LEAD FREE NV

NvCLPPP

Nevada Childhood Lead Poisoning Prevention Program

Protocol for Conducting a Lead-Based Paint Inspection and Risk Assessment for Children with a Blood Lead Level Above the CDC's Reference Value

Updated April 2025

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List of Codes

Code	Definition
66	Indicates any inaccessible areas on the Visual Assessment
99	Indicates any non-existent areas on the Visual Assessment
BB	Indicates 'baseboard' component on the XRF Testing Form
Bl	Indicates the color 'black' on the XRF Testing Form
Blu	Indicates the color 'blue' on the XRF Testing Form
Bri	Indicates 'brick' substrate on the XRF Testing Form
Brw	Indicates the color 'brown' on the XRF Testing Form
C	Indicates 'concrete' substrate on the XRF Testing Form
CB	Indicates 'cabinet' component on the XRF Testing Form
CL	Indicates 'closet' component on the XRF Testing Form
Cr	Indicates the color 'cream' on the XRF Testing Form
D	Indicates 'door' component on the XRF Testing Form
DF	Indicates 'doorframe' component on the XRF Testing Form
DJ	Indicates 'doorjamb' component on the XRF Testing Form
DS	Indicates 'doorstop' component on the XRF Testing Form
DW	Indicates 'drywall' substrate on the XRF Testing Form
F	Indicates paint deterioration due to 'friction' on the XRF Testing Form
Gr	Indicates the color 'gray' on the XRF Testing Form
H	Indicates paint deterioration due to 'heat' on the XRF Testing Form
I	Indicates paint deterioration due to 'impact' on the XRF Testing Form
M	Indicates 'metal' substrate on the XRF Testing Form
Mi	Indicates paint deterioration due to 'mildew' on the XRF Testing Form
Mo	Indicates paint deterioration due to 'moisture' on the XRF Testing Form
Or	Indicates the color 'orange' on the XRF Testing Form
P	Indicates 'plaster' on the XRF Testing Form
R	Indicates the color 'red' on the XRF Testing Form
S	Indicates 'stucco' on the XRF Testing Form

SD	Indicates paint deterioration due to ‘substrate damage’ on the XRF Testing Form
T	Indicates ‘tile’ on the XRF Testing Form
W	Indicates ‘wood’ on the XRF Testing Form
We	Indicated paint deterioration due to ‘weather’ on the XRF Testing Form
WF	Indicates ‘windowframe’ component on the XRF Testing Form
Wh	Indicates the color ‘white’ on the XRF Testing Form
WS	Indicates ‘windowsill’ component on the XRF Testing Form
Y	Indicates the color ‘yellow’ on the XRF Testing Form

List of Acronyms

Acronym	Definition
BLL	Blood Lead Level
BLRV	Blood Lead Reference Value
CDC	Centers for Disease Control and Prevention
CLPPP	Childhood Lead Poisoning Prevention Program
CPSC	United States Consumer Product Safety Commission
EPA	United States Environmental Protection Agency
HUD	United States Department of Housing and Urban Development
LBP	Lead-Based Paint
LBPI	Lead-Based Paint Inspector
LI	Lead-Based Paint Inspection
LIRA	Lead Inspection and Risk Assessment
NLLAP	National Lead Laboratory Accreditation Program
PCS	Performance Characteristic Sheet
RA	Risk Assessor
ST	Sampling Technician
XRF	X-ray Fluorescence

Glossary

Term	Definition
Abatement	A measure or set of measures designed to permanently eliminate lead-based paint hazards or lead-based paint (e.g. removal of lead-based paint, removal of lead-contamindaed dust or soil, enclosure, encapsulation, replacement of building components coated with lead-based paint, etc.).
Bare soil	Soil or sand not covered by grass, sod, other live ground covers, wood chips, gravel, artificial turf, or similar covering.
Blood lead reference value (BLRV)	Defined by the CDC, the BLRV is a screening tool that helps identify children who have higher levels of lead in their blood compared with most children in the U.S. The BLRV is based on the 97.5th percentile of the blood lead distribution in U.S. children ages 1–5 years. The BLRV is updated periodically to reflect changes in the population. As of 2021, the BLRV is 3.5 µg/dL.
Building component types	Building component types are constituent parts of a building (e.g. doors, windows, walls) that have a common substrate and are repeated in more than one room in a unit. Building component types can be located inside or outside the dwelling. For example, typical building component types in a bedroom include the ceiling, walls, door and its casing, the window sash, window casings, and any other distinct surface, such as baseboards, crown molding, and chair rails.
Chewable surfaces	Exterior or interior surfaces that are within reach of a child to mouth or chew. Common chewable surfaces in the home include interior window sills, baseboards, doors, and balusters. Generally, these surfaces should show evidence of teeth marks, but the RA may still identify chewable surfaces without visible teeth marks. Metal and other hard materials that cannot be dented by the bite of a child are not considered chewable. Additionally, if a child under the age of six does not reside in the home, previously chewed surfaces would not be considered a hazard. This information can be helpful for the family to take actions to protect their children.
Common areas	Common areas include entryways, lobby areas, hallways, stairways, mail rooms, office waiting rooms, common laundry rooms, multi-purpose rooms, childcare facilities, and other spaces intended for use by residents.
Cross-cultural consumerism	The phenomenon where a certain product or service that originated in one culture for a particular use is then utilized or adopted by consumers from a different cultural background, often with some adaptations.

De minimis levels	Size thresholds used to determine whether repairs and hazard controls will require lead-safe work practices by a lead-certified firm and a clearance. These levels are calculated differently for interior and exterior components, and if they are exceeded, then lead-safe work is necessary.
Deteriorated paint	"Any interior or exterior paint or other coating that is peeling, chipping, chalking or cracking, or any paint or coating located on an interior or exterior surface or fixture that is otherwise damaged or separated from the substrate." Tack or nail holes, small hairlines cracks, and other surface imperfections that are stable are not considered deteriorated paint. However, if the size is larger than a nail hole or hairline crack, the paint is considered to be deteriorated.
Dripline	The area within 3 feet surrounding the perimeter of a building.
Friction surfaces	Any painted surface on the exterior or interior of the home that can be worn down from rubbing, scratching, or coming into contact with another surface while in motion. Common friction surfaces include sliding windows, stairs, drawers, and kitchen shelves.
Impact surfaces	Any painted surface on the exterior or interior of the home that are subject to damage from repeated sudden force. The most common impact surfaces in a home are certain parts of doors, like the door and door frame.
Interim controls	A set of measures designed to temporarily reduce exposure or possible exposure to lead-based paint hazards (e.g., specialized cleaning, repairs, maintenance, painting, temporary containment, etc.)
Lead-based paint (LBP)	Any paint or surface coating (like varnish, shellac, or other coating) that contains lead equal to or greater than 1.0 mg/cm^2 measured by x-ray fluorescence analyzer or 0.5 percent by weight (5,000 µg/g, 5,000 mg/kg, or 5,000 ppm) by laboratory analysis.
Lead-based paint inspector (LBPI)	Conduct a surface-by-surface investigation to determine the presence of LBP in the home. They can perform paint testing, LIs, and post-abatement clearances. LBPIs should be fully trained, competent, and readily able to explain the use of a portable x-ray fluorescence (XRF) analyzer and protocols for an LI.
Lead-based paint hazard	Title X states that a lead-based paint hazard is "any condition that causes exposure to lead from lead contaminated dust, lead-contaminated soil, or lead-contaminated paint that is deteriorated or present in accessible surfaces, friction surfaces, or impact surfaces that would result in adverse human health effects…"

Lead-based paint inspection (LI)	A surface-by-surface investigation to determine the presence of lead-based paint and the provision of a report that explains the results of the investigation. This inspection is performed by an EPA-certified paint inspector or risk assessor.
Lead-Based Paint Inspection and Risk Assessment (LIRA)	An on-site investigation of a residential dwelling for lead-based paint hazards. It involves a surface-by-surface investigation of all painted surfaces on the interior and exterior of the dwelling with an XRF. It also includes investigating the age, history, management, and maintenance of the dwelling; conducting a visual assessment; performing limited environmental sampling (such as dust wipe samples, soil samples, and deteriorated paint chip samples); and reporting the results that identify acceptable abatement and interim control strategies based on specific conditions and the owner's capabilities. This investigation identifies the existence, nature, severity, source, and location of LBP hazards in the home. The completion of a LIRA must be conducted by an EPA-certified Risk Assessor.
Lead hazard screen	Limited assessment of hazards performed in accordance with the methods and standards made by the state or EPA, as appropriate. A lead hazard screen may identify the need for a follow-up risk assessment.
Loading	The mass of lead in a given surface area of a substrate. Lead loading is typically measured in units of milligrams per square centimeter (mg/cm^2). It is also called area concentration.
Mass concentration	The mass of lead in a given mass of a substrate. Lead mass concetration is measured in units of parts per million (ppm) or milligrams per kilogram (mg/kg).
National Lead Laboratory Accreditation Program (NLLAP)	EPA has established the NLLAP to recognize laboratories that demonstrate the ability to accurately analyze paint chip, dust, or soil samples for lead.
Painted surface	Any surface coated with a paint, shellac, varnish, stain, or wallpaper which should be presumed to cover paint.
Play areas	An area of frequent soil contact by children of less than 6 years of age as indicated by, but not limited to, such factors as the following: • the presence of play equipment (e.g., sandboxes, swing sets, and sliding boards), toys, or other children's possessions • observations of play patterns • information provided by parents, residents, caregivers, or property owners

Risk Assessment	An on-site investigation to determine the existence, nature, severity, and location of lead-based paint hazards. Only deteriorated paint, disturbed paint, or potential lead-based paint hazards are tested during this assessment. Additionally, this assessment will result in a report that describes identified lead hazards and provides recommendations on how to fix those hazards.
Room equivalent	A room equivalent is an identifiable part of a residence, such as a room, a foyer, a staircase within a housing unit, a hallway within a housing unit, or an exterior area. Closets or other similar areas adjoining rooms should not be considered as separate room equivalents unless they are obviously dissimilar from the adjoining room equivalent. An individual side of an exterior is not considered to be a separate room equivalent, unless there is visual or other evidence that its paint history is different from that of the other sides. All sides of a building are generally treated as a single-room equivalent if the paint history appears to be similar. For multi-family developments or apartment buildings, common areas and exterior sites are treated as separate types of units, not as room equivalents.
Substrate	The underlying material of a building component that is directly underneath the painted surface. Common material types include wood, drywall, plaster, concrete, brick, metal, and tile. If an uncommon substrate is encountered, it is best to select one of the common substrate types that is most similar in density and composition to the uncommon substrate.
Testing Combination	A testing combination is a unique combination of room equivalent, building component type, and substrate. Visible color may not be an accurate predictor of painting history and is not included in the definition of a testing combination.
X-ray Fluorescence (XRF) Analyzer	A handheld, portable device that uses or emits x-rays to identify the elemental contents (including lead [Pb]) in various substrates.

Overview

The purpose of this document is to delineate the process of conducting a **Lead Inspection and Risk Assessment (LIRA)**, or environmental investigation, in the homes of children with a **blood lead level (BLL)** above the Centers for Disease Control and Prevention's (CDC) **blood lead reference value (BLRV)**[1].

A LIRA in response to a child with a BLL above the BLRV is typically the duty of the local health department or childhood lead poisoning prevention program.

What is a LIRA?

A LIRA is a combination of a **lead-based paint inspection (LI)** and **risk assessment**.

The LI involves a comprehensive surface-by-surface examination of all painted or finished surfaces to determine the presence of **lead-based paint (LBP)** on the interior and exterior surfaces of a home. It also involves a report that explains the results of the investigation. LIs can be performed by Environmental Protection Agency (EPA)-certified **LBP inspectors (LBPIs)** or risk assessors.

The RA is a comprehensive examination of a home to determine the existence, nature, severity, and location of **LBP hazards**. It involves a review of the age, history, management, and maintenance of the home; a visual assessment; environmental sampling like dust wipes and soil composites; and a report of the results with recommendations to reduce the hazards within the owner's capabilities. RAs can be performed by EPA-certified risk assessors.

What is a LBP Hazard?

A LBP hazard is any condition that causes exposure to lead, which includes deteriorated LBP, lead-contaminated dust, and lead-contaminated soil. The main purpose of the LIRA is to determine the presence, location, and severity of LBP hazards and other lead exposures, both on the exterior and interior of the home, which primarily involves looking for instances of **deteriorated paint**. To determine whether a **painted surface** in the home is deteriorated, the certified LBPI or RA evaluates the type and size of deterioration.

Who Can Conduct a LIRA?

Per section 404 of Title X, the EPA sets the requirements and framework for who can perform lead inspections, assessments, and **abatements** in the United States. These regulations are to ensure individuals are able to fulfill their legal obligations of protecting themselves and others from lead exposures. ***Table 1*** lists the three courses offered by the EPA to professionals who are interested in getting certified to conduct evaluations of lead dust, LBP, and LBP hazards.

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[1] In July 2022, the Council of State and Territorial Epidemiologists (CSTE) changed the name of the condition from "elevated blood lead level (EBLL)" to "lead in blood". Therefore, it is recommended by the CDC to use terminology that directly addresses the child's blood lead level, such as, "blood lead level above the state's level that triggers follow-up care" or "blood lead level greater than the CDC's BLRV".

In the state of Nevada, individuals who are interested in performing LIRAs must apply and successfully complete both an EPA-authorized LBP inspector and risk assessor course from an EPA-accredited trainer.

Once an individual successfully completes an Inspector or Risk Assessor course, they will receive a course completion certificate, which allows them to begin work immediately. However, this course completion certificate only serves as an interim certification for up to six months following the completion of the training. These individuals must apply for certification and take a required third-party exam online or in-person for their discipline to receive official certification. Individuals must submit an application for certification to EPA within 30 days of completing their initial training course.

Below are some helpful links to learn more about these training courses.

Training Courses

EPA Accredited Lead-Based Paint Trainer Search

Information About LBPI and RA Individual Certification

Information About LBPI and RA Individual Recertification

Information About Certification Fees

Lead Laws and Regulations

Lead Renovation, Repair, and Painting Program

Table 1: Lead-Based Paint Certifications

Discipline	Description	Requirements
Lead Dust Sampling Technician (ST)	STs can only conduct non-abatement lead dust clearance testing after renovation, hazard reduction, or maintenance work. An ST can perform visual inspections, collect dust wipe samples, interpret results, and write lead dust clearance test reports. STs cannot do clearance testing related to abatement.	*Initial Certification:* Complete an 8-hour training course with an EPA-accredited trainer. *Maintain Certification:* Complete an EPA-accredited refresher course within 5 years of the initial course.
Lead-Based Paint Inspector (LBPI)	LBPIs conduct a surface-by-surface investigation to determine the presence of LBP in the home. They can perform paint testing, LIs, and post-abatement clearances. LIs measure the concentration of lead on painted surfaces, but do not determine whether there is an immediate hazard. LBPIs should be fully trained, competent, and readily able to explain the use of a portable **x-ray fluorescence (XRF) analyzer** and protocols for an LI.	*Initial Certification:* Complete 24-hour training with an EPA-accredited trainer. Pass the training course exam. Pass the third-party administered certification exam (if not applying for RA certification). *Maintain Certification:* Complete an EPA-accredited refresher course within 3 years of the initial course.
Risk Assessor (RA)	RAs conduct an on-site investigation of a residential dwelling to determine the presence, nature, severity, and location of lead-based paint hazards. They can perform all of the duties of an LBPI as well as conduct visual assessment, take environmental samples, determine the severity of lead hazards, and provide options to mitigate or eliminate those hazards.	*Initial Certification:* Meet at least one of the following criteria: • Bachelor's degree and 1 year of experience in a related field; • Associate's degrees and 2 years of experience in a related field; • A high school diploma (or equivalent) and at least 3 years of experience in a related field; OR • Certification as an industrial hygienist, professional engineer, registered architect and/or in a related engineering/health/environmental field Successfully complete the LBPI course from an EPA-accredited trainer. Complete a 16-hour RA training from an EPA-accredited trainer. Pass the third-party administered Risk Assessor exam. *Maintain Certification:* Complete an EPA-accredited refresher course within 3 years of the initial course.

Administrative Preparations

Before conducting any LIRAs, it is helpful to identify a **National Lead Laboratory Accreditation Program (NLLAP)** laboratory and to set-up any necessary accounts to order supplies.

Identify a Laboratory

Any environmental samples (e.g., dust, soil, or paint chips) collected during a LIRA can only be analyzed by a lab that meets the EPA's requirements for the NLLAP.

See section **Prepare and Send Environmental Samples for Analysis** for a couple of NLLAP labs in Nevada or visit the EPA's website to find the current list of NLLAP labs. Once an NLLAP lab is selected, it is recommended to connect with them to ask:

1. What are the minimum requirements for dust, soil, and paint chip samples?
2. What information do they prefer to have on the centrifuge tube?
3. What type of centrifuge tubes are we required? Does your lab provide them?
4. What are the costs for the different analyses?
5. How to prepare sample shipments?

Set-up Accounts

Set-up an account once an NLLAP lab is identified.

Additionally, a variety of supplies are needed to conduct environmental sampling for a LIRA (see section **Gather Supplies and Tools** for a complete list of supplies and tools). Therefore, it is helpful to set-up any necessary accounts to purchase supplies. ***Table 2*** lists a couple of accounts to consider.

Table 2: LIRA Accounts

Name	Account Purpose	Account Set-Up
Environmental Express	To order supplies to collect environmental samples, such as Ghost Wipes (15 x 15 cm) and Sample Tubes (50 mL).	Self register online. *If tax exempt, email tax exemption forms to orders@environmentalexpress.com and note "tax exempt" on any orders to flag their admin to send an invoice without tax.*
SGS Forensic Laboratories	To analyze environmental samples, such as dust wipes, soil, and water.	Contact SGS representative to create an account. As of July 2024, the representative for Nevada is: **Nicole Adams** nicole.adams@sgs.com 310-763-2374 x 5601

Preparing for a LIRA

A LIRA in response to a child with a BLL above the BLRV, aims to identify the cause or causes for lead in the child's blood, which involves an investigation of all possible sources of lead exposure inside and outside the child's home. Typically, this environmental investigation is the duty of the local health department or childhood lead poisoning prevention program.

There are a handful of steps that need to occur in preparation for the LIRA.

1. Review the case.
    a. Review or complete the CLPPP Lead Investigation Questionnaire.
    b. Review recent recalls of lead-containing consumer products.
    c. Determine the locations to investigate.
    d. Gather background information about the selected locations.
2. Schedule a time with the child's parent or caregiver to conduct the LIRA.
3. Assign LIRA roles and responsibilities.
4. Gather all of the necessary supplies and tools for the LIRA.

Case Review

The first step of LIRA preparation is reviewing the case of the child with a BLL above the BLRV. This review is to help pinpoint possible sources of lead exposure in the child's environment and determine where environmental samples may need to be taken and potential consumer products to test (*Appendix A: Types of Potential Lead-Contaminated Consumer Products*).

Lead Investigation Questionnaire

The questionnaire goes into detail about potential sources of lead exposure in the child's environment, the child's behaviors, and the hobbies and occupations of other members in the home. Answers are obtained from the child's primary parent or caregiver. If there is a case management team, then they will send the LIRA team a completed copy of the CLPPP Lead Investigation Questionnaire for review. However, if there is no case management team, the LIRA team will need to complete the questionnaire with the child's primary parent or caregiver before conducting the LIRA. If possible, complete the questionnaire in-person at the child's primary residence since observations can help supplement answers on the questionnaire.

There are some common challenges that may be encountered when completing the CLPPP Lead Investigation Questionnaire with the primary parent or caregiver, including language and cultural differences, **cross-cultural consumerism**, distrust of governmental officials, subjective perceptions of "risky" products, stigma associated with the use of certain products, and general miscommunication—particularly if a product has multiple names or uses. Each of these challenges can contribute to difficulty in identifying the source of lead exposure, which may interfere with the case investigation. ***Table 3*** provides some strategies on how the case management and LIRA teams can overcome these challenges.

Table 3: Strategies to Overcome LIRA Challenges

Strategy	Description
Apply cultural competence and humility	Aim to be culturally sensitive and nonjudgmental. Increase your familiarity with the customs and cultures of the family. This strategy can be critical for gaining trust and obtaining valuable information related to potential sources of lead exposure.
Acknowledge concerns and resolve uncertainty	Explain how lead exposure can harm the health of family members. Emphasize that you are there to help. Acknowledge any concerns the family may have (e.g., concerns about immigration status, child protective services, etc.) and assure the family that the goal is to protect the health of the child.
Involve the parents or caregivers	Emphasize the importance of reducing lead exposure. Be specific when possible and provide (linguistically and culturally appropriate) supporting materials when available. Be willing to explore potential exposure information the parents/guardians provide, even if you consider the source to be unlikely. At the least, this strategy can help build partnership with the family in solving the problem.
Ask general questions before probing further	It is best practice to first ask very general questions, like "Does your child take or use any products for their health?" and then ask specifying questions such as "What are these products used for?" or "How long has your child been taking these products?" Ask general questions and follow-up questions multiple times in different ways to try and identify sources of lead exposure.
Be informed	Review reports, news, and literature related to lead-containing products as often as possible. NvCLPPP regularly updates its Product Recalls page. This strategy can help you stay up-to-date about current recalls of lead-containing consumer products and familiar with terms used to refer to certain products.
Address cultural products with sensitivity and educational information	When communicating prevention messaging associated with culturally significant products, provide linguistically and culturally responsive educational materials, when possible, to supplement recommendations to reduce or stop use.
Present an alternative	Work with the family to identify an acceptable substitute. However, if this strategy is not possible (typically due to the cultural or religious significance of the product), provide risk management guidance, while reminding the family of the benefits of eliminating lead exposure sources.
Encourage blood lead monitoring	Encourage the family to do follow-up blood lead monitoring, especially if the source of exposure cannot be eliminated (e.g., use of culturally or religiously significant products).
Be observant and perceptive	If the case interview is conducted in person or during a home visit, it can be helpful to watch for potential lead sources and risky behaviors (e.g., mouthing non-food items or hand-to-mouth actions). Additionally, be aware of body language. If culturally acceptable, maintaining eye contact and an open posture helps express empathy and engage the family.

Recent Recalls

Lead is in more than just paint. It can be found in various goods and products used in everyday life, such as glazed ceramics, aluminum cookware, mini-blinds, toys, spices, cosmetics, and more (*Appendix A: Types of Potential Lead-Contaminated Consumer Products*). Review the recent U.S. Consumer Product Safety Commission (CPSC) recalls of lead-containing consumer products directly on the CPSC website or NvCLPPP's Product Recalls page.

Determine Locations

The preliminary selection of locations to investigate should be based on the responses from the questionnaire and should not necessarily be limited to just the primary residence.

At the very least, one of the locations will be the child's primary residence. However, the child may also spend a significant amount of time at another family member's home, daycare, in a vehicle, or other location that may serve as the source of lead exposure.

Confirm Year of Construction

Consult the respective County Assessor's website (***Table 4***) to determine the date of construction, and potentially obtain a preliminary copy of the floor plan, of the child's primary residence and other investigation locations.

Table 4: County Assessors

County	Website
Carson City	Carson City Property Inquiry
Churchill	Churchill County Property Tax Inquiry
Clark	Clark County Real Property Records
Douglas	Douglas County Parcels, Personal Property, and Tax Accounts
Elko	Elko County Parcels, Personal Property, and Tax Accounts
Esmeralda	Esmeralda County Property Tax Inquiry
Eureka	Eureka County Parcels, Personal Property, and Tax Accounts
Humboldt	Humboldt County Parcels, Personal Property, and Tax Accounts
Lander	Lander County Assessor Data Searches
Lincoln	Lincoln County Parcel, Personal Property, and Tax Records
Lyon	Lyon County Parcel, Personal Property, and Tax Accounts
Mineral	Mineral County Property Tax Inquiry
Nye	Nye County Assessor Property Inquiry
Pershing	Pershing County Property Tax Inquiry
Storey	Storey County Property Tax Inquiry
Washoe	Washoe County Real Property Assessment Data
White Pine	White Pine County Parcel Search

Schedule the LIRA

The next step of LIRA preparation is to contact the child's primary parents or caregiver to schedule the investigation. When scheduling the LIRA, it is important to provide the primary parent or caregiver with a summary of:

- The LIRA process in response to a BLL above the BLRV
- Approximately how long it will take
- What will be tested (e.g., painted surfaces, dishware, toys, and bare soil from common outdoor play areas)
- No special cleaning is necessary before the team arrives

Gather Supplies and Tools

The last step of LIRA preparation is to gather the necessary supplies and tools needed to conduct the investigation. ***Table 5*** lists the items that should be taken on a LIRA.

Table 5: LIRA Supplies and Tools Checklist

Equipment
☐ XRF analyzer
☐ XRF batteries
☐ XRF extension pole (if applicable)
☐ Dosimeter(s)
☐ iPad (if applicable)
☐ Phone or camera
☐ External charger or batteries

Paperwork
☐ Blank paper
☐ Lead Hazard Photo Log (PDF | Excel)
☐ Building Conditions Form (PDF)
☐ HUD Performance Characteristic Sheet (PCS) for XRF analyzer (SciAps X-550)
☐ XRF Calibration Check (Excel)
☐ XRF Paint Testing Form (PDF | Excel)
☐ Dust Sampling Form (PDF | Excel)
☐ Soil Sampling Form (PDF | Excel)
☐ Water Sampling Form (PDF | Excel)
☐ Water Sample Collection Instructions (Word)
☐ Miscellaneous Sampling Form (PDF | Excel)
☐ Lab Chain of Custody Forms
SGS Forensic Laboratories I (SGS)

Educational Materials
☐ EPA's Renovate Right document
☐ NvCLPPP's Tips to Clean flyer (ENG or SPA)
☐ NvCLPPP's After the Lead Test brochure (ENG or SPA)

General Sampling Supplies
☐ Nonsterlized, nonpowdered disposable gloves
☐ Disposable shoe coverings
☐ Masking tape
☐ Metal ruler(s)
☐ Tape measurer
☐ Centrifuge tubes with sealable caps
☐ Gallon-size Ziplock rack, or box to carry tubes
☐ Permanent markers (e.g., Sharpie)
☐ Step stool or ladder
☐ Wet wipes

Dust Sampling Supplies
☐ Disposable wipes that are acceptable for dust sampling
☐ Dust sample collection templates (if applicable)

Soil Sampling Supplies
☐ Soil coring device
☐ Stainless steel spoon or spatula (or disposable plastic)

Water Sampling Supplies
☐ Clean, plastic 1-liter bottle

Paint Chip Sampling Supplies
☐ Plastic tarp or trash bags
☐ Utility knife
☐ 1/2" to 1" chisel
☐ Heat Gun
☐ LED flashlight

Miscellaneous Supplies
☐ Clipboards
☐ Pens
☐ Pencils
☐ Rubber bands
☐ Sticky notes

Conducting a LIRA

LIRAs should be conducted by a minimum of two team members, where *at least one* is an *EPA-certified risk assessor*. Additionally, it is important to apply a methodical approach and to keep careful documentation of everything done in the LIRA to prevent errors and omissions as well as protect yourself if results are ever questioned or challenged.

There are several steps to the LIRA, where certain activities must be completed by an *EPA-certified risk assessor or lead-based paint inspector*:

1. Explain the process of the LIRA to the primary parent or caregiver.
2. Photograph the exterior of the home*.
3. Complete an inventory of the home to determine where to test and collect environmental samples.
    a. Sketch a diagram of the floorplan*.
    b. Conduct a Building Conditions Assessment.
4. Calibrate-in the XRF analyzer.
5. Conduct a Visual Assessment
6. Test painted surfaces with the XRF analyzer
    a. Randomly select 10 **testing combinations** to re-test.
    b. As necessary, re-calibrate the XRF analyzer every 4 hours.
7. Test other items with the XRF analyzer.
8. Transcribe testing and sampling information onto appropriate forms*.
9. Photograph any positive findings*.
10. Calibrate-out the XRF analyzer.
11. Collect dust samples.
12. Collect soil samples.
13. Document locations of environmental samples on the sketch of the home*.
14. If necessary, collect paint chip samples.
15. Collect a tap water sample.
16. Debrief with the family.
17. Drop-off or send environmental samples for lab analysis*.

**Tasks that can be completed by non-certified team members*

LIRA Process

Inform the primary parent or caregiver that a room-by-room assessment will be conducted on the interior and immediate exterior of the home. It is essential to ask if there are any rooms or areas of the home that you are not allowed to enter.

Photo Documentation

Photos should be taken throughout the LIRA to help document the process. Before starting the LIRA, it is important to ensure the device that will take photos is able to report the correct time and date stamp since these will be used in the LIRA report.

Photos to capture during the LIRA:

- Home exterior that includes the address or unit number
- Any structural component or item that tests positive for lead (include XRF reading as necessary)
- Any food product or consumer good that tests positive for lead (include any pertinent information like packaging, manufacturer or brand names, and serial or lot numbers)

Additionally, all photos should be documented on the Lead Hazard Photo Log (PDF | Excel). Each entry will include:

- Photo number
- Corresponding reading from the XRF analyzer with units
- Location in the home
- Brief description of the structural component or surface
- Any pertinent information such as:
    - Packaging
    - Labels
    - Brand and/or manufacturer information
    - Serial or lot numbers
    - Any other appropriate identifying infromation

Table 6 provides an example of how to fill-out the Lead Hazard Photo Log (PDF | Excel).

Table 6: Example of Lead Hazard Photo Log

Picture #	Corresponding Reading	Units (mg/cm^2 or ppm)	Location & Description
1	2.2	mg/cm^2	Kitchen, Upper Cabinet Door, White, Deteriorated
2	1.5	mg/cm^2	Bath 1, Tile, Floor, Intact
3	1.8	mg/cm^2	Bed 1, Door, Blue, Deteriorated
4	50	ppm	Backyard, Play area 1, Rubber mulch

Inventory of the Home

An inventory of the home should be completed before the start of any XRF testing. This inventory includes the inspection of building conditions and development of a list of testing combinations, which provides an overview of what needs to be inspected, identifies problems, and helps organize the inspection work activities.

Sketch of the Home

HUD recommends creating a rough sketch of the home to facilitate documentation of the LIRA and discussions related to the location of tests and samples. The sketch should include all parts of the property, like the floor plan of the home with all rooms, any doors, windows, the garage, sheds, play structures, fences, areas with bare soil, and other components that may require a test or sample. ***Figure 1*** shows an example of a labeled sketch of the home.

Once there is a rough sketch, directional labels need to be added to the overall sketch of the home. Typically, sketches of the home will involve only four sides (unless the home has a unique shape), which are notated from A to D (or so on to correspond with the number of sides of the home). The reference point, or 'A' label, will be the side of the home with the main entryway, and then the remaining sides will be labeled alphabetically in a clockwise direction.

Then, name labels need to be added to each of the **room equivalents** on the sketch. A room equivalent is any identifiable part of the interior or exterior of the home, like the kitchen, living room, dining room, staircase, hallways, bedrooms, bathrooms, backyard, and so on. Closets are not considered a room equivalent, but they should be included in the sketch since they may be a potential play area for children. If there are more than one of a particular room equivalent that serves the same purpose (e.g., bedroom or bathroom), then a number will need to accompany the name label.

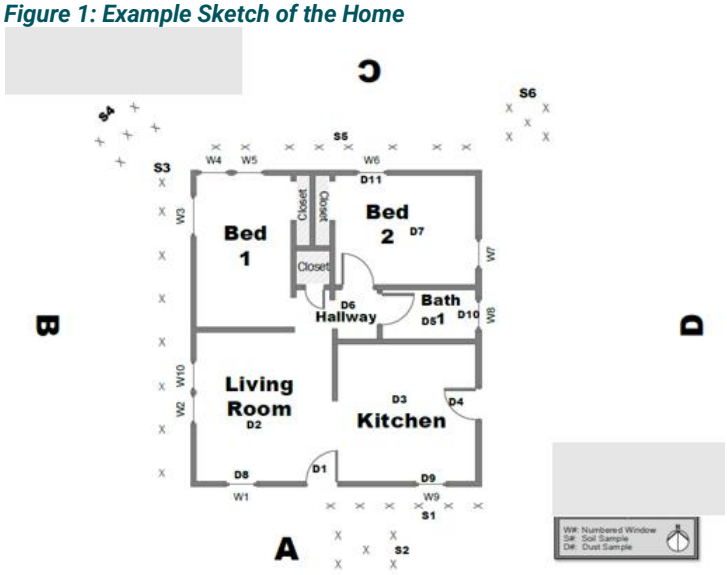
Walls of each room equivalent will follow the same directional label notation based on the reference point for the overall sketch. For example, the 'A' wall in Bedroom 1 will be the wall that faces the main entryway, not necessarily the room entryway.

Indicate any inaccessible areas on the sketch with 'NA' and ensure to document the reason those areas were inaccessible in the final report. Common reasons an area may be inaccessible are: per the resident's request or due to a safety hazard like an aggressive pet.

All windows should be included on the sketch and numbered in a clockwise direction. Lastly, the location of dust and soil samples will be included on this sketch as well.

If applicable, a sketch should be made for each floor of the home.

Figure 1: Example Sketch of the Home



Building Conditions Inspection

A building conditions inspection is a quick visual assessment to determine the conditions of the home and should be performed prior to the visual assessment, XRF testing, and environmental sampling. The RA will observe the conditions of the home to gain insights into possible causes of existing or future paint or substrate deterioration. For example, a roof in disrepair should be noted since moisture could cause paint deterioration. In addition, a poorly maintained building may indicate that an owner is unlikely to maintain **interim controls**.

This inspection should be documented on the Building Conditions Form.

In instances that do not involve a child with a BLL above the BLRV, the RA can use this initial inspection to determine whether a **lead hazard screen** is appropriate to perform instead of a full LIRA. However, a full LIRA must be completed for all cases that involve a child with a BLL above the BLRV since the purpose is to identify the cause or causes of lead exposure.

Paint Readings with XRF

Lead in paint, varnish, shellac, or other surface coatings can be identified by direct readings using an XRF analyzer. The XRF determines lead measured in milligrams per square centimeter (mg/cm^2) of the coating on the tested **building component**. Currently, the federal standard to identify LBP with an XRF is 1.0 mg/cm^2.

The RA should systematically take readings of painted surfaces in each room equivalent for each testing combination. Check paint on walls, doors, shelves, floors, and furniture, as well as all friction, impact, and chewable surfaces. The purpose of collecting paint readings with the XRF is to determine the presence of LBP on painted surfaces in the home.

Testing Combinations

Throughout the inventory of the home, the RA should begin to develop a list of testing combinations on the interior and exterior of the home. A testing combination is a unique combination of room equivalent, building component type, and substrate. If a unique building component is present in only one room, it is considered to be a testing combination. Each testing combination may be composed of more than one building component (such as two similar windows within a room equivalent). ***Table 7*** provides a list of building components and substrates and ***Table 8*** provides examples of testing combinations.

Building components are the various structures of a home, such as all of the parts of doors, windows, walls, stairs, and so on. *Appendices B-E* provides diagrams of these various structures of a home and *Appendix F* shows several photo examples. When naming the building component, it is important to list the specific part of the component (e.g., door jamb, door casing, interior windowsill). Then, substrates are the various materials that a building component can be made of and are painted on. The most common substrates are brick, concrete, drywall, metal, plaster, and wood.

Current paint color can be reported but is not an accurate predictor of the painting history and, therefore, is not part of a testing combination. All testing combinations in each room equivalent

should be tested via XRF or paint chip sample unless similar building component types with identical substrates (such as windows) are all found to contain LBP in the first five interior room equivalents.

Additionally, certain building components that are adjacent to each other and not likely to have different painting histories can be grouped together into a single testing combination, such as:

- Window casings, stops, jambs, and aprons
- Interior window mullions and sashes
- Exterior window mullions and sashes
- Door jambs, stops, transoms, casings and other door frame parts
- Door stiles, rails, panels, mullions, and other door parts
- Baseboards and associated trim (such as quarter-round or other caps)
- Painted electrical sockets, switches, or plates can be grouped with walls

Substrates should be classified into one of six types: brick, concrete, drywall, metal, plaster, or wood. These substrates cover almost all building materials that are painted and are linked to those used in the XRF Performance Characteristic Sheets (PCS). For example, the concrete substrate type includes poured concrete, precast concrete, and concrete block.

If a painted substrate is encountered that is different from the substrate categories shown on the PCS, select the substrate type that is most similar in density and composition to the substrate being tested. For example, for painted glass substrates, an inspector should select the concrete substrate, because it has about the same density (2.5 g/cm^2) and because the major element in both is silicon.

For components that have layers of different substrates, such as plaster over concrete, the substrate immediately adjacent to (underneath) the painted surface should be used. For example, plaster over concrete block is recorded as plaster.

Table 7: Examples of Components and Substrates

Component		Substrate
<u>Interior</u>	<u>Exterior</u>	• Brick
• Balustrades	• Air conditioners	• Ceramic
• Baseboards	• Balustrades	• Concrete
• Bathroom Vanities	• Beams	• Drywall
• Bathtubs	• Bulkheads	• Metal
• Beams	• Ceilings	• Plaster
• Built-in painted furniture	• Chimneys	• Porcelain
• Cabinets	• Columns	• Wood
• Ceilings	• Corner boards	
• Chair rails	• Doors and trim	
• Columns	• Fascias	
• Counter tops	• Fences	
• Crown molding	• Garages and garage doors	
• Doors and trim	• Gutters and downspouts	
• Downspouts	• Joists	

• Electrical Fixtures (Painted) • Fireplaces • Floors • Handrails • Newel posts • Other heating units • Radiators • Shelf supports • Shelves • Stair stringers • Stair treads and risers • Tile • Pottery • Walls • Window sashes and trim • Window jambs and channels • Window sills (stools) and aprons	• Handrails • Lattice work • Laundry line post posts • Mailboxes • Painted roofing • Porches and balconies • Railings and railing caps • Rake boards • Sashes • Siding • Soffits • Stair treads and risers • Stair stringers • Storage sheds and garages • Swing sets and other play equipment • Windows and trim	

Table 8: Examples of Testing Combinations

Room Equivalent	Component	Substrate
Bedroom 1	Door	Wood
Bedroom 1	Door Frame	Metal
Bedroom 1	Wall	Drywall
Kitchen	Wall	Plaster
Kitchen	Interior Windowsill 1	Wood
Garage	Floor	Concrete

Visual Assessment

The visual assessment is an extension of the building conditions inspection that gathers more information about the overall conditions of the interior and exterior of the home. A certified LBPI or RA can conduct the visual assessment and will look for any instances of paint deterioration, structural issues, bare soil, and visible dust accumulation. Findings from the visual assessment are documented on the XRF Paint Testing Form (PDF | Excel), which will help determine where additional tests or environmental samples need to be collected in the home.
This visual assessment should include all:

- rooms
- exterior areas like garages, fences, and storage sheds
- painted components and surfaces like walls, windows, and trims
- friction, impact, or chewable surfaces

Overall, the visual assessment will aim to answer the following:

1. Is the home in generally good repair, or are there significant structural or moisture problems?
2. Are there large amounts of deteriorated paint or visible dust accumulation?
3. Are the windows and doors possibly coated with LBP?
4. Are there any obvious exterior sources of lead that are nearby?

And, although the visual assessment does not determine the presence or absence of LBP, it will result in a complete inventory of the location and approximate size of:

- All instances of deteriorated paint
- **Friction surfaces** coated with paint
- **Impact surfaces** coated with paint
- **Chewed surfaces** coated with paint
- All instances of deteriorated home structures
- Bare soil

Identifying Deteriorated Paint

To determine whether a painted surface in the home is deteriorated, the certified LBPI or RA should evaluate:

1. How large is the area of deterioration?
2. What type of deterioration is occurring?

Additionally, LBPIs and RAs should use the U.S. Department of Housing and Urban Development's (HUD) established criteria to rate the extent of paint deterioration (***Table 9***). Surfaces that rate "fair" will require monitoring or repair, while surfaces that rate "poor" will require hazard controls. Additionally, only surfaces that rate as "poor" are considered deteriorated, and should be marked as an area for XRF testing or paint chip sampling.

Table 9: Criteria to Rate Paint Deterioration

Component Location	Intact	Fair	Poor
Exterior components with large surface areas	Entire surface is intact.	Less than or equal to 10 ft^2.	More than 10 ft^2.
Interior components with large surface areas (walls, ceilings, floors, doors)	Entire surface is intact.	Less than or equal to 2 ft^2.	More than 2 ft^2.
Interior and exterior components with small surface areas (window sills, baseboards, soffits, trim)	Entire surface is intact.	Less than or equal to 10% of the total surface area of the component.	More than 10% of the total surface area of the component.

As the LBPI or RA determines which surfaces are deteriorated, it is also helpful to identify the type of deterioration since it can inform the hazard control options. ***Table 10*** describes the three types of bulk deterioration and ***Table 11*** describes the six types of layered deterioration.

LBPIs and RAs should also look for holes in walls, damage to **substrates**, and any debris from deteriorated paint, such as:

- Holes larger than nail or tack holes
- Paint chips or dust from painting activities that were not cleaned up
- Paint residue on floors
- Paint chips on the soil near the **dripline** of the home
- Moisture, heat, rot, or rust damage to structures or surfaces of the home
- Wear, tear, or deterioration to structures or surfaces of the home

Lastly, the LBPI or RA also need to note whether the total size of deterioration falls within the **de minimus levels**, which are size thresholds used to determine whether the repairs and hazard controls will require lead-safe work practices by a lead-certified firm and a clearance. These levels are calculated differently for interior and exterior components, and if they are exceeded, then lead-safe work is necessary.

Interior De Minimis Levels

- 2 square feet (ft^2) per room or space; or
- 10% of the total surface area on a small component type like window sills, baseboards, or trim

Exterior De Minimis Levels

- 20 square feet (ft^2) on all exterior surfaces, including outbuildings, fences, and play equipment attached to the ground; or
- 10% of the total surface area on a small component type like window sills, baseboards, or trim

It is important to note that de minimis levels control how a repair must be made, not whether the repair is made. If deteriorated paint is identified, it must be repaired regardless of how big or small the deterioration.

Table 10: Types of Bulk Deterioration

Condition Type	Brief Description	Image
Checking	A pattern of short, narrow breaks in the top layer of paint that is usually caused by a loss of elasticity. Plywood substrates can often cause checking. The deteriorated paint should be removed if a new coating is going to be applied.	
Cracking and Flaking	An advanced form of checking that usually occurs on surfaces with multiple layers of paint and includes breaks in the film that extend to the base substrate. The cracks usually form parallel to the grain of the wood. The damaged coating should be removed if a new coating is to be applied.	
Alligatoring	Reptilian scale patterns on dried paint films that are often caused by the inability of the topcoat to bond smoothly to a glossy coat underneath. The old paint should be completely removed and the surface should be primed and repainted. Alligatoring is usually associated with paint films that are too thick, or the application of a brittle coating over a more flexible one. In some cases it may be necessary to remove all of the paint before recoating, since the existing paint film is already too thick. Enclosure or component replacement will probably be the most effective and safe hazard control methods in this circumstance.	

Table 11: Types of Layered Deterioration

Condition Type	Brief Description	Image
Blistering	The formation of bubbles in the paint film caused by either heat or moisture. The risk assessor should break open one of the bubbles; if bare substrate shows, then the likely cause is moisture. However, if another layer of paint shows instead of substrate, heat probably caused the blister (not moisture). The risk assessor should endeavor to locate the moisture source if moisture is suspected. Control of the moisture source will lengthen the effective life span of many forms of lead-based paint hazard control, especially paint film stabilization.	
Scaling or Flaking (Peeling)	A form of paint separation often found in those exterior areas of the building susceptible to condensation, such as under eaves. Salt deposits drawn to the paint film surface can cause scaling. The deteriorated paint should be removed, and the salts should be washed off if the surface is to be recoated. Enclosure may be the most effective and safe hazard control method for this type of deterioration.	
Peeling from Metal	A form of paint separation usually caused by improper priming of bare, galvanized metal, or by rusting (often seen on garage doors). The loose paint should be removed by wet scraping and the metal should be primed with a galvanizing primer or other primer made for metal before paint film stabilization. Industrial paints containing lead should not be used to prime metal surfaces. Component replacement and enclosure are likely to be most effective.	

Peeling from Exterior Wood	A type of paint deterioration usually resulting from wet wood swelling under paint, causing the paint film to loosen, crack, and dislodge. The water may be present because of either moisture passing through the substrate from the interior (poor ventilation) or exterior sources of moisture penetrating the paint film. The risk assessor should recommend that the cause of the moisture problem be discovered and addressed before attempting paint film stabilization or any form of recoating.	
Peeling from Plaster Walls	Peeling from plaster walls could be the result of insufficient wet troweling of the white coat when the plaster was applied, causing chalking of the surface. Both the use of glue size, which absorbs water, and use of a primer with poor alkali resistance can also cause deterioration.	
Peeling from Masonry Surfaces	Peeling from masonry surfaces is often caused by the alkaline condition of the surface. A coating system that is appropriate for alkaline surfaces should be used.	

Friction, Impact, and Chewable Surfaces

During a visual assessment, RAs should also look for friction, impact, and chewable painted surfaces since they are prone to some deterioration and may generate some dust.

- **Friction surfaces** are any painted surface on the exterior or interior of the home that can be worn down from rubbing, scratching, or coming into contact with another surface while in motion. Common friction surfaces include sliding windows, stairs, drawers, and kitchen shelves.
- **Impact surfaces** are any painted surface on the exterior or interior of the home that are subject to damage from repeated sudden force. The most common impact surfaces in a home are certain parts of doors, like the door and door frame.
- **Chewable surfaces** are exterior or interior surfaces that are within reach of a child to mouth or chew. Common chewable surfaces in the home include interior window sills, baseboards, doors, and balusters. Generally, these surfaces should show evidence of teeth marks, but the RA may still identify chewable surfaces without visible teeth marks. This information can be helpful for the family to actions to protect their children.

Bare Soil

Lastly, during the visual assessment, RAs should also look for instances of **bare soil**, which is any soil that does not have good coverage from grass, gravel, turf, or other landscaping materials. Bare soil can be found in **play areas**, non-play areas along the dripline or foundation of the home, non-play areas in the rest of the yard, and vegetable gardens. RAs may also consider pet sleeping areas, other garden spaces, paths and walkways, and other areas on the exterior of the home.

Instances of bare soil in play areas and non-play areas should be included on the sketch of the home.

Collection and Testing Process

Before the RA can collect paint readings, the XRF must be calibrated within its calibration check limits listed on the HUD PCS (see NvCLPPP SciAps X-550 User Guide for LIRAs for more information on XRF calibration). XRF calibration must occur at the start of the LIRA, every 4 hours, at the end of the LIRA, and between LIRA locations if multiple are going to occur in one day. Each calibration must be documented on the XRF Calibration Check. If the XRF does not properly calibrate, then it cannot be used for the LIRA. Therefore, the LIRA should be postponed to a later time, or paint chip samples should be collected.

In addition to XRF calibration, the RA must conduct 10 retests with the XRF before the conclusion of the LIRA as a quality assurance and control (QA/QC) measure. These retests are randomly selected throughout the home as the initial readings are collected. The original and retest results must also be documented on the XRF Calibration Check to determine whether they fall within the retest tolerance limit.

Then, all readings should be documented on the XRF Paint Testing Form (PDF | Excel). ***Table 12*** provides some examples of how-to fill out the XRF Paint Testing Form.

If trends or patterns of LBP paint classifications are found among building component types in different room equivalents, an inspection report may summarize results by building component type, as long as all measurements are included in the report. For example, the inspection may find that all doors and door casings in a dwelling unit are coated with LBP (or are positive for LBP).

Table 12: Example of XRF Testing Form

XRF Paint Testing											
Description							XRF	Visual Assessment			
#	Room Equivalent	Location	Component	Substrate	Color	Condition	Reading (mg/cm^2)	Friction or Impact?	Teeth Marks?	Area (sq. ft)	Notes
1	Living Room	A	Wall	Drywall	Blue	Intact	0				
2	Room 2	D	Door	Wood	White	Poor	2.5	F	N	<10	Retest 1
3	Kitchen	B	Wall	Drywall	White	Intact	7.0	N/A	Y	N/A	Paint intact, but positive for lead.
4	Front Entry	B	Window frame	Wood	White	Intact	0				
5	Backyard	Play area 1	N/A	Rubber	Black	N/A	36				Rubber mulch covering play area.

Supplies

☐ HUD PCS for XRF analyzer
☐ XRF Calibration Check (Excel)
☐ XRF Paint Testing Form (PDF | Excel)
☐ XRF analyzer
☐ XRF batteries
☐ XRF extension pole (if applicable)
☐ iPad
☐ Phone or camera
☐ Step stool or ladder

Steps

1. Put on dosimeter and ensure to follow all radiation safety precautions.
2. Turn on and calibrate the XRF. Document calibration readings on the XRF Calibration Check Form and ensure it meets the XRF calibration check limits specified on the HUD PCS.
3. Take at least one XRF reading for each testing combination identified in each room equivalent.

- As XRF readings are taken, randomly select 10 testing combinations to conduct repeat testing. These repeats can be marked with a sticky note.

4. Document information and results of XRF readings on the XRF Paint Testing Form (PDF | Excel). Documentation should include:

- Substrate
- Component
- Color
- Condition – intact or deteriorated
- Location – as identified on the map
- XRF Reading (mg/cm^2) - numerical result from the XRF
- Results – mark as positive or negative
- Values at or above 1.0 mg/cm2 are considered positive.
- Values under 1.0 mg/cm2 are considered negative.
- Notes - For locations with deteriorated, lead-positive paint, indicate also:
- Approximate size of the suspected hazard
- Small area = 20 ft2 or less (exterior), 2 ft2 or less (interior room equivalent), or 10% or less of a component with a small surface area
- Probable cause of deterioration, if known e.g., mildew, friction, impact, abrasion, heat, water intrusion, substrate failure
- Additional notes (e.g., friction or impact surface; visible teeth marks)

5. Take a photo of any testing combination that results in a positive reading.
6. After all initial testing combinations have an XRF reading, collect readings for the randomly selected retests.

7. Document retest information and results in the same way as the initial readings, but indicate it is a 'retest' in the notes section.
8. Input initial and retest readings into the XRF Calibration Check Form to determine the retest tolerance limit.
9. Calibrate the XRF and turn off machine.

Testing Other Possible Lead Sources

Exposure to lead is not limited to just LBP. Consumer products (like foods, spices, traditional medicines, and cookware) could contain lead (*Appendix A: Types of Potential Lead-Contaminated Consumer Products*) and be a potential source of lead exposure. It is equally important to test consumer products for lead as it is to test structural components for lead. Other possible lead sources can be screened for lead via XRF or a sample can be collected and sent to a laboratory for analysis.

Collection and Testing Process

The Lead Investigation Questionnaire should provide valuable insight into other items to test for lead in the home and is beneficial to review with the family during the LIRA. Particular focus should be placed on items the child puts in their mouth, plays with, or eats from, in addition to any unusual or imported consumables or food items. It can be challenging to decide which consumer products to test. ***Table 13*** provides some strategies to help decide which consumer products to sample.

Table 13: Strategies to Inform Consumer Product Sample Collection

Strategy	Description
Apply historical knowledge	Ask about the use of products historically known to contain high levels of lead. In addition, ask probing questions on the use of foreign-purchased or imported products for health, food, cultural or other purposes. Products that are regulated in the United States by a federal agency, are less likely to be of concern (e.g., prescription, allopathic medications, drugstore cosmetics).
Establish linkage of product to the case	Determine whether the child with a BLL above the BLRV has come into contact with the product.Focus on products that are consumed, put in the mouth, or used on orby the child in a way that could result in ingestion or hand-mouth exposure (e.g., foods, medications, easily dispersible products like topically applied, fine powders).
Consider routes of exposure	Lead is well-absorbed via the gastrointestinal tract. Skin is a good barrier for lead; however, hand-to-mouth exposure can occur with certain products (e.g., topically applied, fine powders). Inhalation is not a likely exposure pathway for lead-contaminated products unless such products are burned.
Assess usage patterns	Evaluate the child's product use pattern – was product used recently or on a routine basis resulting in dietary or non-dietary ingestion? Also, consider the frequency and duration of reported usage in relation to when the blood lead test was completed.

The following questions can also be helpful to consider when determining which consumer products to sample:

- Did the child come into contact with the product in question?
- Does the time frame of exposure to the product match the time frame of the BLL above the BLRV report?
- Has there been enough exposure to the product to cause the associated BLL above the BLRV?
- What was the frequency and duration of contact with the product in question?
- Was or is there potential for the product to be ingested or mouthed?
- Is the product a fine powder that is topically applied with potential for hand-to-mouth exposure?
- Was the product purchased abroad?
- If more than one person in the household has a BLL above the BLRV, what products do they have in common?

It is important to follow a standardized sample collection protocol and gather critical product information (e.g., brand, product description, purchase source, etc.) when sampling other possible lead sources. A standardized process and detailed documentation of product information can help identify potential sources of lead exposure in individual cases as well as provide insight about possible trends in product usage across multiple cases and inform enforcement activities.

Lastly, when screening consumer products for lead via XRF, it is essential to use an appropriate mode on the machine to ensure most accuracy of results. If using the SciAps X-550 XRF Analyzer, reference NvCLPPP's SciAps X-550 User Guide for a list of recommended modes for various consumer product types.

Supplies

☐ Miscellaneous Sampling Form (PDF | Excel)
☐ XRF analyzer
☐ XRF batteries
☐ iPad
☐ Phone or camera
☐ Nonsterlized, nonpowdered disposable gloves
☐ Centrifuge tubes with sealable caps
☐ Stainless steel spoon or spatula (or disposable plastic)
☐ Gallon-size Ziploc bags, rack, or box to carry tubes
☐ Disposable wipes
☐ Permanent markers (e.g., Sharpie)

Preparation

1. Identify other possible lead sources to screen with XRF and collect for laboratory analysis.
2. Prepare the centrifuge tubes by using a permanent marker to label the tube with:
    a. Case number
    b. Miscellaneous sample number
    c. Date of collection
    d. Sample name
    e. Any other information required by the lab
3. Complete the Miscellaneous Sampling Form (PDF | Excel).
    a. Sample number
    b. Sample collection date
    c. Owner type
    d. Sample type
    e. Product name
    f. Brand name
    g. Manufacturer/importer name address, and/or phone number
    h. Lot, serial, or id number
    i. Expiration date
    j. Country of manufacture
    k. Product details
    l. Product description
    m. Product usage
    n. Duration of usage
    o. Purchase source
    p. Country and region of purchase
    q. Analysis/screening method
    r. Analyte
    s. Concentration
    t. Unit
    u. Reporting limit
    v. Date of analysis

Steps

1. If applicable, screen the product for lead via XRF with the most appropriate mode and record results on the Miscellaneous Sampling Form (PDF | Excel).
2. Put on a pair of disposable gloves.
3. Clean collection tools (e.g., stainless steel spoon) with a fresh wipe before collecting any samples to prevent cross-contamination. Properly dispose of any wipes used to clean the tools in your own trash bag.
4. Change into a new pair of disposable gloves. Properly dispose of the old pair of gloves in your own trash bag.
5. Collect samples in individual sampling tubes or bags.

    a. If collecting a powder or liquid, shake it thoroughly before collecting a sample.
6. Transfer the product or a portion of the product into a clean centrifuge tube or bag. Ensure to collect an adequate amount of the product, if available, collect:
    a. 1-2 tablespoons of dry powders
    b. 10+ pills or tablets
    c. 5+ mL of liquids
    d. Check with the laboratory for guidance as needed.
7. When using a sample collection device to collect samples (e.g., using a spoon to collect a powder sample), use a new collection device or clean the device before collecting the next sample to avoid cross-contamination
8. Take photos of the item collected. If available, include:
    a. A photo of the sample tube or bag (with sample ID visible) with product packaging
    b. Photos of the product (e.g., open jar, open bottle, pills, spice, etc.)
    c. Photos of all sides of the product packaging
    d. Photos of package inserts
    e. Photos of the store receipt or other purchase documentation with the product
9. Repeat this process until all consumer product samples are collected.
10. Record all samples onto a lab Chain of Custody form.

Dust Sampling

Dust is one of the main pathways of lead exposure in children, and many studies have shown that lead levels in dust are the strongest predictor of lead in the blood. This strong association is likely due to children ingesting settled dust that contains lead as a result of normal hand-to-mouth behaviors.

The EPA sets the standards for lead in house dust. As of January 13, 2025, the following changes to the EPA's regulatory landscape for dust-lead became effective:

1. Nomenclature change
    a. Dust-Lead Hazard Standards are now **Dust-Lead Reportable Levels (DLRL)**.
    b. Dust-Lead Clearance Levels are now **Dust-Lead Action Levels (DLAL)**.
2. Dust-Lead Reportable Levels
    a. **Any reportable level (ARL)** of lead in dust, as analyzed by a NLLAP laboratory, is considered a hazard.
3. Revised Definition of Abatement
    a. EPA recommends an abatement when dust-lead loadings are at or above the DLAL, as listed in ***Table 14***.
    b. EPA recommends cleaning if there is a reportable level of lead below the DLAL.

Table 14: Dust-Lead Action Levels

Location	Hazard Standard
Floors	5 µg/ft²
Window Sills	40 µg/ft²
Window Trough	100 µg/ft²

Collection and Testing Process

Dust samples should be collected from areas in the home where children are likely to come into contact with dust. Typically, *at least 6 to 8 dust samples* are needed to effectively evaluate the lead hazards in the home. Some of the common areas to collect dust samples include:

- Entryways (including porches)
- Child's primary play area (like the TV room, living room, or dining room)
- Kitchen
- Bedroom(s) of the youngest and next oldest child
- Bathroom(s) used by the youngest child

Per HUD protocols, it is best to collect:

- Floor samples from entryways with immediate access to the outdoors;
- From at least 4 living areas where children are likely to come into contact with dust (e.g. the kitchen, the children's principal playroom, and children's bedrooms)
- At least 1 floor sample and 1 windowsill sample (if a window is present) in each of the rooms or areas selected for dust sampling in the home.

Dust samples from additional areas (other than floors, windowsills, and window troughs) may also be collected at the discretion of the risk assessor and the child's parent or guardian. These additional areas can be other horizontal components, like built-in shelves or cabinets in the bathroom or kitchen that store items the child may frequently use (e.g., food, dishes, toothbrushes, eating utensils). However, it is important to note, EPA does not have a hazard or clearance standard for these components.

In addition to the dust samples collected throughout the home, at least one blank dust sample should be prepared and sent to the lab for analysis. The analysis of a blank sample is to verify the supplies used to collect dust samples are not contaminated with lead. A blank sample is prepared almost the same way as regular samples to ensure the lab does not know which one is the blank. More specifically, the centrifuge tube that the blank sample will be placed in should be labeled the same as regular samples -- with the case number, a unique room identifier, and other pertinent information requested by the lab. Then, to collect the blank sample, a fresh wipe is folded the same way it would be folded during a regular sample without wiping a surface, and then placed into the centrifuge tube.

Supplies

☐ Dust Sampling Form (PDF | Excel)
☐ Disposable wipes that are acceptable for dust sampling
☐ Nonsterlized, nonpowdered disposable gloves
☐ Centrifuge tubes with sealable caps
☐ Dust sample collection templates (if applicable)
☐ Masking tape
☐ Tape measurer

☐ Ruler(s)
☐ Gallon-size Ziplock bags, rack, or box to carry tubes
☐ Permanent markers (e.g., Sharpie)
☐ Trash bags or other receptacle
☐ Disposable shoe coverings

Preparation

1. Determine where to collect dust samples and mark them on the sketch of the home. Include:
    - Entryways with direct access to the outside
    - The child's primary play areas
    - Bedroom(s) of the youngest and next oldest child
    - Bathroom(s) used by the youngest child
    - Any other area that gets high use by the child
    - Floors, windowsills, operable windows, doors or high friction surfaces
    - Any area that tested positive for LBP with the XRF.
2. Determine the dust sample area in inches for each planned dust sample. The sample area must fall within the selected NLLAP lab's minimum area for analysis for the specified surface type (floors, windowsill, or window trough).
3. Prepare the centrifuge tubes by using a permanent marker to label the tube with:
    - Case number
    - Dust sample number
    - Date of collection
    - Sample location
    - Any other information required by the lab
4. Complete the Field Sampling Form for Dust Samples
    - Sample Number
    - Room
    - Surface Type
    - Exact Location of Wipe sample (floor, windowsill, etc.)
    - Smooth or Cleanable Surface
    - Sample Area
    - Notes

Steps

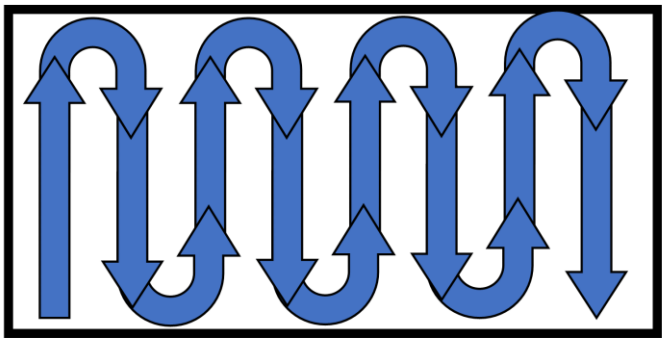
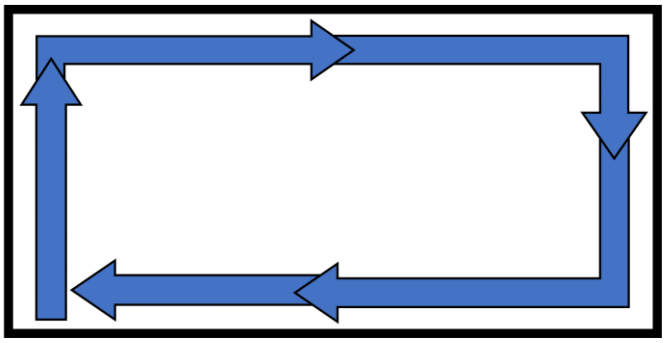
1. Put on a pair of disposable gloves.
2. Clean any tools (e.g., metal rulers or templates) with a fresh wipe before measuring or placing the template to outline the pre-determined dust sample area. Properly dispose of any wipes used to clean the tools in your own trash bag.
3. Outline the pre-determined dust sample area by either using a ruler to measure out masking tape or adhering a template to the surface with masking tape. Take extra precautions so as not to touch the sample area.

4. Change into a new pair of disposable gloves. Properly dispose of the old pair of gloves in your own trash bag.
5. Get a wipe for dust sample collection.
6. Fully open the wipe and conduct a preliminary inspection to ensure it is:
    - Moist
    - The correct size
    - Not expired
    - Without any holes or tears.
    - Note: If using wipes from a “pop-out” container, ensure the container was rotated to distribute the liquid and that the first wipe was disposed of since it could potentially be contaminated by the lid.
7. Collect the dust wipe sample, which will consist of three wipe passes (***Figure 2***). As you collect the sample, ensure the wipe stays within the sample area.
    a. The first wipe pass is side-to-side.
        i. Carefully place the wipe at one of the top corners of the sample area with it fully opened and flat on the surface.
        ii. Grasp the wipe between the thumb and palm.
        iii. Press down firmly, but not excessively. You should apply just enough pressure to move the wipe across the surface to collect the dust without causing the wipe to curl.
        iv. Starting from that top corner, move the wipe side-to-side within the sample area in an “S” motion, slightly overlapping the path of the previous “S” motion.
        v. Repeat the “S” motion as many times as necessary to completely wipe the sample area from side to side.
        vi. End the wipe pass in one of the bottom corners of the sample area.
        vii. Carefully pick up the wipe.
        viii. Fold the wipe in half where the side used to pick up the dust is facing the inside or inward.
    b. The second wipe pass is top-to-bottom.
        i. Carefully place folded wipe at one of the top corners of the sample area. Ensure it is flat on the surface. Similar to the first pass, grasp the wipe between the thumb and fingers. Press down firmly but not excessively.
        ii. Begin to move the wipe top-to-bottom within the sample area in an “S” motion, slightly overlapping the path of the previous “S” motion.Repeat the “S” motion as many times as necessary to completely wipe the sample area from top to bottom.
        iii. End the wipe pass in one of the bottom corners of the sample area.
        iv. Carefully pick up the wipe.
        v. Fold the wipe in half again, where the side used to pick up dust is facing the inside or inward.
    c. The third wipe pass is the perimeter of the sample area.

i. Carefully place the twice-folded wipe in one of the top corners of the sample area.
ii. Ensure it is flat on the surface. Grasp the wipe between the thumb and fingers. Press down firmly but not excessively.
iii. Move the wipe along the entire perimeter of the sample area, ensuring it stays within the tape or template.
iv. End the wipe pass at the top corner you started with.
v. Carefully pick up the wipe.
vi. Fold the wipe in half again, where the side used to pick up dust is facing the inside or inward.
vii. Place the wipe into the centrifuge tube.
viii. Seal the tube with the cap.
ix. Place the centrifuge tube in the designated dust sample bag, rack, or box.

8. Repeat steps 4 – 7 for all samples to be collected
9. Remove all trash related to the dust sample collection (e.g., masking tape, gloves, sampling debris) and properly dispose of these items in your own trash bag.
10. After completing all dust sample collections, prepare at least one blank dust sample to send to the lab for analysis. This blank sample should be disguised as a sample taken from an "extra" room (e.g., if there are 2 bedrooms in the home, label the blank as Bedroom 3). To prepare the blank sample:
    a. Get a wipe for dust sample collection.
    b. Fully open the wipe and conduct a preliminary inspection to ensure it is moist, the proper size, not expired, and without any holes or tears.
    c. Fold the wipe in half, as you would for the first wipe pass.
    d. Then, fold the wipe in half again, as you would for the second wipe pass.
    e. Lastly, fold the wipe in half again, as you would for the third wipe pass.
    f. Place the wipe into the centrifuge tube.
    g. Seal the tube with the cap.
    h. Place the centrifuge tube in the designated dust sample bag, rack, or box.
11. Record all samples onto a lab Chain of Custody form.

Figure 2: Dust Sample Collection Technique

1	First Pass: Left-to-right, “S” shaped motion 
2	Second Pass: Top-to-bottom, “S” shaped motion 
3	Third Pass: Around the perimeter 

Soil Sampling

Several studies have shown a significant association between lead-contaminated soil and children with lead in the blood. Children are most likely exposed from either directly ingesting soil that contains lead or indirectly getting exposed to the contaminated soil if it gets brought into (or "tracked into") the home and settles into the house dust. Therefore, in addition to dust samples, it is necessary to collect soil samples during a LIRA.

When collecting soil samples, the primary concern is bare soil that does not have good coverage from grass, wood chips, gravel, turf or other landscaping materials. The lack of coverage on bare soil makes the lead more readily available for exposure. Given that lead is heavy, if there is good coverage on the soil, then the lead does not have a pathway of exposure.

The EPA sets the hazard and clearance standards for lead in bare soil. ***Table 15*** lists the current standards and clearance levels that were effective as of January 17, 2024.

Table 15: Lead-Soil Hazard Standards

Location	Hazard Standard
Bare Soil	200 ppm
Properties with Multiple Lead Sources	100 ppm

Collection and Testing Process

Soil samples should be collected from playareas and non-playareas of the home with bare soil. Typically, *at least 2 composite soil samples* are needed to evaluate the presence of lead in the soil. A composite soil sample is where 3 to 10 subsamples between 2 to 6 feet apart are placed into the same centrifuge tube for analysis.

Common places to collect soil samples are:

- Any area with bare soil where the child typically plays outside which can be indicated by, but not limited to, the presence of play equipment (like sandboxes, swing sets, and slides), the child's toys or other possessions, your observations of play patterns, or information provided by the parents, caregivers, or nearby residents
- Along the driplines of the home that have bare soil
- Gardens
- Pet sleeping areas
- Pathways that have bare soil

Risk assessors should also consider sampling potentially unusual play areas that may have bare soil, like beneath elevated porches.

Blank soil samples are not needed for lab analysis in a LIRA.

Supplies

☐ Soil Sampling Form (PDF | Excel)
☐ Soil coring device
☐ Stainless steel spoon or spatula (or disposable plastic)
☐ Ruler or tape measurer
☐ Nonsterlized, nonpowdered disposable gloves
☐ Gallon-size Ziplock bags, rack, or box to carry tubes
☐ Disposable wipes
☐ Centrifuge tubes with sealable caps
☐ Masking tape
☐ Permanent markers (e.g., Sharpie)
☐ Trash bags or other receptacle
☐ Disposable shoe coverings

Preparation

1. Determine where to collect soil samples and the number of subsamples per composite. Include at least one distinguishable area with bare soil (like a common play area or drip line).
2. Mark the soil samples on the sketch of the home.
3. Prepare the centrifuge tubes by using a permanent marker to label the tube with:
    - Case number
    - Soil sample number
    - Date of collection
    - Sample Location (e.g., play area, dripline, sandbox, etc..)
    - Number of subsamples
    - Any other information required by the lab
4. Complete the Soil Sampling Form (PDF | Excel).
    - Sample number
    - Location of composite sample and the number of composites taken
    - Type of area samples – play area or non-play area
    - Approximate area of bare soil represented by the sample

Steps

1. Put on a pair of disposable gloves.
2. Clean any tools (e.g., soil coring device and stainless steel spoon) with a fresh wipe before collecting any soil subsamples. Properly dispose of any wipes used to clean the tools in your own trash bag.
3. Change into a new pair of disposable gloves. Properly dispose of the old pair of gloves in your own trash bag.
4. Collect the soil composite from the pre-determined area.
    a. Push the soil coring device into the ground to capture the top ½ inch of soil.

    b. Gently pull the soil coring device out of the ground and transfer to a centrifuge tube.
    c. If the ground is hard and you are unable to get a sample using the soil coring tool, use the spoon or spatula to collect and transfer the top ½ inch of soil into the centrifuge tube.
    d. Move the appropriate distance away from this subsample to collect the next.
        i. Drip line: Space each subsample at least 2 to 6 feet apart.
        ii. Playarea: Collect subsamples in an equidistant X pattern.
5. Repeat steps 4a-4e until 3 to 10 subsamples are collected in the centrifuge tube.
6. Seal centrifuge tube with the cap.
7. Place the centrifuge tube in the designated soil sample bag, rack, or box.
8. Change into a new pair of disposable gloves. Properly dispose of the old pair of gloves in your own trash bag.
9. Clean any tools (e.g., soil coring device and stainless steel spoon) with a fresh wipe after collecting soil subsamples. Properly dispose of any wipes used to clean the tools in your own trash bag.
10. Record all samples onto a lab Chain of Custody form.

Paint Chip Sampling

Paint chip samples do *not* need to be collected if you have an XRF that is functioning properly and did not produce any inconclusive values.

If you do have to collect paint chip samples, ensure they are done after dust sample collection to minimize cross-sample contamination. Paint chip sampling is a destructive method that may release a small amount of lead dust. Personnel conducting paint sampling should avoid hand-to-mouth contact (specifically, smoking, eating, drinking, and applying cosmetics) and should wash their hands with running water immediately after sampling.

Collection and Testing Process

Before any paint chip samples are collected, the occupant must be notified that paint chip samples are needed and the locations where those samples may be taken. When collecting paint chip samples, it is necessary to collect all layers of paint from the surface and to collect the samples from nonobtrusive areas in the home, such as:

- Behind pictures
- Behind furniture
- Near corners
- Underneath protruding surfaces like mantels or windowsills

Paint chips are analyzed in a laboratory and results are reported as either a **mass concentration** (µg/g or % lead) or a **loading** (mg/cm^2). A paint chip sample does not need to be more than 2 to 4 square inches in size (however, confirm the paint chip size needed with the identified laboratory).

Record the exact dimensions of the area sampled. Results are reported in mass concentration ug/g or % lead. If the area sampled is measured exactly, and all the paint within that area can be removed and collected, it is possible to also report the results as the area concentration in mg/cm^2, also known as the loading. If you report the sample results as a loading, in mg/cm^2, you must tell the laboratory in advance and have it report the weight of the whole sample, the mass concentration, and the loading; in this case, including a small amount of substrate in the sample is permitted.

Paint chip sampling requires some form of containment. There are two methods:

- **Method 1: Plastic Sheeting Underneath Sampling Area.** A clean, four-by-four-foot sheet of plastic should be placed under the area to be sampled to capture any paint chips not captured by the collection device or creased piece of paper. Any visible paint chips falling to the plastic should be included in the sample. Dispose of the plastic after each sample collection by placing the plastic sheeting in a trash bag. Do not throw away the plastic at the dwelling. Wet wipes may be used to clean the area.
- **Method 2: "Glovebag" Approach.** A "glovebag" approach may be used if further containment is necessary. A durable sheet of plastic is loosely taped to the surface to be sampled, and a paint scraper, collection device, and shipment container are housed inside the plastic. There should be enough room in the plastic to permit a scraping motion without dislodging the tape holding the plastic to the surface. Large plastic baggies can be used instead of the sheet of plastic if paint chips are to be shipped to the lab in plastic baggies. When properly conducted, this method completely seals the surface during sample collection. A four-by-four-foot sheet of plastic is still required under the "glovebag" to capture any debris that fall to the ground during this procedure. The tape should be slowly removed from the surface to avoid lifting any additional paint off of the surface.

Supplies

☐ Sharp stainless steel paint scraper
☐ Box cutter or other sharp tool to score the wall
☐ Metal ruler
☐ Disposable wipes
☐ Nonsterlized, nonpowdered disposable gloves
☐ Centrifuge tubes with sealable caps or other
☐ Collection device (clean creased piece of paper or cleanable tray)
☐ Tape measure or ruler (if results are reported in mg/cm^2)
☐ Ladder
☐ Trash bags
☐ Flashlight
☐ Masking tape
☐ Letter-size paper
☐ Permanent markers (e.g., Sharpie)
☐ Heat gun or other heat source operating below 1100°F to soften the paint before removal
☐ Paint Chip Sampling Form (PDF | Excel)

Preparation

1. Determine where to collect paint chip samples. Ensure sample locations are in a nonobtrusive location.
2. Inform the family that paint chip samples need to be collected and the locations of the samples.
3. Mark the paint chip samples on the sketch of the home.
4. Prepare the centrifuge tubes by using a permanent marker to label the tube with:
    - Case number
    - Paint chip sample number
    - Date of collection
    - Sample Location
    - Any other information required by the lab
5. Complete the Paint Chip Sampling Form (PDF | Excel).

Steps

1. Determine what type of containment method to use for the paint chip sample collection and set up the containment.
2. Put on a pair of disposable gloves.
3. Clean any tools (e.g., paint scraper or box cutter) with a fresh wipe before collecting any paint chip samples. Properly dispose of any wipes used to clean the tools in your own trash bag.
4. Change into a new pair of disposable gloves. Properly dispose of the old pair of gloves in your own trash bag.
5. Take a clean piece of letter-size paper and make a crease about one-quarter of the way down along the long-edge of the paper.
6. Tape the paper underneath the paint chip sample area, it will help catch any debris.
7. Use a metal ruler and permanent marker to measure and mark the paint chip sample area based on the laboratory's needed measurements.
8. Change into a new pair of disposable gloves. Properly dispose of the old pair of gloves in your own trash bag.
9. If necessary, use a heat gun to soften the paint before removal.
    - Hold the heat gun no closer than six inches from the surface.
    - Do not scorch the paint.
    - Stop heating once the paint is softened or blistering is observed.
10. Use the box cutter or other sharp tool to score around the measured paint chip sample area. Ensure the score goes through all layers of paint.
11. Use the paint scraper to scrape all layers of paint from the substrate directly into the centrifuge tube or onto a piece of paper. Be careful not to collect any of the substrates.
12. If applicable, carefully create a cone out of the paper to funnel the paint chip samples into the labeled centrifuge tube.
13. Seal the centrifuge tube with a cap.

14. Place the centrifuge tube in the designated paint chip sample bag, rack, or box.
15. Change into a new pair of disposable gloves. Properly dispose of the old pair of gloves in your own trash bag.
16. Carefully dispose of the paint chip sample containment area.
17. Use disposable wipes to clean any dust that was generated from the paint chip sample.
18. If necessary, reseal the surface with spackling and new paint to repair the area.

Water Sampling

When conducting a LIRA in response to a child with a BLL above the BLRV, it is optimal practice to collect water samples since drinking water can be a significant source of lead exposure. However, it is not required to collect a water sample. It is important to note that lead exposure from drinking water is typically due to corrosion of the plumbing system, not the groundwater.

Currently, the EPA National Primary Drinking Water Regulations for Lead has the limit set for lead in drinking water to 10 ppb (or 0.010 mg/L).

Collection and Testing Process

Water samples should be collected from a cold water tap in the kitchen or bathroom after the water has sat for *at least* 6 hours. In other words, the water sample is collected after *at least* 6 hours of no water use within the home, meaning no running the dishwasher, flushing the toilet, or cleaning dishes. Due to this requirement, it is typically best to collect the sample first thing in the morning, which is known as the “first flush” sample. This sampling technique represents the worst-case scenario and is generally collected by the family the morning after the LIRA.

Supplies

☐ 1-liter bottle that is clean, plastic, and wide-mouth

Preparation

1. Prepare the water sample collection bottle by using a permanent marker to label the bottle with:
    a. Case number
    b. Water sample number
    c. Date of collection
    d. Sample Location
    e. Any other information required by the lab

Steps

1. Explain the collection procedure to the parent or caregiver, which includes:
    a. Collecting the sample first thing in the morning before flushing the toilet or washing hands since it is best to have water that sat for at least 6 hours.
    b. Using the kitchen or bathroom cold-water faucet to collect the sample.
    c. Sealing the sample bottle tightly with the included cap after sample collection.
    d. Showing the family what information to fill out on the forms.

    e. Advising the family that staff will return to pick up the sample and paperwork the following morning.
2. Give the family the water sample collection bottle and Water Sample Collection Instructions (Word).
3. Coordinate a pick-up time with the parent or caregiver.
4. Pick up the water sample and chain of custody form.
5. Deliver or ship the water sample to ensure it is analyzed within 14 days after collection.

Debrief with the Family

After the LIRA, the family should be provided with the following:

1. A 'Thank You' for their time
2. A quick overview of what was found or not found
3. A copy of the EPA's Renovate Right booklet
4. Recommendations to mitigate lead exposure (if lead hazards were found), such as:
    - Wet-cleaning
    - Removing, reducing, or terminating the use of non-structural hazards
5. An expected timeline to receive the final LIRA report in the mail
6. Educational materials, such as:
    - NvCLPPP's Tips to Clean flyer (ENG or SPA)
    - NvCLPPP's After the Lead Test brochure (ENG or SPA)

Prepare and Send Environmental Samples for Analysis

Also, after the LIRA, all collected environmental samples must be sent to an NLLAP laboratory for analysis. Accreditation of these labs occurs periodically, therefore, it is critical to regularly check whether your chosen lab is still a part of NLLAP.

Lab analysis of environmental samples will confirm whether samples fall within current standards and regulations for lead (*Appendix G: US Standards and Regulations for Lead Levels*).

As of May 2024, NvCLPPP has worked with and recommends SGS Forensic Laboratories for lead lab analysis. SGS Laboratories have locations in the West Coast with the capabilities to analyze dust, soil, paint chip, and drinking water samples (***Table 16***).

Table 16: SGS Lab Locations in the West Coast

West Coast Location	Address	Phone Number	Lab Capabilities for Lead Analysis
SGS Forensic Hayward	3777 Depot Road, Suite 409 Hayward, CA 94545	(510)887-8828 (800)827-3274	Flame AA only: Dust Soil Paint chips
SGS Forensic Carson	20535 South Belshaw Avenue Carson, CA 90746	(310)763-2374 (888)813-9417	Flame AA and ICP: Dust Soil Paint chips
SGS Silver State Las Vegas	3626 East Sunset Road Ste 100 Las Vegas, NV 89120	(702)387-0040	EPA Method 200.8: Lead in drinking water
Local SGS Forensic Laboratories Representative Nicole Adams (310)763-2374 x 5601 Nicole.adams@sgs.com			

The following steps for preparing and sending samples for lab analysis are appropriate for SGS labs. If using a different NLLAP laboratory, confirm their requirements and processes beforehand by contacting a customer service representative.

Preparing Environmental Samples for Lab Analysis

1. Double-check that all centrifuge tubes are:
    a. Correctly labeled
    b. Recorded on the corresponding lab Chain of Custody form (The sample IDs on the centrifuge labels and Chain of Custody should clearly match up)
    c. Securely closed with a lid
    d. Covered with parafilm to prevent leaking (if a liquid sample)
2. Prepare a gallon-size Ziploc bag for each type of environmental sample (e.g., dust samples, soil samples, etc.) by using a permanent marker to label the bag with:
    a. Environmental sample type
    b. Property address
    c. Case number
3. Place environmental samples into their corresponding Ziploc bag.
4. Complete the remainder of the Chain of Custody form(s) (i.e. Client information, turn around time, analysis method, relinquished by, etc).
    a. For analysis method for dust, soil, and paint chip samples specify whether Flame AA or ICP
    b. For analysis method for drinking water, specify EPA 200.8
5. Take photos or make a copies of each of the Chain of Custody forms. Theset will be retained for your records.
6. Place the corresponding Chain of Custody form into the Ziploc bag. Close the bag.
7. If shipping samples:

a. Place the Ziploc bags with environmental samples into a shipping box and securely pack everything. If necessary, use newspaper, bubble wrap, or packing peanuts. Dust, soil, and paint chip samples may be sent in the same box, however water samples should be packed seperately since they will go to a different lab.
b. Prepare a shipping label. Make sure you address the appropriate lab:
    i. Las Vegas lab accepts drinking water samples
    ii. Carson or Hayward lab accepts dust, soil, and paint chip samples

Sending Environmental Samples for Lab Analysis

Next, drop-off samples at the laboratory, designated drop-off location, or post office according to your chosen lab's procedures.

If using SGS Laboratories, samples can be shipped to one of the locations listed on ***Table 16*** at the expense of the health district, or they can be dropped off at a nearby SGS location for free priority shipping to other SGS Labs. There are two SGS drop off locations in Nevada, one in Las Vegas and one in Reno (***Table 17***).

Table 17: SGS Drop-off Locations in Nevada

Drop-off Location	Address	Contact Information
Las Vegas Office*	3626 East Sunset Road Ste 100 Las Vegas, NV 89120	(702)873-4478
Reno Office*	1135 Financial Blvd Reno, NV 89502	(775)857-2400
**Note: Check with lab to determine whether samples must be dropped-off before a certain time. Appointments outside of normal business hours can be arranged upon request.*		

As long as the correct method of analysis is filled out on the Chain of Custody, the SGS drop-off location will ship the samples to the appropriate lab, whether that be Carson, Hayward, or Las Vegas. Results will be emailed to the email address listed on the Chain of Custody within the turnaround time selected. If you do not receive lab results within your seleced turnaround time, contact a customer service representative.

Multi-Unit Housing

If the LIRA in response to a child with a BLL above the BLRV is conducted at a multi-unit property, then the testing and sampling techniques remain the same within the child's primary unit, but additional dust and soil samples may need to be collected around the property (***Table 18***).

Dust

In addition to dust samples collected within the primary unit, dust samples should also be collected from:

- Common areas
- Main entryway of the building
- Shared or common stairways
- Shared or common hallways
- Other common areas frequented by the child

Table 18: Recommended Additional Areas to Collect Dust Samples

Number of Floors	Locations of Additional Dust Samples
4 or less	1) Entry area floor 2) Floor of the first-story landing of a common hallway or stairway OR a frequently used interior window sill or trough
More than 4	1) Entry area floor 2) Floor of the first-story landing of a common hallway or stairway OR a frequently used interior window sill or trough 3) Floor areas in the corridor of every fourth floor 4) Window troughs or interior window sill in the corridor of every fourth floor 5) Stair treads of every fourth floor 6) Stair landing of every fourth floor

Soil

Some multi-unit properties may have several play areas with bare soil. At some point, sampling additional play areas does not provide benefit to the LIRA. ***Table 19*** provides general guidance on how many play areas to sample at a multi-unit property. Risk assessors should use their professional judgment when sampling at very large, multi-unit properties.

Table 19: Recommended Number of Additional Play Areas to be Sampled

Number of Dwelling Units Per Building	Number of Play Areas to Sample
1 to 10	No more than 2 per building
More than 10	No more than 3 per building

It is also recommended to collect *1 additional soil sample in non-play areas* of nonresidential buildings on the property if the following conditions are present:

1. The building is a substantial permanent structure (like a garage);
2. It was built before 1978, or the year of construction is unknown and there is no reason to presume it was built more recently;
3. There is evidence that surfaces of the building are painted;
4. It is free-standing and not structurally connected or part of the residential building; and
5. The bair soil is accessible to young children (i.e., access is not effectively blocked by a fence, wall, or thorny bushes).

Concluding a LIRA

It is necessary to compile all paperwork, results, and findings from the LIRA for your records. This information will then be used to create a LIRA report that includes:

- A summary of the results and where hazards and potential hazards were found
- Recommendations for hazard control
- All data and identifying information

Records Management

In the appropriate case folder:

1. Download and save a copy of all XRF data as a Microsoft Excel file.
2. Download and save a copy of all photos.
3. Label all photos (e.g., Picture 1, Picture 2, etc.) according to how they appear on the Lead Hazard Photo Log (PDF | Excel)
4. Review the transcribed XRF findings on the XRF Paint Testing Form for accuracy and completeness.
5. Document laboratory results on the corresponding environmental sample forms.
6. Save a copy of the final LIRA Report as a PDF document.
7. Enter or submit data into appropriate databases (e.g., EpiTrax).

Writing a Report

The final report communicates the results and provides thorough documentation of the LIRA. This report will communicate whether lead hazards were identified in the home, and, if so, measures to control or abate those hazards.

The LIRA Final Report Template includes:

1. Executive Summary and Key Findings
2. Background Information
3. Findings
4. Important Information to Know
5. Certification
6. Supporting and Supplemental Documentation

An original, signed copy of the report should be delivered to the family via mail or email. Additionally, a copy should be forwarded to case management (if applicable) and a copy should be retained in the case folder.

Optional Reporting

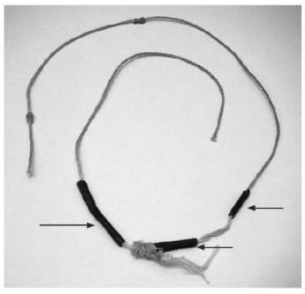
Routine monitoring can help recognize trends in non-paint lead exposures and identify new lead sources. Findings can also inform strategies for targeted education and lead poisoning prevention activities, as well as provide evidence for national and/or international policies to reduce lead exposures from contaminated products. Consider reporting results associated with consumer products to NYC Open Data.

Appendices

Appendix A: Types of Potential Lead-Contaminated Consumer Products

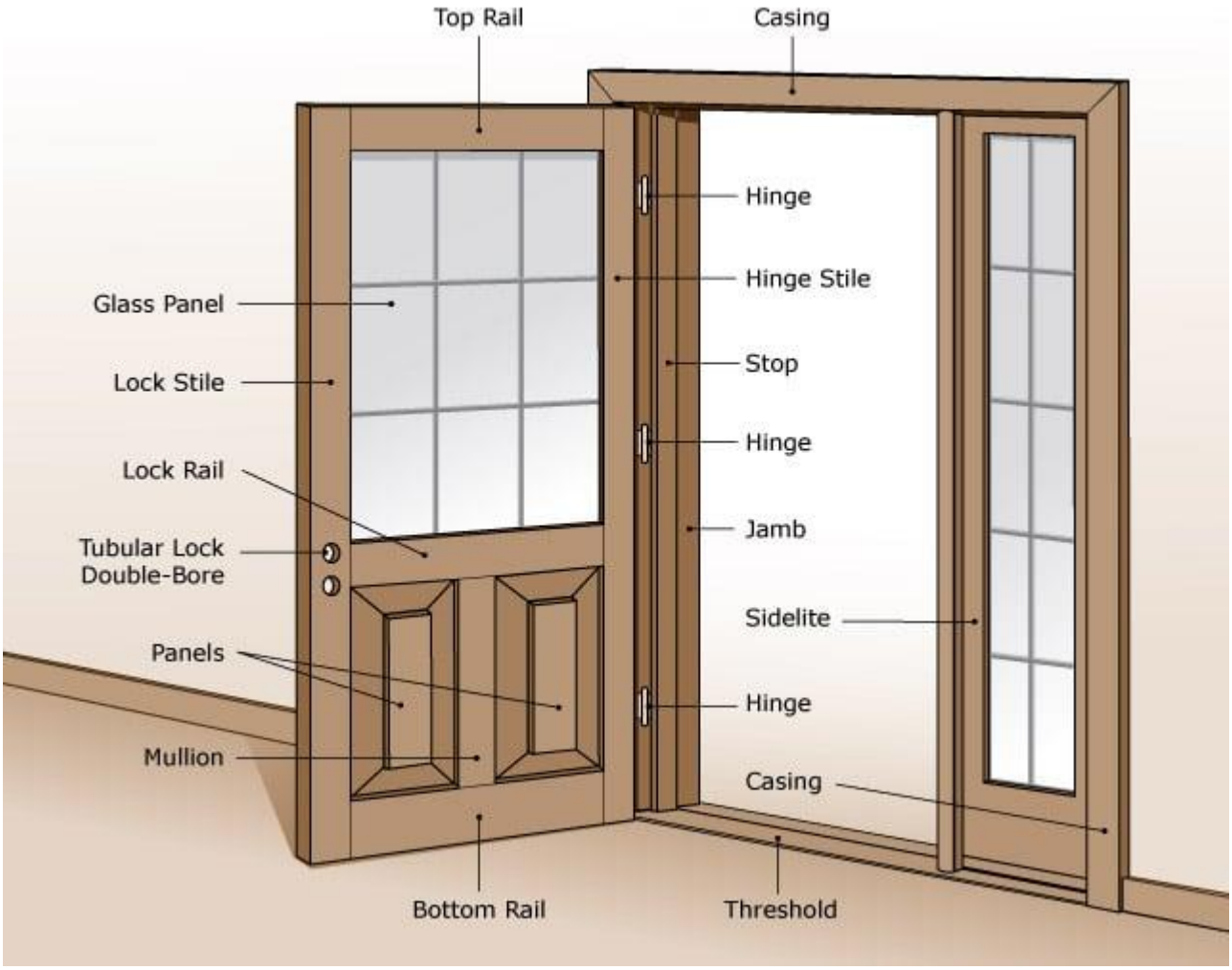
Product Category	Examples	Photo Examples
Foods	• Candies • Snack mixes that use chili or fruit pulps • Chocolates (Ecuador)	 Nick George / The Chronicle
Spices	• Turmeric • Cinnamon	 LeadFreeNYC
Health Remedies	• Rasa Shastra Ayurvedic medicines • Traditional Chinese medicines • Calabash Chalk • Tierra Santa/Panito del Señor • Litargirio	 California Department of Public Health  North Carolina Healthy Homes

Cookware or Dishes	• Traditional or handmade ceramics • Traditional “Kansa” or brassware	 FDA  Journal of Exposure Science and Environmental Epidemiology
Cosmetics and Cultural Powders	• Kohl • Kajal • Surma • Tiro • Sindoor • Tika • Kum kum • Litargirio	 LeadFreeNYC  North Carolina Healthy Homes
Toys or Novelty Items	• Painted toys • Small figurines • Children’s sunglasses • Pencil pouches • Dolls • Toy cars and trucks	 CDC

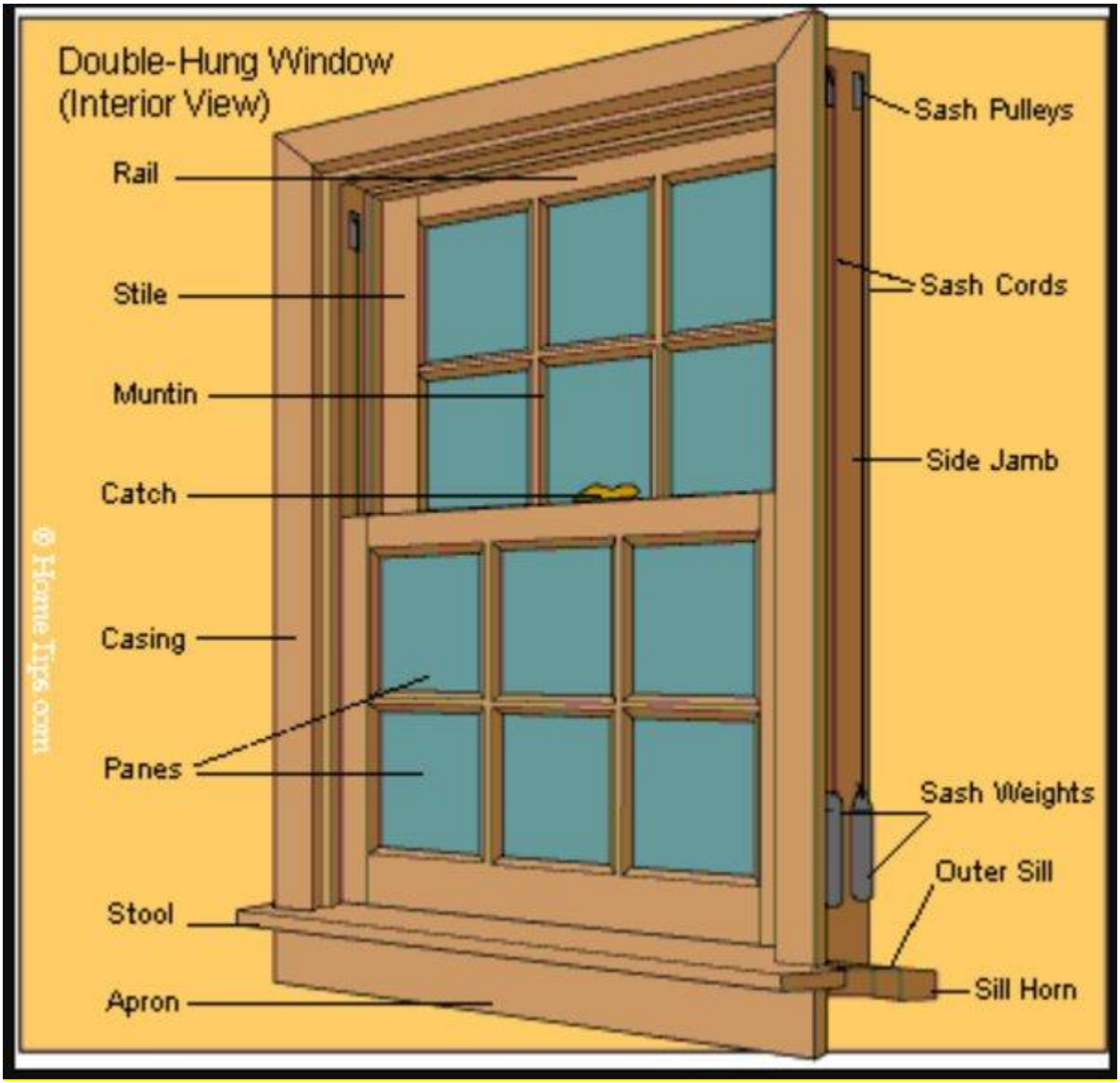
		   CPSC
Jewelry, Amulets, Charms	• Children's necklaces • Children's bracelets • Metal jewelry • Imitation pearl beads	 LeadFreeNYC  CDC

		 Jeff Weidenhamer, Ashland University

Appendix B: Door Components

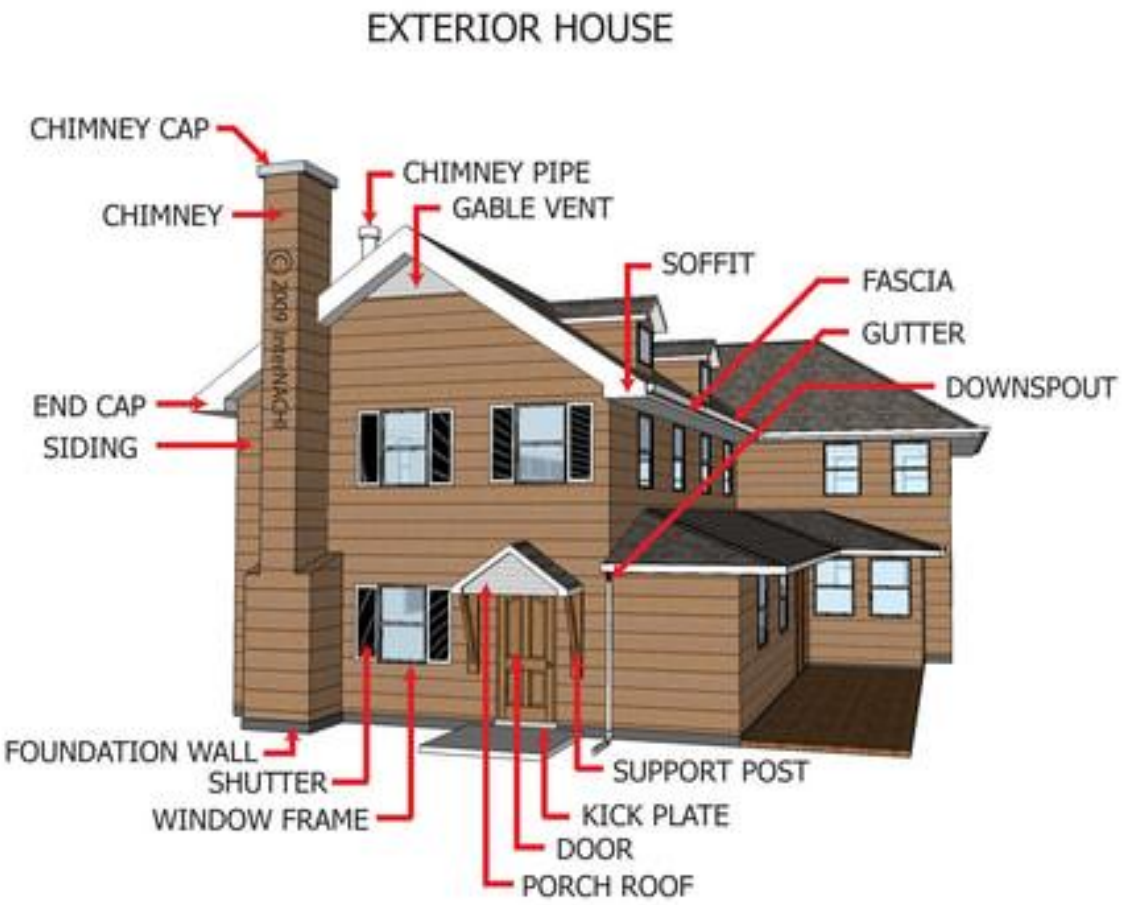


Appendix C: Window Components

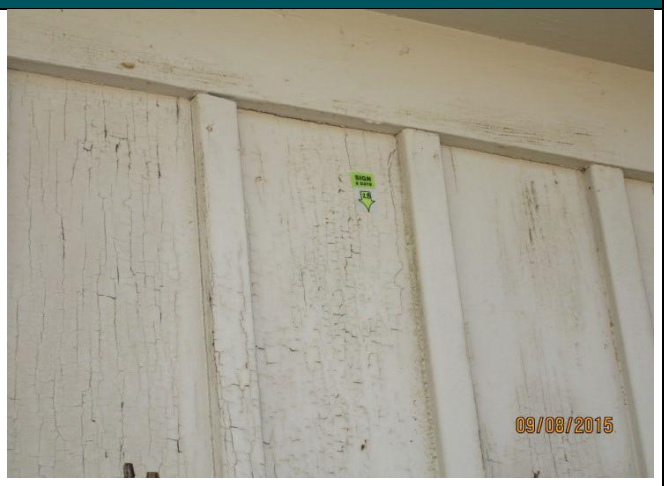


Appendix D: Stair Components

Appendix E: Exterior House Components



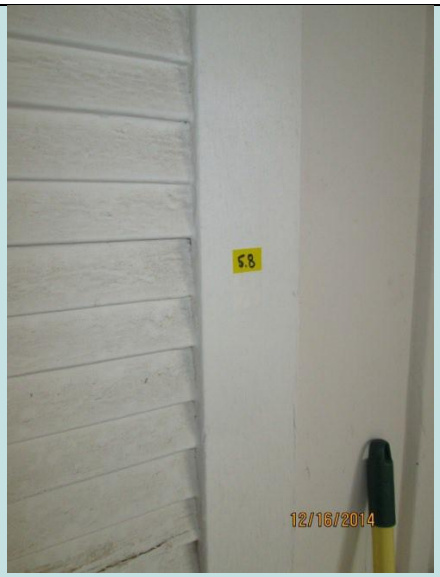
Appendix F: Examples of Components with Pictures

Component	Picture
Wood Exterior Wall with vertical wall trim and Upper wall trim	
Exterior wall with metal siding with deteriorated paint	
Exterior Stucco Wall	

Foundation of House	
C /D Wall Corner Board	
Overhang	

Overhang Support	
Fascia	
Roof Flashing	

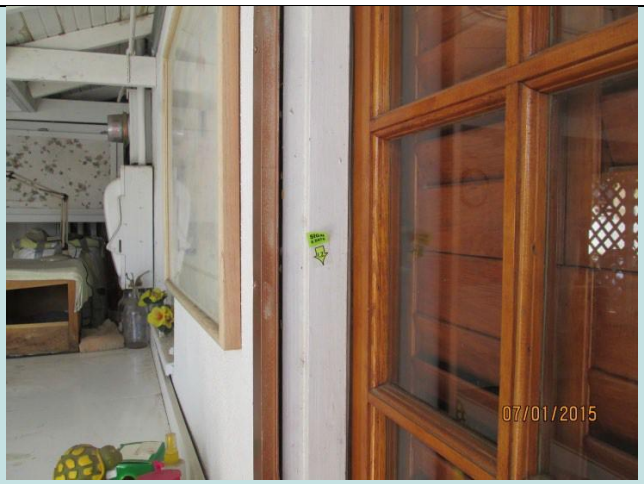
Window 1 Windowsill	
Window 1 Apron (decorative component below the windowsill)	
Window 1 Frame	

Window 1 Casing (or outer window frame)	
Window 1 Shutter	

A Wall Decorative piece	
Door Knocker	

Covered Porch Support Beam	
Covered Porch Overhang Support	
Covered Porch Overhang	

Carport Vertical Siding	
Kitchen Upper Cabinet Door	
Kitchen Cabinet Shelf	

Bath 1 Door	
Kitchen Doorstop	
Kitchen Inner Doorjamb	

Bath 1 Tile Floor	
Bath 3 Tile B Wall	

Appendix G: US Standards and Regulations for Lead Levels

Lead hazard standards help determine whether a lead hazard is present during a risk assessment or lead hazard screen. Clearance levels are used to evaluate the effectiveness of post-abatement cleaning.

Lead Hazard Standards

Media	Level	Agency
Ceramic Foodwares – cups and mugs[1]	0.5 µg/mL*	FDA
Ceramic Foodwares – flatware[1]	3 µg/mL*	FDA
Ceramic Foodwares – large hollowware other than pitchers[1]	1 µg/mL*	FDA
Ceramic Foodwares – pitchers[1]	0.5 µg/mL*	FDA
Ceramic Foodwares – small hollowware other than cups and mugs[1]	2 µg/mL*	FDA
Consumer Products – accessible parts of children's products[2,3]	100 ppm	CPSC
Consumer Products – food cans, solder[4,5]	banned	FDA
Consumer Products – paint and similar surface coatings[6,7]	90 ppm	CPSC
Dust	any reportable level	EPA
Lead-Based Paint (any paint, varnish, shellac, or other coating)[8,9]	1.0 mg/cm^2 5,000 µg/g 5,000 ppm 5,000 mg/kg	EPA
Processed Foods Intended for Babies and Young Children – fruits, vegetables (excluding single-ingredient root vegetables), mixtures (including grain- and meat-based mixtures), yogurts, custards/puddings, and single-ingredient meats[10]	10 ppb	FDA
Processed Foods Intended for Babies and Young Children – single-ingredient root vegetables[10]	20 ppb	FDA
Processed Foods Intended for Babies and Young Children – Dry infant cereals[10]	20 ppb	FDA
Soil – play areas[11]	200 ppm	EPA
Soil – property with multiple sources of lead exposure[11]	100 ppm	EPA
Drinking water – bottled[5,12]	5 ppb	FDA
Drinking water – tap[13]	10 ppb 0.010 mg/L	EPA

Based on the level of lead per mL of **leaching solution.*

Dust-Lead Action Levels

Media	Level	Agency
Dust – floors[4]	5 µg/ft²	EPA
Dust – window sills[4]	40 µg/ft²	EPA
Dust – window troughs[4]	100 µg/ft²	EPA

Health-Related Values

Type	Level	Agency
Adult, Action Level in the Workplace – Air[14,15]	30 µg/m^3	OSHA
Adult, Blood Lead Level in the Workplace[14,15]	40 µg/100g	OSHA
Adult, Permissible Exposure Limit (PEL) in the Workplace – Air[14,15]	50 µg/m^3 (averaged over 8-hour period)	OSHA
Children, Blood Lead Reference Value[16]	3.5 µg/dL	CDC

Note: These tables were last updated as of April 2025. Please check each agency for the most current standards.

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