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## LEAD-BASED PAINT INSPECTION REPORT

PREPARED FOR THE FOLLOWING PROPERTY:



1827 NE 28<sup>th</sup> Street  
Ocala, FL 34470

**PERFORMED ON:**

August 24, 2022

**PERFORMED AND PREPARED BY:**

A handwritten signature in black ink that reads 'Debra Koontz'. The signature is written in a cursive style.

Debra Koontz  
Certified Risk Assessor  
LBP-R-1191376-2

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**August 24, 2022**

Re: Lead-Based Paint Inspection Report

Property Located at: **1827 NE 28<sup>th</sup> Street, Ocala, FL 34470**

Property Owner: **Tammy Hulon**

Phone: **352-512-3912**

Dear Client:

Please find enclosed the lead-based paint inspection report for the property located at **1827 NE 28<sup>th</sup> Street, Ocala, FL 34470**. The survey was performed within the current acceptable industry guidelines, Housing and Urban Development (HUD) Guidelines Chapter 7 (revised 1997) and EPA regulations.

DK Environmental & Construction Services, Inc. (DKE) conducted the lead-based paint inspection services at the above-referenced site on **August 24, 2022**.

DKE used an RMD LPA-1 X-Ray Fluorescence (XRF) lead paint analyzer to sample paint for lead. XRF instrument serial #2737 (resourced on April 21, 2021) was used on this job.

Licensed EPA Lead Risk Assessor Debra Koontz (License No. LBP-R-I191376-2, expiration date 09/06/2024) performed the inspection services.

**At the specific time and date of the inspection services, DK Environmental & Construction Services, Inc. detected no lead-based paint in the property.**

If you have any questions or concerns regarding this report, please feel free to contact us at 814-243-1927.

Sincerely,

A handwritten signature in black ink that reads "Debra Koontz".

Debra Koontz, President

DK Environmental & Construction Services, Inc.

## II. Executive Summary

DKE was authorized to perform a lead-based paint (LBP) inspection of the property located at **1827 NE 28<sup>th</sup> Street, Ocala, FL 34470**. DKE tested all painted components according to the specifications described in the protocols for Lead Based Paint testing in the Housing and Urban Development (HUD) Guidelines Chapter 7 (revised 1997) and all applicable Federal, State, and Local regulations.

DKE's scope of services involved XRF testing as well as a surface-by-surface visual inspection of all painted surfaces throughout the entire property to determine which lead-based paint surfaces/components are deteriorated (above de minimis level). All accessible, painted building components (that potentially contain lead-based paint) were tested utilizing X-Ray Fluorescence (XRF) Analysis. The data collected is in Appendix V. Wall "A" in each room is the wall where the front entrance door opening is located (or aligned with the street). Going clockwise and facing wall "A", wall "B" will always be to your right, Wall "C" directly to the rear and wall "D" to the left.

DKE tested a total of **one hundred and twenty-six (126) surfaces via XRF analysis and six (6) calibrations. Zero (0) were found to contain lead at levels greater than or equal to the regulatory level of 1.0 mg/cm<sup>2</sup>**. These surfaces are identified in Section III: G. This report represents all field data, observations and findings related to the lead inspection performed in the above referenced property. The results, assessments and findings stated in this report are representative of the conditions observed in this property at the time of the inspection services.

This inspection measures lead in both deteriorated and intact paint surfaces. The procedure involved taking readings from representative surfaces throughout the testing area or room. The most common primary analytical method for detecting lead in paint is X-Ray Fluorescence (XRF). The XRF instrument is used because of its demonstrated abilities to accurately determine the amount of lead that is present without disturbing the painted surfaces as well as its high speed and relatively low cost per sample.

Some building components may have been inaccessible at the time of the inspection services, or were not tested because they were covered by other building materials (paneling, tile, siding, etc.). It is possible that painted surfaces may be hidden by these materials. Such surfaces should be assumed to contain lead-based paint, or should be tested by a licensed lead-based paint inspector or risk assessor.

### **III. Scope of Inspection**

#### **A. Building Background**

The property located at **1827 NE 28<sup>th</sup> Street, Ocala, FL 34470** is a **1,876** square foot building (1 unit), built in **1946**. No history of renovations, repairs, or painting was provided to DKE during the inspection services.

#### **B. Preface**

DKE was authorized to perform lead-based paint testing of the above referenced property to determine the possible presence, condition, location and amount of lead-based paint. The testing was conducted on **August 24, 2022** from 10:14am to 11:49am.

#### **C. Training**

All inspectors utilized by DKE have EPA/State licensure and are licensed Lead Risk Assessors who have passed the "HUD Visual Assessment Course". All Lead Risk Assessors utilized by DKE have also been trained in the use, calibration and maintenance of the X-Ray Fluorescence (XRF) equipment they currently use, along with necessary principles of Radiation Safety.

#### **D. Equipment**

An RMD LPA-1 X-Ray Fluorescence (XRF) lead paint analyzer, serial #2737 was used on this job.

#### **E. Inspection Company**

The inspection services were performed by an inspector/risk assessor employed by DK Environmental & Construction Services, Inc. 9007 Paolos Place, Kissimmee, FL 34747, telephone number (321)401-5094.

#### **F. Methods**

The calibration of the type of X-Ray Fluorescence (XRF) is done in accordance with the Performance Characteristic Sheet (PCS) for this instrument. These XRF instruments are calibrated using a calibration standard block of known lead content. Three calibration readings are taken before and after each property is tested to insure manufacturer's standards are met. If the inspection is longer than four hours, a set of three calibration readings must be taken before the four hours expires, and then an additional three calibration readings taken at the end of the inspection. If for any reason the instrument is not maintaining a consistent calibration reading within the manufacturer's standards for performance on the calibration block supplied by the manufacturer, manufacturer's recommendations are used to bring the instrument into calibration. If the instrument cannot be brought back into calibration, it is taken off the site and sent back to the manufacturer for repair and/or re-calibration.

## G. Findings

Property Address: **1827 NE 28<sup>th</sup> Street, Ocala, FL 34470**

DKE tested a total of **one hundred and twenty-six (126) surfaces via XRF analysis and six (6) calibrations. Zero (0) were found to contain lead at levels greater than or equal to the regulatory level of 1.0 mg/cm<sup>2</sup> in paint in the surfaces tested:**

**At the specific time and date of the inspection services, DK Environmental & Construction Services, Inc. detected no lead-based paint in the property.**

## H. Conclusions

No lead-based paint was identified, as defined by Environmental Protection Agency/Department of Housing and Urban Development (EPA/HUD) as containing lead-in concentrations greater than or equal to 1.0 mg/cm<sup>2</sup>.

When evaluating this report, it is assumed that according to Chapter 7 HUD guidelines, that if one testing combination (i.e. window, door) is positive for lead in an interior or exterior room equivalent, that all other similar testing combinations in those areas are assumed to be positive. The same is true for negative readings. All inaccessible areas are assumed to be positive, even though they were not able to be tested. Inaccessible areas are noted in Section V – XRF Results.

If the lead evaluation results indicate the presence of lead-based paint, the prospective owner may wish to obtain, at *the prospective owner's expense*, additional services of a lead-based paint inspector or risk assessor, certified for the State in which the property is located, to help understand the positive results. This person would review this report and might make additional recommendations about lead hazard control actions. Interpretations and possible actions may vary when only a few readings indicate the presence of lead-based paint.

This inspection was done in accordance with Lead Safe Housing Rule 24 CFR Part 35 subpart J as amended June 21, 2004. The sample results are presented in Appendix V.

The surface conditions ranged from “Intact” to “Deteriorated” at the time of the inspection. Upon completion of lead hazard reduction activities, A clearance examination is required to determine that the lead hazard reduction efforts were



performed adequately. "Paint Film Stabilization" means to repair any defect in the substrate, or any defect in a building component, that is causing the paint deterioration, to remove all loose paint and other loose material from the surface to be treated using lead-safe work practices, and to apply a new protective coating of paint.

A Clearance Examination would include a visual evaluation of all surfaces that were determined to be defective during the initial inspection, and collection of dust samples. It should be determined that the deteriorated paint surfaces have been corrected and that no settled dust lead hazards exist in the dwelling or unit. The clearance report must be signed by a certified/licensed Lead Inspector/Risk Assessor.

Painted surfaces found to be intact during the inspection which contain levels of lead greater than or equal to 1.0 mg/cm<sup>2</sup> could create lead hazards if the paint is turned into dust by abrasion, scraping, or sanding. If conditions of intact paint surfaces become destabilized, these conditions will need to be addressed. If any future construction or modernization work is done on the premises, this report should be given to the contractors as well as the tenants.

#### **IV. DISCLOSURE RESPONSIBILITY AND DISCLAIMER**

##### **Disclosure Responsibility**

A copy of this report must be provided to new lessees (tenants) and purchasers of this property under Federal Law (24 CFR part 35 and 40 CFR part 745) before they become obligated under a lease or sales contract. The complete report must also be provided to new purchasers and it must be made available to new tenants. Landlords (lessors) and sellers are also required to distribute an educational pamphlet and include standard warning language in their leases or sales contracts to ensure that parents have the information they need to protect their children from lead-based paint hazards.

##### **Disclaimer**

This is our report of a visual survey, and X-Ray Fluorescence (XRF) analysis of the readily accessible areas of this building and tested components. The presence or absence of lead-based paint or lead-based paint hazards applies only to the tested or assessed surfaces on the date of the field visit. It should be understood that conditions noted within this report were accurate at the time of the inspection services and in no way reflect the conditions at the property after the date of the inspection services. No other environmental concerns were addressed during the inspection services.

**V. XRF Results**



1827 NE 28<sup>th</sup> Street, Ocala, FL 34470

Read No.	Wall	Structure	Location	Member	Paint Cond	Substrate	Paint Color	Lead (mg/cm <sup>2</sup> )	Mode
Interior Room 001 Bedroom A									
012	A	Wall	U Ctr		I	Drywall	white	0.0	QM
008	A	Baseboard	Ctr		I	Wood	white	0.1	QM
013	B	Wall	U Ctr		I	Drywall	white	0.1	QM
014	B	Ceiling	Ctr		I	Drywall	white	-0.2	QM
009	C	closet wall	Rgt		I	Drywall	white	0.0	QM
010	C	Wall	U Ctr		I	Drywall	white	-0.1	QM
006	C	Door	Rgt	Casing	I	Wood	white	0.0	QM
007	C	Door	Rgt	Door	I	Wood	white	-0.2	QM
011	D	Wall	U Ctr		I	Drywall	white	-0.1	QM
004	D	Door	Ctr	Door	I	Wood	stain	-0.2	QM
005	D	Door	Ctr	Jamb	I	Wood	stain	-0.1	QM
Interior Room 002 Office									
021	A	cabinet	Lft	Door	I	Wood	white	0.1	QM
017	A	Wall	U Ctr		I	Drywall	white	-0.2	QM
020	A	Door	Lft	Door	I	Wood	stain	0.0	QM
016	B	Wall	U Ctr		I	Drywall	white	-0.1	QM
015	B	Ceiling	Ctr		I	Drywall	white	-0.1	QM
023	B	Door	Ctr	Casing	I	Wood	white	0.2	QM
024	C	Crown Mldg	Ctr		I	Wood	stain	-0.1	QM
019	C	Wall	U Ctr		I	Drywall	white	-0.3	QM
018	D	Wall	U Ctr		I	Drywall	white	0.0	QM
022	D	Baseboard	Rgt		I	Wood	white	0.2	QM
Interior Room 003 Bathroom									
030	A	Wall	U Ctr		I	Drywall	white	-0.1	QM
028	A	Door	Rgt	Door	I	Wood	white	-0.4	QM
029	A	Door	Rgt	Jamb	I	Wood	white	0.1	QM
027	B	cabinet	Lft		I	Wood	stain	-0.1	QM
031	B	Wall	U Ctr		I	Drywall	white	0.0	QM
032	C	Wall	U Ctr		I	Drywall	white	-0.1	QM
026	C	Window	Lft	Casing	I	Wood	stain	0.0	QM
025	D	Crown Mldg	Ctr		I	Wood	stain	0.1	QM
033	D	Wall	U Ctr		I	Drywall	white	-0.2	QM
034	D	Ceiling	Ctr		I	Drywall	white	0.1	QM
Interior Room 004 Laundry Rm									
037	A	Crown Mldg	Ctr		I	Wood	white	0.3	QM
035	A	Ceiling	Ctr		I	Wood	white	-0.2	QM
038	B	Door	Ctr	Door	I	Wood	white	-0.2	QM
036	C	Window	Lft	Casing	I	Wood	white	0.3	QM
Interior Room 005 Rear Entry									
042	A	Wall	U Ctr		I	Drywall	white	-0.1	QM
041	A	Ceiling	Ctr		I	Wood	white	-0.2	QM
043	B	Wall	U Ctr		I	Drywall	white	-0.1	QM
044	C	Wall	U Ctr		I	Drywall	white	0.1	QM
039	C	Door	Ctr	Casing	I	Wood	white	0.2	QM
040	D	Crown Mldg	Ctr		I	Wood	stain	0.2	QM
045	D	Wall	U Ctr		I	Drywall	white	0.2	QM
Interior Room 006 Kitchen									
002	A	Wall	U Ctr		I	Drywall	white	0.1	QM
009	A	Door	Ctr	Door	I	Wood	stain	0.1	QM
010	A	Door	Ctr	Jamb	I	Wood	white	0.2	QM
003	B	Wall	U Ctr		I	Drywall	white	-0.2	QM
007	B	Baseboard	Rgt		I	Wood	stain	-0.1	QM
006	C	cabinet	Ctr		I	Wood	stain	-0.1	QM
004	C	Wall	U Ctr		I	Drywall	white	-0.3	QM
005	C	Ceiling	Ctr		I	Drywall	white	0.2	QM
008	D	Crown Mldg	Ctr		I	Wood	stain	0.3	QM
001	D	Wall	U Ctr		I	Drywall	white	-0.2	QM

Read No.	Wall	Structure	Location	Member	Paint Cond	Substrate	Paint Color	Lead (mg/cm <sup>2</sup> )	Mode
Interior Room 007 Play Room									
014	A	Ceiling	Ctr		I	Wood	white	-0.1	QM
011	B	Door	Rgt	Casing	I	Wood	white	0.0	QM
012	B	Door	Rgt	Door	I	Wood	white	-0.4	QM
013	C	Baseboard	Lft		I	Wood	white	0.1	QM
015	D	Shelf	Ctr		I	Wood	stain	0.1	QM
Interior Room 008 Living Rm									
021	A	Wall	U Ctr		I	Wood	stain	0.1	QM
020	A	Ceiling	Ctr		I	Wood	stain	0.1	QM
024	B	Wall	U Ctr		I	Wood	stain	-0.1	QM
017	B	Window	Ctr	Casing	I	Wood	stain	-0.1	QM
023	C	Wall	U Ctr		I	Wood	stain	0.3	QM
016	C	Baseboard	Lft		I	Wood	stain	-0.1	QM
022	D	Wall	U Ctr		I	Wood	stain	-0.1	QM
018	D	Door	Lft	Jamb	I	Wood	stain	0.0	QM
019	D	Door	Lft	Door	I	Wood	stain	0.0	QM
Interior Room 009 Bedroom B									
026	A	Wall	U Ctr		I	Wood	white	-0.1	QM
036	A	Baseboard	Ctr		I	Wood	yellow	-0.1	QM
037	B	Crown Mldg	Ctr		I	Wood	yellow	0.3	QM
029	B	Wall	L Ctr		I	Wood	green	-0.2	QM
030	B	Wall	L Ctr		I	Wood	blue	-0.1	QM
031	B	Ceiling	Ctr		I	Drywall	blue	-0.1	QM
033	C	closet wall	Lft		I	Wood	white	-0.1	QM
032	C	closet wall	Ctr		I	Wood	blue	-0.2	QM
025	C	Wall	U Ctr		I	Wood	white	0.0	QM
034	C	Door	Lft	Jamb	I	Wood	white	0.1	QM
035	C	Door	Lft	Door	I	Wood	white	0.0	QM
027	D	Wall	L Lft		I	Wood	yellow	-0.1	QM
028	D	Wall	L Lft		I	Wood	pink	-0.1	QM
038	D	Window	Ctr	Casing	I	Wood	yellow	0.0	QM
Interior Room 010 Hallway									
045	A	Wall	U Ctr		I	Drywall	white	0.0	QM
044	B	Wall	U Ctr		I	Drywall	white	0.0	QM
041	B	Baseboard	Ctr		I	Wood	stain	0.3	QM
042	C	Crown Mldg	Ctr		I	Wood	stain	0.2	QM
043	C	Wall	U Ctr		I	Drywall	white	0.1	QM
046	D	Wall	U Ctr		I	Drywall	white	0.0	QM
047	D	Ceiling	Ctr		I	Drywall	white	0.0	QM
039	D	Door	Lft	Jamb	I	Wood	white	0.0	QM
040	D	Door	Lft	Door	I	Wood	white	-0.1	QM
Interior Room 011 Bathroom									
055	A	Crown Mldg	Ctr		I	Wood	stain	0.4	QM
049	A	Wall	U Ctr		I	Drywall	white	0.2	QM
056	A	Baseboard	Ctr		I	Wood	stain	0.0	QM
050	B	Wall	U Ctr		I	Drywall	white	0.2	QM
052	B	Door	Lft	Door	I	Wood	white	-0.1	QM
057	C	cabinet	Lft		I	Wood	stain	-0.1	QM
051	C	Wall	U Ctr		I	Drywall	white	-0.1	QM
054	D	Crown Mldg	Ctr		I	Wood	white	0.1	QM
048	D	Ceiling	Ctr		I	Drywall	white	0.0	QM
053	D	Window	Ctr	Casing	I	Wood	white	-0.1	QM

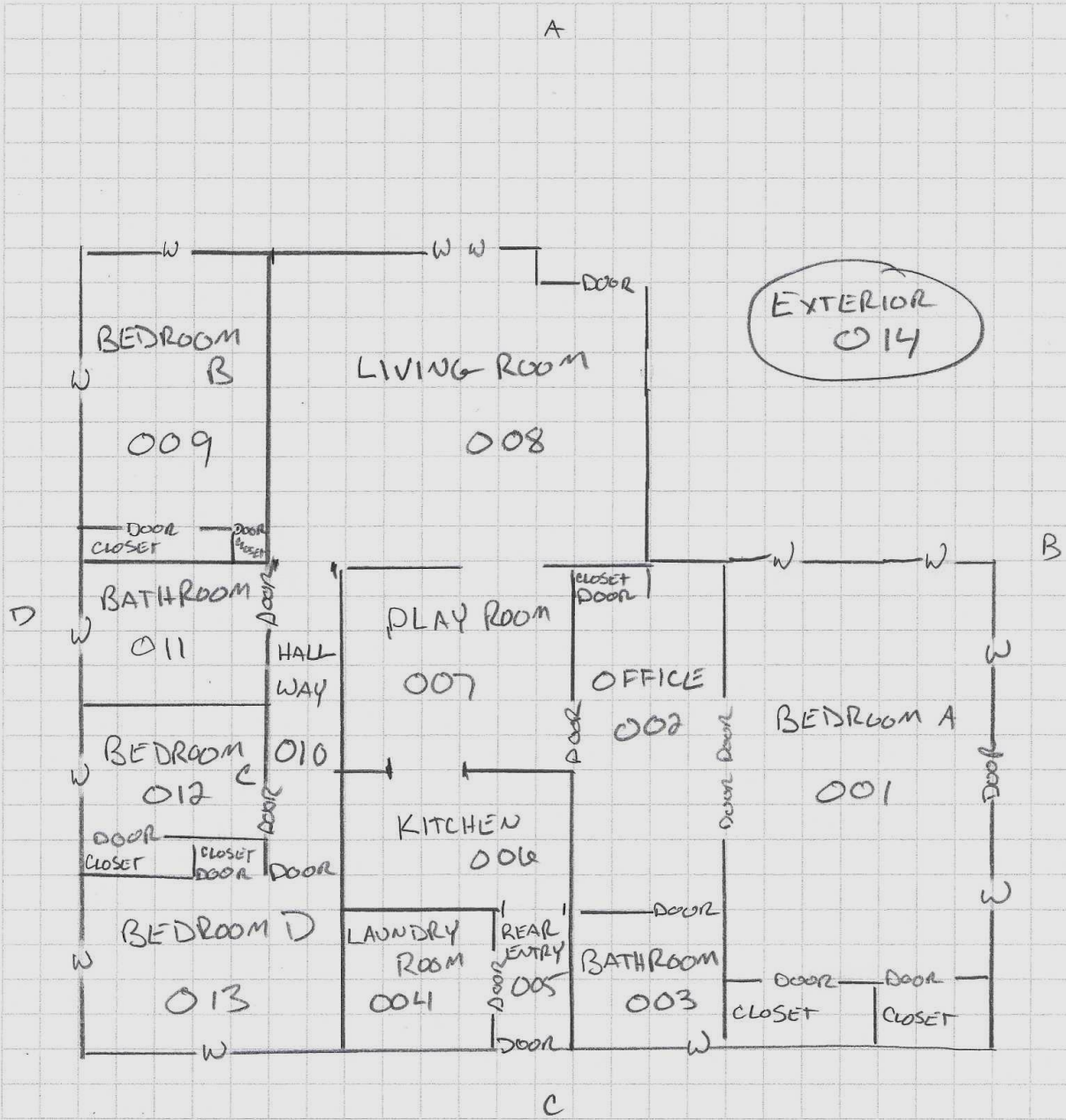
Read No.	Wall	Structure	Location	Member	Paint Cond	Substrate	Paint Color	Lead (mg/cm <sup>2</sup> )	Mode
Interior Room 012 Bedroom C									
061	A	Crown Mldg	Ctr		I	Wood	stain	0.0	QM
065	A	Wall	U Ctr		I	Drywall	white	0.0	QM
064	B	Wall	U Ctr		I	Drywall	white	-0.2	QM
063	B	Ceiling	Ctr		I	Drywall	white	0.0	QM
062	B	Door	Rgt	Door	I	Wood	white	0.3	QM
068	C	closet wall	Rgt		I	Drywall	white	0.3	QM
067	C	Wall	U Ctr		I	Drywall	white	0.0	QM
058	C	Door	Rgt	Door	I	Wood	stain	0.0	QM
059	C	Door	Rgt	Casing	I	Wood	stain	0.1	QM
066	D	Wall	U Ctr		I	Drywall	white	-0.1	QM
060	D	Baseboard	Ctr		I	Wood	stain	0.2	QM
Interior Room 013 Bedroom D									
069	A	closet wall	Ctr		I	Drywall	white	0.0	QM
070	A	Wall	U Ctr		I	Drywall	white	-0.2	QM
077	A	Door	Rgt	Casing	I	Wood	white	0.3	QM
078	A	Door	Rgt	Door	I	Wood	white	-0.1	QM
076	B	Crown Mldg	Ctr		I	Wood	stain	0.1	QM
071	B	Wall	U Ctr		I	Drywall	white	0.0	QM
072	C	Wall	U Ctr		I	Drywall	white	0.2	QM
075	C	Baseboard	Ctr		I	Wood	stain	0.1	QM
073	D	Wall	U Ctr		I	Drywall	white	0.0	QM
074	D	Ceiling	Ctr		I	Drywall	white	0.3	QM
014 Exterior									
080	A	Slab	Ctr		D	Concrete	blue	-0.3	QM
082	A	post	Ctr		D	Metal	gray	-0.4	QM
079	A	Door	Ctr	Jamb	I	Wood	white	-0.1	QM
081	A	Door	Ctr	Threshold	D	Wood	blue	0.1	QM
083	B	Stairs	Ctr	Treads	D	Concrete	blue	0.0	QM
084	C	Door	Ctr	Jamb	I	Wood	white	0.1	QM
Calibration Readings									
001								1.0	TC
002								1.0	TC
003								0.9	TC
130								1.0	TC
131								0.9	TC
132								1.0	TC

---- End of Readings ----

**VI. Drawings/Floor Plans**

DK Environmental & Construction Services, Inc.  
8786 Sonoma Coast Drive, Winter Garden, FL 34787  
407-614-4572 814-243-1927  
dkenvironmental@yahoo.com

SITE PLAN



Case # 08241014

Address 1827 NE 28<sup>th</sup> St  
Ocala, FL, 34470

**VII. Property Photographs**

1827 NE 28<sup>th</sup> Street, Ocala, FL 34470



Exterior(014) A-Wall



Exterior(014) B-Wall



Exterior(014) C-Wall



Exterior(014) D-Wall



**VIII. License/Certification**

# United States Environmental Protection Agency

This is to certify that

Debra L Koontz



has fulfilled the requirements of the Toxic Substances Control Act (TSCA) Section 402, and has received certification to conduct lead-based paint activities pursuant to 40 CFR Part 745.226 as:

Risk Assessor

## In the Jurisdiction of:

All EPA Administered Lead-based Paint Activities Program States, Tribes and Territories

This certification is valid from the date of issuance and expires September 06, 2024

LBP-R-191376-2

Certification #

August 18, 2021

Issued On

Adrienne Priselac, Manager, Toxics Office

Land Division



**IX. XRF Performance Characteristics Sheet**

## Performance Characteristic Sheet

EFFECTIVE DATE: October 24, 2000

EDITION NO.: 4

**MANUFACTURER AND MODEL:**Make: *Radiation Monitoring Devices*Model: *LPA-1*Source: *<sup>57</sup>Co*

Note: This sheet supersedes all previous sheets for the XRF instrument of the make, model, and source shown above for instruments sold or serviced after June 26, 1995. For other instruments, see prior editions.

### FIELD OPERATION GUIDANCE

**OPERATING PARAMETERS**

Quick mode or nominal 30-second standard mode readings.

**XRF CALIBRATION CHECK LIMITS**0.7 to 1.3 mg/cm<sup>2</sup> (inclusive)**SUBSTRATE CORRECTION:**For XRF results below 4.0 mg/cm<sup>2</sup>, substrate correction is recommended for:

Metal using 30-second standard mode readings.

None using quick mode readings.

Substrate correction is not needed for:

Brick, Concrete, Drywall, Plaster, and Wood using 30-second standard mode readings

Brick, Concrete, Drywall, Metal, Plaster, and Wood using quick mode readings

**THRESHOLDS:**

30-SECOND STANDARD MODE READING DESCRIPTION	SUBSTRATE	THRESHOLD (mg/cm <sup>2</sup> )
Results corrected for substrate bias on metal substrate only	Brick	1.0
	Concrete	1.0
	Drywall	1.0
	Metal	0.9
	Plaster	1.0
	Wood	1.0

QUICK MODE READING DESCRIPTION	SUBSTRATE	THRESHOLD (mg/cm <sup>2</sup> )
Readings not corrected for substrate bias on any substrate	Brick	1.0
	Concrete	1.0
	Drywall	1.0
	Metal	1.0
	Plaster	1.0
	Wood	1.0



RMD LPA-1, PCS Edition 4, Page2 of 4

## BACKGROUND INFORMATION

### EVALUATION DATA SOURCE AND DATE:

This sheet is supplemental information to be used in conjunction with Chapter 7 of the HUD *Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing* (HUD Guidelines"). Performance parameters shown on this sheet are calculated from the EPA/HUD evaluation using archived building components. Testing was conducted on approximately 150 test locations in July 1995. The instrument that performed testing in September had a new source installed in June 1995 with 12 mCi initial strength.

### OPERATING PARAMETERS:

Performance parameters shown in this sheet are applicable only when properly operating the instrument using the manufacturer's instructions and procedures described in Chapter 7 of the HUD Guidelines.

### XRF CALIBRATION CHECK:

The calibration of the XRF instrument should be checked using the paint film nearest 1.0 mg/cm<sup>2</sup> in the NIST Standard Reference Material (SRM) used (e.g., for NIST SRM 2579, use the 1.02 mg/cm<sup>2</sup> film).

If readings are outside the acceptable calibration check range, follow the manufacturer's instructions to bring the instruments into control before XRF testing proceeds.

### SUBSTRATE CORRECTION VALUE COMPUTATION

Chapter 7 of the HUD Guidelines provides guidance on correcting XRF results for substrate bias. Supplemental guidance for using the paint film nearest 1.0 mg/cm<sup>2</sup> for substrate correction is provided:

XRF results are corrected for substrate bias by subtracting from each XRF result a correction value determined separately in each house for single-family housing or in each development for multifamily housing, for each substrate. The correction value is an average of XRF readings taken over the NIST SRM paint film nearest to 1.0 mg/cm<sup>2</sup> at test locations that have been scraped bare of their paint covering. Compute the correction values as follows:

Using the same XRF instrument, take three readings on a bare substrate area covered with the NIST SRM paint film nearest 1 mg/cm<sup>2</sup>. Repeat this procedure by taking three more readings on a second bare substrate area of the same substrate covered with the NIST SRM.

Compute the correction value for each substrate type where XRF readings indicate substrate correction is needed by computing the average of all six readings as shown below.

For each substrate type (the 1.02 mg/cm<sup>2</sup> NIST SRM is shown in this example; use the actual lead loading of the NIST SRM used for substrate correction):

$$\text{Correction value} = (1\text{st} + 2\text{nd} + 3\text{rd} + 4\text{th} + 5\text{th} + 6\text{th Reading}) / 6 - 1.02 \text{ mg/cm}^2$$

Repeat this procedure for each substrate requiring substrate correction in the house or housing development.

### EVALUATING THE QUALITY OF XRF TESTING:

Randomly select ten testing combinations for retesting from each house or from two randomly selected units in multifamily housing. Use either 15-second readings or 60-second readings.

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Conduct XRF re-testing at the ten testing combinations selected for retesting.

Determine if the XRF testing in the units or house passed or failed the test by applying the steps below.

Compute the Retest Tolerance Limit by the following steps:

Determine XRF results for the original and retest XRF readings. Do not correct the original or retest results for substrate bias. In single-family housing a result is defined as the average of three readings. In multifamily housing, a result is a single reading. Therefore, there will be ten original and ten retest XRF results for each house or for the two selected units.

Calculate the average of the original XRF result and retest XRF result for each testing combination.

Square the average for each testing combination.

Add the ten squared averages together. Call this quantity C.

Multiply the number C by 0.0072. Call this quantity D.

Add the number 0.032 to D. Call this quantity E.

Take the square root of E. Call this quantity F.

Multiply F by 1.645. The result is the Retest Tolerance Limit.

Compute the average of all ten original XRF results.

Compute the average of all ten re-test XRF results.

Find the absolute difference of the two averages.

If the difference is less than the Retest Tolerance Limit, the inspection has passed the retest. If the difference of the overall averages equals or exceeds the Retest Tolerance Limit, this procedure should be repeated with ten new testing combinations. If the difference of the overall averages is equal to or greater than the Retest Tolerance Limit a second time, then the inspection should be considered deficient.

Use of this procedure is estimated to produce a spurious result approximately 1% of the time. That is, results of this procedure will call for further examination when no examination is warranted in approximately 1 out of 100 dwelling units tested.

#### **BIAS AND PRECISION:**

Do not use these bias and precision data to correct for substrate bias. These bias and precision data were computed without substrate correction from samples with reported laboratory results less than 4.0 mg/cm<sup>2</sup> lead. The data which were used to determine the bias and precision estimates given in the table below have the following properties. During the July 1995 testing, there were 15 test locations with a laboratory-reported result equal to or greater than 4.0 mg/cm<sup>2</sup> lead. Of these, one 30-second standard mode reading was less than 1.0 mg/cm<sup>2</sup> and none of the quick mode readings were less than 1.0 mg/cm<sup>2</sup>. The instrument that tested in July is representative of instruments sold or serviced after June 26, 1995. These data are for illustrative purposes only. Actual bias must be determined on the site. Results provided above already account for bias and precision. Bias and precision ranges are provided to show the variability found between machines of the same model.

30-SECOND STANDARD MODE READING MEASURED AT	SUBSTRATE	BIAS (mg/cm <sup>2</sup> )	PRECISION <sup>†</sup> (mg/cm <sup>2</sup> )
0.0 mg/cm <sup>2</sup>	Brick	0.0	0.1
	Concrete	0.0	0.1
	Drywall	0.1	0.1
	Metal	0.3	0.1
	Plaster	0.1	0.1
	Wood	0.0	0.1
0.5 mg/cm <sup>2</sup>	Brick	0.0	0.2
	Concrete	0.0	0.2
	Drywall	0.0	0.2
	Metal	0.2	0.2
	Plaster	0.0	0.2
	Wood	0.0	0.2
1.0 mg/cm <sup>2</sup>	Brick	0.0	0.3
	Concrete	0.0	0.3
	Drywall	0.0	0.3
	Metal	0.2	0.3
	Plaster	0.0	0.3
	Wood	0.0	0.3
2.0 mg/cm <sup>2</sup>	Brick	-0.1	0.4
	Concrete	-0.1	0.4
	Drywall	-0.1	0.4
	Metal	0.1	0.4
	Plaster	-0.1	0.4
	Wood	-0.1	0.4

<sup>†</sup>Precision at 1 standard deviation.

**CLASSIFICATION RESULTS:**

XRF results are classified as positive if they are greater than the upper boundary of the inconclusive range, and 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. Earlier editions of this *XRF Performance Characteristics Sheet* did not include both bounds of the inconclusive range as "inconclusive." While this edition of the Performance Characteristics Sheet uses a different system, the specific XRF readings that are considered positive, negative, or inconclusive for a given XRF model and substrate remain unchanged, so previous inspection results are not affected.

**DOCUMENTATION:**

An EPA document titled *Methodology for XRF Performance Characteristic Sheet* provides an explanation of the statistical methodology used to construct the data in the sheets, and provides empirical results from using the recommended inconclusive ranges or thresholds for specific XRF instruments. For a copy of this document call the National Lead Information Center Clearinghouse at 1-800-424-LEAD. A HUD document titled *A Nonparametric Method for Estimating the 5th and 95th Percentile Curves of Variable-Time XRF Readings Based on Monotone Regression* provides supplemental information on the methodology for variable-time XRF instruments. A copy of this document can be obtained from the HUD lead web site, [www.hud.gov/lea](http://www.hud.gov/lea).

This edition of the XRF Performance Characteristic Sheet was developed by QuanTech, Inc., under a contract from the U.S. Department of Housing and Urban Development (HUD). HUD has determined that the information provided here is acceptable when used as guidance in conjunction with Chapter 7, Lead-Based Paint Inspection, of HUD's *Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing*.



**X. Glossary**

**Abatement:** A measure or set of measures designed to permanently eliminate lead-based paint hazards or lead based paint. Abatement strategies include the removal of lead-based paint, enclosure, encapsulation, replacement of building components coated with lead-based paint, removal of lead-contaminated dust, and removal of lead-contaminated soil or overlaying of soil with a durable covering such as asphalt (grass and sod are considered interim control measures). All of these strategies require preparation, cleanup, waste disposal, post-abatement clearance testing, record keeping, and, if applicable, monitoring. See also **Complete Abatement** and **Interim controls**.

**Accreditation:** A formal recognition certifying that an organization, such as a laboratory, is competent to carry out specific tasks or types of tests.

**Accuracy:** The degree of agreement between an observed value and an accepted reference value (a "true" value); a data quality indicator. Accuracy includes a combination of random errors (Precision) and systematic errors (bias) due to sampling and analysis.

**Bare soil:** Soil not covered with grass, sod, some other similar vegetation, or paving, including the sand in sandboxes.

**Building component:** Any element of a building that may be painted or have dust on its surface, e.g. walls, stair treads, floors, railings, doors, windowsills, etc.

**Certification:** The process of testing and evaluating against certain specifications the competence of a person, organization, or other entity in performing a function or service, usually for a specified period of time.

**Certified:** The designation for Contractors who have completed training and other requirements to safely allow them to undertake risk assessments, inspections, or abatement work. Risk assessors, inspectors, and Abatement Contractors should be certified by the appropriate local, State, or Federal agency.

**Chewable surface:** See **Chewed surface**.

**Chewed surface:** Any painted surface that shows evidence of having been chewed or mouthed by a young child. A chewed surface is usually a protruding, horizontal part of a building, such as an interior windowsill.

**Cleaning:** The process of using a vacuum and wet cleaning agents to remove leaded dust. The process includes the removal of bulk debris from the work area. OSHA prohibits the use of compressed air to clean lead-contaminated dust from a surface.

**Clearance examination:** Visual examination and collection of environmental samples by an inspector or risk assessor, or, in some circumstances, a Sampling Technician, and analysis by an accredited laboratory upon completion of an abatement project, interim control intervention, or maintenance job that disturbs lead-based paint (or paint suspected of being lead-based). The clearance examination is performed to ensure that lead exposure levels do not exceed standards established by the EPA Administrator pursuant to Title IV of the Toxic Substances Control Act, and that any cleaning following such work adequately meets those standards.

**Common area:** A room or area that is accessible to all residents in a community (e.g. hallways or lobbies). In general, any area not kept locked.

**Composite sample:** A single sample made up of individual subsamples. Analysis of a composite sample produces the arithmetic mean of all subsamples.

**Containment:** A process to protect workers and the environment by controlling exposures to the lead-contaminated dust and debris created during abatement.

**Deteriorated lead-based paint:** Any lead-based paint coating on a damaged or deteriorated surface or fixture, or any interior or exterior lead-based paint that is peeling, chipping, flaking, worn, chalking, alligating, cracking, or otherwise becoming separated from the substrate.

**Disposal (of waste):** The discharge, deposit, injection, dumping, spilling, leaking, or placement of solid or liquid waste on land or in water so that none of its constituents can pollute the environment by being emitted into the air or discharged into a body of water, including groundwater.

**Encapsulation:** Any covering or coating that acts as a barrier between lead-based paint and the environment, the durability of which relies on adhesion and the integrity of the existing bonds between multiple layers of paint and between the paint and the substrate. See also **Enclosure**.

**Enclosure:** The use of rigid, durable construction materials that are mechanically fastened to the substrate to act as a barrier between the lead-based paint and the environment.

**Evaluation:** Risk assessment, paint inspection, reevaluation, investigation, clearance examination, or risk assessment screen.

**Examination:** See **Clearance Examination**.

**Federal Register (FR):** A daily Federal publication that contains proposed and final regulations, rules, and notices.

**Impact Surface:** An interior or exterior surface (such as surfaces on doors) subject to damage by repeated impact or contact.

**Inspection (of paint):** A surface-by-surface investigation to determine the presence of lead-based paint (in some cases including dust and soil sampling) and a report of the results.

**Interim controls:** A set of measures designed to temporarily reduce human exposure or possible exposure to lead-based paint hazards. Such measures include specialized cleaning, repairs, maintenance, painting, temporary containment, and management and resident education programs. Monitoring, conducted by Owners, and reevaluations, conducted by professionals, are integral elements of interim control. Interim controls include dust removal, paint film stabilization, treatment of friction and impact surfaces, installation of soil coverings such as grass or sod, and land use controls. See also **Monitoring, Reevaluations, and Abatement**.

**Interior windowsill:** The portion of the horizontal window ledge that protrudes into the interior of the room, adjacent to the window sash when the window is closed. Often called the window stool.

**Latex:** A waterborne emulsion paint made with synthetic binders, such as 100% acrylic, vinyl acrylic, terpolymer, or styrene acrylic. A stable emulsion of polymers and pigment in water.

**Lead:** Lead includes metallic lead and inorganic and organic compounds of lead.

**Lead-based paint:** Any paint, varnish, shellac, or other coating that contains lead equal to or greater than 1.0 mg/cm<sup>2</sup> (milligrams of lead per square centimeter of surface) as measured by XRF or laboratory analysis, or 0.5% by weight (5,000ug/g, 5,000 ppm (parts per million), or 5,000 mg/kg) as measured by laboratory analysis (Local definitions may vary.)

**Lead-based paint hazard:** A condition in which exposure to lead from lead-contaminated dust, lead-contaminated soil, or deteriorated lead-based paint would have an adverse effect on human health (as established by the EPA Administrator under Title IV of the Toxic Substances Control Act). Lead-based paint hazards include, for example, deteriorated lead-based paint, leaded dust levels above applicable standards. And bare leaded soil above applicable standards.

**Lead-based paint hazards control:** Activities to control and eliminate lead-based paint hazards, including interim controls, abatement, and complete abatement.

**Lead-contaminated dust:** Surface dust in residences that contains an area concentration of lead in excess of the standard established by the EPA Administrator, pursuant to Title IV of the Toxic Substances Control Act. As of April 01, 2017, EPA standards for lead dust for risk assessments are  $\geq 10$  ug/ft<sup>2</sup> (micrograms of lead per square foot) for floors, and  $\geq 100$  ug/ft<sup>2</sup> for interior windowsills. The EPA standard for clearance are  $< 10$  ug/ft<sup>2</sup> for floors, 100 ug/ft<sup>2</sup> for windowsills, and 100 ug/ft<sup>2</sup> for window troughs. Porch floors are also wiped during final clearance, with a lead dust clearance action level of  $< 40$  ug/ft<sup>2</sup>.

**Lead-contaminated soil:** Bare soil on residential property that contains lead in excess of the standard established by the EPA Administrator, pursuant to Title IV of the Toxic Substances Control Act. The standard is 400 ug/g in play areas and 1,200 ug/g in the rest of the property.

**Leaded dust:** See **Lead-contaminated dust**.

**Licensed:** Holding a valid license or certification issued by the EPA or by an EPA-approved State program pursuant to Title IV of the Toxic Substances Control Act. The license is based on certification for lead-based paint hazard control work. See also **Certified**.

**Maintenance:** Work intended to maintain adequate living conditions in a dwelling, which has the potential to disturb lead-based paint or paint that is suspected of being lead-based.

**Mean:** The arithmetic average of a series of numerical data values. For example, the algebraic sum of the data values divided by the number of data values.

**Microgram (ug):** 1/1,000,000 of a gram. Used to measure weight.

**Monitoring:** Surveillance to determine (1) that known or suspected lead-based paint is not deteriorating, (2) that lead-based paint hazard controls, such as paint stabilization, enclosure, or encapsulation have not failed, and (3) that structural problems do not threaten the integrity of hazard controls.

**Owner:** A person, firm, corporation, guardian, conservator, receiver, trustee, executor, government agency or entity, or other judicial officer who, alone or with others, owns, holds, or controls the freehold or leasehold title or part of the title to property, with or without actually possessing it. This definition includes a vendee who possesses the title, but does not include a mortgagee or an Owner of a reversionary interest under a ground rent lease.

**Paint inspector:** An individual who has completed training from an accredited program and been licensed or certified by the appropriate State or local agency to (1) perform inspections to determine and report the presence of lead-based paint on a surface-by-surface basis through onsite testing, (2) report the findings of such an inspection, (3) collect environmental samples for laboratory analysis, (4) perform clearance testing, and optionally (5) document successful compliance with lead-based paint hazard control requirements or standards.

**Paint removal:** An abatement strategy that entails the removal of lead-based paint from surfaces. For lead hazard control work, this can mean using chemicals, heat guns below 1,100° F, and certain contained abrasive methods. Open-flame burning, open-abrasive blasting, sandblasting, extensive dry scraping, and stripping in a poorly ventilated space using a volatile stripper are prohibited paint removal methods. Hydroblasting is not recommended.

**Plastic:** See **Polyethylene plastic**.

**Polyethylene plastic:** All references to polyethylene plastic refer to 6 mil plastic sheeting or polyethylene bags (or double bags if using 4 mil polyethylene bags), or any other thick plastic material shown to demonstrate at least the equivalent dust contamination performance. Plastic used to contain waste should be capable of completely containing the waste and, after being properly sealed, should remain leak tight with no visible signs of discharge during movement or relocation.

**Polyurethane:** An exceptionally hard and wear-resistant coating (created by the reaction of polyols with a multifunctional isocyanate). Often used to seal wood floors following lead-based paint hazard control work and cleaning.

**Reevaluation:** In lead hazard control work, the combination of a visual assessment and collection of environmental samples performed by a certified risk assessor to determine if a previously implemented lead-based paint hazard control measure is still effective and if the dwelling remains lead-safe.

**Removal:** See **Paint removal**.

**Renovation:** Work that involves construction and/or home or building improvement measures such as window replacement, weatherization, remodeling, and repainting.

**Replacement:** A strategy of abatement that entails the removal of building components coated with lead-based paint (such as windows, doors, and trim) and the installation of new components free of lead-based paint.

**Resident:** A person who lives in a dwelling.

**Risk assessment:** An onsite investigation of a residential dwelling to discover any lead-based paint hazards. Risk assessments include an investigation of the age, history, management, and maintenance of the dwelling, and the number of children under age 6 and women of childbearing age who are residents; a visual assessment; limited environmental sampling (i.e. collection of dust wipe samples, soil samples, and deteriorated paint samples); and preparation of a report identifying acceptable abatement and interim control strategies based on specific conditions.

**Risk assessor:** A certified individual who has completed training with an accredited training program and who has been certified to (1) perform risk assessments, (2) identify acceptable abatement and interim control strategies for reducing identified lead-based paint hazards, (3) perform clearance testing and reevaluations, and (4) document the successful completion of lead-based paint hazard control activities.

**Site:** The land or body of water where a facility is located or an activity is conducted. The site includes adjacent land used in connection with the facility or activity.

**Soil:** See **Bare soil**.

**Spectrum analyzer:** A type of XRF analyzer that provides the operator with a plot of the energy and intensity, or counts of both K and L x-ray spectra, as well as a calculated lead concentration. See also **XRF analyzer**.

**Standard deviation:** A measure of the precision of a reading. The spread of the deviation from the mean. The smaller the standard deviation, the more precise the analysis. The standard deviation is calculated by first obtaining the mean, or the arithmetic average, of all of the readings. A formula is then used to calculate how much the individual values vary from the mean – the standard deviation is the square root of the arithmetic average of the squares of the deviation from the mean. Many hand calculators have an automatic standard deviation function. See also **Mean**.

**Subsample:** A representative portion of a sample. A subsample may be either a field sample or a laboratory sample. A subsample is often combined with other subsamples to produce a composite sample. See also **Composite sample**.

**Substrate:** A surface on which paint, varnish, or other coating has been applied or may be applied. Examples of substrates include wood, plaster, metal, and drywall.

**Substrate effect:** The radiation returned to an XRF analyzer by the paint, substrate, or underlying material, in addition to the radiation returned by any lead present. This radiation, when counted as lead x-rays by an XRF analyzer contributes to substrate equivalent lead (bias). The inspector may have to compensate for this effect when using XRF analyzers. See also **XRF analyzer**.

**Substrate Equivalent Lead (SEL):** The XRF measurement taken on an unpainted surface, used to calculate the corrected lead concentration on a surface by using the following formula: Apparent Lead Concentration-Substrate Equivalent Lead = Corrected Lead Concentration. See also **XRF analyzer**.

**Target housing:** Any residential unit constructed before 1978, except dwellings that do not contain bedrooms or dwellings that were developed specifically for the elderly or persons with disabilities, unless a child younger than 6 resides or is expected to reside in the dwelling. In the case of jurisdictions that banned the sale or use of lead-based paint before 1978, the Secretary of HUD may designate an earlier date for defining target housing.

**Test location:** A specific area on a testing combination where XRF instruments will test for lead-based paint.

**Trained:** Successful completion of a training course in a particular discipline. For lead hazards control work, the training course must be accredited by the EPA or by an EPA-approved State program, pursuant to Title IV of the Toxic Substances Control Act.

**Treatment:** In residential lead-based paint hazard control work, any method designed to control lead-based paint hazards. Treatment includes interim controls, abatement, and removal.

**Trough:** See **Window trough**.

**Windowsill:** See **Interior windowsill**.

**Window trough:** For a typical double-hung window, the portion of the exterior windowsill between the interior windowsill (or stool) and the frame of the storm window. If there is no storm window, the window trough is the area that receives both the upper and lower window sashes when they are both lowered. Sometimes inaccurately called the window "well".

**Worker:** An individual who has completed training in an accredited program to perform lead-based paint hazard control in housing.

**Worksite:** Any interior or exterior area where lead-based paint hazard control work takes place.

**XRF analyzer:** An instrument that determines lead concentration in milligrams per square centimeter (mg/cm<sup>2</sup>) using the principle of x-ray fluorescence (XRF). Two types of field portable XRF analyzers are used – direct readers and spectrum analyzers. For this lead-based paint inspection, the term XRF analyzer only refers to portable instruments manufactured to analyze paint, that have a HUD Performance Characteristic Sheet, and are interpreted in accordance with the Performance Characteristic Sheet. It does not refer here to laboratory-grade units or portable instruments designed to analyze soil.