# Ann Arbor Housing Commission

## Limited XRF Instrument Testing Report
**(For Purposes of RRP Rule Compliance)**

**For**

## 2072 Garden Circle
## Ann Arbor, MI

## January 30, 2015

ENVIRONMENTAL, INC.
5300 PLYMOUTH ROAD
ANN ARBOR, MICHIGAN 48105
734-930-0995

ENVIRONMENTAL, INC.
5300 PLYMOUTH ROAD
ANN ARBOR, MICHIGAN 48105
734-930-0995

March 6, 2015

Ms. Jennifer Hall
Executive Director
Ann Arbor Housing Commission
404 N. Ashley
Ann Arbor, MI 48103

Dear Ms. Hall:

Enclosed please find the Limited Lead X-Ray Fluorescence (XRF) Testing Report for 2072 Garden Circle. This Report is separated into the following sections:

- Section I XRF Testing Summary/Background/Testing Information
- Section II Description of XRF Lead Testing Procedure
- Section III Description of Lead Testing Data Terms, XRF Lead Testing Results
- Section IV Building Diagram(s)
- Section V Niton Performance Characteristic Sheet

The on-site Limited Lead XRF Lead Testing of the above-mentioned facility was conducted by a Michigan Accredited Lead Inspector from Nova Environmental, Inc.

If you have any questions or concerns regarding the enclosed material, please feel free to contact me at (734) 930-0995.

Thank you for choosing Nova Environmental, Inc.

Sincerely,

NOVA ENVIRONMENTAL, INC.

Kary S. Amin
Vice President

KSA/ij

ENVIRONMENTAL, INC.

**Ann Arbor Housing Commission**

**Limited Lead XRF Testing Report**
**For**
**2072 Garden Circle**

**Section I**

**XRF Testing Summary/Background**

## XRF Testing Summary:

Nova Environmental, Inc. conducted a total of fifty-two (52) Niton XRF Analyzer tests (excluding instrument calibrations) at **2072 Garden Circle**. All components/testing combinations sampled were negative (see Section III for detailed data results).

## Background:

Nova Environmental, Inc. was contacted by Ms. Jennifer Hall of the Ann Arbor Housing Commission who requested that Nova conduct lead XRF Testing within the residence at 2072 Garden Circle in order to determine the presence of lead-based paint in accordance with the Environmental Protection Agency's Renovation Repair and Painting (RRP) Rule.

Nova Environmental, Inc. conducted the testing using an X-Ray Fluorescence (XRF) Lead Analyzer. The testing of individual painted components was conducted in accordance with U.S. Department of Housing and Urban Development publication, "*Guidelines for the Evaluation and Control of Lead-Based Paint in Housing*", Chapter 7, 1997 Revision.

It should be noted that the following limitations were realized during this XRF testing process:

- XRF testing was only conducted on certain attached components within the applicable spaces. No XRF testing was conducted on unattached materials, such as furniture, toys bookcases, etc.
- No testing was performed on painted components above ceilings, in inaccessible locations, roofs or on exterior components that were not accessible by 6' ladder.
- Painted components that could not be accessed by a 6' ladder were not XRF tested. This includes, but is not limited to high ceilings, walls and other painted components within Gymnasiums and Cafeterias.
- If a specific component was not identified as being XRF tested within Section III of this Report, Ann Arbor Housing Commission and affected contractors shall assume that it is lead-based painted or surface coated and treat it as such until testing in accordance with the RRP Rule is performed.

**Ann Arbor Housing Commission**

**Limited Lead XRF Testing Report**
**For**
**2072 Garden Circle**

**Section I (Continued)**

**Limited Lead RRP Testing Report Information**

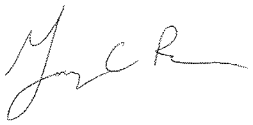
**Lead Inspection Information:**

| | |
|---|---|
| Name of Client: | Ann Arbor Housing Commission |
| Name of Building: | 2072 Garden Circle |
| Address of Building: | 2072 Garden Circle: Ann Arbor, MI |
| Date(s) of XRF Lead Testing: | January 30, 2015 |
| Contact Person: | Ms. Jennifer Hall |
| Contact Person's Telephone Number: | 734.794.6721 |

**Lead Certification Information**:

| | |
|---|---|
| Name of Certified Inspector(s): | Gary C. Bosh |
| Certification Number: | P-03238 |
| Certification Expiration: | March 31, 2015 |
| Serial Number of XRF Device: | #XLp303A 20368 |
| Latest XRF Re-sourcing Date: | August 8, 2012 |

Signature of Certified Inspector:



* A copy of each Lead Inspector(s) Michigan Lead Certification is attached.

Michigan Department of Community Health

Healthy Homes Section

**Gary C. Bosh**

**Lead Inspector**

Cert. number P-03238

**Annual fee due by March 31,** 2015

*Appropriate refresher training and exam must be taken to renew this certification before March 31,2015*

ENVIRONMENTAL, INC.

**Ann Arbor Housing Commission**

**Limited Lead XRF Testing Report**
**For**
**2072 Garden Circle**

**Section II**

**Description of Testing Procedure**

## Lead Paint Testing Methods:

Nova Environmental, Inc. conducted the testing using an X-Ray Fluorescence (XRF) Lead Analyzer. The testing of individual painted components was conducted in accordance with U.S. Department of Housing and Urban Development publication, "*Guidelines for the Evaluation and Control of Lead-Based Paint in Housing*", Chapter 7, 1997 Revision.

## Lead-Based Paint Testing Method

Nova Environmental, Inc. conducted the testing of painted components using the Niton XLp-303A Lead Analyzer. This state-of-the-art instrument allows for the testing of lead in paint using non-destructive means. The Lead Analyzer fully complies with all applicable Federal and Michigan State regulations. The Performance Characteristic Sheet for the Niton XLp-303A is located in Section V of this report.

The HUD/EPA standards indicate that any concentration of lead in paint at or above 1.0 milligram per square centimeter ($mg/cm^2$) is considered lead-based paint, and would be identified within the XRF testing data forms as **"Positive"**. Any concentration of lead in paint below 1.0 $mg/cm^2$ would be noted within the XRF testing data forms as "Negative". The detection limit for the XRF is 1.0 $mg/cm^2$ and this was the setting used for this evaluation.

Occupational Safety & Health Administration (OSHA) standards, however, have determined that any concentration of lead in paint is fully covered by their regulation. Note that OSHA does not recognize a negative reading on the XRF and requires laboratory analysis (bulk sampling) for a final determination of negative for lead in paint. Therefore, the results of the XRF testing within this report comply with the RRP Rule but do not necessarily comply with the OSHA Lead Construction Standard.

NOVA
ENVIRONMENTAL, INC.

**Ann Arbor Housing Commission**

**Limited Lead XRF Testing Report**
**For**
**2072 Garden Circle**

**Section III**

**Lead XRF Testing Data Terms and Results**

This Section provides the results of the XRF testing conducted.

The first portion of this Section provides a description of the XRF testing data terms.

The second portion of this Section is a listing of the XRF testing data and applicable results.

## 2072 Garden Circle

## Section III

## Description of XRF Testing Data Terms

The following is a list of terms that appear on the XRF Testing Results forms and their respective definitions.

**Reading No:** A number assigned by the XRF device's memory at the time the reading was taken. This reading typically is in ascending sequential order.

**Room:** The room or room equivalent is the common name for a given functional space, such as bath, kitchen, porch, or a room number etc.

**Component:** The structure or the common-named structural material that was tested, such as door, wall, floor, etc.

**Substrate:** The substrate is the material underneath the paint, such as brick, concrete, drywall, metal, plaster or wood.

**Color:** The actual color of the surface of the component tested, such as brown, blue, etc.

**Side:** The side, in this case directional, of the tested component such as north, south, east and west (for casework, direction indicates closest wall).

**Result:** This column is the actual result of the reading from the XRF device. A result of "**Positive**" indicates any concentration at or above 1.0 milligram per square centimeter ($mg/cm^2$). This means that the test was positive for lead according to the RRP Rule. A result of "Negative" indicates that the concentration was below 1.0 $mg/cm^2$ and, therefore, non lead-based paint according to the RRP Rule. A "Null" indicates an unsuccessful test usually followed by another test of the component in the same location.

**PbC:** The numerical result. LOD is Limit of Detection.

**Units:** The stated units of concentration, as $mg/cm^2$.

| Reading No | School Room | Component | Substrate | Color | Side | Results | PbC | Units |
|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | 2.08 | cps |
| **2** | | **CALIBRATE NITON** | | | | **Positive** | **1** | **mg/cm ²** |
| **3** | | **CALIBRATE NITON** | | | | **Positive** | **1** | **mg/cm ²** |
| **4** | | **CALIBRATE NITON** | | | | **Positive** | **1** | **mg/cm ²** |
| 5 | Back Bedroom | Wall | Drywall | White | A | Negative | <LOD | mg/cm ² |
| 6 | Back Bedroom | Wall | Drywall | White | B | Negative | <LOD | mg/cm ² |
| 7 | Back Bedroom | Wall | Drywall | White | C | Negative | <LOD | mg/cm ² |
| 8 | Back Bedroom | Wall | Drywall | White | D | Negative | <LOD | mg/cm ² |
| 9 | Back Bedroom | Window Frame | Wood | White | D | Negative | <LOD | mg/cm ² |
| 10 | Back Bedroom | Door Frame | Wood | White | A | Negative | <LOD | mg/cm ² |
| 11 | Back Bedroom | Door | Wood | Stain | A | Negative | <LOD | mg/cm ² |
| 12 | Master Bedroom | Door | Wood | Stain | D | Negative | <LOD | mg/cm ² |
| 13 | Master Bedroom | Door Frame | Wood | White | D | Negative | <LOD | mg/cm ² |
| 14 | Master Bedroom | Window Frame | Wood | White | C | Negative | <LOD | mg/cm ² |
| 15 | Master Bedroom | Wall | Plaster | White | A | Negative | <LOD | mg/cm ² |
| 16 | Master Bedroom | Wall | Plaster | White | B | Negative | <LOD | mg/cm ² |
| 17 | Master Bedroom | Wall | Plaster | White | C | Negative | <LOD | mg/cm ² |
| 18 | Master Bedroom | Wall | Plaster | White | D | Negative | <LOD | mg/cm ² |
| 19 | Front Bedroom | Wall | Drywall | Pink | A | Negative | <LOD | mg/cm ² |
| 20 | Front Bedroom | Wall | Drywall | Pink | B | Negative | <LOD | mg/cm ² |
| 21 | Front Bedroom | Wall | Drywall | Pink | C | Negative | <LOD | mg/cm ² |
| 22 | Front Bedroom | Wall | Drywall | Pink | D | Negative | <LOD | mg/cm ² |
| 23 | Front Bedroom | Window Frame | Wood | Pink | B | Negative | <LOD | mg/cm ² |
| 24 | Front Bedroom | Door Frame | Wood | Pink | D | Negative | <LOD | mg/cm ² |
| 25 | Front Bedroom | Door | Wood | Stain | D | Negative | <LOD | mg/cm ² |
| 26 | Bathroom | Door | Wood | Stain | B | Negative | <LOD | mg/cm ² |
| 27 | Bathroom | Door Frame | Wood | White | B | Negative | <LOD | mg/cm ² |
| 28 | Bathroom | Wall | Drywall | White | A | Negative | <LOD | mg/cm ² |
| 29 | Bathroom | Wall | Drywall | White | B | Negative | <LOD | mg/cm ² |
| 30 | Bathroom | Wall | Drywall | White | C | Negative | <LOD | mg/cm ² |
| 31 | Bathroom | Wall | Drywall | White | D | Negative | <LOD | mg/cm ² |
| 32 | Hall | Wall | Drywall | Green | B | Negative | <LOD | mg/cm ² |

**Inspector(s): Gary C. Bosh**
**Date(s): 1/30/2015**

| Reading No | School Room | Component | Substrate | Color | Side | Results | PbC | Units |
|---|---|---|---|---|---|---|---|---|
| 33 | Hall | Wall | Drywall | Green | D | Negative | <LOD | mg/cm ² |
| 34 | Hall | Door Frame | Wood | Green | B | Negative | <LOD | mg/cm ² |
| 35 | Closet | Door | Wood | Stain | B | Negative | <LOD | mg/cm ² |
| 36 | Closet | Drop Ceiling Grid | Drywall | Green | A | Negative | <LOD | mg/cm ² |
| 37 | Closet | Drop Ceiling Grid | Drywall | Green | C | Negative | <LOD | mg/cm ² |
| 38 | Closet | Drop Ceiling Grid | Drywall | Green | D | Negative | <LOD | mg/cm ² |
| 39 | Living Room | Wall | Drywall | Green | A | Negative | <LOD | mg/cm ² |
| 40 | Living Room | Wall | Drywall | Green | B | Negative | <LOD | mg/cm ² |
| 41 | Living Room | Wall | Drywall | Green | C | Negative | <LOD | mg/cm ² |
| 42 | Living Room | Door | Wood | Stain | A | Negative | <LOD | mg/cm ² |
| 43 | Living Room | Door Frame | Wood | Green | A | Negative | <LOD | mg/cm ² |
| 44 | Living Room | Window Frame | Wood | Green | A | Negative | <LOD | mg/cm ² |
| 45 | Kitchen | Window Frame | Wood | Pink | D | Negative | <LOD | mg/cm ² |
| 46 | Kitchen | Door Frame | Wood | Pink | D | Negative | <LOD | mg/cm ² |
| 47 | Kitchen | Door | Wood | Stain | D | Negative | <LOD | mg/cm ² |
| 48 | Kitchen | Wall | Drywall | Pink | A | Negative | <LOD | mg/cm ² |
| 49 | Kitchen | Wall | Drywall | Pink | B | Negative | <LOD | mg/cm ² |
| 50 | Kitchen | Wall | Drywall | Pink | C | Negative | <LOD | mg/cm ² |
| 51 | Kitchen | Wall | Drywall | Pink | D | Negative | <LOD | mg/cm ² |
| 52 | Basement | Wall | Concrete | White | A | Negative | <LOD | mg/cm ² |
| 53 | Basement | Wall | Concrete | White | B | Negative | <LOD | mg/cm ² |
| 54 | Basement | Wall | Concrete | White | C | Negative | <LOD | mg/cm ² |
| 55 | Basement | Wall | Concrete | White | D | Negative | <LOD | mg/cm ² |
| 56 | Exterior | Window Panel | Cellulose | Blue | D | Negative | <LOD | mg/cm ² |
| 57 | | CALIBRATE NITON | | | | Negative | 0.9 | mg/cm ² |
| 58 | | CALIBRATE NITON | | | | Negative | 0.9 | mg/cm ² |
| **59** | | **CALIBRATE NITON** | | | | **Positive** | **1** | **mg/cm ²** |

**Inspector(s): Gary C. Bosh**
**Date(s): 1/30/2015**

NOVA ENVIRONMENTAL, INC.

**Ann Arbor Housing Commission**

**Limited Lead XRF Testing Report**
**For**
**2072 Garden Circle**

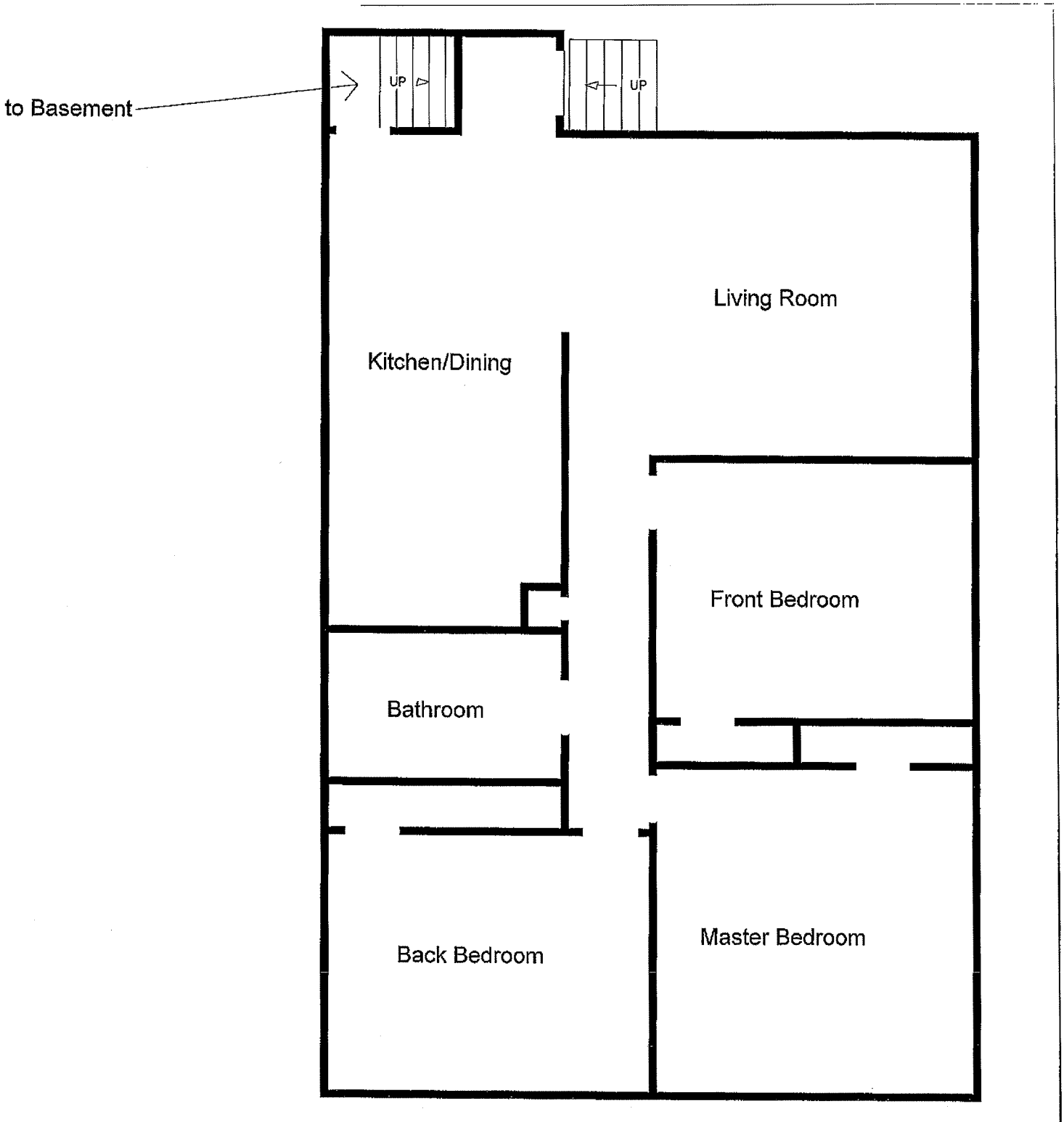
**Section IV**

**Building Diagram(s)**

This Section includes the diagram(s) of the facility.

# 2072 Garden Circle

# Ann Arbor, Michigan



NOVA ENVIRONMENTAL, INC.

**Ann Arbor Housing Commission**

**Limited Lead XRF Testing Report**
**For**
**2072 Garden Circle**

**Section V**

**Niton Performance Characteristic Sheet**

This Section includes the technical data that is provided by the manufacturer regarding the XRF instrument.

# Performance Characteristic Sheet

**EFFECTIVE DATE:** September 24, 2004 **EDITION NO.:** 1

**MANUFACTURER AND MODEL:**

Make: *Niton LLC*
Tested Model: *XLp 300*
Source: $^{109}Cd$
Note: This PCS is also applicable to the equivalent model variations indicated below, for the Lead-in-Paint K+L variable reading time mode, in the XLi and XLp series:

XLi 300A, XLi 301A, XLi 302A and XLi 303A.
XLp 300A, XLp 301A, XLp 302A and XLp 303A.
XLi 700A, XLi 701A, XLi 702A and XLi 703A.
XLp 700A, XLp 701A, XLp 702A, and XLp 703A.

Note: The XLi and XLp versions refer to the shape of the handle part of the instrument. The differences in the model numbers reflect other modes available, in addition to Lead-in-Paint modes. The manufacturer states that specifications for these instruments are identical for the source, detector, and detector electronics relative to the Lead-in-Paint mode.

## FIELD OPERATION GUIDANCE

**OPERATING PARAMETERS:**

Lead-in-Paint K+L variable reading time mode.

**XRF CALIBRATION CHECK LIMITS:**

| |
|---|
| 0.8 to 1.2 mg/cm$^2$ (inclusive) |

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

For XRF results using Lead-in-Paint K+L variable reading time mode, substrate correction is not needed for:

Brick, Concrete, Drywall, Metal, Plaster, and Wood

**INCONCLUSIVE RANGE OR THRESHOLD:**

| K+L MODE READING DESCRIPTION | SUBSTRATE | THRESHOLD (mg/cm$^2$) |
|---|---|---|
| Results 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 |

## 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 in August 2004 on 133 testing combinations. The instruments that were used to perform the testing had new sources; one instrument's was installed in November 2003 with 40 mCi initial strength, and the other's was installed June 2004 with 40 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.

### SUBSTRATE CORRECTION VALUE COMPUTATION:

Substrate correction is not needed for brick, concrete, drywall, metal, plaster or wood when using Lead-in-Paint K+L variable reading time mode, the normal operating mode for these instruments. If substrate correction is desired, refer to Chapter 7 of the HUD Guidelines for guidance on correcting XRF results for substrate bias.

### 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 the K+L variable time mode readings.

Conduct XRF retesting 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.

**TESTING TIMES:**

For the Lead-in-Paint K+L variable reading time mode, the instrument continues to read until it is moved away from the testing surface, terminated by the user, or the instrument software indicates the reading is complete. The following table provides testing time information for this testing mode. The times have been adjusted for source decay, normalized to the initial source strengths as noted above. Source strength and type of substrate will affect actual testing times. At the time of testing, the instruments had source strengths of 26.6 and 36.6 mCi.

| Testing Times Using K+L Reading Mode (Seconds) | | | | | | |
|---|---|---|---|---|---|---|
| | All Data | | | Median for laboratory-measured lead levels ($mg/cm^2$) | | |
| Substrate | $25^{th}$ Percentile | Median | $75^{th}$ Percentile | Pb < 0.25 | 0.25 ≤ Pb<1.0 | 1.0 ≤ Pb |
| Wood Drywall | 4 | 11 | 19 | 11 | 15 | 11 |
| Metal | 4 | 12 | 18 | 9 | 12 | 14 |
| Brick Concrete Plaster | 8 | 16 | 22 | 15 | 18 | 16 |

**CLASSIFICATION RESULTS:**

XRF results are classified as positive if they are greater than or equal to the threshold, and negative if they are less than the threshold.

**DOCUMENTATION:**

A document titled *Methodology for XRF Performance Characteristic Sheets* 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.

This XRF Performance Characteristic Sheet was developed by the Midwest Research Institute (MRI) and QuanTech, Inc., under a contract between MRI and the XRF manufacturer. 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*.