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	Engineering and Design COMBINED LEAD INSPECTION/RISK ASSESSMENT FOR TARGET HOUSING PROPERTY TRANSFERS STANDARD SCOPE OF WORK	
	Distribution Restriction Statement Approved for public release; distribution is unlimited.	
	This Engineering Pamphlet has been developed to incorporate the Environmental Protection Agency's definition of lead hazards to young children as published in 40 CFR 745 Subpart D: Lead, Identification of Dangerous Levels of Lead; Final Rule, 5 January 2001	

This EP Supercedes EP 1110-1-31 Dated 15 September 2000

DEPARTMENT OF THE ARMY
U. S. Army Corps of Engineers
Washington, D. C. 20314-1000

EP 1110-1-31

CEMP-RA

Pamphlet
No. 1110-1-31

31 August 2001

Engineering and Design
COMBINED LEAD INSPECTION/RISK ASSESSMENT
FOR TARGET HOUSING PROPERTY TRANSFERS
STANDARD SCOPE OF WORK

1. Purpose. The standard Scope of Work (SOW) described in this Engineer Pamphlet (EP) provides a framework for developing site- and project-specific scopes of work for completion of combined lead inspections/risk assessments for DA property transfers.

2. Applicability. This pamphlet applies to all USACE Commands responsible for design of lead inspections/risk assessment projects.

3. Distribution. Approved for public release; distribution is unlimited.

4. References. References are included in Appendix A, Paragraph 1.1.

5. Discussion.

a. This EP provides a standard SOW for conducting combined lead inspections/risk assessments for DA property transfers.

b. This EP provides a framework based on Federal regulations and guidance in effect as of the EP date of publication. The SOW editor shall ensure that updated Federal requirements, as well as applicable state and local (or Outside Continental United States (OCONUS)) requirements are addressed in using this SOW.

c. Those responsible for designing conducting combined lead inspections/risk assessment projects shall be familiar with the concepts and procedures described in the references in Appendix A.

FOR THE COMMANDER:

ROBERT CREAR
Colonel, Corps of Engineers
Chief of Staff

2 APPENDICES
APP A – Combined Lead Inspection/
Risk Assessment
Standard Scope of Work
APP B - Tables and Forms

This EP Supercedes EP 1110-1-31 Dated 15 September 2000

APPENDIX A
COMBINED LEAD INSPECTION/RISK ASSESSMENT FOR TARGET HOUSING PROPERTY TRANSFERS STANDARD SCOPE OF WORK

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NOTE TO SCOPE OF WORK EDITOR

This Standard Scope of Work (SOW) is to be used for performing combined lead inspection/risk assessments at Department of Army (DA) properties known as target housing and child occupied facilities (see Glossary) that are being prepared for sale based on Section 1013 of Title X (42 U.S.C. 4822) implemented by 24 CFR 35, 15 September 1999 (64 FR 50142).

This SOW requires that the lead inspection/risk assessment be performed at one time, thereby minimizing cost and disruption to housing occupants.

The lead inspection provides a report describing the location(s) of lead-based paint (LBP) and the risk assessment provides a report describing lead hazards found and control measures recommended eliminating the hazards.

This SOW is not to be used to mitigate lead hazards discovered during the lead inspection/risk assessment. Lead hazard abatement is contractually addressed under separate contract using U. S. Army Corps of Engineers Guide Specification 13281 “Lead Hazard Control Activities”.

This SOW does not include requirements for conducting elevated blood lead (EBL) investigations addressed in Reference 1.1.1.3.c of this SOW. EBL investigations are of concern at active target housing or child-occupied facilities and involve comprehensive analyses of all lead exposure sources to the child or children with EBL, both inside and outside the home, and can involve input and cooperation between a number of regulatory agencies.

This SOW does not include requirements to assess lead in drinking water. This issue is adequately covered under the Safe Drinking Water Act monitoring requirements, should it become an issue at the time of sale or transfer of property.

The editor of this SOW should note the following conventions used throughout this Standardized SOW: 1) [brackets] indicate that the SOW editor must either select from the text within the brackets or provide project specific information for insertion into the text, and 2) when the complete text of a given paragraph is within [brackets] and the bracketed text is deleted the SOW editor must also delete the paragraph heading and renumber accordingly.
The editor of this SOW must have a certificate of completion of current U.S. Environmental Protection Agency (USEPA) training or state training (if required by the state where the work is to be performed) as a certified lead inspector/risk assessor (see 40 CFR 745.223). In addition, the SOW editor must be familiar with Federal, state and local requirements applicable in the jurisdiction in which the project is to be completed. Contact state and local authorities to determine whether established requirements and procedures are more restrictive than those outlined in this SOW. State contacts for the Centers for Disease Control Childhood Lead Poisoning Prevention Program may be found on the Internet at

http://www.cdc.gov/nceh/program/lead/grants/contacts/contacts.htm
****

1.0 PROJECT OVERVIEW, OBJECTIVES, AND DESCRIPTION OF WORK

1.1 REFERENCES

1.1.1 Federal

1.1.1.1 Consumer Product Safety Commission (CPSC)

a. CPSC Finds Lead Poisoning Hazard for Young Children in Imported Vinyl Miniblinds, Press Release 96-150, June 25, 1996

(see http://www.cpsc.gov/cpscpub/prerel/prhtml96/96150.html)

1.1.1.2 U.S. Environmental Protection Agency (EPA)

a. EPA National Lead Laboratory Accreditation Program, (NLLAP) Laboratory Quality System Requirements (LQSR) Revision 2.0, August 1, 1996

(see http://www/epa/gov/opptomtr/lead/nllapacr.txt)

b"Lead; Requirements for Lead-Based Paint Activities in Target Housing and Child-Occupied Facilities", 40 CFR Part 745, Subpart L, Lead-Based Paint Activities; Final Rule, 61 FR 45813, August 29, 1996,

c. "Lead; Requirements for LBP Activities in Target Housing and Child-Occupied Facilities; Certification Requirements and Work Practice Standards for Individuals and Firms, Amendment"; 40 CFR Part 745, Subpart L, Lead-Based Paint Activities; Final Rule, 64 FR 42849, August 6, 1999.

d. "Lead; Identification of Dangerous Levels of Lead", Final Rule, 40 CFR Part 745, Subpart D Lead-Based Paint Hazards, and Subpart L, Lead-Based Paint Activities, 66 FR 1206, January 5, 2001.

1.1.1.3 U.S. Department of Housing and Urban Development (HUD)

a. Requirements for Notification, Evaluation, and Reduction of Lead-Based Paint Hazards in Federally Owned Residential Property and Housing Receiving Federal Assistance; Final Rule 24 CFR Part 35, September 15, 1999.

b. Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing, U.S. Department of Housing and Urban Development, Government Printing Office, Washington, D.C. June 1995. (Chapter 7 revised 1997)

c. The Lead Listing, The National Lead Service Providers' Listing System. This listing is accessible on the Internet at http://www.leadlisting.org.

1.1.1.4 Occupational Safety and Health Administration (OSHA)

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

1.1.2 U.S. Army (DA)

1.1.2.1 Army Regulation (AR) AR 200-1, Environmental Protection and Enhancement

1.1.2.2 AR 420-70, Facilities Engineering, Buildings and Structures

1.1.2.3 DA Public Works Technical Bulletin 420-70-2, Installation Lead Hazard Management.
(see http://www.usacpw.belvoir.army.mil/ pubs/pubs.htm)

1.1.2.4 DA Memorandum (DAIM-FD (420-70)) Subject: Guidance for Lead-Based Paint Hazard Management During Transfer of Army Real Property, 28 March 2000, as applicable.

1.1.2.5 DA Hazardous Asbestos and Lead Optimal Management System (HALO)

1.1.2.6 U.S. Army Corps of Engineers EM 385-1-1, Safety & Health Requirements Manual

1.1.3 State, Local, Outside Continental United States (OCONUS), Host Nation Agreements, etc.

[Insert applicable references]

1.1.4 Other Organizations

1.1.4.1 American Association for Laboratory Accreditation (A2LA)
Environmental Lead Program Requirements, February 1994. (A2LA offers accreditation under NLLAP.)

1.1.4.2 American Industrial Hygiene Association (AIHA)

Analytical Quality Programs Quality Manual and Policies, Environmental Lead Laboratory Accreditation Program (ELLAP) and Industrial Hygiene Laboratory Accreditation Program, July 1997. **(**http://www.aiha.org**)**

1.1.4.3 American Society for Testing and Materials (ASTM)

a. E1605, *Standard Terminology Relating to Abatement of Hazards from Lead-Based Paint in Buildings and Related Structures*

b. E1613, *Standard Test Method for Analysis of Digested Samples for Lead by Inductively Coupled Plasma Atomic Emission Spectrometry (ICP-AES), Flame Atomic Absorption (FAAS), or Graphite Furnace Atomic Absorption (GFAAS) Techniques*

c. E1644, *Standard Practice for Hot Plate Digestion of Dust Wipe Samples for the Determination of Lead by Atomic Spectrometry*

d. E1645, *Standard Practice for the Preparation of Dried Paint Samples for Subsequent Lead Analysis by Atomic Spectrometry*

e. E1726, *Standard Practice for Sample Digestion of Soils for the Determination of Lead by Atomic Spectrometry*

f. E1727, *Standard Practice for Field Collection of Soil Samples for Lead Determination by Atomic Spectrometry Techniques*

g. E1728, *Standard Practice for Field Collection of Settled Dust Samples Using Wipe Sampling Methods for Lead Determination by Atomic Spectrometry Techniques*

h. E1729, *Standard Practice for Field Collection of Dried Paint Samples for Lead Determination by Atomic Spectrometry Techniques*

i. E1792, *Standard Specification for Wipe Sampling Materials for Lead in Surface Dust*

j. E1979, *Standard Practice for Ultrasonic Extraction of Paint, Dust, Soil, and Air Samples for Subsequent Determination of Lead*

k. PS95-98, *Standard Provisional Practice For Quality Systems For Conducting In Situ Measurements Of Lead Content In Paint Or Other Coatings Using Field Portable X-Ray Fluorescence (XRF) Devices*

l. PS116-99, *Provisional Practice For The Performance Evaluation Of The Portable X-Ray Fluorescence Spectrometer For The Measurement Of Lead In Paint Films*

1.2 REGULATORY REQUIREMENTS

1.2.1 Regulatory Authority/Requirements

The Contractor shall conduct all work in accordance with the following Federal, state, and local regulations and requirements. Where inconsistencies exist between the requirements and this Scope of Work (SOW), the Contractor shall use the most protective.

1.2.1.1 Federal Requirements

a. Lead Inspection/Risk Assessment Procedures and Requirements.

The Contractor shall comply with 24 CFR 35 Subparts B, C and R; and 40 CFR 745 Subpart D and L (as amended) in meeting the requirements of this SOW. Referenced methodologies in Lead-Based Paint Guidelines for Disposal of Department of Defense Residential Real Property-A Field Guide, the Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing, HUD, June 1995 (Chapter 7 Revision, 1997) shall be used where applicable. Lead hazards shall be identified based on "Lead; Identification of Dangerous Levels of Lead"; 40 CFR 745 Final Rule, 66 FR 1206, 5 January 2001. The Contractor shall comply with DA Public Works Technical Bulletin 420-70-2, Installation Lead Hazard Management regarding use of DA Hazardous Asbestos and Lead Optimal Management System (HALO) (See Glossary).

b. Health and Safety Requirements

The Contractor shall comply with applicable OSHA standards and with the USACE Safety and Health Requirements Manual, EM 385-1-1, to include the submission of an Accident Prevention Plan (APP) to the Contracting Officer (See Glossary) prior to performing field activities. Field activities shall not begin without acceptance of the APP.

1.2.1.2 State and Local Requirements

****

NOTE: Reference state, local, (and OCONUS if applicable) or installation-specific requirements that differ from the federal requirements cited above that are applicable to the work addressed in this SOW.

****

[The Contractor shall comply with the following state [and local] [and installation] requirements in completing the activities required by this SOW. [Insert applicable references]]

1.3 SITE CHARACTERISTICS, OBJECTIVES AND DESCRIPTION OF WORK

1.3.1 Site Location/Characteristics and Occupant Use Patterns

****

NOTE: Identify the target housing/child-occupied facilities to be addressed in the combined inspection/risk assessment on a unit-by-unit basis. Provide site location

information including installation or building designations, unit addresses and floor plans. Attach the information to the SOW. Summarize any physical characteristics and occupant use pattern information (see Glossary) that may be relevant to the risk assessment in light of the property transfer, that the Contractor must review by 40 CFR 745 Subpart L. This SOW requires the Contractor to collect detailed physical characteristics information during the visual assessment in Task # 2 using Forms 1 and 2 (Figure B-1 and Figure B-2, Appendix B).

****

The Contractor shall perform lead inspections/lead risk assessments at [insert unit description information]. Procedures and requirements for conducting these activities are defined in the following paragraphs. The physical characteristics, and occupant use patterns include [insert physical characteristic and occupant use pattern descriptive information].

1.3.2 Previous Studies and Results

****

NOTE: Include previous lead studies and results that are to be reviewed and considered by the lead inspector/risk assessor in making decisions and conclusions for the work specified in this SOW.

****

[Prior to initiating field activities required by this SOW, the lead inspector/risk assessor shall review the previous study data results collected at the location(s) provided as an attachment to this SOW.]

1.3.3 Project Work Tasks/Description or Work

The project work tasks include: [describe each project specific work task that is required to accomplish the Tasks described in this SOW]. The lead inspections/risk assessments shall include a visual assessment, and sampling each testing combination (see Glossary) for the presence of LBP, and where found, sampling for the identification of lead hazards at each unit included in the survey. Procedures and requirements for completing the inspection/risk assessment activities are defined in the paragraphs that follow. The combined lead inspection/risk assessment shall be performed at one time in each selected unit.

1.3.4 Unit Selection Strategy

****

NOTE: All lead inspections/risk assessments involving multi-family housing units greater than 20 units of similar construction and maintenance histories at Army installations shall be evaluated using random sampling strategy. All single unit housing, multi-unit housing comprised of 20 or fewer units, and all units that have dissimilar

construction or maintenance histories must be evaluated individually. Housing unit access and common area sampling strategies must also be addressed as a part of sampling strategy.

****

[The Contractor shall perform a lead inspection/risk assessment on each unit identified in this SOW.]

[The Contractor shall randomly select (see Glossary) the housing units for lead inspection/risk assessment from the total unit population. The minimum number that must be randomly selected shall be determined by using Table B-1 (Appendix B). The Contractor shall randomly select alternate housing units beyond the minimum number required in Table B-1 to provide flexibility based on information obtained on site and the success in gaining access to the selected housing units. The procedure used to randomly select the units shall be specified in the Project Work Plan.]

1.3.5 Data Quality Objectives (DQOs)

****

NOTE: Refer to EPA's "Lead; Identification of Dangerous Levels of Lead", Final Rule, 66 FR 1206, 5 January 2001, and "Requirements for Notification, Evaluation, and Reduction of Lead-Based Paint Hazards in Federally Owned Residential Property and Housing Receiving Federal Assistance"; Final Rule 24 CFR Part 35, September 15, 1999 for guidance in applying the action levels to use for the project.

****

The Contractor shall meet the project-specific DQOs (see Glossary) for the sampling, analysis and Quality Assurance/Quality Control (QA/QC) by meeting the requirements of Paragraphs 2.2 and 2.3. DQOs must be met in order to provide project required data quality. The data thus collected shall be compared to the action levels defining lead hazards provided in Table A-1 below. If the data are below the action levels, recommendations shall be made in the Lead Inspection/Risk Assessment Report in accordance with Paragraph 2.4.10.

Table A-1

Lead-Based Paint and Hazard Levels for a Lead Inspection/Lead Risk Assessment

Sample Matrix/Surface Type	Action and Lead Hazard Level[1]
Lead-based paint[1]	1.0 mg/cm^2 (XRF) 0.5% by weight or 5,000 µg/g (paint chip if not used in conjunction with XRF measurements. If paint chip is used in conjunction with XRF measurements, lab must report paint chip lead loading in units of mg/cm^2 and must specify paint chip sample

	collection techniques required to the contractor)
Deteriorated Paint	Any Lead-Based Paint on any substrate (interior or exterior) that is peeling, chipping, chalking or cracking, or otherwise damaged or separated from the substrate.
Paint-lead Hazard	Any friction surface subject to abrasion with horizontal dust lead levels below and nearest the surface equal or exceed Dust-Lead Hazard levels in this Table. Any chewable lead-based paint surface with teeth marks. Damaged or deteriorated lead-based paint impact surface such as caused by door knobs or out-of-plumb doors.
Dust-Lead Hazard[2] (single surface wipe sampling only) All Floors, Hard Surface and Carpeted Interior Window Sills	 40 µg/ft² 250 µg/ft² Floors or windowsills in unsampled dwellings or common areas part of multi-family units if at least one sampled unit tested positive for these parameters.
Soil-Lead Hazard[2]: Bare Soil :Child Play Area Soil-Lead Hazard[2] : Remainder of Yard Excluding Child Play Areas	>400 ppm >1200 ppm
[1] See Glossary [2] See 40 CFR 745.223 for definition.	

1.3.6 Bid Assumptions

****

NOTE: Review lead inspection/risk assessment sampling, analysis, QA/QC and reporting tasks that will be performed in Paragraphs 2.0 through 2.4. Typically, 135 XRF shots are taken in a three-bedroom home with a cost range per shot of $1.50 to $2.00 each. Six to eight dust wipes are typically sampled per unit during most risk assessments. Three paint chip samples should be allowed for each unit, either to confirm XRF readings or for deteriorated paint or paint on small surfaces. A total of two composite soil samples per unit are also typical for most risk assessments. One QA dust spike sample for each 50 field wipes, and QA paint chip samples at 1% to 5% of total paint chip samples collected should be allowed. Typical lab cost for lead dust, paint chip, and soil can range to $25.00 per sample keeping in mind that an NLLAP recognized lab must be used. The prices may vary depending on geographical region. Check with qualified labs in the area that

are likely to be used. It may be cost-effective to overnight mail samples to remote labs with known proficiency and cost savings in lead analysis. This information can easily be obtained by asking some of the large national consultants that do business with the District Office in other areas. In the bid, ask the contractor to provide a unit cost per sample to be charged by them in calculating their overall proposal, in the event additional samples beyond those projected must be collected once the contract begins (e.g., re-sampling certain areas, etc.) or there is a reduction in samples. Consult with the contracting officer. Also include the requirement for a preliminary site walkover.

****

Bid assumptions include: [insert assumptions as applicable]

2.0 PROJECT REQUIREMENTS

2.1 TASK 1 DESCRIPTION OF CURRENT CONDITIONS/PROJECT WORK PLAN

****

NOTE: Determine the need for the Contractor to review information contained in the installation's Lead Hazard Management Plan if one is available and conduct interviews with personnel familiar with the unit histories, in the Contractor's development of the Project Work Plan and Risk Assessment Sampling Plan.

****

2.1.1 Background Data

The Contractor shall review general information on physical characteristics and occupant use patterns affecting children under six years old for the units that will be addressed in the lead inspection/risk assessment, [and preexisting survey data] prior to performing Task 2.

2.1.1.1 Lead Hazard Management Plan Review

[The Contractor shall review the installation's Lead Hazard Management Plan, including the history of LBP hazards in the units to be assessed in this SOW.]

2.1.1.2 Interviews

[The Contractor shall conduct interviews of personnel familiar with facility history and with facility use patterns. Personnel to be interviewed shall include:

a. Installation Lead Hazard Management Team Leader

b. Installation Environmental Officer - to determine if LBP has been found in previous assessments, to identify LBP locations, to verify maintenance histories, and to

coordinate unit access procedures.

c. Director of Public Works - to discuss assessment logistics, e.g., access and assessment scheduling

d. [The Safety Officer]

e. [Installation Medical Authority – to review the Childhood Lead Poisoning Prevention Program (CLPP Program)]

f. [The Chief of Housing – to coordinate assessment logistics including occupant access and notification procedures]

g. [Any team members of the BRAC team to consider any requirements that may be imposed for property transfer. This might include report format, transmission of data, use of local subcontractors, etc.]

2.1.1.3 Summary of Preexisting Data, [Lead Hazard Management Plan] and Interviews

[The Contractor shall complete a project deliverable as an attachment to the Project Work Plan that summarizes the review of preexisting data, [the Lead Hazard Management Plan] and interviews for the units to be assessed, based on the information provided and addressed above. The summary shall address the following:

a. Reliability of Previously Collected Data

A brief summary of the reliability of data from previous studies.

b. Lead Hazard Management Plan

[A brief description of the Installation's Lead Hazard Management Plan and summary of information pertinent to the Lead Inspection/Risk Assessment to be performed including any previous lead-based paint identification data, and maintenance history and practices.]

c. Interviews

A brief summary of the interviews and the conclusions reached.]

2.1.2 Project Boundaries Identification/Floor Plans

****

NOTE: If digital site maps and floor plans for each type of unit are not available, the SOW editor may wish to have the contractor prepare Computer Assisted Design and

Drafting (CADD) drawings of the units involved with the lead inspection/risk assessments. Such drawings should be prepared by the contractor in accordance with the Tri-Service GIS Spatial DATA Standards. Having the contractor prepare the CADD drawings can significantly increase the cost of the lead inspection/risk assessments.

****

Site maps identifying individual units for all facilities that will be inspected/assessed, and floor plans/sketches for each type of unit are [provided in CADD format and] attached as a part of this SOW. The Contractor's risk assessor shall use the [CADD] floor plans/sketches when performing Task 2 to identify and record sample locations.

2.1.3 Preliminary Site Visit/Walkover

The lead inspector/risk assessor shall conduct a preliminary site visit/walkover. This walkover shall be used to ensure that all site-specific conditions and special accessibility requirements are addressed in the Project Work Plan and Lead Inspection/Risk Assessment Sampling Plan.

2.1.4 Occupant Notification/Housing Unit Access

****

NOTE: Occupant notification of planned lead inspection/risk assessment activities is an installation responsibility. Coordinate with the Director of Public Works, the Environmental Manager and the Housing Authority.

****

The Government shall notify the occupants of the units that will be inspected/assessed regarding the activities planned [insert text as applicable] days prior to beginning the assessment activities, and shall arrange access to housing units. The Contractor shall coordinate with the Contracting Officer and establish a schedule for unit entry based upon the contractor's Lead Inspection and Risk Assessment Sampling Plans and requirements of Paragraph 3.4.2. The Contracting Officer shall be notified of the approximate schedule of any required field-repeated testing QC process at least [Insert number of day] days in advance. The Contracting Officer also has the right to request the contractor perform this repeated testing upon request, (unannounced visit) so long as these requests do not exceed 10% of the units surveyed.

2.1.5 Project Work Plan

The Contractor shall prepare a project work plan after the preliminary site visit/walkover and preliminary review of this SOW. The project work plan shall address the following:

- Accident Prevention Plan (APP) including Radiation Safety Program describing procedures to limit and prevent radiation exposure from using XRF instruments

- Project work tasks/description of work including any recommended changes following preliminary walkover and review, including the [CADD] floor plans/sketches, and including [usability of preexisting data] unit access requirements, scheduling, escort requirements, and laboratory turn-around requirements if different than as specified in this SOW
- The Lead Inspection Sampling Plan to include unit and sample selection logic, and the type, model and serial number of each XRF unit and its associated Performance Characteristic (PC) Sheet.
- Risk Assessment Sampling Plan to include unit and sample selection and analysis strategy.
- Project personnel/team identification and qualifications
- Identification and qualifications of each laboratory used to analyze lead samples
- [Summary of Preexisting Data, Lead Hazard Management Plan, and Interviews]

2.2 TASK 2 – CONDUCT LEAD INSPECTION/RISK ASSESSMENT

****
NOTE: Under Task 2 the lead inspection and risk assessments are to be accomplished concurrently.
****

2.2.1 Lead Inspection

The lead inspection shall be conducted using an X-Ray Fluorescence Analyzer (XRF) that meets the performance requirements specified in this SOW.

2.2.1.1 Visual Assessment

The lead inspector/risk assessor shall as a part of the visual assessment of the lead inspection, identify each interior and exterior component or component system (see Glossary) with a distinct painting history for the housing units to be inspected as shown on the floor plans/sketches provided as part of this SOW and included as part of the Project Work Plan.

The contractor shall prepare as a part of the visual assessment a list of all testing combinations (see Glossary) of the component or component systems in all interior rooms, on all exterior-building surfaces, and on surfaces in other exterior areas, such as fences, playground equipment, and garages to be submitted with the Lead Inspection/Risk Assessment Report. Descriptions or identification of testing combinations shall be sufficiently detailed to permit verification by the Contracting Officer.

2.2.1.2 Substrate Correction

The lead inspector/risk assessor shall perform substrate correction using the red NIST SRM (1.02 mg/cm^2) over test locations that have been scraped clean of their paint covering. The lead

inspector/risk assessor shall follow the computation methods for determining substrate correction values provided in the PC Sheet for each respective XRF instrument used during the survey. When scraping painted surfaces for substrate correction, the lead inspector/risk assessor shall contain the paint scrapings and dispose of the waste off-site. Wipe the scraped area and any surrounding area to avoid the release of leaded dust or debris.

For multi-family housing, randomly choose two housing units to collect and calculate substrate measurements, and use those values in all tested units, common areas, and exteriors. If substrates exist in common areas and exteriors that were not found in the unit interiors, select two locations from these areas for substrate correction.

The location of the substrate correction for each substrate material shall be indicated on the floor plans/sketches, and submitted as part of the QA/QC portion of the Lead Inspection/Risk Assessment Report.

2.2.1.3 Surface Testing Using XRF Measurement

The lead inspector/risk assessor shall test at least one location per testing combination, except for interior and exterior four-wall combinations comprising the typical room or building exterior, where four readings shall be taken, one on each wall. The selection of the test location for a specific testing combination shall be representative of the paint over the areas, which are most likely to be coated with old paint or lead-based paint coatings. All layers of paint shall be included and the XRF probe faceplate shall be able to lie flat against the surface at the test location. If no acceptable location for XRF testing exists for a given testing combination, a paint-chip sample shall be collected and submitted to the laboratory following the laboratory's SOP for collecting paint chip samples to determine lead loading per cc of surface area, and ASTM's *Standard Practice for Field Collection of Dried Paint Samples for Lead Determination by Atomic Spectrometry Techniques* (E 1729). All testing locations shall be marked on the floor plans/sketches and Form 1 (Figure B-1, Appendix B).

2.2.1.4 Classification of XRF Results

The lead inspector/risk assessor shall classify the XRF results as positive, negative or inconclusive as defined in the XRF instrument's PC sheet. Test results are positive if they are greater than the upper boundary of the inconclusive range, negative if they are less than the lower boundary of the inconclusive range, or inconclusive if in between. The inconclusive range includes both its upper and lower bounds. All XRF readings and results shall be recorded for each testing combination tested at the time the readings are taken during and as a part of the visual assessment on Form 1 (See Figure B-1, Appendix B), compared to the Action and Lead Hazard Levels in Table A-1 and submitted as an attachment to the Lead Inspection/Risk Assessment Report. Field-repeated testing shall be accomplished, at no additional cost to the Government, in accordance with the XRF validation requirements of this SOW.

Paint chip samples shall be collected for all inconclusive XRF readings in addition to those surfaces where the XRF cannot be properly operated (e.g., small, rounded, surfaces etc.). The location of all paint chip samples shall be documented on the building drawing and documented in accordance with this SOW.

2.2.1.5 Specific Requirements for Multi-Family Housing

****

NOTE: The following requirements should be selected for multi-family housing. These requirements are in addition to those listed in Paragraph 2.2.1 through 2.2.1.4.

****

Contractor shall identify testing combinations and conduct XRF testing in common areas and building exteriors. The lead inspector/risk assessor shall classify XRF results following the Multi-Family Decision Flow Chart provided Figure B-2 Appendix B. Paint chip samples taken in accordance with the chart to confirm XRF readings shall be taken and submitted to the laboratory following the laboratory's SOP for collecting paint chip samples to determine lead loading per cc of surface area, and ASTM's *Standard Practice for Field Collection of Dried Paint Samples for Lead Determination by Atomic Spectrometry Techniques* (E 1729).

2.2.2 Risk Assessment

2.2.2.1 Visual Assessment

****

NOTE: Since lead testing will be performed in conjunction with the risk assessment, the lead inspector/risk assessor shall immediately review XRF results and determine if the potential hazard areas contain LBP.

****

The lead inspector/risk assessor shall perform concurrently with the lead inspection visual assessment, an assessment of all selected units to locate potential LBP hazards and to evaluate the magnitude of each hazard. Following the floor plans or sketches, the lead inspector/risk assessor shall visually inspect the unit exterior and every room of each unit that will be assessed to evaluate paint and building conditions. Every lead-based paint component system with the same distinct painting history (see Glossary) testing positive for lead shall be inspected for deterioration.

The lead inspector/risk assessor shall review the XRF data recorded on Form 1 (see Figure B-1, Appendix B) and identify through observation:

- Any friction surface or impact surface with visibly deteriorated paint, and
- All other lead-based paint surfaces with visible deteriorated paint.

- Visible dust
- Bare soil

The lead inspector/risk assessor shall visually assess painted surfaces in common areas accessible to children. The lead inspector/risk assessor shall inspect deterioration on friction and impact surfaces by operating and examining the friction and/or impact surfaces of several of the windows and doors that are used most frequently (if known) that contain LBP. The visual assessment of each unit shall be documented using Form 2 and Form 3 (see Figures B-3 and B-4, Appendix B). The forms shall be submitted as attachments to the Lead Inspection/Risk Assessment Report.

2.2.2.2 Sample Location Selection

****

NOTE: Multi-unit common areas must be sampled when performing multi-unit assessment sampling. Sampling criteria for community buildings, day care, or other spaces frequented by children require coordination with customer prior to beginning the project.

****

The lead inspector/risk assessor shall select single surface dust wipe and soil sample locations during the visual assessment. Paint chip samples, as required, should be selected in concert with the lead inspection phase of the project. Sample locations for each unit shall be identified on each unit floor plan or sketch, and shall be based on visual observations, separate component systems with distinct histories, pre-assessment unit information (including physical characteristics, use patterns, previous study results), and on the following:

- Lead-based paint surfaces that have been chewed or where chewing or mouthing has been reported shall be identified as LBP hazards and shall not require sampling.
- Chewed surfaces may include interior windowsills, balusters, shelves, stairs, and other component systems accessible to children's mouths.
- Samples shall not be collected from worn portions of the painted surfaces that will be tested.
- Friction or impact surface hazards shall be evaluated by dust wipe analysis, and accordingly shall not require paint chip sampling.

a. Dust Wipe Sample Locations

One dust sample shall be collected from interior windowsills and floors in all living areas representing distinct component systems, where one or more children, less than 6 years of age are most likely to contact dust. Any lead-based paint on a friction surface with visibly deteriorated paint or that is subject to abrasion shall be sampled where the lead dust levels on the nearest horizontal surface beneath the friction surface can potentially exceed the dust-lead hazard action levels in Table A-1.

- Multi-family dwellings

In addition to samples required above, interior windowsill and floor dust samples shall be sampled for lead concentration in:

- Common areas adjacent to the sampled residential dwelling or child-occupied facility
- Other common areas in the building where the risk assessor determines children six or under might contact dust according to the following:

Common Areas – Multi-Unit Low Rise (up to and including four stories):

- one from the entry floor, and
- one from the floor of the first story landing of a common hallway, or stairway
- If a hallway window is frequently used, the risk assessor shall collect an interior windowsill sample as a substitute for the first story floor-landing sample.

Common Areas – Multi-Unit High Rise (greater than four stories):

- Two additional samples from the corridor of every fourth floor
- One sample from the floor areas
- One sample from the windowsill
- Two additional samples from stairways: one from the stair treads, one from the landing

For child-occupied facilities:

Interior window sill and floor dust samples shall be collected in each room, hallway or stairwell utilized by one or more children, age six or under, and in other common areas in the child-occupied facility where such children are likely to come in contact with dust according to the following:

Community buildings, day care, or other spaces frequented by children - Spaces up to 2000 square feet:

- Floors: two samples from widely separated “high traffic” areas
- Windows: two samples - each sample from a window sill, up to two

Community buildings, day care, or other spaces frequented by children - Spaces over 2000 square feet:

- Floors: one additional sample for every 2000-square foot increment
- Windows: one additional sample from a windowsill for every 2000-square foot increment.

Community buildings, day care, or other spaces frequented by children - Management office:

- Resident-waiting area: one floor sample if under 400 square feet, two samples if over 400 square feet.]

b. Paint Chip Sample Locations

****

NOTE: The lead inspector/risk assessor uses an XRF instrument to determine which painted components contain LBP. Therefore, paint chip samples need only be collected for those components with deteriorated paint where the XRF cannot operate properly. If the SOW editor wishes to rely on the results of the lead inspection (XRF data with paint chip data for surfaces not accessible with XRF instruments or with inconclusive XRF readings) and wishes to use the data for the risk assessment, choose option 1. If the SOW editor does not wish to rely on the results of the XRF for the risk assessment, (which is part of this work), the SOW editor should select option 2. (This will incur additional expense of laboratory paint chip sample analysis.)

****

[Option 1]
[The lead inspector/risk assessor shall immediately review the results of the lead inspection, and determine if any identified LBP surfaces contain deteriorated paint and note the extent of the damage.]

[Option 2]
[One paint chip sample shall be collected from each interior [and exterior] deteriorated paint component system with a distinct painting history. Only one sample shall be taken for each such component system for which a common painting history can reasonably be assumed. The deteriorated areas of the represented paint system shall be given sampling priority for ease of removal. Samples shall be collected from inconspicuous locations whenever possible and safe. Sampling locations shall be selected based on presence of all intact layers of paint.]

c. Soil Sample Locations

****

NOTE: In some parts of the country, particularly the South and coastal areas, family housing may have accessible crawl spaces used as play areas by small children. Samples should be collected from the bare soil in these crawl spaces.

****

The lead inspector/risk assessor shall collect at least two composite soil samples representing all bare soils accessible to children. Only bare soils shall be sampled. Bare soil areas to be considered include:

- one composite from the foundation drip line and,
- one composite from exterior play areas including accessible crawl spaces
- [gardens]

2.2.2.3 Risk Assessment Sample and Sample Location Documentation

All XRF testing locations shall be marked on the floor plans/sketches and Form 1 (Figure B-1, Appendix B) at the time of actual testing during the inspection phase of the combined inspection/risk assessment. Paint chip sample locations shall be recorded on the floor plans or sketches and by filling in the identifying information on Form 4 (Figure B-5, Appendix B).

Single surface dust sample locations shall be recorded on the floor plans or sketches and by filling in the identifying information on Form 5 (Figure B-6, Appendix B).

Each composite soil sample location and identity shall be recorded on Form 6 (Figure B-7, Appendix B), and on the floor plans or sketches by sub-sample location. The plans or sketches shall include property boundaries.

The Contracting Officer reserves the right to audit the Risk Assessment Sample and Sample Location Documentation for any unit, at any time during the course of the project. The Risk Assessment Sample and Sample Location Documentation shall be included as an attachment to the Risk Assessment Sampling Plan following completion of the fieldwork and submitted as a part of the Lead Inspection/Risk Assessment Report.

2.2.3 Single Surface Dust Sampling

Dust samples shall be collected for analysis by single surface wipe sampling. Dust wipe samples shall always be collected before paint chip samples to avoid cross-contamination. Gloves shall always be changed before each additional sample is collected. After donning gloves, do not touch anything other than the wipe and surface to be sampled. If the wipe is dropped, or contact is made outside the sampling area, discard the wipe and sample another undisturbed area. In each unit that will be sampled, discard the first wipe from the dispenser before initiating sampling. Fold the wipes completely before inserting into the collection tube.

The lead inspector/risk assessor shall collect wipe samples in accordance with ASTM's *Standard Practice for Field Collection of Settled Dust Samples Using Wipe Sampling Methods for Lead Determination by Atomic Spectrometry Techniques* (E 1728), using wipe materials meeting the requirements of *Standard Specification for Wipe Sampling Materials for Lead in Surface Dust* (E 1792). (see AIHA web site **(**http://www.aiha.org**)** for a listing of wipe vendors meeting ASTM Method E 1792 criteria.)

2.2.4 Deteriorated Paint Chip Sampling

****

NOTE: If option 1 was selected in Paragraph 2.2.2.2b then select option 1 here. If option 2 was selected in Paragraph 2.2.2.2b, then select option 2 here.

****

[Option 1]
[The XRF data properly collected as part of the inspection phase of this assessment shall be used to evaluate all deteriorated paint surfaces for the presence of lead. Deteriorated painted surfaces that were not suitable for testing by XRF due to shape, or accessibility etc., or where inconclusive XRF readings were generated during the inspection phase, shall be tested destructively by paint chip sample collection. The paint chip samples shall be collected and submitted in accordance with the laboratory's SOP for collecting paint chip samples to determine lead loading per cc of surface area, and ASTM's *Standard Practice for Field Collection of Dried Paint Samples for Lead Determination by Atomic Spectrometry Techniques* (E 1729).]

[Option 2]
[The lead inspector/risk assessor shall collect and preserve paint chip samples on all deteriorated painted surfaces in accordance with ASTM's *Standard Practice for Field Collection of Dried Paint Samples for Lead Determination by Atomic Spectrometry Techniques* (E 1729).]

2.2.5 Soil Sampling

Each composite sample shall include not less than two (2) and not more than ten (10) sub-samples collected from distinct locations roughly equidistant from each other along an axis. Sub-samples along drip lines shall generally be collected two to six feet from each other. In other sampling locations such as play areas sub-samples shall be collected from roughly equidistant locations along each leg of an X-shaped pattern. Sample collection shall be conducted in accordance with the most current edition of *Standard Practice for Field Collection of Soil Samples for Lead Determination by Atomic Spectrometry Techniques*, ASTM Standard E 1727.

2.2.6 Sample Identification

Dust, paint, and soil samples shall be identified using unique sample numbers. Field and laboratory blanks and spiked samples submitted to the laboratory for QA/QC purposes shall be numbered in such a way that the sample identity will not be revealed to personnel conducting the analysis.

2.2.7 Sample Chain-of-Custody

The Contractor shall follow a standard chain-of-custody protocol to ensure and document a continuous record of sample possession from sample collection to receipt by the laboratory. The Contractor shall complete and maintain chain-of-custody forms for each set of samples shipped

to the laboratory, and a copy of the forms shall accompany each shipment of samples. An example chain-of-custody Form 7 is included as Figure B-8 in Appendix B.

The Contractor shall include copies of all chain-of-custody forms completed during the assessment in the Lead Inspection/Risk Assessment Report.

2.2.8 Decontamination

Field sampling equipment shall be decontaminated following the appropriate ASTM standard. At a minimum, the field decontamination procedures for non-disposable sampling equipment (e.g., knives, coring devices, scrapers) shall consist of either wiping the equipment off twice using a clean wet wipe each time, or washing in a solution of non-phosphate detergent (e.g., Liquinox®), and rinsing with distilled water. The equipment shall be decontaminated prior to each use, between each sample, and prior to leaving the site. Disposable latex gloves shall be discarded after each sample. Gloves need not be changed between each sub-sample when collecting composite soil samples. The Contractor shall coordinate with the installation environmental officer to determine requirements for the disposal of decontamination waste and used personal protective equipment.

2.3 TASK 3 SAMPLE DATA ANALYSIS, EVALUATION OF FINDINGS

2.3.1 XRF Data Interpretation

XRF results shall be interpreted by the Contractor in accordance with ASTM Standards, the XRF manufacturer's PCS, and as otherwise required in this SOW.

2.3.2 Sample Preparation and Analysis

Samples collected by the lead inspector/risk assessor during the assessment(s) shall be sent to an [independent] laboratory recognized by the EPA under the NLLAP for analysis. The laboratory must be accredited for each type of analysis required. The Contractor shall verify the following with the laboratory:

2.3.2.1 Dust Sample Preparation and Analysis

Dust samples shall be prepared for analysis following the ASTM *Practice for Hot Plate Digestion of Dust Wipe Samples for the Determination of Lead by Atomic Spectrometry* (E 1644) or *Standard Provisional Practice for Ultrasonic Extraction of Paint, Dust, Soil, and Air Samples for Subsequent Determination of Lead* (E 1979) and analyzed following the *Standard Test Method for Analysis of Digested Samples for Lead by Inductively Coupled Plasma Atomic Emission Spectrometry (ICP-AES), Flame Atomic Absorption (FAAS), or Graphite Furnace Atomic Absorption (GFAAS) Techniques* (E 1613). The most current version of the methodology shall be used. The laboratory shall report results in units of microgram per square foot ($\mu g/ft^2$), allowing direct comparison with Table A-1, EPA, and HUD criteria.

2.3.2.2 Paint Chip Sample Preparation and Analysis

Paint chip samples shall be prepared for analysis following the ASTM *Standard Practice for the Preparation of Dried Paint Samples for Subsequent Lead Analysis by Atomic Spectrometry* (E 1645) or *Standard Provisional Practice for Ultrasonic Extraction of Paint, Dust, Soil, and Air Samples for Subsequent Determination of Lead* (E 1979), and analyzed following the *Standard Test Method for Analysis of Digested Samples for Lead by Inductively Coupled Plasma Atomic Emission Spectrometry (ICP-AES), Flame Atomic Absorption (FAAS), or Graphite Furnace Atomic Absorption (GFAAS) Techniques* (E 1613). The most current version of the methodology shall be used. Results shall be reported in units of micrograms per gram (µg/g) and parts per million (ppm), allowing direct comparison with Table A-1, EPA, and HUD criteria.

2.3.2.3 Soil Sample Preparation and Analysis

Soil samples shall be prepared for analysis following the ASTM *Standard Practice for Sample Digestion of Soils for the Determination of Lead by Atomic Spectrometry* (E 1726) or *Standard Provisional Practice for Ultrasonic Extraction of Paint, Dust, Soil, and Air Samples for Subsequent Determination of Lead* (E 1979) and analyzed following the *Standard Test Method for Analysis of Digested Samples for Lead by Inductively Coupled Plasma Atomic Emission Spectrometry (ICP-AES), Flame Atomic Absorption (FAAS), or Graphite Furnace Atomic Absorption (GFAAS) Techniques* (E 1613). The most current version of the methodology shall be used. Results shall be reported in units of µg/g and ppm, allowing direct comparison with the EPA criteria.

2.3.2.4 Laboratory Turnaround Time

The Contractor shall require the laboratory to report analytical results to the Contractor within [Insert appropriate number of days] days of the laboratory's receipt of the samples in the laboratory.

2.3.3 Quality Assurance and Quality Control (QA/QC)

2.3.3.1 XRF Performance Validation and Verification

The lead inspector/risk assessor shall use only XRF spectrum analyzers with current, published Performance Characteristic (PCS) sheets that provide valid measurements at the Action Levels specified in Table A-1. A copy of the PCS for the XRF instruments used on this project shall be submitted in the Lead Inspection Sampling Plan section of the Lead Inspection/Risk Assessment Report.

The lead inspector/risk assessor shall perform calibration checks at the beginning and end of the inspection work or every four hours, whichever comes first or as otherwise specified in Chapter 7 of the HUD Guidelines: "Guidelines for the Evaluation and Control of Lead-Based

Paint Hazards in Housing, June 1995. (Chapter 7 revised 1997)". If the PCS of the XRF spectrum analyzer manufacturer requires additional or more stringent warm up, quality control, or calibration check instructions than those described in the HUD Guidelines, they shall be followed. Calibration shall also be performed before and after turning the instrument on or off throughout the inspection work (e.g., lunch breaks, changing batteries). If the failed calibration results occur at the end of a testing period, the results obtained during that testing period shall be discarded and the unit re-tested. The lead inspector/risk assessor shall record all calibration check results and submit this record in the Contractor Data Certification section of the Lead Inspection/Risk Assessment Report.

Validation shall be accomplished with the lead inspector/risk assessor randomly selecting 10 testing combinations for retesting in the surveyed units for every 10 units tested. The retesting shall be with the same XRF spectrum analyzer. The average of the 10 XRF retest results shall not vary from the 10 original XRF results by more than the retest tolerance limit that is calculated as specified on the XRF PCS sheet. If the limit is exceeded, the procedure shall be repeated using 10 different testing combinations. If the retest tolerance is exceeded again, the original inspection is considered invalid. This process must be documented in the Contractor Data Certification section of the Lead Inspection/Risk Assessment Report.

2.3.3.2 Field Blank Dust Wipe QA Samples

Field blanks for single wipe sampling shall be collected in accordance with ASTM's Standard Practice for Field Collection of Settled Dust Samples Using Wipe Sampling Methods for Lead Determination by Atomic Spectrometry Techniques (E 1728), using wipe materials meeting the requirements of Standard Specification for Wipe Sampling Materials for Lead in Surface Dust (E 1792) using the same wipe material used to collect the field wipe samples. There shall be no indication to the laboratory, by sample identification numbers or other means, that the field blank samples are QA samples.

2.3.3.3 Field Spike Dust Wipe QA Samples

****

NOTE: The AIHA produces the most reliable spiked lead samples that are commercially available and are specified over all other sources if commercial spikes are purchased, since the AIHA prepared spiked samples are used in the Environmental Lead Proficiency Analytical Testing (ELPAT) certification program. The AIHA stock samples are obtained through the AIHA.
AIHA
2700 Prosperity Road
Fairfax, Virginia 22031
(703) 849-8888 (voice)
(703) 207-3561 (fax)
http://www.aiha.org/fees.html/

The text below gives the Contractor two options to generate spiked wipe samples:

In Option a, the Contractor must obtain the same wipe material used by the commercial source in preparing the spikes, to collect field samples.

Option b allows the Contractor to use a second independent laboratory to prepare spikes sent to the laboratory doing the analysis of the field data. NIST traceable materials must be used by the laboratory in preparing the spike samples.

****

The Contractor shall submit double-blind (spiked) QA dust wipe samples to the laboratory at a frequency of one double-blind sample per 50 field samples collected (with a minimum of at least one) using one of the two following options:

a. The Contractor shall obtain commercially prepared spiked wipe samples that are prepared by meeting the same QA/QC requirements required in preparing spiked wipe samples used by the AIHA in its management of the Environmental Lead Proficiency Analytical Testing (ELPAT) laboratory certification program, for submittal to the laboratory. [One source of spike samples meeting the QA/QC requirements is listed on the AIHA web site: http:\\www.aiha.org]. The Contractor shall obtain from the commercial source, wipes of the same brand and type as those used to prepare the spiked samples. The Contractor shall use these wipes to collect field samples and to prepare field blank samples.

b. The Contractor shall hire a laboratory to prepare spiked wipe samples using National Institute of Standards and Testing (NIST) traceable materials. Spiked samples shall be prepared using leaded dust, not lead in solution. The lead concentration in the spiked wipe samples shall approximate the amount of lead in the lead action level criteria for hard floors in Table A-1 of this SOW. The Contractor shall provide uncontaminated wipes of the same brand and lot as the wipes that will be used to collect field samples, to the laboratory preparing the spiked samples. The laboratory shall use these wipes to prepare the spiked wipe samples. The laboratory preparing the spiked samples shall be independent of the laboratory that will be used to analyze the field samples and field QA samples.

There shall be no indication to the laboratory analyzing the field samples, by sample identification numbers or other means, that the spiked samples are QA samples.

2.3.3.4 Field Duplicate/Spike Paint Chip QA Samples

****

NOTE: The use of commercially prepared paint chip samples as spike samples allows the contractor to submit spiked paint chip samples of predetermined, known lead concentrations to the laboratory for QA purposes. This option can be used in conjunction with the requirement to prepare field duplicate spike samples.

****

The Contractor shall submit double-blind QA paint chip samples to the laboratory for analysis. At a minimum, these shall include field duplicate samples, prepared by using standard mortar and pestle homogenizing techniques, collected at a rate of 2-5% of total samples collected. [The Contractor shall submit standard reference samples (commercially-prepared paint chip samples with a known concentration of lead) at a rate of 2-5% of the total samples collected, to the laboratory for analysis. The lead concentration in the samples used shall be within 75% to 125% of the lead hazard action levels in Table A-1 if available.] There shall be no indication to the laboratory, by sample identification numbers or other means, that the samples are QA samples. The Contractor shall evaluate the results of the analyses of QA samples as outlined in the DQOs developed under this SOW.

2.3.3.5 Field Rinsate Blank QA Samples (Soil)

One rinsate blank (see Glossary) for coring or spoon sampling techniques (refer to ASTM Method E1727) shall be included with each batch of soil samples sent to the laboratory.

2.3.3.6 Matrix Spike/Matrix Spike Duplicate (MS/MSD) Soil QC Samples

The Contractor shall collect a sufficient quantity of soil to ensure that the laboratory can prepare the MS/MSD samples. (One set of MS/MSD samples shall be prepared for each batch of soil samples submitted to the laboratory for analysis in accordance with ASTM's *Standard Practice for Sample Digestion of Soils for the Determination of Lead by Atomic Spectrometry (*E 1726).)

2.3.4 Project Data Review and Assessment

****

NOTE: The analytical data acceptance criteria for lead hazard identification and control samples provided in Table B-3 (Appendix B) have been adapted from the Laboratory Quality System Requirements (LQSR) Revision 2.0 (August 1996), Table 1, Section 10-Quality Assurance and Quality Control. Table B-3 must be verified (and updated as needed) as a part of the SOW editing process by contacting the EPA NLLAP Program Manager (call the EPA Hot Line 1-800-424-LEAD). Any time laboratory data are reviewed for acceptability; the current revision of the LQSR must be consulted to make required changes to Table B-3.

****

The Contractor shall review all project data collected as part of the current assessment and verify that the data is acceptable to meet the DQOs. Data review includes (1) Field sample collection and control review, and (2) analytical laboratory data review. Field sample collection and control review includes evaluating the adequacy of the Lead Inspection Sampling Plan and Risk Assessment Sampling Plan throughout the performance of the assessment.

2.3.4.1 Field Dust Wipe Quality Assurance Verification

Prior to beginning field dust sampling, the Contractor shall provide the laboratory with at least one uncontaminated wipe per each container of bulk packed wipes that will be used for collecting field dust wipes, to verify that the wipe material meets the requirements of *Standard Specification for Wipe Sampling Materials for Lead in Surface Dust* (E 1792). Wipes containing more than 5.0 µg/wipe of background lead shall render the entire container of bulk packed wipes represented by the analyzed wipe, contaminated and disqualify the represented wipes for field use. (See AIHA web site for a listing of wipe vendors meeting ASTM Method E 1792 criteria.)

2.3.4.2 Laboratory QA and QC Verification.

****

NOTE: The Contractor must choose the most advantageous technique to provide extra samples to the laboratory, should additional samples be required by the laboratory to replace sampling or QA/QC data lost due to laboratory mistakes. The Government is not liable for cost of additional sample collection due to laboratory mistakes, Contractor sample collection problems, or chain-of-custody errors.

****

a. Evaluation of Laboratory Data

The Contractor shall obtain and review NLLAP-required QC data generated for each sample run completed under this SOW. The QC data shall include batch QC validation data and the 95% confidence interval data (determined by the laboratory from QC charts or a QC database for each matrix, i.e., single surface dust wipe samples, deteriorated paint chip samples, soil samples) determined at concentrations equivalent to 40 µg/ft^2 for dust wipe samples, 0.5% by weight (5000 µg/g (ppm)) for paint chip samples, and [insert applicable criteria from Table A-1] µg/g (ppm)) for bulk soil samples. The Contractor shall evaluate the data package to determine that the QA/QC data generated for each sample run falls within current NLLAP Laboratory Quality System Requirements (LQSR) parameters listed in Table B-3 (Appendix B). Spiked samples submitted to the laboratory in accordance with this SOW shall fall within 75% - 125% of the true value.

b. Rejection of Laboratory Data

The Contractor shall not accept or use data from the laboratory that does not fall within current NLLAP LQSR parameters specified in Table B-3. If the laboratory fails to obtain spiked results within the specified error limits:

- Two more spikes of the same matrix shall be sent immediately to the laboratory for

analysis.
- If the two additional spike samples fail, the sample batch shall be considered invalid for the matrix represented.

If laboratory data are rejected and insufficient quantities of the samples remain to allow re-analysis of the samples while adhering to QA/QC requirements, the Contractor shall collect and submit additional samples, at no cost to the Government, for laboratory analysis using NLLAP QA/QC protocols. The Contractor shall also be responsible for any re-sampling required due to laboratory errors that result in the destruction or loss of data, or a failure to report results on any samples submitted.

2.3.4.3 Contractor Certification of Project Data Validity

The Contractor shall certify that all field data collected to determine the presence of a lead hazard were valid and meet the DQOs.

2.3.4.4 Comparison with Table A-1 Lead Hazard Action Levels

The Contractor shall compare the collected data with the lead hazard criteria listed in Table A-1 to determine whether lead-based paint and/or lead hazards are present. This comparison shall be documented in the Lead Inspection/Risk Assessment Report.

For all lead hazard evaluations, the data shall be examined to determine if consistent patterns emerge (e.g., the window troughs contain high levels, while floors and interior sills are low); such patterns will be used in the development of recommendations for focused cost-effective control measures.

2.3.4.5 Laboratory Report

The Contractor shall require that the laboratory report information necessary for the Contractor to comply with the data evaluation/validation requirements outlined in this SOW. The Laboratory Report shall include the following information addressing all field samples submitted to it by the Contractor excluding sample data collected by the Contractor using XRF instrumentation:

- cover page information including Laboratory name and address, methods, dates, instruments, digestions, and signature of the laboratory director
- sample information including identification and results for blanks, QC samples, samples, dilution factors, and batch identification
- results of initial precision and accuracy runs
- results of calibration, including sources of standards and detection limits
- results of blanks, including type of blank, and any corrections used
- results of calibration verification checks

- results of tests for precision and accuracy
- results of standard sample analysis to 95% confidence intervals which contain concentrations of lead that correspond to a given action level

2.4 TASK 4 LEAD INSPECTION/ RISK ASSESSMENT REPORT

****

NOTE: 40 CFR 745.227(h) requires that Lead Inspection and Risk Assessment reports be retained for a minimum of three years. State, local, or installation regulations may require a longer retention period.

****

The Contractor shall prepare a Lead Inspection/Risk Assessment Report containing the elements described below.

2.4.1 General Report Contents

In addition to the information described in Paragraphs 2.4.2 through 2.4.10 below, the assessment report shall include:

- Date of [each] lead inspection/risk assessment
- Address of [each] building
- Unit number
- Date of construction of [each] building
- Name, signature, and certification number of each lead inspector/risk assessor conducting the lead inspection/risk assessment
- Name, address, and telephone number of the Contractor's firm employing the certified lead inspector(s)/risk assessor(s)
- Lead Inspection Sampling Plan with discussion of room equivalents, testing combinations, and XRF PC sheet. Also list the XRF instrument manufacturer, model, serial number, mode(s) of operation and age of radioactive source
- An XRF data summary table listing results for all painted components tested (all field-completed XRF Readings/Results Forms (Form 1) can be submitted in place of this XRF data summary table with prior concurrence and approval of the Contracting Officer. This table shall report by unit the following: positive results, negative results and inconclusive results. This table shall list the actual result by substrate. For any inclusive results, the contractor shall list the corresponding paint chip sample results.
- Risk Assessment Sampling Plan to include Risk Assessment Sample and Sample Location Documentation
- Laboratory Report
- Pre-existing data used in decision process (other than that provided as part of this SOW or addressed in Paragraph 2.4.2 below)

2.4.2 Summary of Pre-Existing Data Lead Hazard Management Plan and Interviews

[The Contractor shall attach a copy of the Summary of Pre-existing Data, Lead Hazard Management Plan, and Interviews]

2.4.3 Other Field and Laboratory Data

The report shall include correspondence, conference notes, field notes and forms and other documentation including copies of field calculations, building and paint evaluation forms, sample collection forms, chain-of-custody forms, and other records of field data that are not already addressed in the requirements for this report.

2.4.4 Contractor Data Certification

The Contractor shall certify that the data used to develop conclusions and recommendations were reviewed, are valid, and meet the DQOs (i.e., that the data were of sufficient quantity and quality to identify and characterize lead hazards at the units).

2.4.5 Project Data Presentation/Electronic/HALO Data Downloading

****

NOTE: All data collected during activities described in this SOW is to be provided to the Army in a format compatible with the Army's Hazardous Asbestos and Lead Optimal Management System (HALO) or, if the installation does not utilize HALO, compatible with Army installation data management system requirements. HALO is a hazard management system designed to track lead and asbestos hazards and actions taken in response to the identified hazards. HALO requires an IBM-compatible personal computer (with a Pentium® processor), Windows 95, 16 MB of RAM, 10MB of available hard disk space, Word 97, and display resolution of 800x600 pixels. The current point-of-contact for HALO is:

USACE Engineering Research and Development Center (CEERDC)
CEERD-CF-M
(217) 352-6511, extension 7239 (commercial)

Where an Army installation has no unique data management system for LBP data, HALO will be the default program for all deliverables under this SOW. The SOW must detail the procedure for the Contractor to follow in providing the results of the lead inspection/risk assessment to the COTR for downloading into HALO or other system agreed upon to be used in the transfer process by the installation.

At a minimum, the Contractor must be provided with a copy of the HALO Data Dictionary. The dictionary identifies the table names, field names, data types, and any

required default values. The dictionary is part of the HALO program and can be obtained through the installation, or by contacting CEERD CF-M. If the transferee is known, consult them for reporting requirements. In every case, electronic archives should be produced for the record.

****

The Contractor shall provide laboratory data to the Contracting Officer in both hard copy and electronic format. The electronic data report shall be provided in [HALO format] [insert other data management system as applicable] with the capability of being downloaded into the [Installation's] electronic data management system.

2.4.6 Update Installation Management Plan

****

NOTE: Since this is for property transfer, select the most efficient method of reporting that meets the transfer requirements and preserves the record. If the installation does not have a Lead Hazard Management Program, it would probably be best to specify the HALO Program as the reporting system. If the Installation has a Lead Hazard Management Plan, it is probably best to update it to the requirements of this SOW. Consult with the transferee (if known) to determine the scope of this task (e.g., whether to limit the task to entry of new data into the appropriate electronic format, to include an update of a hard copy document, or to deliver an addendum to the existing installation plan).

****

[After entering the assessment data into HALO, the Contractor shall run the installation management program to generate an updated installation lead hazard management program.]

[The Contractor shall update the installation lead hazard management plan.]

2.4.7 Comparison of Contractor Findings to Installation HALO Findings

[The Contractor shall include a comparison of the lead inspector/risk assessor findings and recommendations with those generated by HALO.]

2.4.8 Contractor Conclusions and Recommendations

The report shall separate housing constructed prior to 1960 from housing constructed from 1960 through the end of 1977. For housing constructed during these time periods the contractor shall use Table B-2 (Appendix B) in developing conclusions and control recommendations. The report shall contain the Contractor's conclusions and lead hazard control recommendations. [Where the lead inspector/risk assessor's findings and recommendations differ from those

generated by HALO, the report shall provide the rationale for the lead inspector/risk assessor's findings and recommendations.]

2.4.9 Lead Hazard Identification Summary

The Contractor shall prepare a lead hazard identification summary form for each housing unit assessed. The summary form shall contain the location, the surface type, and the basis of determination of each identified lead-based paint hazard and any other potential lead hazards. [The Contractor shall include a photograph of each deteriorated paint sample location.] An example Form 8 is included (see Figure B-9, Appendix B). The summary forms to be submitted by the Contractor as a part of the Lead Inspection/Risk Assessment Report shall include as a minimum the information contained on Form 8.

2.4.10 Regulatory Statements of Compliance

****

NOTE: This requirement addresses recommendations where no hazards are identified.

****

If lead hazards are not identified, the Contractor shall provide recommended monitoring protocols to minimize future lead hazard development, based on observations made during the inspection/assessment, and accepted practices.

3.0 SUPPLEMENTAL REQUIREMENTS FOR CONTRACTED SERVICES

****

NOTE: The supplemental requirements are part of the solicitation for services and not part of each delivery or task.

****

3.1 CONTRACTOR FIRM/PERSONNEL QUALIFICATIONS

3.1.1 Contractor Firm Experience

The contracted firm shall have a minimum of [insert appropriate number of years] years experience in conducting lead inspections and risk assessments and have adequate qualified staff . Three references, at a minimum, shall be required for completed projects equal in complexity to the one described in this SOW.

3.1.2 Contractor Lead Inspector/Risk Assessor/Project Manager Qualifications

****

NOTE: Some states or local jurisdictions may use different terminology for individuals certified to complete the services described in this SOW, i.e., the certificate may include a title other than "lead inspector" or "risk assessor."

****

The Contractor shall employ a certified lead inspector/risk assessor to complete the inspections and risk assessments described in this SOW.

3.1.2.1 EPA Certification

EPA certification (or certification under an EPA-approved state program) is required pursuant to 40 CFR 745.226. (64 FR 42849, 6 August 1999).

3.1.2.2 State and Local Certification

Each lead inspector/risk assessor shall possess current certification or licensing required under state or local jurisdictions, if applicable, in addition to or in place of EPA certification, depending or the requirements of the jurisdictions.

3.1.2.3 Radioactive Materials License

The contractor must have a current Radioactive Materials License if required by the State where the work will be performed.

3.1.2.4 Evidence of Certification

A copy of each current applicable certificate shall be included in the Project Work Plan for each Contractor lead inspector/risk assessor participating in this project.

3.1.2.5 Record of Experience

A resume or other description of the certified lead inspector/lead risk assessor's experience, which is directly applicable to the activities required under this SOW shall be included in the Project Work Plan.

3.1.2.6 Use of Lead Inspector/Risk Assessment Teams

****

NOTE: Indicates the number and size of assessment teams.

****

The Contractor shall specify in the Project Work Plan the number of lead inspection/risk

assessment teams are to be used to perform the lead inspection risk assessment addressed in this SOW. No more than [insert appropriate number] lead inspectors/risk assessors per team shall be assigned to conduct the lead inspection/risk assessments. Team leaders shall have a minimum of three years experience in conducting lead hazard risk assessments.

3.1.2.7 Project Manager Experience

The project manager shall have a minimum of three years experience in managing lead inspections and risk assessments. A resume or other description of the project manager's experience that is directly applicable to the activities required under this SOW shall be provided as a part of the Project Work Plan.

3.1.3 Contracted Laboratory Qualifications

The Contractor shall provide as a part of the Project Work Plan evidence of current NLLAP recognition for each laboratory used for either preparation or analysis of samples taken for this assessment. The evidence of NLLAP recognition shall include certifications for each sample matrix analyzed. The laboratory conducting any worker exposure air sample analysis shall be accredited by the AIHA and shall be a current successful passing participant in the AIHA's Proficiency Analytical Testing (PAT) Program for analyte sampled.

3.1.4 Contractor Errors and Omissions Liability Insurance

****

NOTE: Consult with the Contracting Officer to develop requirements for Contractor errors and omissions liability insurance that are appropriate for the scope of the project.

****

The Contractor shall provide documentation to the Contracting Officer that the Contractor is currently covered by an errors and omissions liability insurance policy. [Insert errors and omissions text as appropriate]

3.2 PROJECT RECORDS

3.2.1 Record keeping Requirements

****

NOTE: EPA regulations (40 CFR 745.227(h)) require that lead-hazard risk assessment reports be retained for a minimum of three years. State, local, or installation regulations may require a longer retention period. Include the applicable retention period in the SOW requirements below.

****

The Contractor shall maintain records related to the lead inspection/risk assessment for at least [insert appropriate number of years] years following completion of the assessment(s) outlined under this SOW. Records shall include:

3.2.1.1 Project Work Plan

3.2.1.2 Lead Inspection/Risk Assessment Report

3.3 PROJECT COORDINATION

The Contractor shall coordinate activities through the Contracting Officer . Contact with installation personnel, including the installation POC, members of the installation lead hazard management team, building occupants or POCs, and other installation personnel shall be coordinated through the Contracting Officer.

3.4 GOVERNMENT SUPPORT

****

NOTE: Little standard language is offered in this paragraph, since the requirements will be very project-specific. The specific language will need to be defined with the customer. Include in the following paragraphs provisions for utilities, water, phone lines, computers, transportation while on the installation, etc. delineating who is responsible.

****

3.4.1 Government Quality Control Oversight

[Insert Appropriate Provisions]

The Contracting Officer reserves the right to audit the lead inspection and risk assessment sample and sample location documentation for any unit, at any time during the course of the project.

3.4.2 Security and Escorts

****

NOTE: It is advisable for Contractor personnel to be accompanied by an escort from the Housing Office while in family housing units. The escort should introduce the team on behalf of the Housing Office, state how long the work is expected to take, answer questions, and observe the team while it works. This is good public relations and protects the installation, the Contractor, and the occupants from disputes about claims of loss and damage. It reassures occupant family members, especially those who have forgotten about or have not heard about the lead inspections/risk assessments. If occupants (especially spouses) are likely not to understand the explanation in English, a bilingual escort should be provided. The escort may use the time on behalf of the Housing Office to discuss occupants' concerns and to observe actual and potential hazards and maintenance problems of all types.

If an escort cannot be provided, special precautions must be taken to protect all parties:

- The notice to occupants about the impending work should include information to the occupant on how Contractor personnel should identify themselves at the door.
- Contractor personnel should be directed to never enter a unit unless there is an adult present or, at minimum, an older and responsible adolescent (18 years or older) who clearly understands the intended work and agrees to the team entering. Personnel should be directed not to ask children who answer the door whether a parent is home, but rather whether a parent is free to come to the door. This is to avoid encouraging children to tell strangers that no adult is home.
- Agreement should be reached on what Contractor personnel can tell occupants about the work or in response to questions, as opposed to referring occupants to the Housing Office.

It is not practical for a single person to introduce multiple teams of risk assessor(s) to each occupant because it is not possible to predict in advance how long each risk assessment will take.

The contractor is responsible for the security of their equipment (especially XRF units), their employees, and to relock doors upon exit.

If special security arrangements must be made for the work, this should be noted below. This might include both personnel and vehicle passes, as well as any information or passes to enter secure locations.

****

[Insert Appropriate Provisions]

3.4.3 Temporary Office/Equipment Storage/Staging Areas

The installation shall provide space for the duration of the field activities that the Contractor may use as a temporary office, equipment storage, and staging area. [The Government] [The Contractor] shall provide [insert appropriate text for utilities, phone lines, permits, etc.].

3.5 TRAVEL AND MEETINGS

All meetings shall be attended by the Contractor project or task manager and the certified lead inspector/risk assessor if these are different individuals.

3.5.1 Preliminary Project Site Visit/Walkover

****

NOTE: Where the Contractor's project manager is not the same individual as the lead inspector/risk assessor, the lead inspector/risk assessor and the project manager must be required to participate in the site visit. If the Contractor is to use a number of lead inspection/risk assessment teams, the lead inspector/risk assessor who is to act as the field team leader for each team must participate in the site visit. Other team members and support staff need not participate.

****

The [Contractor's project manager] lead inspector/risk assessor(s) shall visit a representative sample of the units that will be assessed with the Contracting Officer and installation POC.

3.5.2 Project Work Plan Review and Start-up Meeting

The Contractor shall attend a start-up meeting to review finalize and approve the Project Work Plan to include the Lead Inspection Sampling Plan and Risk Assessment Sampling Plan immediately prior to beginning field activities. The Contractor shall generate meeting minutes that will be submitted to the Contracting Officer within [two weeks] of the meeting.

3.5.3 Data Certification Meeting

****

NOTE: Data certification may also be discussed at the Final Risk Assessment Report Meeting, Progress Report Meeting, or other meeting to help limit the number of required meetings.

****

[The Contractor shall attend a meeting to review the Contractor's lead inspection and risk assessment data certification outcomes]

3.5.4 Final Lead Inspection/Risk Assessment Report Meeting

The Contractor shall attend a meeting to review the final Lead Inspection/Risk Assessment Report prior to final submittal.

3.5.5 Additional Meetings

[Insert additional meetings if required]

3.6 SCHEDULES

****

NOTE: Consult with the customer in determining schedule requirements. Combine meeting topics where appropriate. At a minimum, the schedule milestones are:

1) Site visit/project walkover
2) Project Work Plan submission
3) Start-up meeting if not combined with item 2
4) Data certification meeting if not combined with item 5
5) Final Lead Inspection/Risk Assessment Report meeting

****

[Insert appropriate schedule milestones]

3.7 SUBMITTALS

3.7.1 Project Work Plan

The Contractor shall submit a Project Work Plan to the Contracting Officer for government acceptance.

3.7.2 Progress Report(s)

[The Contractor shall provide [weekly, biweekly, monthly, etc.] project progress reports to the Contracting Officer. The reports shall be due to the Contracting Officer [Insert date(s) as appropriate]. The reports shall address [progress, schedule, etc. as appropriate].]

3.7.3 Final Lead Inspection/Risk Assessment Data Submission in Electronic Format

The Contractor shall provide the lead inspection/risk assessment data in electronic [HALO] [specify other] format.

3.7.4 Final Lead Inspection/Risk Assessment Report

The Contractor shall provide [insert appropriate numbers] hard copies in [three ring binders] [specify other] of the final report as described in Paragraph 2.4. A CD of this report shall be included in each binder.

3.7.5 Backup Data (optional)

****

NOTE: Request submission of any backup data if required.

****

[Insert backup data requirements]

3.8 MISCELLANEOUS

3.8.1 Glossary

This paragraph contains acronyms, and terms commonly used in this SOW. For a more complete listing of terms commonly used in reference to lead-based paint projects consult appropriate regulations or ASTM standards.

Certified lead inspector/risk assessor	An individual who has been trained by an accredited training program, as defined by 40 CFR 745.223, and certified by EPA pursuant to §745.226 to conduct lead inspections and risk assessments. The individual samples for the presence of lead in dust and soil and conducts risk assessments to identify lead hazards to children under six years old, associated with the presence lead in dust, paint and soil.
Child-occupied facility	A building, or portion of a building, constructed prior to 1978, visited regularly by the same child, 6 years of age or under, on at least two different days within any week (Sunday through Saturday period), provided that each day's visit lasts at least 3 hours and the combined weekly visit lasts at least 6 hours, and the combined annual visits last at least 60 hours. Child-occupied facilities may include, but are not limited to, day-care centers, preschools and kindergarten classrooms. (40 CFR 745.223)
Common area	A portion of a building that is generally accessible to all occupants. Such an area may include, but is not limited to, hallways, stairways, laundry and recreational rooms, playgrounds, community centers, garages, and boundary fences. (40 CFR 745.223)

Component, component system, building component	Specific design or structural elements or fixtures of a building, or child-occupied facility that are distinguished from each other by form, function, and location. (40 CFR 745.223)
Contracting Officer	Contracting Officer or his/her authorized Representative (COR) or authorized Technical Representative (COTR)
Contractor	A contractor is a private firm, corporation, or individuals operating to provide service to clients. The contractor must possess all valid licenses and certifications as required by state regulations and the CO. The term "contractor" in this SOW also implies the firm that is or hires the lead inspectors/risk assessors. When this term is used in this SOW, it implies both.
Data Quality Objective	The qualitative and quantitative statements, guidelines, and requirements presented in paragraphs 2.2 and 2.3 of this SOW that clarify study objectives, define the appropriate type of data, and specify the tolerance levels of potential errors that will be used as the basis for establishing the quality of the data needed to support decisions. (see EM 200-1-2 Appendix G DQO Attainment Verification Worksheet for further refinement of the DQO definition.
Deteriorated paint	Paint that is cracking, flaking, chipping, peeling, or otherwise separating from the substrate of a building component. (40 CFR 745.223)
Distinct painting history	The application history, as indicated by its visual appearance or a record of application, over time, of paint or other surface coatings to a component or room. (40 CFR 745.223)
Double-blind sample	For the purposes of this SOW, this refers to a QC sample (replicate, duplicate, spiked sample, etc.) that is sent to the laboratory with no indication of the possible lead content and without identifying the sample as a QC sample.
HALO	The Army's Hazardous Asbestos and Lead Optimal Management System, which is; an electronic management system designed for installation use to track lead hazards and actions taken in response to identified lead hazards.

Lead-based paint (LBP)	Paint or other surface coatings that contain lead equal to or in excess of 1.0 milligrams per square centimeter or more than 0.5 percent by weight (5000 µg/g (parts per million)). (40 CFR 745.223)
Lead-based paint hazard	Any condition that causes exposure to lead from dust-lead hazards, soil-lead hazards, or lead-based paint that is deteriorated or present in chewable surfaces, friction surfaces, or impact surfaces, and that would result in adverse human health effects. (40 CFR Part 745)
Lead-based paint inspection	A surface-by-surface investigation to determine the presence of lead-based paint and the provision of a report explaining the results of the investigation. (40 CFR Part 745)
$\mu g/ft^2$	Micrograms per square foot
µg/g	Micrograms per gram (parts per million on mass/mass basis)
Occupant use patterns	Characteristics of occupants including number of child-bearing age females, average age and numbers of children occupying units, unit use patterns including entrances most frequently used, windows opened most frequently, use of window air-conditioners, gardening habits, cleaning habits of occupants, yard characteristics and use of yard as play area.
QA	Quality assurance; defined by NLLAP as an "integrated system of activities involving planning, QC, quality assessment, reporting, and quality improvement to ensure that a product or service meets defined standards of quality within a state level of confidence." (NLLAP LQSR Revision 2.0 (August 1, 1996))
QC	Quality control; defined by NLLAP as the "overall system of technical activities whose purpose is to measure and control the quality of a product or service so that it meets the needs of users. The aim is to provide quality that is satisfactory, adequate, dependable, and economical. (NLLAP LQSR Revision 2.0 (August 1, 1996))

Random Sampling	A technique for selecting a sample of *n* elements from a population of elements in such a way that each combination of *n* elements has the same probability of being selected. *In statistical sampling*, the process of selecting sample units in such a way that all units under consideration have the same probability of being selected. (ASTM E1605)
Rinsate Blank	A sample of "used" cleaning fluid rinse solution, also called equipment blank. Rinsate blank examples include a final rinse of the device used to collect soil or vacuumed dust or the final rinse to clean a scoop used to collect soil or vacuumed dust samples. The Rinsate blank is used in rinsing collection media and equipment prior to use to monitor possible cross contamination. The Rinsate blank goes through all steps in the analysis including the digestion. (EPA, 757-R-92-006, May 1993)
Risk assessment	(1) An on-site investigation to determine the existence, nature, severity, and location of lead-based paint hazards, (2) The provision of a report by the individual or the firm conducting the risk assessment, explaining the results of the investigation and options for reducing lead-based paint hazards. (40 CFR 745.223)
Room equivalent	A room equivalent is an identifiable part of a residence, such as a room, a house exterior, a foyer, staircase, hallway, or an exterior area (exterior areas contain items such as play areas, painted swing sets, painted sandboxes, etc.). 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. Most closets are not separate room equivalents. Exteriors should be included in all inspections. 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 (typically two for row houses or four for freestanding houses) are generally treated as a single-room equivalent if the paint history appears to be similar. For multifamily developments or apartment buildings, common areas and exterior sites are treated as separate types of units, not as room equivalents (1995 HUD Guidelines, Chapter 7, 1997 Revision).

Substrate	The substrate is the material underneath the paint. 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. 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 *XRF Performance Characteristic Sheet*, 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^3) 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. (1995 HUD Guidelines, Chapter 7, 1997 Revision)
Target Housing	Any housing constructed prior to 1978, except housing for the elderly or persons with disabilities (unless any one or more children age 6 years or under resides or is expected to reside in such housing for the elderly or persons with disabilities) or any 0-bedroom dwelling. (40 CFR 745.223)
Testing Combination	A unique combination of room equivalent, building component type, and substrate. (1995 or 1997 HUD guidelines, Chapter 7, 1997 revision)

X-Ray Fluorescence Analyzer (XRF)	An instrument that determines lead concentration in milligrams per square centimeter (mg/cm^2) using the principle of x-ray fluorescence (XRF). Two types of XRF analyzers are used—direct readers and spectrum analyzers. In this SOW, the term XRF analyzer only refers to portable instruments manufactured to analyze paint, and does not refer to laboratory-grade units or portable instruments designed to analyze soil. (1995 HUD Guidelines)
XRF Performance Characteristic Sheet (PC)	The "P.C. Sheet" is unique for each XRF Instrument. It specifies the inconclusive range, calibration check tolerance, and other instrument – specific information.

APPENDIX B

TABLES AND FORMS

This appendix contains tables and example forms to be used in completing lead hazard risk assessments. The forms are adapted from those presented in the HUD guidelines, and may be further modified to meet installation-specific or project-specific requirements. The tables and forms include:

Table B-1 Number of Units to be Tested in Multifamily Developments
Table B-2 Main Hazard Control Options That Could Be Identified in Risk Assessments
Table B-3 Analytical Data Acceptance Criteria for Lead-Based Paint Hazard Control Activities

Figure B-1 XRF Reading/Results Record Form 1
Figure B-2 Multifamily Decision Flowchart
Figure B-3 Building/Housing Unit Condition Form 2
Figure B-4 Paint Condition on Selected Surfaces Data Form 3
Figure B-5 Deteriorated Paint Chip Sampling Form 4
Figure B-6 Risk Assessment Dust Wipe Sampling Form 5
Figure B-7 Risk Assessment Soil Sampling Form 6
Figure B-8 Example Chain-of-Custody Form 7 for Lead Risk Assessment Sampling
Figure B-9 Lead Hazard Identification Results Summary Form 8

Table B-1
Number of Units to be Tested in Multifamily Developments

Number of Similar Units, Similar Common Areas, or exterior Site in a Building or Development	Pre-1960 or Unknown-age Building or Development: Number to Test	1960-1977 building or Development: Number to Test
1-9	All	All
10-13	All	10
14	All	11
15	All	12
16-17	All	13
18	All	14
19	All	15
20	All	16
21-26	20	16
27	21	17
28	22	18
29	23	18
30	23	19
31	24	19
32	25	19
33-34	26	19
35	27	19
36	28	19
37	29	19
38-39	30	20
40-48	31	21
49-50	31	22
51	32	22

Table B-1 (Continued)
Number of Units to be Tested in Multifamily Developments

Number of Similar Units, Similar Common Areas, or exterior Site in a Building or Development	Pre-1960 or Unknown-age Building or Development: Number to Test	1960-1977 building or Development: Number to Test
52-53	33	22
54	34	22
55-56	35	22
57-58	36	22
59	37	23
60-69	38	23
70-73	38	24
74-75	39	24
76-77	40	24
78-79	41	24
80-88	42	24
89-95	42	25
96-97	43	25
98-99	44	25
100-109	45	25
110-117	45	26
118-119	46	26
120-138	47	26
139-157	48	26
158-159	49	26
160-177	49	27
178-197	50	27
198-218	51	27

Table B-1 (Continued)
Number of Units to be Tested in Multifamily Developments

Number of Similar Units, Similar Common Areas, or exterior Site in a Building or Development	Pre-1960 or Unknown-age Building or Development: Number to Test	1960-1977 building or Development: Number to Test
219-258	52	27
259-279	53	27
280-299	53	28
300-379	54	28
380-499	55	28
500-776	56	28
777-939	57	28
940-1004	57	29
1005-1022	58	29
1023-1032	59	29
1033-1039	59	30
1500	87	44
2000	116	58
2500	145	73
3000	174	87
3500	203	102
4000	232	116

*Adapted from Table 7.3 of the 1997 Revision to the HUD Guidelines.

**Follow the procedures outlined in Section V of Chapter 7 of the HUD Guidelines (1997 Revision):

> …multifamily housing is defined as any group of units that are similar in construction from unit to unit, with:
>
> - 21 or more units, if any were built before 1960 or are of unknown age, or
> - 10 or more units, if they were all built from 1960 through 1977.
>
> Developments with fewer units should be treated as a series of single-family housing units.
>
> The number of similar units, similar common areas or exterior sites to be tested (the sample size) is based on the total number units, similar common areas or exterior sites in the building(s), as specified in Table 7.3. Use the table for sampling each set of similar units, each set of similar common areas and each set of exterior sites. For pre-1960 or unknown-age buildings or development with 1,040 or more similar units, similar common areas or exterior sites, test 5.8 percent of them, and round up any fraction to the next whole number. For 1960-1977 buildings or developments with 1,000 or more units, test 2.9 percent of the units, and round up any fraction to the next whole number. For reference, the table shows entries from 1500 to 1000 in steps of 500. For example, in a development built in 1962, with 200 similar units, 20 similar common areas, and 9 similar exterior sites, sample 27 units, 16 common areas, and all 9 exterior sites.

Appendix 12 of the HUD Guidelines details the statistical rationale for this table.

Table B-2*
Main Hazard Control Options That Could Be Identified in Risk Assessments

Treatment Option	Dust[1] on Floor	Dust[1] on windows	Paint[2] on Doors	Paint[2] on Windows	Paint[2] on Floors and Walls	Paint[2] on Trim	High Soil Lead Levels
Dust removal	X	X	X	X	X	X	X
Paint film stabilization			X	X	X	X	
Friction reduction treatments	X	X		X		X	
Impact reduction treatments	X	X	X			X	
Planting grass	X						X
Planting sod	X						X
Paving the soil	X						X
Encapsulation					X	X	
Enclosure					X	X	
Paint removal by heat gun[3]			X	X	X	X	
Paint removal by chemical[β]			X	X	X	X	
Paint removal by contained abrasive[3]			X	X	X	X	
Soil removal	X	X					X
Building component replacement			X	X	X	X	

*Adapted from Table 5.8 of the 1995 HUD Guidelines.

[1]Lead-contaminated dust.

[2]Deteriorated lead-based paint.

[3]Limited areas only.

Table B-3
Analytical Data Acceptance Criteria for Lead-Based Paint Hazard Control Activities

DATA ATTRIBUTE Frequency	ACCEPTANCE LIMITS			
	SINGLE WIPE	COMPOSITE WIPE	PAINT CHIP	SOIL
INDEPENDANT CALIBRATION VERIFICATION (ICV) Once per Day	Within ± 10% of Known Value	Within ± 10% of Known Value	Within ± 10% of Known Value	Within 10% of Known Value
INITIAL CALIBRATION BLANK (ICB) At the Beginning of Run	Absolute Value Not More Than 10% of the Regulatory Limit or Minimum Level of Concern	Absolute Value Not More Than 10% of the Regulatory Limit or Minimum Level of Concern	Absolute Value Not More Than 10% of the Regulatory Limit or Minimum Level of Concern	Absolute Value Not More Than 10% of the Regulatory Limit or Minimum Level of Concern
CONTINUING CALIBRATION VERIFICATION CCV) Beginning and End of Run and Every 10 Samples or as specified in the SOP	Within ± 15% of Known Value for ICP or FAAS; Within ± 20% for GFAA	Within ± 15% of Known Value for ICP or FAAS; Within ± 20% for GFAA	Within ± 15% of Known Value for ICP or FAAS; Within ± 20% for GFAA	Within ± 15% of Known Value for ICP or FAAS; Within ± 20% for GFAA
INTERFERENCE CHECK SAMPLE (ICS) Beginning and End of Run or Twice Every Eight Hours	Within 20% of Known Value	Within 20% of Known Value	Within 20% of Known Value	Within 20% of Known Value
CONTINUING CALIBRATION BLANK (CCB) After each ICS and CCV	Absolute Value not More Than 10% of Regulatory Limit of Level of Concern	Absolute Value not More Than 10% of Regulatory Limit of Level of Concern	Absolute Value not More Than 10% of Regulatory Limit of Level of Concern	Absolute Value not More Than 10% of Regulatory Limit of Level of Concern
LABORATORY CONTROL SAMPLE (LCS) One per 20 Samples or Batch-Minimum Frequency 5%	Within ± 20% of Known Value	Within ± 20% of Known Value	Within ± 20% of Known Value	Within ± 20% of Known Value
MATRIX SPIKE SAMPLE (MSS) One per 20 Samples or Batch-Minimum Frequency 5%	Within 25% of Calculated Value	Within 25% of Calculated Value	Within 25% of Calculated Value	Within 25% of Calculated Value
DUPLICATE FIELD SAMPLE (DFS) One per 20 Samples or Batch-Minimum Frequency 5%	Within ±25% Relative Percent Difference (RPD)	Within ±25% Relative Percent Difference (RPD)	Within ±25% Relative Percent Difference (RPD)	Within ±25% Relative Percent Difference (RPD)
MATRIX BLANK (MB) One per 20 Samples or Batch-Minimum Frequency 5%	Absolute Value Not More Than 10% of Regulatory Limit of Level of Concern	Absolute Value Not More Than 10% of Regulatory Limit of Level of Concern	Absolute Value Not More Than 10% of Regulatory Limit of Level of Concern	Absolute Value Not More Than 10% of Regulatory Limit of Level of Concern

Adapted from Table 1, EPA NLLAP Laboratory Quality System Requirements (LQSR) Revision 2.0, August 1, 1999

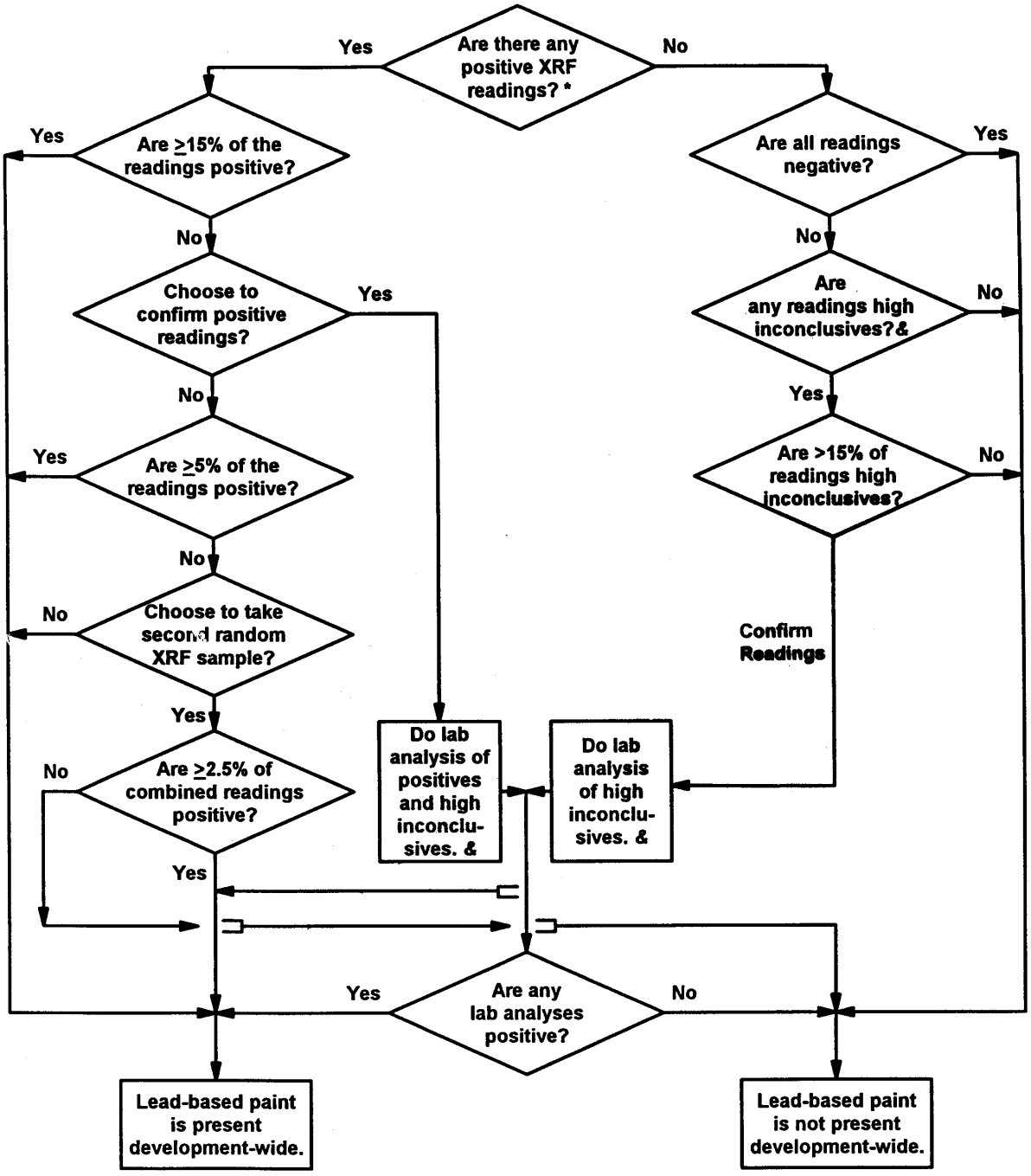
FORM 1
XRF READING/RESULTS

Address/Unit No._____ Date:_____ Page____of_____
Room Equivalent _____
XRF Serial No._____ Inspector Signature_____

Substrate	Component	Color	Test Locations	XRF Reading	Correction Value	Result	Classification (pos, neg, inc)	Laboratory Result	Unit	Final Classification
									mg/cm^2 %	
									mg/cm^2 %	
									mg/cm^2 %	
									mg/cm^2 %	
									mg/cm^2 %	
									mg/cm^2 %	
									mg/cm^2 %	

Figure B-1: XRF Reading/Results Form

Multifamily Decision Flowchart



* *"Positive," "negative," and "inconclusive" XRF readings are determined in accordance with the XRF instrument's Performance Characteristics Sheet as described in the HUD* Guidelines for the Evaluation and Control of Lead Hazards in Housing, *chapter 7.*

& *A high inconclusive reading is an XRF reading at or above the midpoint of the inconclusive range. For example, if the inconclusive range is 0.41 to 1.39, its midpoint (average) is 0.90; a reading in the range from 0.90 to 1.39 would be a high inconclusive reading.*

Source: HUD LBP Guidelines, 1997 Revision, Chapter 7.

Figure B-2 Multifamily Decision Flowchart

FORM 2
BUILDING/HOUSING UNIT CONDITION

(In multi-family housing, use a separate form for each unit.)

Installation _____ POC _____

Housing Group _____

Street Address _____ Unit No. _____ City _____ State _____

Name of risk assessor _____

Condition	Yes	No	Comments
Roof missing parts of surfaces (tiles, boards, shakes, etc.)			
Roof has holes or large cracks			
Gutters or downspouts broken			
Chimney masonry cracked, bricks loose or missing, obviously out of plumb			
Exterior or interior walls have obvious large cracks or holes, requiring more than routine pointing (if masonry) or painting			
Exterior siding has missing boards or shingles			
Water stains on interior walls or ceilings			
Plaster walls or ceilings deteriorated			
Two or more windows or doors broken, missing, or boarded up			
Foundation has major cracks, missing material, structure leans, or visibly unsound			
Other (specify)			
Other (specify)			
***Total Number**			

*If the "Yes" column has two or more checks, the dwelling is usually considered to be in poor condition for the purposes of a lead-hazard risk assessment. (Source: HUD Guidelines, Form 5.1)

Additional Comments:

_____ _____

Risk Assessor Signature and Certification Number Date

Figure B-3: Building/Housing Unit Condition Form

FORM 3

PAINT CONDITION ON SELECTED SURFACES DATA

Installation _____ POC _____

Housing Group _____

Street Address _____ Unit No. _____ City _____ State _____

Name of risk assessor _____

Building Component	Location Notes	Paint condition; type* of deterioration.	Deterioration due to friction or impact?	Deterioration due to moisture?	Location of painted component with visible bite marks
Building siding					
Exterior trim					
Exterior windows					
Exterior doors					
Railings					
Porch floors					
Other porch surfaces					
Interior doors					
Ceilings					
Walls					
Interior windows					
Interior floors					
Interior trim					
Stairways					
Radiator (or radiator cover)					
Kitchen cabinets					
Bathroom cabinets					
Other surfaces:					
Mini blinds					

*Types of deterioration: surface deterioration (chalking, mildew, or friction/impact damage); bulk deterioration (checking, cracking and flaking, and alligatoring); layered deterioration (blistering, scaling or flaking (peeling), peeling from metal, peeling from exterior wood, peeling from plaster walls, and peeling from masonry surfaces); or a combination. Record the overall condition of a component that is similar throughout a dwelling. Record specific locations of any component with bite marks.

(Table adapted from 1995 HUD Guidelines, Form 5.2)

Figure B-4: Paint Condition on Selected Surfaces Data Form

FORM 4

DETERIORATED PAINT CHIP SAMPLING

Installation _____ POC _____

Housing Group _____

Street Address _____ Unit No. _____ City _____ State _____

Dwelling Selection Criteria: All Dwellings _____ Random _____

Sample ID#	Room Name and Number	Component	Lab Results	Units
				µg/g (ppm)
				µg/g (ppm)
				µg/g (ppm)
				µg/g (ppm)
				µg/g (ppm)
				µg/g (ppm)
				µg/g (ppm)
				µg/g (ppm)
				µg/g (ppm)
				µg/g (ppm)

Sample *all* layers of paint, not just deteriorated paint layers.

Total number of samples on this page: _____

Date assessed: _____ Date sent to lab: _____

Shipped by: _____ Received by: _____
(signature) (signature)

Date results reported: _____ Analyzed by: _____

(Note: Attach a Copy of the Chain-of-Custody Form to this Form. See Lab Report for QA/QC Information.)

NOTES:

_____

Name of Risk Assessor (print) _____

Certification Number(s) _____

Signature _____

Figure B-5: Deteriorated Paint Chip Sampling Form

FORM 5

RISK ASSESSMENT DUST WIPE SAMPLING

Installation _____ POC _____

Housing Group _____

Street Address _____ Unit No. _____ City _____ State _____

Dwelling Selection Criteria: All Dwellings _____ Random _____

Sample ID#	Room Name and Number	Surface Type (floor, window sill, etc.)	Is surface smooth and cleanable?	Surface Substrate	Dimensions of Sample Area (inches)	Area (ft^2)	Results of Lab Analysis ($\mu g/ft^2$)
					____ X ____		
					____ X ____		
					____ X ____		
					____ X ____		
					____ X ____		
					____ X ____		
					____ X ____		
					____ X ____		
					____ X ____		
					____ X ____		

Total number of samples on this page: _____

Date of sample collection: _____ Date sent to lab: _____

(Note: Attach a Copy of the Chain-of-Custody Form to this Form. See Lab Report for QA/QC Information.)

NOTES:

_____

Name of Risk Assessor (print) _____

Certification Number(s) _____

Signature _____ Date _____

Figure B-6: Risk Assessment Dust Wipe Sampling Form

FORM 6

RISK ASSESSMENT SOIL SAMPLING

Installation _____ POC _____

Housing Group _____

Street Address _____ Unit No. _____ City _____ State _____

Sample ID#	Location	Bare	Results of Lab Analysis (µg/g or ppm)

Date of sample collection: _____ Date shipped to lab: _____

(Attach a Copy of the Chain-of-Custody Form to this Form. See Lab Report for QA/QC Information.)

NOTES:

_____

Name of Risk Assessor (print) _____

Certification Number(s) _____

Signature _____ Date _____

Figure B-7: Risk Assessment Soil Sampling Form

FORM 7
EXAMPLE CHAIN OF CUSTODY FORM
FOR LEAD RISK ASSESSMENT SAMPLING

Page _____ of _____

Project Name _____ Project Number _____ Installation _____ Project Manager _____ Company Name _____ Company Address _____ _____ Phone _____					Sample Preparation/Analysis Required (check the appropriate box)					
					ASTM E1644 (Prep)	ASTM E1645 (Prep)	ASTM E1726 (Prep)	ASTM E1979 (Prep)	ASTM E1613 (Anal)	Other (specify)
Sample ID	Sample Date	Time	Sample Matrix (wipe, paint chip, soil, other)	Laboratory ID						

Sampler:	1. Released by:	2. Received by:	Special Instructions/Comments:
Signature	Signature	Signature	
Printed Name/Certification Number	Printed Name	Printed Name	
Company Name	Company Name	Company Name	
Date/Time	Date/Time	Date/Time	

Figure B-8: Example Chain of Custody Form for Lead Risk Assessment Sampling

FORM 8
LEAD-HAZARD IDENTIFICATION RESULTS SUMMARY

Installation _____ POC _____ Phone Number: _____

Building Address or Location _____

Housing Unit No. (if applicable) _____

Location of Identified Lead-Based Paint and/or Lead Hazards

Room Number or Identifier	Surface Type (floor, window sill, etc.)	Sample Type (dust, paint, soil)	Sample ID#	Results of Lab Analysis	EPA Action Levels	Basis for Determination of Hazard (e.g., deteriorated paint)	Comments

Date of sample collection: _____ Total number of samples collected: _____

KEY: (1) **Room Number or Identifier**: must correspond with the unique Unit Number used for each unit as identified in the Risk Assessment Report.

(2) **Sample ID #**: Must correspond to the unique sample numbers generated during sample collection and submitted in Laboratory Report as part of the Risk Assessment Report.

(3) **Results of Lab Analysis**: Report Dust in µg/ft²; Paint Chips in % by weight and µg/g (parts per million (ppm)) and soil in ppm.

(4) **EPA Action Levels**: Dust: 40 µg/ft² for floors; and 250 µg/ft² for window sills; Paint chips 0.5% by weight (5000 µg/g (ppm)); and soil: 400 ppm bare soil in play areas; 1200 ppm bare soil, non-play areas.

(5) **Basis for Determination of Hazard**: Dust exceeds Table A-1 action level for surface evaluated, paint chip exceeds Table A-1 definition for LBP and is deteriorated, and soil exceeds Table A-1 action levels based on child access and use.

Figure B-9: Lead-Hazard Identification Results Summary Form