

Public Law 102-550 and the CFRs may be obtained from the Superintendent of Documents, Government Printing Office, Washington, DC 20402 [(202) 783-3238].

Policies and protocols may be obtained from Commander, USACHPPM (Prov), ATTN: MCHB-MI-S (Ms. Victoria Belfit), Aberdeen Proving Ground, MD 21010-5422 [DSN 584-2488 or (410) 671-2488].

USAEHA technical guides may be obtained from the Commander, USACHPPM (Prov), ATTN: MCHB-CM-I, Aberdeen Proving Ground, MD 21010-5422 [DSN 584-4408 or (410) 671-4408].

The USAEHA report may be obtained from the Commander, USACHPPM (Prov), ATTN: MCHB-ME-S, Aberdeen Proving Ground, MD 21010-5422 [DSN 584-3651 or (410) 671-3651].

The video may be obtained by writing to your MACOM Surgeon's Office.

U.S. Army Center for Health Promotion and Preventive Medicine (Provisional)

Just the Facts

93-003-1294

Know How You Can Protect Your Child From Lead Poisoning

◆ **Military Housing Occupants, Homeowners and Renters**

◆ **Information/Guidance**

◆ **Reducing Lead Exposure**

Presently U.S. Army installations are in the process of developing lead teams to manage lead programs and minimize the risk from lead on their installations. To further minimize that risk, the U.S. Army Center for Health Promotion and Preventive Medicine (Provisional) [USACHPPM (Prov)] has developed the following recommendations. If you live offpost, these recommendations may be appropriate. You may also contact your local public health department.

What is lead poisoning?

It is a term for a variety of health effects related to various blood-lead levels. It is caused by the ingestion or inhalation of lead. Children who appear healthy may have lead poisoning; children under the age of 6 are particularly susceptible.

How does lead affect children?

Lead poisoning can—

- impair learning
- interfere with the ability to think
- decrease the ability to hear
- stunt growth
- cause behavioral disorders
- decrease attention span
- cause anemia.

Three Steps to Lead Poisoning Prevention

Step 1: Have Your Child Tested or Screened

Know your child's blood-lead level. A simple blood test can indicate the lead level in your child's system. Contact your healthcare provider, pediatrician, well child clinic, or Preventive Medicine Service for additional information.

Step 2: Know Potential Sources of Lead

◆ **Paint**. Lead-based paint (LBP), usually found in homes built prior to 1980, can be a major source of lead. Paint chips and lead dust are generated from chalking or deteriorating paint, or from the abrasive action of sliding surfaces, such as painted windows and doors.

◆ **Soil**. Soil can be contaminated with lead chips and dust from exterior paint or other lead sources. Soil near roads may be high in lead from gasoline exhaust.

◆ **Water**. Drinking water may contain lead from water pipes, pipe fittings, or lead solder in plumbing.

◆ **Food**. Food may be contaminated with lead if stored or cooked in poorly glazed pottery that contains lead, if stored in lead crystal, or if stored in cans with lead seams or solder.

◆ **Work or Hobbies**. Lead-bearing dust is generated from work involving battery operations, rifle-range operations, the reloading of ammunition, or hobbies such as stained glass, ceramics, and target practice.

U.S. Army Center for Health Promotion and Preventive Medicine (Provisional)
USACHPPM (Prov) Lead Team
Aberdeen Proving Ground, Maryland 21010-5422
DSN 584-2488 or Commercial (410) 671-2488
email: mchbmis@aeha1.apgea.army.mil

AEHA Form 326, 1 Oct 94 (MCHB-CS)

Step 3: Manage Lead Sources

Lead in Paint

◆ Contact your local housing office or Preventive Medicine Service for testing information if you live onpost. Installation family quarters are part of a program to identify and manage sources of LBP.

◆ Have your house tested for LBP if you live offpost and your house was built before 1980, or you suspect lead is present. Both onpost and offpost dwellers can use the following management techniques:

◆ Routinely wash smooth surfaces (walls, floors, window ledges, toys) with a high phosphate soap (powdered dishwasher detergent). Use a phosphate-free detergent formulated to remove lead where these soaps are prohibited. Wear impermeable gloves, or use personal protection to avoid skin irritation.

◆ Vacuum carpets with a vacuum cleaner specially designed with a high efficiency particulate air (HEPA) filter. Keep areas where your children play as clean and dust-free as possible. (NOTE: **Do not retrofit a regular household vacuum cleaner with a HEPA filter.** Be sure to use a specially designed HEPA vacuum cleaner. Attempts to use a regular household vacuum to manage lead-bearing dust may aggravate the problem by making lead dust airborne.)

If anyone in your household has an elevated blood-lead level, identify the source and follow the management techniques above to reduce exposure.

Lead in Soil

◆ Plant grass, ground cover, shrubs or flowers, or use mulch to cover bare soil.

◆ Have the sand in your child's sandbox tested for lead, or replace it with sand that is lead free.

Lead in Drinking Water

◆ Have your water tested if you live offpost and you suspect your plumbing contains lead or lead solder, or if anyone living in your house has an elevated blood-lead level.

◆ Draw drinking and cooking water only from the cold water tap. If water has not been used for more than 2 hours, allow it to run for 30-60 seconds before drawing it for drinking or cooking.

Lead Leaching into Food

◆ Do not store or cook food in pottery or ceramic ware that may be poorly glazed. (Be suspicious of any pottery purchased overseas.)

◆ Do not store foods or beverages in lead crystal for a prolonged time.

◆ Do not store food in open cans.

Exposure to Lead During Work or Hobbies

◆ Ensure practice of established workplace sanitation and hygiene standards.

◆ Change or wash clothing worn when working with lead before entering your home.

◆ Wash clothes worn when working with lead separately from family laundry.

Healthful Hints for Reducing Lead Exposure:

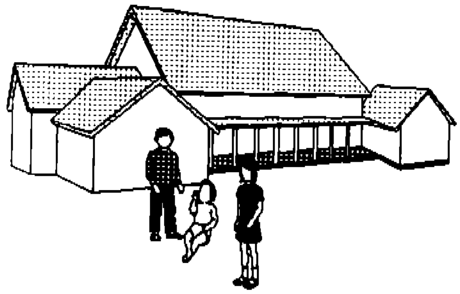
◆ Feed your child a well-balanced diet high in calcium, iron and vitamin C. These nutrients decrease the body's absorption rate of lead. Avoid foods high in fat, which increase the body's lead absorption rate.

◆ Teach your children to wash their hands before meals, nap, and bedtime. Most lead exposures in children are due to ingesting lead-containing dust by hand-to-mouth contact.

◆ Wash pacifiers and bottles after they fall on the floor. Wash toys and stuffed animals regularly.

U.S. Army Center for Health Promotion and Preventive Medicine (Provisional)

Approach to the Follow-Up of Elevated Blood-Lead Levels



◆ **Healthcare Providers**

◆ **Screening**

◆ **Exposure Sources**

The Rationale for Measuring Blood-Lead Levels in Children

There are two purposes for measuring blood-lead levels in children: to confirm or dispute a clinical suspicion of lead poisoning, and to screen for elevated blood-lead levels in asymptomatic children.

After testing blood-lead levels in a child, practitioners will then be able to determine:

◆ The child's appropriate follow-up treatment based on measured blood-lead level.

◆ How to investigate the possible sources of lead in the child's environment if indicated by an elevated blood-lead level.

Use of Screening Programs

Practitioners can measure blood-lead levels in groups of children for screening programs. Since children are a sensitive receptor for lead, these programs assess the lead burden in the community by looking at the measured blood-lead levels in children.

Practitioners can also use screening programs to:

◆ Note elevations in blood-lead levels.

◆ Assess possible sources of lead, thereby limiting further exposure.

◆ Recognize and address significant sources of lead to lessen further possible exposure to others in the community.

The Results of Screening: Blood-Lead Levels in 10-15 Microgram/Deciliter (µg/dl) Range

Confusion often exists while investigating lead sources. A common question arises regarding the blood-lead level above which practitioners must conduct "epidemiologic investigations." The Centers for Disease Control and Prevention's (CDC) document, *Preventing Lead Poisoning in Young Children*, suggests that "many children (or a large proportion of children) with blood-lead levels in the range of 10-14 µg/dl should trigger community-wide childhood lead poisoning prevention activities."

This would involve educating the public concerning:

◆ Blood-lead level screening for those children not already screened.

◆ Lead in paint (particularly in older homes with peeling paint).

◆ Other sources of lead, such as water, soil, occupation, and hobbies.

This does not mean practitioners must test every child's home for lead in paint, water, and soil. The Environmental Protection Agency's estimates indicate:

U.S. Army Center for Health Promotion and Preventive Medicine (Provisional)
USACHPPM (Prov) Lead Team
Aberdeen Proving Ground, Maryland 21010-5422
DSN 584-2488 or Commercial (410) 671-2488
email: mchbmis@aeha1.apgea.army.mil

◆ Children with blood-lead levels under 20 µg/dl do not have one overwhelming source of exposure.

◆ Blood-lead levels under 20 µg/dl reflect the ongoing exposures to small amounts in soil (variable by location), water (variable by type of plumbing, etc.), and other routes in combination.

However, practitioners must educate parents about the various routes of exposure and how to limit these routes.

Blood-Lead Levels Above 15 µg/dl

The CDC suggests environmental investigation and intervention for children whose blood-lead level is persistently measured in the 15-19 µg/dl range and above. If practitioners find a number of children with blood-lead levels greater than 15 µg/dl through screening, the practitioners must:

◆ Consider whether some common source of exposure exists for the group.

◆ Focus questioning to detect the common source, to include a common place (such as a day-care center, a playground which may have lead in the soil, or a common water source).

◆ Attempt to find the common source through "epidemiologic investigation" for the primary prevention of exposure to others in the community.

The Role of the Practitioner

The practitioner must:

◆ Be familiar with the possible sources of lead exposure in the particular community.

◆ Be able to determine the source's relative significance for a particular child.

◆ Be able to uncover unusual lead sources for the child by proper questioning; such sources may be related to parental occupation, hobbies or time spent outside the child's household.

◆ Be familiar with the treatment or appropriate referral for children with elevated blood-lead levels.

The Team Approach

Preventive medicine activities are often the logical center of the team. Physicians or community health nurses can:

◆ Conduct interviews involving one or several children with elevated blood-lead levels.

◆ Conduct home visits to assess the condition of paint in the home, the location of the home, and other sources of exposure.

The practitioner must then:

◆ Coordinate with industrial hygiene for evaluation.

◆ Inform the post commander, the public affairs office, and other essential personnel.

Final Points to Consider

Military families are mobile; practitioners must consider the blood-lead level exposure from prior homes at previous duty assignments, especially if the child has recently arrived onpost.

The persistence and resources that the practitioner uses to identify and eliminate the source(s) of lead should be proportional to the measured blood-lead level in the child.

For further details, contact the Clinical Preventive Medicine Directorate, DSN 584-2714 or Commercial (410) 671-2714; or the USACHPPM (Prov) Lead Team, DSN 584-2488 or Commercial (410) 671-2488.

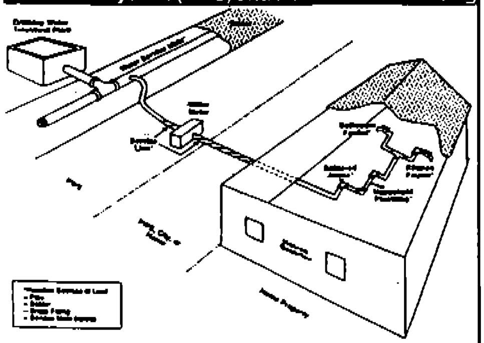
U.S. Army Center for Health Promotion and Preventive Medicine
(Provisional)

Just the Facts

93-005-1294

Managing Lead in Drinking Water

blic Water System (PWS) and Homeowner Plumbing



◆ **Housing Occupants**

◆ **Exposure Potential**

◆ **Testing**

Presently, U.S. Army installations are developing a profile of the quantity of lead in drinking water onpost. Installations will take actions to minimize your lead exposure once sampling and analysis are complete. To further minimize your risk to lead in drinking water, the U.S. Army Center for Health Promotion and Preventive Medicine [USACHPPM (Provisional)] has developed the following recommendations. If you live offpost, these recommendations may be appropriate, or you may wish to contact your local public health department.

Exposure Potential

Lead in drinking water can significantly increase a person's total exposure to lead. The U.S. Environmental Protection Agency (EPA) estimates that drinking water can make up to 20 percent of a person's total exposure to lead. Young children, infants, and fetuses appear to be particularly vulnerable to lead poisoning. A child's mental and physical development can be affected by overexposure to lead. High lead levels may also cause high blood pressure and fertility problems in adults.

When water stands in lead pipes or plumbing systems containing lead for several hours or more, the lead may dissolve into your drinking water. This means the first water drawn from the tap in the morning, or later in the afternoon after returning from work or school, can contain fairly high levels of lead.

Reducing Exposure Potential

In 1991, the EPA passed regulations under the Safe Drinking Water Act requiring public water suppliers to analyze drinking water samples and to determine the amount of lead in drinking water. Testing the water is essential because you cannot see, taste, or smell lead in drinking water.

If this testing indicates that elevated lead levels are present [i.e., if 90 percent of the samples have more than 15 parts per billion (ppb) of lead], water suppliers are required to notify their customers of the problem and take steps toward reducing the high lead levels. These steps may include treating the water to make it less corrosive and replacing lead service lines.

If testing indicates that the drinking water drawn from a water system or specific tap contains lead above 15 ppb, consumers can take the following precautions:

◆ Let the water run from the tap for 30-60 seconds before using it for drinking or cooking if the water in a faucet has gone unused for more than 2 hours.

◆ Draw water from the cold tap and heat it on the stove or in a microwave oven if you need hot water for cooking and drinking.

Lead in Water Fountains

Water fountains and coolers are of special concern because of their prevalence in schools where children are drinking water. The EPA has identified specific water coolers that contain components made of lead (references 1 and 2). Contact your installation preventive medicine office for a list of such water coolers. These coolers should be taken out of service immediately and replaced with lead-free coolers from the manufacturer. The list was originally intended for schools but is applicable to all public areas, such as office buildings and hospitals.

Additional Information

For more information on lead in your drinking water, contact your installation preventive medicine office. Personnel there can assist in determining if lead is a problem in your residence or workplace and can offer additional guidance on reducing exposure potential.

1. *Federal Register, 18 January 1990, Vol 55, No. 12.*

2. *Federal Register, 4 October 1989, Vol 54, No. 67.*

U.S. Army Center for Health Promotion and Preventive Medicine (Provisional)
USACHPPM (Prov) Lead Team
Aberdeen Proving Ground, Maryland 21010-5422
DSN 584-2488 or Commercial (410) 671-2488
email: mchbmis@aeha1.apgea.army.mil

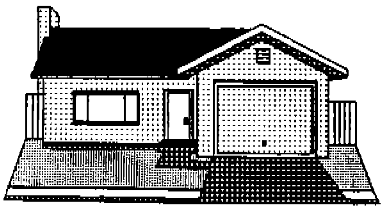
AEHA Form 326, 1 Oct 94 (MCHB-CS)

Just the Facts

93-006-1294

U.S. Army Center for Health Promotion and Preventive Medicine (Provisional)

In-Place Management Controls of Lead-Based Paint



- **Military Housing Occupants/ Installation Lead Teams**
- **Risk Assessment**
- **Temporary Controls**

Importance of a Comprehensive Risk Assessment

A risk assessment determines how much of a health hazard lead-based paint (LBP) may pose based on the condition of the paint, age of occupants, cleanliness of house, etc. In most cases, the property owner (such as the installation housing office) must ensure a risk assessment is completed. This should include sampling for LBP and lead-bearing dust prior to using any in-place management controls (also known as interim controls).

A properly performed risk assessment will aid in determining:

◆ If LBP problems exist.

◆ What in-place management controls would be most appropriate.

◆ If abatement should occur instead of in-place management controls.

In-Place Management vs. Abatement

In-place management controls of LBP intend to make housing units and facilities lead-safe by temporarily controlling lead hazards; abatement controls lead hazards permanently. The Centers for Disease Control defines "permanently" as 20 years.

Consider in-place management controls when:

◆ Inspections and/or risk assessments have identified LBP hazards.

◆ In-place management controls would be more appropriate to control the hazards as opposed to immediate abatement.

◆ Meeting the requirements of the Department of Army's (DA) LBP policies concerning in-place management controls in target facilities is necessary.

◆ An alternative to abatement is necessary until you receive proper funding to abate LBP hazards.

Forms of In-Place Management Controls

◆ Cleaning surfaces with a high phosphate detergent (such as automatic dishwasher detergent) or detergents made specifically for this purpose to reduce levels of lead-bearing dust to acceptable levels.

◆ Stabilizing all LBP surfaces by removing defective paint and repainting.

◆ Repairing all defective and rotted substrates that could result in rapid paint deterioration.

◆ Treating friction and impact surfaces, such as doors, floors, steps, handrails and windows, when there is concern that these objects are responsible for generating LBP chips or lead-bearing dust.

◆ Treating protruding, accessible surfaces where LBP may be present, such as windowsills, that children might chew on.

U.S. Army Center for Health Promotion and Preventive Medicine (Provisional)
USACHPPM (Prov) Lead Team
Aberdeen Proving Ground, Maryland 21010-5422
DSN 584-2488 or Commercial (410) 671-2488
email: mchbmis@aeha1.apgea.army.mil

AEHA Form 326, 1 Oct 94 (MCHB-CS)

◆ Repairing leaking roofs and siding to prevent paint deterioration.

◆ Educating residents and maintenance personnel on how to avoid lead poisoning.

◆ Using good personal hygiene practices, such as handwashing, after performing cleaning operations.

For More Information

* Memorandum, Office of the Assistant Secretary, 28 April 1993, subject: Lead-Based Paint Policy Guidance.

* Memorandum, Assistant Chief of Staff for Installation Management, DAIM-FDF-B, 5 November 1993, subject: Policy Guidance - Lead-Based Paint and Asbestos in Army Properties Affected by Base Realignment and Closure.

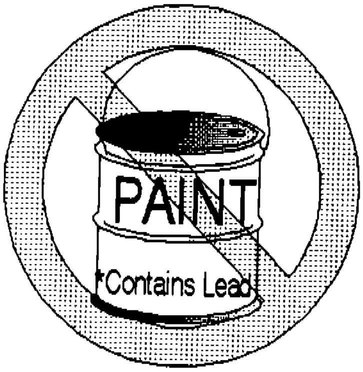
* U.S. Department of Housing and Urban Development, Office of Public and Indian Housing, September 1990 (pages 87, 89, and A14-111 revised May 1991), Lead-Based Paint: Interim Guidelines for Hazard Identification and Abatement in Public and Indian Housing.

U.S. Army Center for Health Promotion and Preventive Medicine (Provisional)

Just the Facts

93-007-1294

Lead-Based Paint Sampling



- **Installation Lead Teams, Inspectors, and Risk Assessors**
- **Methods**
- **Risk Assessment**

Why It Is Important to Sample for Lead-Based Paint

Sampling for lead-based paint (LBP) is an important part of a risk assessment to determine sources of lead exposure.

Sampling for LBP must occur in housing units and target facilities built prior to 1980 according to Department of Army (DA) policies; this also includes housing units and facilities transferred from DA control. DA policies contain specifics on sampling completion date.

Determining the lead concentration in paint enables the worker to use the proper personal protection before beginning any operations involving LBP.

Determining hazardous waste through analytical procedures is expensive. Using limited paint sampling to "screen" for the general presence of lead helps to determine if a hazardous waste exists.

When to Sample for Lead-Based Paint

The following are several situations which may call for analysis of lead concentration in paint:

◆ Investigating potential lead-exposure sources in the case of a lead-poisoned child.

◆ Performing risk assessments identifying potential lead exposures for occupants or maintenance personnel.

◆ Meeting property transferral requirements established in DA policies for buildings containing LBP.

◆ Establishing required worker protection for maintenance, renovation, abatement and demolition activities, according to Federal regulations, such as Title 29, Code of Federal Regulations, Part 1926.62.

◆ Determining if a particular waste product is hazardous.

How to Sample for Lead-Based Paint

DA policy, as well as Draft Department of Housing and Urban Development (HUD) Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing, contains specifics on sampling and sampling strategy.

A comprehensive survey provides the best health risk assessment; this includes sampling of all "unlike" painted surfaces on the interior and exterior of a building. A single paint-chip sample does not give an accurate picture of the extent or location of LBP.

Perform sampling for LBP using three methods:

◆ Paint Chip Laboratory Analysis Test

◆ Portable X-ray Fluorescence (XRF) Technology Test

◆ "Chemical Spot-Check" Test

U.S. Army Center for Health Promotion and Preventive Medicine (Provisional)
USACHPPM (Prov) Lead Team
Aberdeen Proving Ground, Maryland 21010-5422
DSN 584-2488 or Commercial (410) 671-2488
email: mchbmis@aeha1.apgea.army.mil

AEHA Form 326, 1 Oct 94 (MCHB-CS)

The advantages and disadvantages of the three methods are as follows:

METHOD	ADVANTAGES	DISADVANTAGES
Paint Chip Laboratory Analysis Test	Analyzed in a lab Accurate results Results reflect lower as well as upper layers of paint	Lengthy processing time High lab costs Many layers of paint may "dilute" results Destructive to painted surfaces
Portable XRF Technology Test	Performed onsite Less destructive to painted surfaces Direct-reading	Equipment is expensive Requires trained operators May not read accurately on some surfaces, such as brick and metal Requires operators to enroll in a dosimetry program
Chemical Spot-Check Test (sodium sulfide/rhodizonate)	Performed onsite Potential use as a screening tool on white paint with high lead content	Other metals in paint can cause false positives Difficult to use on colored paint due to reliance on color change May fail to detect small amounts of lead or lead in bottom layer of paint Some surface destruction necessary Qualitative indicator

How To Interpret Sampling Results

The action level or "hazard level" for lead in paint is 1.0 milligram per square centimeter (mg/cm^2) when using XRF and 0.5 percent lead by weight when analyzing paint chips in a lab. Some states may have more stringent requirements. This is important when transferring Army property.

These results do not present an accurate picture of the true hazard to occupants or employees. A risk assessment is important because it considers the use and condition of the structure and the possible sources of lead (water, soil, etc.). A risk assessment, along with the results of LBP sampling, most accurately presents the health risks posed by LBP and lead in general. Consult the appropriate guidance before initiating a sampling program.

For More Information

◆ Memorandum, Office of the Assistant Secretary, 28 April 1993, subject: Lead-Based Paint Policy Guidance.

◆ Memorandum, Assistant Chief of Staff for Installation Management, DAIM-FDF-B, 5 November 1993, subject: Policy Guidance - Lead-Based Paint and Asbestos in Army Properties Affected by Base Realignment and Closure.

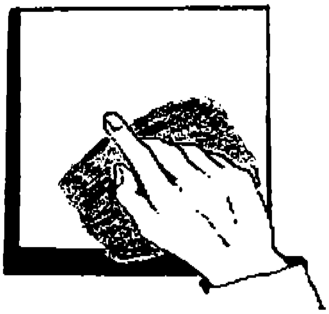
◆ U.S. Department of Housing and Urban Development, Office of Public and Indian Housing, September 1990 (pages 87, 89 and A14-111 revised May 1991), Lead-Based Paint: Interim Guidelines for Hazard Identification and Abatement in Public and Indian Housing.

U.S. Army Center for Health Promotion and Preventive Medicine (Provisional)

Just the Facts

93-006-1294

Lead Dust Sampling in Residential Facilities



- **Installation Lead Teams, Inspectors, and Risk Assessors**
- **Methods**
- **Risk Assessment**

Why It Is Important to Sample Dust for Lead

Lead-bearing dust is a major source of lead exposure to children. The lead in dust may come from sources such as lead-based paint (LBP) or lead-contaminated soil. Army policies (references 1 and 2) incorporate lead-bearing dust sampling as an important part of a risk assessment process.

When to Sample for Lead Dust

The following are two situations which may require analysis of lead concentration in dust:

◆ Investigating potential lead-exposure sources in the case of a lead-poisoned child. When a healthcare practitioner identifies a lead-poisoned child and the child resides in military housing or spends a large amount of time in an Army-operated child-development center or family child-care home, an investigation is necessary to identify the source of exposure.

◆ Performing risk assessments of housing units/areas or facilities to identify potential lead exposures to occupants or maintenance personnel. Occupants and maintenance personnel who live or work around lead-bearing dust may also be exposed to lead. The Department of Army (DA) policies state that sampling for LBP and lead-bearing dust must occur in housing units and target facilities built prior to 1980, including units and facilities transferred from DA control (references 1 and 2).

How to Sample for Lead-Bearing Dust

Interior-wipe sampling is a method for collecting settled dust from hard, smooth surfaces, such as cement floors, tile, vinyl, windowsills, and window wells. Do not take samples from carpet or furniture. Follow these procedures when performing lead-dust sampling:

◆ Collect floor samples from an area of 1 square foot using a template.

◆ Measure and record the length and width of the sample area when sampling windowsills and window wells.

◆ Identify and document all areas sampled (location, surface type, area measurements, surface material, etc.) when performing wipe sampling.

◆ Wear clean, disposable gloves.

◆ Use commercially available, non-alcohol, non-aloe wet wipes (such as baby wipes).

◆ Wipe over the entire measured area using moderate pressure.

◆ Refold the wet wipe exposing a clean side; repeat the process at a 90 degree angle to the original pattern.

◆ Fold the wipe again with exposed side facing inward.

◆ Place in a clean collection tube and label appropriately.

U.S. Army Center for Health Promotion and Preventive Medicine (Provisional)
USACHPPM (Prov) Lead Team
Aberdeen Proving Ground, Maryland 21010-5422
DSN 584-2488 or Commercial (410) 671-2488
email: mchbmis@aeha1.apgea.army.mil

◆ Be sure to change gloves, and clean equipment after taking each sample.

◆ Collect dust samples from carpeted areas using a vacuum-collection method. Contact the U.S. Army Center for Health Promotion and Preventive Medicine (Provisional) [USACHPPM (Prov)] for details.

NOTE: Also see the USACHPPM (Prov) fact sheet entitled Points of Contact for Lead Issues.

How to Interpret Sampling Results

The current action levels for dust-wipe samples are as follows:

Floors............greater than 200 micrograms lead per ft^2
Windowsills.......greater than 500 micrograms lead per ft^2
Window wells (and exterior sills)...greater than 800 micrograms lead per ft^2

Initiate actions such as in-place management (interim controls) or abatement if results exceed the above levels to reduce the lead-dust levels. [See USACHPPM (Prov) Fact Sheet entitled In-Place Management Controls of Lead-Based Paint.]

These results, by themselves, do not present an accurate picture of the true hazard to occupants or employees. A risk assessment is important because it considers the use and condition of the structure and the possible sources of lead (water, soil, etc.). Therefore, a risk assessment, along with the results of LBP sampling, provides the most accurate representation of the health risks posed by lead-bearing dust and lead in general. Please consult the appropriate guidance or USACHPPM (Prov) before initiating a sampling program.

NOTE: The methods and action levels described above are generally not appropriate for adult occupational settings. In these situations, please contact the USACHPPM (Prov) for specific guidance.

References:

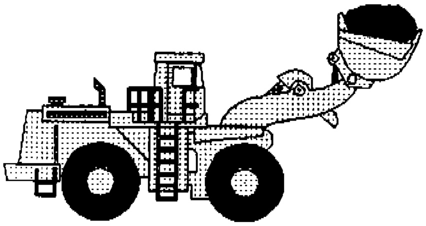
1. Memorandum, Office of the Assistant Secretary, 28 April 1993, subject: Lead-Based Paint Policy Guidance.

2. Memorandum, Assistant Chief of Staff for Installation Management, DAIM-FDF-B, 5 November 1993, subject: Policy Guidance - Lead-Based Paint and Asbestos in Army Properties Affected by Base Realignment and Closure.

3. U.S. Department of Housing and Urban Development, Office of Public and Indian Housing, September 1990 (pages 87, 89, and A14-111 revised May 1991), Lead-Based Paint: Interim Guidelines for Hazard Identification and Abatement in Public and Indian Housing.

U.S. Army Center for Health Promotion and Preventive Medicine (Provisional)

Lead Contamination and Soil Sampling



- DPW/PVNTMED Svc
- TCLP
- Laboratory Analysis

When Should You Consider Soil Sampling?

There are many situations which may call for an analytical assessment of lead concentrations in soil/sand. Some examples include:

1. Investigation of potential lead exposure sources in the case of a lead-poisoned child.

2. Scoping/risk assessment study for a housing area/community to identify potential sources of lead to the inhabiting child.

3. Characterization of a specific potential source to children (such as a playground, sandbox, or bare soil around a structure with chipping/ peeling lead paint).

4. Assessment of "cleanliness" after demolition of lead-painted structures or after abatement projects.

5. "Future Use" clearance to ensure suitability for specific construction/ future use at site.

6. Follow-up study of area previously identified as having high lead concentrations.

7. "Waste Characterization" of removed soil to determine whether soil must be treated as a hazardous waste.

Why Would Soil Sampling Be Necessary in These Situations?

For the first five situations (1-5) previously listed, soil sampling may be necessary to simply quantify the general concentration of lead in soil of a particular area or source in order to evaluate the hazards related to the specific exposure scenario. Though it will depend on the size of the area sampled, these situations typically call for limited sampling.

The sixth situation (6) previously listed would necessitate soil sampling to determine the actual extent of lead contamination once high concentrations were identified. More extensive sampling may be necessary to qualify the degree of contamination to include identifying horizontal and possibly vertical (depth) migration. Follow-up studies may also be used to evaluate the success of cleanup actions.

Finally, the last situation (7) previously listed involves a different type of laboratory analytical procedure. The analysis of a (soil) waste may be necessary to ensure that lead will not leach out of the soil when it is placed in an unlined landfill or placed back on the ground. The laboratory test, known as the Toxicity Characteristic Leaching Procedure (TCLP), does not provide the "total" lead concentration in the soil; rather, it provides a concentration of lead found in a leached "extract." This test is used specifically for evaluating already removed soil and should not be used in the situations (1-6) requiring a "total" evaluation of lead concentrations in soil.

U.S. Army Center for Health Promotion and Preventive Medicine (Provisional)
USACHPPM (Prov) Lead Team
Aberdeen Proving Ground, Maryland 21010-5422
DSN 584-2488 or Commercial (410) 671-2488
email: mchbmis@aeha1.apgea.army.mil

How Do You Design Your Sampling Strategy?

This fact sheet describes the method of collecting samples for laboratory analysis. Though a current approach using x-ray fluorescence (XRF) devices to evaluate soil-lead concentrations is becoming more and more popular, this Center considers sampling and laboratory analysis the most accurate method that, when done appropriately, is not excessively expensive. If used, XRFs should be used strictly as a screening tool and must be followed by confirmatory laboratory analyses.

Several sampling methodologies may be acceptable. You can use U.S. Department of Housing and Urban Development (HUD) guidance for certain situations. The following is suggested guidance only. We suggest you obtain further guidance/assistance to verify the appropriateness of a sampling strategy for your needs. Consult your installation environmental officer or the Waste Disposal Engineering Division at USACHPPM (Provisional).

Soil sampling for the first five situations previously listed would typically involve limited "point" sampling. The number of samples depends on the situation; however, one may consider a minimum of three samples for the smallest of areas (to allow for evaluation of variance) while larger areas may require ten or perhaps even more. These situations typically call for only an initial, general quantification of lead. Select sampling points either at random, based on bias, or both. "Biased" sample locations are selected at sites where high lead is suspected or known (such as an area adjacent to a house with visible paint chips). Obtain all the samples from the actual area of interest where there is a defined exposure potential and the soil is bare. For example, sampling next to a major highway is probably inappropriate because children are not expected to be playing there. Removing sod/vegetation to sample underlying soil is also inappropriate because of the lack of exposure potential to the bare soil.

A follow-up assessment (situation 6) most likely requires more intensive sampling - generally, a minimum of ten samples should be obtained for each area identified as a potential "hotspot." More samples may be necessary if the area is assumed to be large or if depth sampling is required. Sampling locations should radiate outward from previously identified areas (horizontally and vertically, if necessary). We suggest that you obtain further guidance before proceeding with a follow-up assessment. Waste characterization (situation 7) can be done by means of "generator knowledge" or through sampling and analysis (the TCLP). If sampling is performed, obtain and analyze two or three samples of soil that "represents" the waste.

What Do the Results Mean?

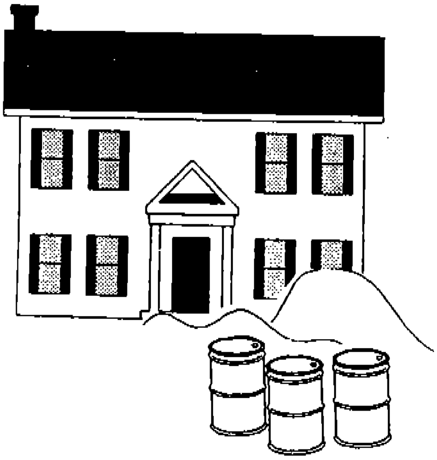
The EPA has identified soil lead levels ranging from 500-1000 parts per million (ppm) as being safe for residential scenarios. This Center currently suggests that for residential situations, a lead level at or below 500 ppm should be acceptable. This, however, does not mean that a single sample point exceeding 500 ppm is a problem. The overall results for an area should be statistically evaluated [e.g., the upper 80 percent confidence interval (Cl) then compared to 500 ppm]. Specific points which exceed 500 ppm may or may not pose a problem, depending on the overall exposure potential. Whether action is required (such as soil removal or covering with clean soil or sod) will depend on the specifics of the situation. Additional assistance is advised in these cases. Keep in mind that remedial actions, such as removal, are usually costly and may not provide obvious benefits. In extreme cases where action is necessary, procedures, such as covering with clean soil or sod, are suggested.

When exposure to children is limited or unlikely, levels between 500 ppm and 1000 ppm are acceptable. Consistent concentrations above 1000, however, may indicate a threat to the environment as well as public health. In cases such as these, we advise that you obtain further guidance.

Finally, waste (removed) soil that has a lead-TCLP concentration exceeding 5 milligrams per liter (mg/L) is regulated as a hazardous waste. This involves specific handling, storage, and disposal requirements as described in Title 40, Code of Federal Regulations (CFR), Part 262, Standards Applicable to Generators of Hazardous Waste. Again, if isolated results exceed this threshold, they should be statistically assessed to identify the upper 80 percent Cl.

U.S. Army Center for Health Promotion and Preventive Medicine (Provisional)

Waste Characterization of Lead Paint-Containing Wastes



- DPW/PVNTMED Svc
- Hazardous Waste
- Nonhazardous Waste

Federal regulations mandate that waste generators determine whether their wastestreams should be classified as "hazardous wastes." Wastes that are deemed hazardous must be carefully stored, treated and disposed of according to the Resource Conservation and Recovery Act (RCRA). One of the characteristics that defines a hazardous waste is the amount of certain toxic constituents (such as metals like lead) that may leach out of the waste. The RCRA defines the analytical method to evaluate the waste; it also stipulates the allowable limits for a constituent (like lead) to leach.

The table on the back of this page describes various types of debris that are commonly "contaminated" with lead-containing paint. The discussion assumes that lead-containing paint has been previously identified [either through direct laboratory analyses, x-ray fluorescence (XRF) testing, spot-tests, or historic knowledge]. If NO information is available regarding the existence of lead in the painted surfaces, screening with one of these methods (i.e., direct lab analyses, XRF, etc.) is recommended to provide information for worker protection. The screening method can possibly reduce the need for expensive waste characterization analysis (known as the Toxicity Characteristic Leaching Procedure or TCLP).

After each type of waste, the table provides a suggested waste characterization code: HW = hazardous waste [according to RCRA, Title 40, Code of Federal Regulations (CFR), Part 261.24, Toxicity Characteristic]; SW = nonhazardous waste. Use these suggested waste characterizations as a tool to assess your operation's wastestream and determine when analyses are warranted; also use these waste characterizations to determine when enough information is available to characterize your waste based on "generator knowledge." There are exceptions to the waste characterizations listed based on general industry-based findings.

Keep in mind that when waste is deemed to be SW (i.e., nonhazardous), some limited sampling may be warranted for "liability's sake." Classifying waste as HW without sampling and analyses, on the other hand, may be overly conservative and costly. While HW disposal is more expensive than regular SW disposal, the costs of sampling and analytical analyses (such as the TCLP for lead) do add up. A cost analysis helps in determining the most practical approach for your individual needs. While SW costs are less than HW costs, disposal must still be consistent with state and local waste regulations.

Finally, keep in mind that these suggested guidelines are all based on Federal regulations. Individual states and localities may have more stringent requirements and, therefore, should be consulted when you are determining waste disposal practices.

Reference: USAEHA Interim Final Report, Lead-Based Paint Contaminated Debris, Waste Characterization Study No. 37-26-JK44-92, May 1992-May 1993.

U.S. Army Center for Health Promotion and Preventive Medicine (Provisional)
USACHPPM (Prov) Lead Team
Aberdeen Proving Ground, Maryland 21010-5422
DSN 584-2488 or Commercial (410) 671-2488
email: mchbmis@aeha1.apgea.army.mil

(1) **Whole-Building Demolition Debris** (SW). Consists of all building components (painted and non-painted) to include wood, brick, cement (foundations), plaster, drywall, etc., that are torn down during demolition and collected for disposal. Waste characterization is based on analyzed samples that are "representative" of the waste. Therefore, you can obtain proportionate quantities of the various structural components (e.g., by coring or drilling through the materials) and combine them for analyses according to the TCLP requirements.

(2) **Partial Demolition (Building Renovation) Debris** (SW/HW/Both). May consist of a variety of components (painted and non-painted), such as those in whole-building demolition debris, but does not include the entire building/structure. You may use the same sampling procedures as discussed above. A second option involves careful predetermination and characterization of the individual components to allow for special waste handling and segregation procedures during the operations. Careful segregation is more feasible for renovations/partial demolitions than for whole-building demolition and may reduce the volume of HW. Where segregation is not practical for a particular operation, use the overall "representative" sample approach. A cost analysis is beneficial in determining waste management practices.

(3) **Unique Components** (HW). Includes discrete components that have been removed for abatement or maintenance purposes. These components may include baseboards, window frames, doors, etc. Where the components come from similar structures, some minimal sampling may be beneficial, particularly where the concentrations of lead in the paint are not deemed to be extremely high. Sampling should include the substrate (e.g., wood) and, therefore, be consistent with the "representative" approach. Usually, the proportion of paint to overall mass of the waste is sufficient to result in a relatively "high" TCLP concentration, thereby resulting in an HW.

(4) **Contaminated Media/Items**. Encompasses everything from the paint chips/scrapings to solvents, personal protective clothing and other items that are "contaminated" with dust or paint chips/residues. We have listed some of these items below with associated discussion and waste characterizations.

◆ **Paint Chips/Scrapings** (HW). Contain and collect. Handle, package, and dispose of as an HW.

◆ **Blast Grit** (HW/SW). Since there are different types of grit, the degree of contamination will vary; we recommend limited sampling.

◆ **Solvents** (HW). These may be hazardous for constituents other than lead, specifically for RCRA-"listed" compounds. Refer to the material safety data sheets or other product data for more information. "Listed" compounds are HWs regardless of lead concentrations. For otherwise nonhazardous solvents, ascertain the concentration of lead after use for ultimate waste characterization. Some solvents can be distilled/recycled. While the "cleaned" solvent is not an HW, any sludge or filters used for recycling purposes are probably HWs (see below).

◆ **Caustic Pastes** (HW/SW). Due to different compounds and different paints, we suggest minimal sampling and analyses.

◆ **Water** (HW/SW). Water may be used during blasting, decontamination, cleaning, rinsing, etc. Due to the different uses, we recommend minimal sampling. Whenever possible, we recommend recycling of water; filters used in recycling may be HW (see below).

◆ **Filters, Sludges, etc.** (HW). From air filters, water filters/recycling, or solvent reclamation operations, these items are usually very "concentrated" wastes that are high in lead and, therefore, an HW.

◆ **Plastics, Tarps, Personal Protective Equipment** (HW). To the degree possible, reuse these items. At the end of an operation or when disposal of these items is otherwise necessary, best management practices include proper containment (i.e., drumming), handling and disposal. In general, it may be cost efficient to classify these wastes as an HW without sampling. Decontamination of these items may minimize the volume of HW.

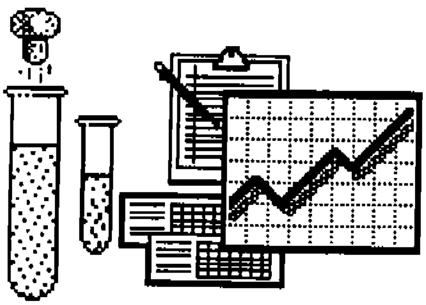
◆ **Soil** (HW/SW). Soil that is "contaminated" with lead may require removal from a site and proper disposal. Removal is based on a health risk assessment and/or Environmental Protection Agency Office of Solid Waste and Emergency Response lead cleanup levels of 500-1000 parts per million. Soil removal may not be necessary if a health risk is not evident. In-place management is recommended and soil removal conducted on a case-by-case basis. Similar to other materials previously discussed, the waste characterization of this removed soil will depend on a TCLP analysis for lead. We recommend limited sampling to characterize the waste soil.

Just the Facts

93-011-1294

U.S. Army Center for Health Promotion and Preventive Medicine (Provisional)

Laboratory Sampling Guidance



- DPW/PVNTMED Svc
- Lead Analysis
- Approved Methodologies

The laboratories at the U.S. Army Center for Health Promotion and Preventive Medicine (Provisional) [USACHPPM (Prov)] have the full capability to perform lead analysis on water, dust, soil, paint chips, cellulose ester (CE) and high volume filters, and wipe samples. The USACHPPM (Prov) employs approved methodologies using the latest atomic absorption, inductively coupled plasma, and/or inductively coupled plasma-mass spectrometry instrumentation. All scheduled work should be coordinated between the project officer and the laboratory point of contact prior to sampling to establish priority, turnaround times, detection limits, the number of samples, and funding source.

The current sampling guidance is:

MATRIX	ANALYTICAL RANGE*	SAMPLE REQ**
Water	1-1000 µg/L	1-liter plastic bottle, HNO_3 to pH < 2
Soil	0.2-10,000 mg/kg	Minimum of 20 grams, air-dried, sieved through 20/30-mesh sieve, 4-oz. glass bottle
Paint Chips	1-20,000 mg/kg	Minimum of 500 mg in small plastic or glass vial
CE Filters	0.001-5 mg/filter	Minimum of 200 liters on 0.8 µm closed-faced filter cassette
High Volume Filters	0.001-100 mg/filter	Encase the whole filter with plastic sheets within an envelope
Dust Wipes	0.001-10 mg/wipe	Keep moist in small, tightly closed vial

* No interpretation of results is reported.
** Sample number must consider blanks and duplicate samples.

Key:
µg/L - micrograms per liter
HNO_3 -nitric acid
mg/kg - milligrams/kilograms
µm - micrometer

Arrange sample coordination/analysis by contacting Lynn Boyd or David Rosak, DSN 584-2637/2810 or commercial (410) 671-2637/2810. Contact the laboratory at USACHPPM (Prov) for additional guidance.

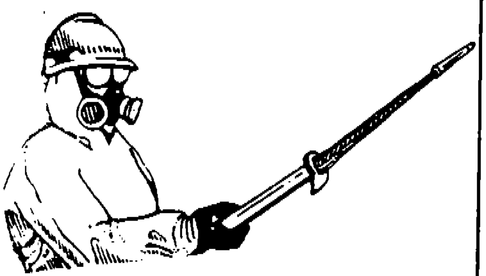
U.S. Army Center for Health Promotion and Preventive Medicine (Provisional)
USACHPPM (Prov) Lead Team
Aberdeen Proving Ground, Maryland 21010-5422
DSN 584-2488 or Commercial (410) 671-2488
email: mchbmis@aeha1.apgea.army.mil

U.S. Army Center for Health Promotion and Preventive Medicine (Provisional)

Just the Facts

93-012-1294

Paint Removal Technologies and Pollution Prevention



- Department of Public Works
- Waste-Reducing Methods
- In-Place Removal

Paint removal by traditional methods, such as sandblasting and solvent stripping, will often result in generating hazardous waste, particularly lead-based paint (LBP). The following are a few waste-reducing alternatives to the traditional paint-removal operations:

1. Binding Agents: Binding agents are nonhazardous additives that blend with abrasive media prior to the blasting process. When used in the specified quantity, a binding agent can limit the solubility of numerous toxic metals in the spent-blast media through physical and/or chemical bonding. This method renders the blast waste nonhazardous and suitable for disposal in a sanitary landfill. Do not consider the binding agent a form of treatment. The Resource Conservation and Recovery Act (RCRA) does not apply because the agent combines with the blast media before producing any waste. Studies on these materials are ongoing to evaluate whether the binding will persist after disposal.

2. Carbon Dioxide (CO_2) Pellets: This technique uses CO_2 pellets propelled by compressed air. The LBP is removed by the shock of impact as well as by the thermal effect of the dry ice pellets. The CO_2 pellets lower the temperature of the coating so that it separates from the substrate and becomes brittle, breaks up and dislodges from the substrate, and subliminates after striking the surface leaving behind only the coating residue. This reduces hazardous waste (as well as total waste) generation since there is no spent-blast media requiring disposal.

3. Plastic Media Blasting (PMB): PMB is an abrasive coating removal method that uses small, irregularly shaped plastic pellets. You can use plastic pellets several times before they wear down and become ineffective. Perform PMB in specialized booths equipped with cyclone-separation systems that segregate the reusable plastic pellets from the rest of the blasting dust. Direct the blasting dust (a mixture of coating particles and unusable plastic particles) to disposal containers.

4. Sodium Bicarbonate: This technology uses a sodium bicarbonate-blast media to remove coatings. Because this media is completely soluble, it provides a mechanism for separating the spent media from the rest of the blast residue.

The sodium bicarbonate often acts as a binding agent when the media combines with the blast residue. This allows the blasting waste to pass the Toxicity Characteristic Leaching Procedure (TCLP) and be disposed of as a nonhazardous, industrial solid waste. However, there have not been any long-term studies to determine if the binding will persist after disposal.

5. Wheat Starch: This is an abrasive process that uses a crystalline-like wheat starch blast media as a means of coating removal. You can

U.S. Army Center for Health Promotion and Preventive Medicine (Provisional)
USACHPPM (Prov) Lead Team
Aberdeen Proving Ground, Maryland 21010-5422
DSN 584-2488 or Commercial (410) 671-2488
email: mchbmis@aeha1.apgea.army.mil

use this material with the same equipment required for PMB with little or no modifications by recovering plastic media and wheat starch particles with a cyclone separator. The small, unusable wheat starch particles separate from the blast residue.

A process has been developed to liquify the starch by adding an enzyme. The waste is sent to a bioreactor where bacteria digests the solubilized wheat starch. The effluent from this process is a sludge that contains any metals present in the coating residue. Although the sludge typically requires disposal as a hazardous waste, it is a smaller volume of sludge than the original blast residue since it does not contain the spent wheat-starch media.

6. Xenon® Flash Lamp: This technology uses a quartz tube containing Xenon gas to remove paint through light energy. When the gas is electrically energized, an intense flash of light discharges. The surface absorbs the light, and the temperature rises so that a thin layer of paint releases. This achieves complete removal. Some systems use CO_2 pellets in concert with Xenon flash lamps to remove the paint residue more quickly. This technology is more expensive than the other alternatives since you need robotic equipment to control the flash lamp apparatus. In addition, Xenon flash lamp-coating removal is best suited for large, smooth surfaces that will not obstruct the movements of the robotic equipment. As a result, this technology is typically used for aircraft paint removal. Large trailers and communications shelters are well suited for this technology.

Consider these technologies as a means of minimizing pollution during in-place removal. Initiatives for preventing long-term pollution include maximizing in-place management techniques (and, therefore, minimizing lifetime-waste generation) and, more importantly, eliminating the continued use of lead-containing paints. The U.S. Army Center for Public Works has determined that LBPs are no longer necessary for even the painting of exterior surfaces and steel structures. Managers for all construction, renovation, and maintenance operations should ensure that all paints used meet the current definition of non-lead paint (i.e., contain less than .06 percent lead metal by weight in total nonvolatile content of a liquid paint).

®Xenon is a registered trademark of Schneider Corporation of America, Woodbury, New York. Use of trademarked names does not imply endorsement by the U.S. Army but is intended only to assist in identification of a specific product.

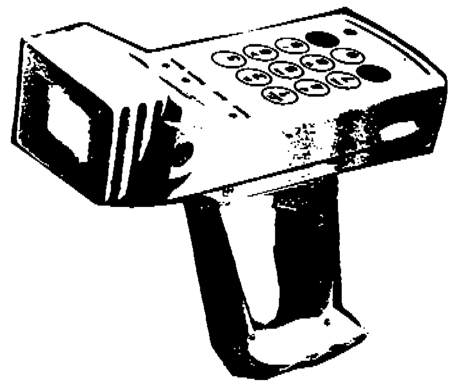
U.S. Army Center for Health Promotion and Preventive Medicine (Provisional)

Just the Facts

93-013-1294

X-Ray Fluorescence (XRF) Analyzers for Lead-In-Paint Detection

This fact sheet presents guidance to consider before purchasing lead-in-paint analyzers that use x-ray fluorescence (XRF).



- Industrial Hygienists, Radiation Protection Officers, DPW
- Lead-In-Paint Analyzers
- Radioactive Source

Method of Detection. Currently, there are about a half dozen portable lead-in-paint analyzers on the commercial market that use XRF as the detection method for determining the presence of lead in paint. They also share another common feature—a radioactive source. The most common radioisotope used in XRF analyzers is cobalt-57 with cadmium-109 used by at least two manufacturers. Both of these radioisotopes emit gamma radiation. The U.S. Army Center for Health Promotion and Preventive Medicine (Provisional) [USACHPPM (Prov)] currently uses an XRF spectrum analyzer equipped with a cobalt-57 sealed source.

Licensing Requirements. Prior to the purchase/acquisition of equipment containing radioactive material, obtain and file a valid Department of the Army Radiation Authorization (DARA). In addition, radioactive materials may be subject to specific licensing requirements and regulations of the U.S. Nuclear Regulatory Commission (USNRC) or the licensing requirements and regulations of a state with which the USNRC has entered into an agreement for exercising regulatory authority. Be sure to check with your local radiation protection officer (RPO) for further clarification.

Employee Health Monitoring. Employees will enter a medical surveillance program that will include a baseline blood count and medical history for potential radiation exposures. This exam will be repeated at least every 3 years and on termination of employment. Additionally, females will be given instructions concerning prenatal radiation exposure (USNRC Regulatory Guide 8.13).

Considering the potential health hazards to personnel using, maintaining, or storing these XRF devices, enrollment into a radiation dosimetry program is often recommended by manufacturers and required by RPOs. If an analyzer is used improperly, or if a damaged source begins to leak radioactive material, overexposure to gamma radiation could occur.

A properly administered dosimetry program, as part of the overall medical surveillance program, will provide an important chronological history of any individual radiation exposures. All USACHPPM (Prov) employees who use, maintain, or store these instruments are enrolled in a radiation dosimetry program and will receive annual radiation safety training.

U.S. Army Center for Health Promotion and Preventive Medicine (Provisional)
USACHPPM (Prov) Lead Team
Aberdeen Proving Ground, Maryland 21010-5422
DSN 584-2488 or Commercial (410) 671-2488
email: mchbmis@aeha1.apgea.army.mil

AEHA Form 326, 1 Oct 94 (MCHB-CS)

Direct-Reading or Spectrum XRF Analyzers. Today's spectrum XRF analyzers have distinct performance advantages over direct-reading XRF analyzers. Depending on the manufacturer, these advantages include automatic substrate correction, indifference to substrate, adaptability for soils or dust analyses, greater sensitivity, better accuracy, speed in measurements, etc. Direct-reading XRF analyzers, however, cost a few thousand dollars less than their spectrum XRF counterparts. Both types of analyzers require expensive source replacement, which can cost as much as $4,000. Sources are recommended for replacement usually within 8 to 15 months after installation depending on the radioisotope and activity of the source. These sources will naturally decay regardless of instrument usage rate.

Common Problems/Hassles/Concerns.

- You probably will be required to use a military vehicle when transporting an XRF unit anywhere on an Army installation.

- Several industry experts dispute the accuracy of XRF instruments and state that better testing alternatives are available. Others claim that many XRF problems are due to specific unit reliability, adjustment to substrate levels, electronic drift, precision, and lack of operator experience.

- Something else to consider before purchasing an XRF is the required leak testing of the instrument's source for possible radioactive leakage and overall source integrity. These tests are required at least semiannually. A leak test is also required before and after transporting the analyzer. Leak test results are not normally available for several days because wipe samples are often sent to an outside laboratory for analyses.

- Each instrument has a range of results that are neither negative or positive. These results are considered inconclusive, and laboratory paint chip samples of the area are required to confirm the results.

Other Paint Testing Methods. Some experts believe that other detection methods, such as anodic stripping voltametry and rhodizonate chemical scratch testing, are simpler and possibly more precise alternatives. (Note: Chemical scratch testing will produce only qualitative results.) Recently, the Environmental Protection Agency hired two companies to perform an evaluation of lead paint testing methods to include current XRF technology, rhodizonate chemical scratch testing, and anodic stripping voltametry methods. Results of this evaluation have not been released.

Renting XRF Analyzers. If your lead testing work load can be accomplished in a couple of months, it probably will be more cost-effective to rent rather than purchase. Short-term renting does away with storing the instrument year-round, semiannual leak tests, employee radiation dosimetry (full-time program), and paying for source replacement and analyzer maintenance. Several major manufacturers of lead paint analyzers offer rental agreements for their equipment. Always coordinate the rental of equipment containing a radioactive source with your local RPO.

Additional Information/Guidance. Please call the USACHPPM (Prov), Industrial Hygiene Field Services Program, Industrial Hygiene Equipment Laboratory, DSN 584-2106 or Commercial (410) 671-2106.

Local Reproduction is
Authorized and Encouraged

December 1994

USACHPPM (PROV) TG No. 203