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

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

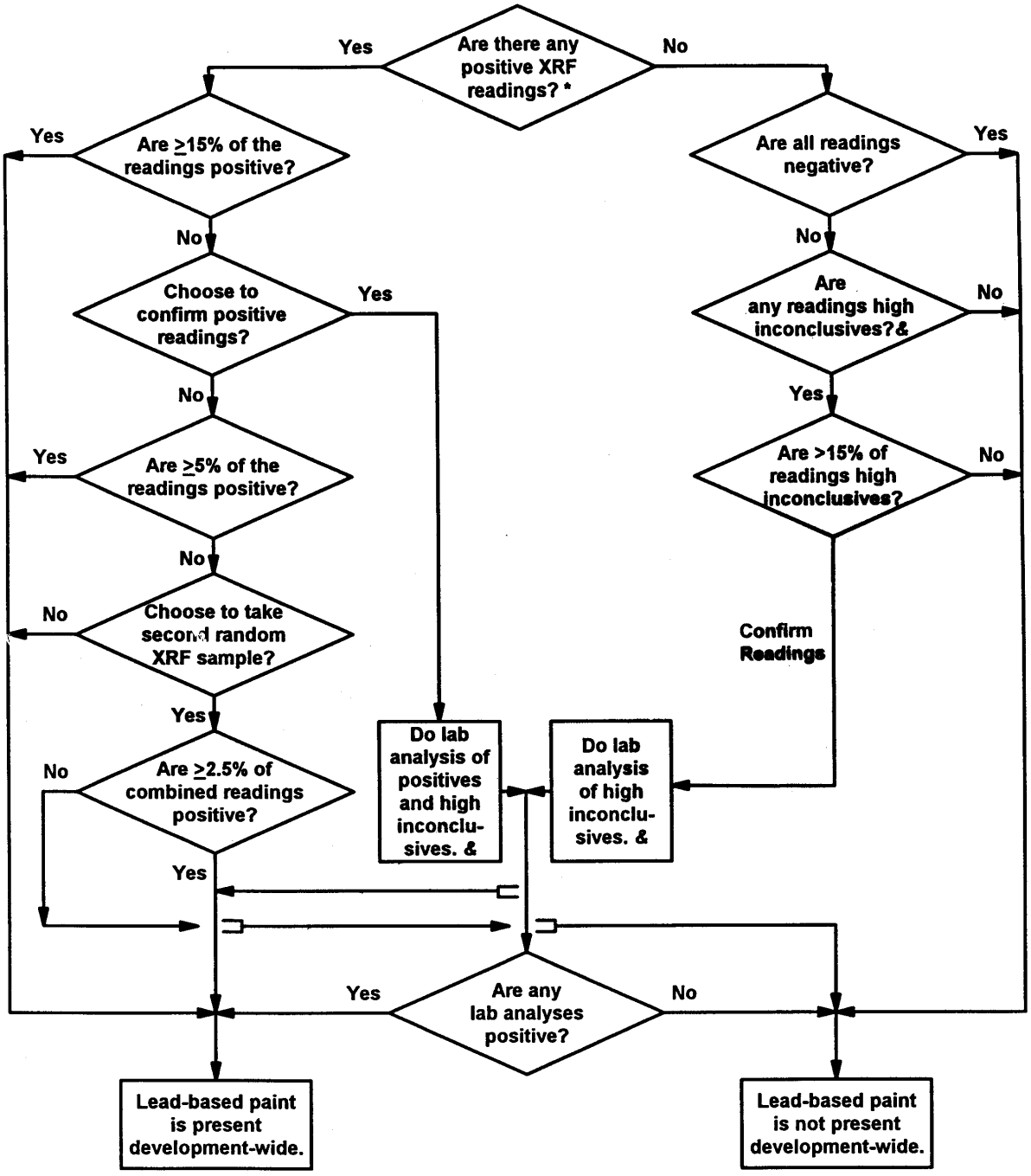
FORM 1
XRF READING/RESULTS

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