SOLICITATION # FY17-RFQ-03

Request for Qualifications
PROFESSIONAL SERVICES
ENVIRONMENTAL CONSULTING, LEAD & ASBESTOS TESTING, RISK ASSESSMENT, HAZARD REDUCTION DESIGN, ABATEMENT, MONITORING AND SITE ASSESSMENTS SERVICES

Department of Facilities

Tampa Housing Authority

Nicholas W. Dickerson, Contracting Officer
5301 W. Cypress St.
Tampa, FL 33607
813-341-9101, ext. 3500

DEADLINE
November 10, 2017 @ 2:00 P.M.

LEFT BLANK

Department of Energy Services and Special Projects

Solicitation #FY17-RFQ-03

Request for Qualifications
PROFESSIONAL SERVICES

ENVIRONMENTAL CONSULTING, LEAD & ASBESTOS TESTING, RISK ASSESSMENT, HAZARD REDUCTION DESIGN, ABATEMENT, MONITORING AND SITE ASSESSMENTS SERVICES

The Tampa Housing Authority (THA) is soliciting qualification based proposals from qualified contractors capable of performing an array of professional services involving the management and implementation of a lead and asbestos hazard reduction program throughout the Authority's Public Housing Community; services shall also include other environmental remediation services such as, pigeon waste, indoor air quality, asbestos, radon, site assessments, etc. This is an indefinite quantity contract solicitation whereby THA intends to award tasks under this contract on an as needed basis. The duration of the services under the resulting contract will not exceed two (2) years and the maximum contract amount is up to $150,000 per awarded contract. The exact nature and extent of services will vary and no specified minimum amount of services will be guaranteed to any firm. The Authority reserves the right to award more than one contract from this solicitation. If multiple awards are made from this solicitation, it shall be at the sole discretion of the Authority as to the quantity of services actually authorized and assignment of task orders.

The basic services required by this solicitation shall, include but is not necessarily limited to the following:

1. Provision of professional consulting services in the area of lead-based paint, asbestos, and other hazardous materials;
2. Design of hazard reduction and abatement plans;
3. Testing for the presence and concentration of lead, asbestos, and other hazards;
4. Reporting and monitoring of hazard reduction activities, and provision of recommendations, cost estimates, and project management;
5. Design-build approach to emergency testing and abatement of units with EBL children. Such work shall be in accordance with THA's lead-based paint testing protocol and HUD's *"Guidelines for the Evaluation and Control of Lead Based Paint Hazards in Housing."* Design build services may also be required for other small environmental tasks or time sensitive projects;
6. Design-build services for hazardous materials abatement projects, construction contract administration, and abatement monitoring; and
7. Other consulting services of an environmental nature.

Firms responding to this Request for Qualifications shall include qualifications (P.E., C.I.H., L.A.C., and Contractor's License) and other pertinent information. Include all other firms comprising the team for this project, in any. This includes the firm proposed to perform any abatement work as required by the above.

All EBL testing and abatement must be expedited and performed in strict compliance with THA's EBL protocol attached as ***Exhibit A***.

An expedient implementation will be required on all assignments. Only firms capable of demonstrating an ability to perform under tight schedules will be considered. Interested firms may respond to this request for proposals by submitting an original and three (3) complete copies of their proposal in strict accordance herewith.

SUBMISSION DEADLINE:

Time: **2:00 P.M. EST (Prevailing Tampa, Florida Time)**
Date: **November 10, 2017**

Important:
Proposals received after this time will be rejected by the Tampa Housing Authority. Proposals which do not conform to the requirements, including organization of the proposal will receive reduced scores in accordance with the evaluation criteria.

MAIL OR HAND DELIVER PROPOSAL TO:

Nicholas W. Dickerson, Director of Contracting
Tampa Housing Authority
5301 West Cypress St., Tampa, Florida 33607
813-341-9101 Ext. 3500

Proposals will be received only at the above address and shall contain the following identification clearly marked on the outside of the sealed envelope; name of company submitting bid and labeled as follows:

Professional Services Proposal for Lead and Asbestos Consulting Services
Solicitation FY17-RFQ-03

In accordance with **Section 3** of the Housing and Urban Development Act of 1968, as amended, the Tampa Housing Authority requires that **to the greatest extent possible**; training, employment and business opportunities are given to low-income persons residing in Public Housing in the City of Tampa. The goal for Section 3 employment is 30% of all new hires resulting from this award. The successful firm will be required to submit a plan showing their commitment toward providing preferences to THA residents for new training, employment or business opportunities created as a result of this contract award.

In accordance with Department of Housing and Urban Development regulations, there shall be a goal of not less than 20% for the purpose of awarding contracts to minority business enterprises (MBE's) or prime consultants with MBE participation of at least 20% of total contract effort.

A selection Panel appointed by the Senior Vice President/Chief Development Officer will rank proposals. Once proposals have been evaluated and ranked, the Tampa Housing Authority will use the competitive negotiation process to negotiate a contract with the most qualified firm whose fee falls within the competitive range. The form of agreement will be THA's Consulting Services Agreement, which will contain a scope of service based on individual task orders and accompanying fee schedule. The contract will be for an indefinite quantity of services over the period of the contract. The scope of work, duration of each task and fees for each assigned task will be negotiated.

PROPOSALS SHALL INCLUDE:
All proposals shall include the following information in order to be considered responsive.

1. A Letter of Interest;
2. Documentation to substantiate each of the listed evaluation criteria;
3. Not less than five most recent references from clients which the firm has performed services of a similar nature. Include project name and value, contact person, address and telephone number along with a description of the work performed and the date completed;
4. The Consultant's fee schedule showing each personnel classification required by the nature of the work required of this RFP with the fully-burdened hourly rate for each classification;
5. Completed form HUD-5369C "Representations, Certifications and other Statements"; and,
6. Completed Non-collusive Affidavit.
7. Completed Section 3 Contracting Commitment Form

PROPOSAL EVALUATION:
The following criteria will be used to evaluate all submissions. Proposals must be organized and tabbed in accordance with the below evaluation criteria:

NO.	Criteria	Score
1	Evidence of firm's ability to perform the work, as evidenced by profiles of the principles and staff's professional and technical experience and facilities.	25
2	Capability to provide professional service in a timely manner.	25
3	Past Performance in terms of quality of work and compliance with performance schedules.	20
4	Evidence that the firm has certifications and/or licenses to provide the services in the State of Florida.	Mandatory
5	Demonstrated knowledge of local conditions, regulations and applicable codes.	Mandatory
6	Certified Statement that the firm is not debarred, suspended or otherwise prohibited from professional practice by any Federal, State, or local agency.	Mandatory
7	Proposed plan to incorporate Section 3 and M/WBE participation in the contract services.	20
8	Completeness and general response to this request for proposal.	10

Questions regarding this request for proposal shall be directed by email to: Nicholas.dickerson@thafl.com. The close out for submission of questions is Monday, November 6, 2017 at 12:00 noon.

Proposal Packages:
A complete proposal package may be obtained from the Contracting Officer by email to Nicholas.dickerson@thafl.com of the Tampa Housing Authority.

THE HOUSING AUTHORITY OF THE CITY OF TAMPA RESERVES THE RIGHT TO REJECT ANY AND ALL PROPOSALS AND TO WAIVE ANY INFORMALITY IN THE SOLICITATION PROCESS.

AN EQUAL OPPORTUNITY EMPLOYER

By order of Jerome D. Ryans, President/Chief Executive Officer

FORMS

HUD-5369-B Instructions to Offerors, Non-Construction
HUD-5639-C Certifications and Representations of Offerors, Non-Construction
HUD-5370-C General Contract Conditions
Non-Collusive Affidavit
Section 3/MBE Compliance Certification Form
Section 3 Certification of Efforts to Comply
Sworn Statement Pursuant to Florida Statues on Public Entity Crimes

LEFT BLANK

Instructions to Offerors Non-Construction

U.S. Department of Housing and Urban Development
Office of Public and Indian Housing

11111111
-03291 -

1. Preparation of Offers

(a) Offerors are expected to examine the statement of work, the proposed contract terms and conditions, and all instructions. Failure to do so will be at the offeror's risk.

(b) Each offeror shall furnish the information required by the solicitation. The offeror shall sign the offer and print or type its name on the cover sheet and each continuation sheet on which it makes an entry. Erasures or other changes must be initialed by the person signing the offer. Offers signed by an agent shall be accompanied by evidence of that agent's authority, unless that evidence has been previously furnished to the HA.

(c) Offers for services other than those specified will not be considered.

2. Submission of Offers

(a) Offers and modifications thereof shall be submitted in sealed envelopes or packages (1) addressed to the office specified in the solicitation, and (2) showing the time specified for receipt, the solicitation number, and the name and address of the offerer.

(b) Telegraphic offers will not be considered unless authorized by the solicitation; however, offers may be modified by written or telegraphic notice.

(c) Facsimile offers, modifications or withdrawals will not be considered unless authorized by the solicitation.

3. Amendments to Solicitations

(a) If this solicitation is amended, then all terms and conditions which are not modified remain unchanged.

(b) Offerors shall acknowledge receipt of any amendments to this solicitation by

(1) signing and returning the amendment;
(2) identifying the amendment number and date in the space provided for this purpose on the form for submitting an offer,
(3) letter or telegram, or
(4) facsimile, if facsimile offers are authorized in the solicitation. The HA/HUD must receive the acknowledgment by the time specified for receipt of offers.

4. Explanation to Prospective Offerors

Any prospective offeror desiring an explanation or interpretation of the solicitation, statement of work, etc., must request it in writing soon enough to allow a reply to reach all prospective offerors before the submission of their offers. Oral explanations or instructions given before the award of the contract will not be binding. Any information given to a prospective offeror concerning a solicitation will be furnished promptly to all other prospective offerors as an amendment of the solicitation, if that information is necessary in submitting offers or if the lack of it would be prejudicial to any other prospective offerors.

5. Responsibility of Prospective Contractor

(a) The HA shall award a contract only to a responsible prospective contractor who is able to perform successfully under the terms and conditions of the proposed contract. To be determined responsible, a prospective contractor must -

(1) Have adequate financial resources to perform the contract, or the ability to obtain them;
(2) Have a satisfactory performance record;
(3) Have a satisfactory record of integrity and business ethics;
(4) Have a satisfactory record of compliance with public policy (e.g., Equal Employment Opportunity); and
(5) Not have been suspended, debarred, or otherwise determined to be ineligible for award of contracts by the Department of Housing and Urban Development or any other agency of the U.S.Government. Current lists of ineligible contractors are available for inspection at the HA/HUD.

(b) Before an offer is considered for award, the offeror may be requested by the HA to submit a statement or other documentation regarding any of the foregoing requirements. Failure by the offeror to provide such additional information may render the offerer ineligible for award.

6. Late Submissions, Modifications, and Withdrawal of Offers

(a) Any offer received at the place designated in the solicitation after the exact time specified for receipt will not be considered unless it is received before award is made and it -

(1) Was sent by registered or certified mail not later than the fifth calendar day before the date specified for receipt of offers (e.g., an offer submitted in response to a solicitation requiring receipt of offers by the 20th of the month must have been mailed by the 15th);
(2) Was sent by mail, or if authorized by the solicitation, was sent by telegram or via facsimile, and it is determined by the HA/HUD that the late receipt was due solely to mishandling by the HA/HUD after receipt at the HA;
(3) Was sent by U.S. Postal Service Express Mail Next Day Service - Post Office to Addressee, not later than 5:00 p.m. at the place of mailing two working days prior to the date specified for receipt of proposals. The term "Working days" excludes weekends and U.S. Federal holidays; or
(4) **Is** the only offer received.

(b) Any modification of an offer, except a modification resulting from the HA's request for "best and final" offer (if this solicitation is a request for proposals), is subject to the same conditions as in subparagraphs (a)(1), (2), and (3) of this provision.

(c) A modification resulting from the HA's request for "best and final" offer received after the time and date specified in the request will not be considered unless received before award and the late receipt is due solely to mishandling by the HA after receipt at the HA.

(d) The only acceptable evidence to establish the date of mailing of a late offer, modification, or withdrawal sent either by registered or certified mail is the U.S. or Canadian Postal Service postmark both on the envelope or wrapper and on the original receipt from the U.S. or Canadian Postal Service. Both postmarks must show a legible date or the offer, modification, or withdrawal shall be processed as if mailed late. "Postmark" means a printed, stamped, or otherwise placed impression (exclusive of a postage meter machine impression) that is readily identifiable without further action as having been supplied and affixed by employees of the U.S. or Canadian Postal Service on the date of mailing. Therefore, offerors should request the postal clerk to place a hand cancellation bull's_-eye postmark on both the receipt and the envelope or wrapper.

(e) The only acceptable evidence to establish the time of receipt at the- HA is the time/date stamp of HA on the offer wrapper or other documentary evidence of receipt maintained by the HA.

(f) The only acceptable evidence to establish the date of mailing of a late offer, modification, or withdrawal sent by Express Mail Next Day Service-Post Office to Addressee is the date entered by the post office receiving clerk on the "Express Mail Next Day Service-Post Office to Addressee" label and the postmark on both the envelope or wrapper and on the original receipt from the U.S. Postal Service. "Postmark" has the same meaning as defined in paragraph (c) of this provision, excluding postmarks of the Canadian Postal Service. Therefore, offerors should request the postal clerk to place a legible hand cancellation bull's eye postmark on both the receipt and the envelope or wrapper.

(g) Notwithstanding paragraph (a) of this provision, a late modification of an otherwise successful offer that makes its terms more favorable to the HA will be considered at any time it is received and may be accepted.

(h) If this solicitation is a request for proposals, proposals may be withdrawn by written notice, or if authorized by this solicitation, by telegram (including mailgram) or facsimile machine transmission received at any time before award. Proposals may be withdrawn in person by a offeror or its authorized representative if the identity of the person requesting withdrawal is established and the person signs a receipt for the offer before award. If this solicitation is an Invitation for bids, bids may be withdrawn at any time prior to bid opening.

7. Contract Award

(a) The HA will award a contract resulting from this solicitation to the responsible offeror whose offer conforming to the solicitation will be most advantageous to the HA, cost or price and other factors, specified elsewhere in this solicitation, considered.

(b) The HA may
(1) reject any or all offers if such action is in the HA's interest,
(2) accept other than the lowest offer,
(3) waive informalities and minor irregularities in offers received, and (4) award more than one contract for all or part of the requirements stated.

(c) If this solicitation is a request for proposals, the HA may award a contract on the basis of initial offers received, without discussions. Therefore, each initial offer should contain the offeror's best terms from a cost or price and technical standpoint.

(d) A written award or acceptance of offer mailed or otherwise furnished to the successful offeror within the time for acceptance specified in the offer shall result in a binding contract without further action by either party. If this solicitation is a request for proposals, before the offer's specified expiration time, the HA may accept an offer, whether or not there are negotiations after its receipt, unless a written notice of withdrawal is received before award. Negotiations conducted after receipt of an offer do not constitute a rejection or counteroffer by the HA.

(e) Neither financial data submitted with an offer, nor representations concerning facilities or financing, will form a part of the resulting contract.

8. Service of Protest

Any protest against the award of a contract pursuant to this solicitation shall be served on the HA by obtaining written and dated acknowledgment of receipt from the HA at the address shown on the cover of this solicitation. The determination of the HA with regard to such protest or to proceed to award notwithstanding such protest shall be final unless appealed by the protestor.

9. Offer Submission

Offers shall be submitted as follows and shall be enclosed in a sealed envelope and addressed to the office specified int he solicitation. The proposal shall show **the hour and date specified** In **the solicitation for receipt, the solicitation number, and the name and address of the offeror, on the face of the envelope.**

It is very Important that the offer be properly identified on the face of the envelope as set forth above in order to insure that the date and time of receipt is stamped on the face of the offer envelope. Receiving procedures are: date and time stamp those envelopes identified as proposals and deliver them immediately to the appropriate contracting official, and only date stamp those envelopes which do not contain identification of the contents and deliver them to the appropriate procuring activity only through the routine mail delivery procedure.

[Describe bid or proposal preparation instructions here:}

Certifications and Representations of Offerors
Non-Construction Contract

U.S. Department of Housing and Urban Development
Office of Public and Indian Housing

This form includes clauses required by OMB's common rule on bidding/offering procedures, implemented by HUD in 24 CFR 85.36, and those requirements set forth in Executive Order 11625 for small, minority, women-owned businesses, and certifications for independent price determination, and conflict of interest. The form is required for nonconstruction contracts awarded by Housing Agencies (HAs). The form is used by bidders/offerors to certify to the HA's Contracting Officer for contract compliance. If the form were not used, HAs would be unable to enforce their contracts. Responses to the collection of information are required to obtain a benefit or to retain a benefit. The information requested does not lend itself to confidentiality.

1. Contingent Fee Representation and Agreement

(a) The bidder/offeror represents and certifies as part of its bid/ offer that, except for full-time bona fide employees working solely for the bidder/offeror, the bidder/offeror:

(1) [ ] has, [ ] has not employed or retained any person or company to solicit or obtain this contract; and

(2) [ ] has, [ ] has not paid or agreed to pay to any person or company employed or retained to solicit or obtain this contract any commission, percentage, brokerage, or other fee contingent upon or resulting from the award of this contract.

(b) If the answer to either (a)(1) or (a) (2) above is affirmative, the bidder/offeror shall make an immediate and full written disclosure to the PHA Contracting Officer.

(c) Any misrepresentation by the bidder/offeror shall give the PHA the right to (1) terminate the resultant contract; (2) at its discretion, to deduct from contract payments the amount of any commission, percentage, brokerage, or other contingent fee; or (3) take other remedy pursuant to the contract.

2. Small, Minority, Women-Owned Business Concern Representation

The bidder/offeror represents and certifies as part of its bid/ offer that it:

(a) [ ] is, [ ] is not a small business concern. "Small business concern," as used in this provision, means a concern, including its affiliates, that is independently owned and operated, not dominant in the field of operation in which it is bidding, and qualified as a small business under the criteria and size standards in 13 CFR 121.

(b) [ ] is, [ ] is not a women-owned small business concern. "Women-owned," as used in this provision, means a small business that is at least 51 percent owned by a woman or women who are U.S. citizens and who also control and operate the business.

(c) [ ] is, [ ] is not a minority enterprise which, pursuant to Executive Order 11625, is defined as a business which is at least 51 percent owned by one or more minority group members or, in the case of a publicly owned business, at least 51 percent of its voting stock is owned by one or more minority group members, and whose management and daily operations are controlled by one or more such individuals.

For the purpose of this definition, minority group members are:

(Check the block applicable to you)

[ ] Black Americans [ ] Asian Pacific Americans
[ ] Hispanic Americans [ ] Asian Indian Americans
[ ] Native Americans [ ] Hasidic Jewish Americans

3. Certificate of Independent Price Determination

(a) The bidder/offeror certifies that—

(1) The prices in this bid/offer have been arrived at independently, without, for the purpose of restricting competition, any consultation, communication, or agreement with any other bidder/offeror or competitor relating to (i) those prices, (ii) the intention to submit a bid/offer, or (iii) the methods or factors used to calculate the prices offered;

(2) The prices in this bid/offer have not been and will not be knowingly disclosed by the bidder/offeror, directly or indirectly, to any other bidder/offeror or competitor before bid opening (in the case of a sealed bid solicitation) or contract award (in the case of a negotiated solicitation) unless otherwise required by law; and

(3) No attempt has been made or will be made by the bidder/offeror to induce any other concern to submit or not to submit a bid/offer for the purpose of restricting competition.

(b) Each signature on the bid/offer is considered to be a certification by the signatory that the signatory:

(1) Is the person in the bidder/offeror's organization responsible for determining the prices being offered in this bid or proposal, and that the signatory has not participated and will not participate in any action contrary to subparagraphs (a)(l) through (a)(3) above; or

(2) (i) Has been authorized, in writing, to act as agent for the following principals in certifying that those principals have not participated, and will not participate in any action contrary to subparagraphs (a)(l) through (a)(3) above (insert full name of person(s) in the bidder/offeror's organization responsible for determining the prices offered in this bid or proposal, and the title of his or her position in the bidder/offeror's organization);

(ii) As an authorized agent, does certify that the principals named in subdivision (b)(2)(i) above have not participated, and will not participate, in any action contrary to subparagraphs (a)(l) through (a)(3) above; and

(iii) As an agent, has not personally participated, and will not participate in any action contrary to subparagraphs (a)(l) through (a)(3) above.

(c) If the bidder/offeror deletes or modifies subparagraph (a)2 above, the bidder/offeror must furnish with its bid/offer a signed statement setting forth in detail the circumstances of the disclosure.

4. Organizational Conflicts of Interest Certification

(a) The Contractor warrants that to the best of its knowledge and belief and except as otherwise disclosed, it does not have any organizational conflict of interest which is defined as a situation in which the nature of work under a proposed contract and a prospective contractor's organizational, financial, contractual or other interest are such that:

(i) Award of the contract may result in an unfair competitive advantage;

(ii) The Contractor's objectivity in performing the contract work may be impaired; or

(iii) That the Contractor has disclosed all relevant information and requested the HA to make a determination with respect to this Contract.

(b) The Contractor agrees that if after award he or she discovers an organizational conflict of interest with respect to this contract, he or she shall make an immediate and full disclosure in writing to the HA which shall include a description of the action which the Contractor has taken or intends to eliminate or neutralize the conflict. The HA may, however, terminate the Contract for the convenience of HA if it would be in the best interest of HA.

(c) In the event the Contractor was aware of an organizational conflict of interest before the award of this Contract and intentionally did not disclose the conflict to the HA, the HA may terminate the Contract for default.

(d) The Contractor shall require a disclosure or representation from subcontractors and consultants who may be in a position to influence the advice or assistance rendered to the HA and shall include any necessary provisions to eliminate or neutralize conflicts of interest in consultant agreements or subcontracts involving performance or work under this Contract.

5. Authorized Negotiators (RFPs only)

The offeror represents that the following persons are authorized to negotiate on its behalf with the PHA in connection with this request for proposals: (list names, titles, and telephone numbers of the authorized negotiators):

6. Conflict of Interest

In the absence of any actual or apparent conflict, the offeror, by submission of a proposal, hereby warrants that to the best of its knowledge and belief, no actual or apparent conflict of interest exists with regard to my possible performance of this procurement, as described in the clause in this solicitation titled "Organizational Conflict of Interest."

7. Offeror's Signature

The offeror hereby certifies that the information contained in these certifications and representations is accurate, complete, and current.

Signature & Date:

Typed or Printed Name:

Title:

General Contract Conditions
Non-Construction

U.S. Department of Housing and Urban Development
Office of Public and Indian Housing

OMB Approval No. 2577-0180 (exp. 4/30/96)

1. Definitions

The following definitions are applicable to this contract:

(a) "Authority or Housing Authority (HA)" means the _____ _____ Housing Authority.

(b) "Contract" means the contract entered into between the Authority and the Contractor. It includes the contract form, the Certifications and Representations, these contract clauses, and the scope of work. It includes all formal changes to any of those documents by addendum, Change Order, or other modification.

(c) "Contractor" means the person or other entity entering into the contract with the Authority to perform all of the work required under the contract.

(d) "Day" means calendar days, unless otherwise stated.

(e) "HUD" means the Secretary of Housing and Urban development, his delegates, successors, and assigns, and the officers and employees of the United States Department of Housing and Urban Development acting for and on behalf of the Secretary.

2. Changes

(a) The HA may at any time, by written order, and without notice to the sureties, if any, make changes within the general scope of this contract in the services to be performed or supplies to be delivered.

(b) If any such change causes an increase or decrease in the hourly rate, the not-to-exceed amount of the contract, or the time required for, performance of any part of the work under this contract, whether or not changed by the order, or otherwise affects the conditions of this contract, the HA shall make an equitable adjustment in the not-to-exceed amount, the hourly rate, the delivery schedule, or other affected terms, and shall modify the contract accordingly.

(c) The Contractor must assert its right to an equitable adjustment under this clause within 30 days from the date of receipt of the written order. However, if the HA decides that the facts justify it, the HA may receive and act upon a proposal submitted before final payment of the contract.

(d) Failure to agree to any adjustment shall be a dispute under clause **Disputes**, herein. However, nothing in this clause shall excuse the Contractor from proceeding with the contract as changed.

(e) No services for which an additional cost or fee will be charged by the Contractor shall be furnished without the prior written consent of the HA.

3. Disputes

(a) All disputes arising under or relating to this contract, including any claims for damages for the alleged breach thereof which are not disposed of by agreement, shall be resolved under this clause.

(b) All claims by the Contractor shall be made in writing and submitted to the HA. A claim by the HA against the Contractor shall be subject to a written decision by the HA.

(c) The HA shall, with reasonable promptness, but in no event in no more than 60 days, render a decision concerning any claim hereunder. Unless the Contractor, within 30 days after receipt of the HA's decision, shall notify the HA in writing that it takes exception to such decision, the decision shall be final and conclusive.

(d) Provided the Contractor has (1) given the notice within the time stated in paragraph (c) above, and (2) excepted its claim relating to such decision from the final release, and (3) brought suit against the HA not later than one year after receipt of final payment, or if final payment has not been made, not later than one year after the Contractor has had a reasonable time to respond to a written request by the HA that it submit a final voucher and release, whichever is earlier, then the HA's decision shall not be final or conclusive, but the dispute shall be determined on the merits by a court of competent jurisdiction.

(e) The Contractor shall proceed diligently with performance of this contract, pending final resolution of any request for relief, claim, appeal, or action arising under the contract, and comply with any decision of the HA.

4. Termination for Convenience and Default

(a) The HA may terminate this contract in whole, or from time to time in part, for the HA's convenience or the failure of the Contractor to fulfill the contract obligations (default). The HA shall terminate by delivering to the Contractor a written Notice of Termination specifying the nature, extent, and effective date of the termination. Upon receipt of the notice, the Contractor shall: (1) immediately discontinue all services affected (unless the notice directs otherwise), and (2) deliver to the HA all information, reports, papers, and other materials accumulated or generated in performing this contract, whether completed or in process.

(b) If the termination is for the convenience of the HA, the HA shall be liable only for payment for services rendered before the effective date of the termination.

(c) If the termination is due to the failure of the Contractor to fulfill its obligations under the contract (default), the HA may (1) require the Contractor to deliver to it, in the manner and to the extent directed by the HA, any work as described in subparagraph (a)(2) above, and compensation be determined in accordance with the **Changes** clause; (2) take over the work and prosecute the same to completion by contract or otherwise, and the Contractor shall be liable for any additional cost incurred by the HA; and (3) withhold any payments to the Contractor, for the purpose of set-off or partial payment, as the case may be, of amounts owed the HA by the Contractor.

(d) If, after termination for failure to fulfill contract obligations (default), it is determined that the Contractor had not failed, the termination shall be deemed to have been effected for the convenience of the HA, and the Contractor shall be entitled to payment as described in paragraph (b) above.

(e) Any disputes with regard to this clause are expressly made subject to the terms of clause titled **Disputes** herein.

5. Assignment of Contract

The Contractor shall not assign or transfer any interest in this contract; *except* that claims for monies due or to become due from the HA under the contract may be assigned to a bank, trust company,

or other financial institution. If the Contractor is a partnership, this contract shall inure to the benefit of the surviving or remaining member(s) of such partnership approved by the HA.

6. Certificate and Release

Prior to final payment under this contract, or prior to settlement upon termination of this contract, and as a condition precedent thereto, the Contractor shall execute and deliver to the HA a certificate and release, in a form acceptable to the HA, of all claims against the HA by the Contractor under and by virtue of this contract, other than such claims, if any, as may be specifically excepted by the Contractor in stated amounts set forth therein.

7. Examination and Retention of Contractor's Records

(a) The HA, HUD, or Comptroller General of the United States, or any of their duly authorized representatives shall, until 3 years after final payment under this contract, have access to and the right to examine any of the Contractor's directly pertinent books, documents, papers, or other records involving transactions related to this contract for the purpose of making audit, examination, excerpts, and transcriptions.

(b) The Contractor agrees to include in first-tier subcontracts under this contract a clause substantially the same as paragraph (a) above. "Subcontract," as used in this clause, excludes purchase orders not exceeding $10,000.

(c) The periods of access and examination in paragraphs (a) and (b) above for records relating to (1) appeals under the clause titled **Disputes**, (2) litigation or settlement of claims arising from the performance of this contract, or (3) costs and expenses of this contract to which the HA, HUD, or Comptroller General or any of their duly authorized representatives has taken exception shall continue until disposition of such appeals, litigation, claims, or exceptions.

8. Organizational Conflicts of Interest

(a) The Contractor warrants that to the best of its knowledge and belief and except as otherwise disclosed, it does not have any organizational conflict of interest which is defined as a situation in which the nature of work under this contract and a Contractor's organizational, financial, contractual or other interests are such that:
(1) Award of the contract may result in an unfair competitive advantage; or
(2) The Contractor's objectivity in performing the contract work may be impaired.

(b) The Contractor agrees that if after award it discovers an organizational conflict of interest with respect to this contract or any task/delivery order under the contract, he or she shall make an immediate and full disclosure in writing to the Contracting Officer which shall include a description of the action which the Contractor has taken or intends to take to eliminate or neutralize the conflict. The HA may, however, terminate the contract or task/delivery order for the convenience of the HA if it would be in the best interest of the HA.

(c) In the event the Contractor was aware of an organizational conflict of interest before the award of this contract and intentionally did not disclose the conflict to the Contracting Officer, the HA may terminate the contract for default.

(d) The terms of this clause shall be included in all subcontracts and consulting agreements wherein the work to be performed is similar to the service provided by the prime Contractor. The Contractor shall include in such subcontracts and consulting agreements any necessary provisions to eliminate or neutralize conflicts of interest.

9. Inspection and Acceptance

(a) The HA has the right to review, require correction, if necessary, and accept the work products produced by the Contractor. Such review(s) shall be carried out within 30 days so as to not impede the work of the Contractor. Any product of work shall be deemed accepted as submitted if the HA does not issue written comments and/or required corrections within 30 days from the date of receipt of such product from the Contractor.

(b) The Contractor shall make any required corrections promptly at no additional charge and return a revised copy of the product to the HA within 7 days of notification or a later date if extended by the HA.

c) Failure by the Contractor to proceed with reasonable promptness to make necessary corrections shall be a default. If the Contractor's submission of corrected work remains unacceptable, the HA may terminate this contract (or the task order involved) or reduce the contract price or cost to reflect the reduced value of services received.

10. Rights in Data (Ownership and Proprietary Interest).

The HA shall have exclusive ownership of, all proprietary interest in, and the right to full and exclusive possession of all information, materials and documents discovered or produced by Contractor pursuant to the terms of this Contract, including but not limited to reports, memoranda or letters concerning the research and reporting tasks of this Contract.

11. Interest of Members of Congress

No member of or delegate to the Congress of the United States of America or Resident Commissioner shall be admitted to any share or part of this contract or to any benefit to arise therefrom, but this provision shall not be construed to extend to this contract if made with a corporation for its general benefit.

12. Interest of Members, Officers, or Employees and Former Members, Officers, or Employees

No member, officer, or employee of the HA, no member of the governing body of the locality in which the project is situated, no member of the governing body in which the HA was activated, and no other public official of such locality or localities who exercises any functions or responsibilities with respect to the project, shall, during his or her tenure, or for one year thereafter, have any interest, direct or indirect, in this contract or the proceeds thereof.

13. Limitation on Payments to Influence Certain Federal Transactions

(a) Definitions. As used in this clause:

"Agency", as defined in 5 U.S.C. 552(f), includes Federal executive departments and agencies as well as independent regulatory commissions and Government corporations, as defined in 31 U.S.C. 9101(1).

"Covered Federal Action" means any of the following Federal actions:
(1) The awarding of any Federal contract;
(2) The making of any Federal grant;
(3) The making of any Federal loan;
(4) The entering into of any cooperative agreement; and,
(5) The extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

Covered Federal action does not include receiving from an agency a commitment providing for the United States to insure or guarantee

a loan.

"Indian tribe" and "tribal organization" have the meaning provided in section 4 of the Indian Self-Determination and Education Assistance Act (25 U.S.C. 450B). Alaskan Natives are included under the definitions of Indian tribes in that Act.

"Influencing or attempting to influence" means making, with the intent to influence, any communication to or appearance before an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with any covered Federal action.

"Local government" means a unit of government in a State and, if chartered, established, or otherwise recognized by a State for the performance of a governmental duty, including a local public authority, a special district, an intrastate district, a council of governments, a sponsor group representative organization, and any other instrumentality of a local government.

"Officer or employee of an agency" includes the following individuals who are employed by an agency:

(1) An individual who is appointed to a position in the Government under title 5, U.S.C., including a position under a temporary appointment;
(2) A member of the uniformed services as defined in section 202, title 18, U.S.C.;
(3) A special Government employee as defined in section 202, title 18, U.S.C.; and,
(4) An individual who is a member of a Federal advisory committee, as defined by the Federal Advisory Committee Act, title 5, appendix 2.

"Person" means an individual, corporation, company, association, authority, firm, partnership, society, State, and local government, regardless of whether such entity is operated for profit or not for profit. This term excludes an Indian tribe, tribal organization, or other Indian organization with respect to expenditures specifically permitted by other Federal law.

consistent with the amount normally paid for such services in the private sector.

"Recipient" includes all contractors, subcontractors at any tier, and subgrantees at any tier of the recipient of funds received in connection with a Federal contract, grant, loan, or cooperative agreement. The term excludes an Indian tribe, tribal organization, or any other Indian organization with respect to expenditures specifically permitted by other Federal law.

"Regularly employed" means, with respect to an officer or employee of a person requesting or receiving a Federal contract, grant, loan, or cooperative agreement, an officer or employee who is employed by such person for at least 130 working days within one year immediately preceding the date of the submission that initiates agency consideration of such person for receipt of such contract, grant, loan, or cooperative agreement. An officer or employee who is employed by such person for less than 130 working days within one year immediately preceding the date of submission that initiates agency consideration of such person shall be considered to be regularly employed as soon as he or she is employed by such person for 130 working days.

"State" means a State of the United States, the District of Columbia, the Commonwealth of Puerto Rico, a territory of possession of the united States, an agency or instrumentality of a State, and a multi-State, regional, or interstate entity having governmental duties and powers.

(b). Prohibition.

(1) Section 1352 of title 31, U.S.C. provides in part that no appropriated funds may be expended by the recipient of a Federal contract, grant, loan, or cooperative agreement to pay any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with any of the following covered Federal actions: the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) The prohibition does not apply as follows:

(i) Agency and legislative liaison by Own Employees.

(A) The prohibition on the use of appropriated funds, in paragraph (1) of this section, does not apply in the case of a payment of reasonable compensation made to an officer or employee of a person requesting or receiving a Federal contract, grant, loan, or cooperative agreement, if the payment is for agency and legislative activities not directly related to a covered Federal action.

(B) For purposes of paragraph (b)(2)(i)(A) of this clause, providing any information specifically requested by an agency or Congress is permitted at any time.

(C) The following agency and legislative liaison activities are permitted at any time only where they are not related to a specific solicitation for any covered Federal action:

(1) Discussing with an agency (including individual demonstrations) the qualities and characteristics of the person's products or services, conditions or terms of sale, and service capabilities; and,
(2) Technical discussions and other activities regarding the application or adaptation of the person's products or services for an agency's use.

(D) The following agency and legislative liaison activities are permitted where they are prior to formal solicitation of any covered Federal action:

(1) Providing any information not specifically requested but necessary for an agency to make an informed decision about initiation of a covered Federal action;
(2) Technical discussions regarding the preparation of an unsolicited proposal prior to its official submission; and
(3) Capability presentations by persons seeking awards from an agency pursuant to the provisions of the Small Business Act, as amended by Public Law 95-507 and other subsequent amendments.

(E) Only those activities expressly authorized by subdivision (b)(2)(i)(A) of this clause are permitted under this clause.

(ii) Professional and technical services.

(A) The prohibition on the use of appropriated funds, in subparagraph (b)(1) of this clause, does not apply in the case of-

(1) A payment of reasonable compensation made to an officer or employee of a person requesting or receiving a covered Federal action or an extension, continuation, renewal, amendment, or modification of a covered Federal action, if payment is for professional or technical services rendered directly in the preparation, submission, or negotiation of any bid, proposal, or application for that Federal action or for meeting requirements imposed by or pursuant to law as a condition for receiving that Federal action.
(2) Any reasonable payment to a person, other than an officer or employee of a person requesting or receiving a covered Federal action or an extension, continuation, renewal, amendment, or modification of a covered Federal action if the payment is for professional or technical services rendered directly in the preparation, submission, or negotiation of any bid, proposal, or appli-

cation for that Federal action or for meeting requirements imposed by or pursuant to law as a condition for receiving that Federal action. Persons other than officers or employees of a person requesting or receiving a covered Federal action include consultants and trade associations.

(B) For purposes of subdivision (b)(2)(ii)(A) of clause, "professional and technical services" shall be limited to advice and analysis directly applying any professional or technical discipline.

(C) Requirements imposed by or pursuant to law as a condition for receiving a covered Federal award include those required by law or regulation, or reasonably expected to be required by law or regulation, and any other requirements in the actual award documents.

(D) Only those services expressly authorized by subdivisions (b)(2)(ii)(A)(1) and (2) of this section are permitted under this clause.

(iii) Selling activities by independent sales representatives.

The prohibition on the use of appropriated funds, in subparagraph (b)(1) of this clause, does not apply to the following selling activities before an agency by independent sales representatives, provided such activities are prior to formal solicitation by an agency and are specifically limited to the merits of the matter:

(A) Discussing with an agency (including individual demonstration) the qualities and characteristics of the person's products or services, conditions or terms of sale, and service capabilities; and

(B) Technical discussions and other activities regarding the application or adaptation of the person's products or services for an agency's use.

(c) Agreement. In accepting any contract, grant, cooperative agreement, or loan resulting from this solicitation, the person submitting the offer agrees not to make any payment prohibited by this clause.

(d) Penalties. Any person who makes an expenditure prohibited under paragraph (b) of this clause shall be subject to a civil penalties as provided for by 31 U.S.C. 1352. An imposition of a civil penalty does not prevent the Government from seeking any other remedy that may be applicable.

(e) Cost Allowability. Nothing in this clause is to be interpreted to make allowable or reasonable any costs which would be unallowable or unreasonable in accordance with Part 31 of the Federal Acquisition Regulation (FAR), or OMB Circulars dealing with cost allowability for recipients of assistance agreements. Conversely, costs made specifically unallowable by the requirements in this clause will not be made allowable under any of the provisions of FAR Part 31 or the relevant OMB Circulars.

14. Equal Employment Opportunity

During the performance of this contract, the Contractor agrees as follows:

(a) The Contractor shall not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin.

(b) The Contractor shall take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, or national origin. Such action shall include, but not be limited to, (1) employment, (2) upgrading, (3) demotion, (4) transfer, (5) recruitment or recruitment advertising, (6) layoff or termination, (7) rates of pay or other forms of compensation, and (8) selection for training, including apprenticeship.

(c) The Contractor shall post in conspicuous places available to employees and applicants for employment the notices to be provided by the Contracting Officer that explain this clause.

(d) The Contractor shall, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin.

(e) The Contractor shall send, to each labor union or representative of workers with which it has a collective bargaining agreement or other contract or understanding, the notice to be provided by the Contracting Officer advising the labor union or workers' representative of the Contractor's commitments under this clause, and post copies of the notice in conspicuous places available to employees and applicants for employment.

(f) The Contractor shall comply with Executive Order 11246, as amended, and the rules, regulations, and orders of the Secretary of Labor.

(g) The Contractor shall furnish all information and reports required by Executive Order 11246, as amended and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto. The Contractor shall permit access to its books, records, and accounts by the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

(h) In the event of a determination that the Contractor is not in compliance with this clause or any rule, regulation, or order of the Secretary of Labor, this contract may be canceled, terminated, or suspended in whole or in part, and the Contractor may be declared ineligible for further Government contracts, or federally assisted construction contracts under the procedures authorized in Executive Order 11246, as amended. In addition, sanctions may be imposed and remedies invoked against the Contractor as provided in Executive Order 11246, as amended, the rules, regulations, and orders of the Secretary of Labor, or as otherwise provided by law.

(i) The Contractor shall include the terms and conditions of this clause in every subcontract or purchase order unless exempted by the rules, regulations, or orders of the Secretary of Labor issued under Executive Order 11246, as amended, so that these terms and conditions will be binding upon each subcontractor or vendor. The Contractor shall take such action with respect to any subcontract or purchase order as the Secretary of Housing and Urban Development or the Secretary of Labor may direct as a means of enforcing such provisions, including sanctions for noncompliance; provided that if the Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction, the Contractor may request the United States to enter into the litigation to protect the interests of the United States.

15. Dissemination or Disclosure of Information

No information or material shall be disseminated or disclosed to the general public, the news media, or any person or organization without prior express written approval by the HA.

16. Contractor's Status

It is understood that the Contractor is an independent contractor and is not to be considered an employee of the HA, or assume any right, privilege or duties of an employee, and shall save harmless the HA and its employees from claims suits, actions and costs of every description resulting from the Contractor's activities on behalf of the HA in connection with this Agreement.

17. Other Contractors

HA may undertake or award other contracts for additional work at or

near the site(s) of the work under this contract. The contractor shall fully cooperate with the other contractors and with HA and HUD employees and shall carefully adapt scheduling and performing the work under this contract to accommodate the additional work, heeding any direction that may be provided by the Contracting Officer. The contractor shall not commit or permit any act that will interfere with the performance of work by any other contractor or HA employee.

18. Liens

The Contractor is prohibited from placing a lien on HA's property. This prohibition shall apply to all subcontractors.

19. Training and Employment Opportunities for Residents in the Project Area (Section 3, HUD Act of 1968; 24 CFR 135)(Applicable to contracts in excess of $500,000)

(a) The work to be performed under this contract is on a project assisted under a program providing direct Federal financial assistance from HUD and is subject to the requirements of section 3 of the HUD Act of 1968, as amended, 12 U.S.C. 1701u. Section 3 requires that to the greatest extent feasible opportunities for training and employment be given lower income residents of the project area and contracts for work in connection with the project be awarded to business concerns which are located in, or owned in substantial part by persons residing in the area of the project.

(b) The parties to this contract will comply with the provisions of Section 3 and the regulations issued pursuant thereto by the Secretary of HUD set forth in 24 CFR part 135, and all applicable rules and orders of HUD issued thereunder prior to the execution of this contract. The parties to this contract certify and agree that they are under no contractual or other disability which would prevent them from complying with these requirements.

(c) The contractor will send to each labor organization or representative of workers with which the contractor has a collective bargaining agreement or other contract or understanding, if any, a notice advising the organization of the contractor's commitments under this clause and shall post copies of the notice in conspicuous places available to employees and applicants for employment or training.

(d) The contractor will include this clause in every subcontract for work in connection with the project and will, at the direction of the applicant for or recipient of Federal financial assistance, take appropriate action pursuant to the subcontract upon a finding that the subcontractor is in violation of regulations issued by the Secretary of HUD, 24 CFR part 135. The contractor will not subcontract with any subcontractor where it has notice or knowledge that the latter has been found in violation of these regulations and will not award any subcontract unless the subcontractor has first provided it with a preliminary statement of ability to comply with the requirements of these regulations.

(e) Compliance with the provisions of section 3, the regulations set forth at 24 CFR part 135, and all applicable rules and orders of HUD issued thereunder prior to the execution of the contract shall be a condition of the Federal financial assistance provided to the project, binding upon the applicant or recipient for such assistance, its successors, and assigns. Failure to fulfill these requirements shall subject the applicant or recipient, its contractors and subcontractors, its successors, and assigns to those sanctions specified by the grant or loan agreement or contract through which the Federal assistance is provided, and to such sanctions as are specified by 24 CFR part 135.

LEFT BLANK

NON-COLLUSIVE AFFIDAVIT

State of _____

County of _____

Being first duly sworn, deposes and says that he/she is

_____ the party making the foreseeing proposal or bid, that such proposal or bid is genuine and not collusive or sham; that said bidder had not colluded, conspired, connived or agreed, directly and indirectly, with any bidder or person to put in a sham bid or to refrain from bidding, and had not in any manner, directly or indirectly, sought by agreement or collusion, or communication, or conference, with any person, to fix the bid price or any other bidder, or to fix an overhead, profit or cost element of said bid price, or of that of any other bidder, or to secure any advantage against the Housing Authority of the City of Tampa or any person interested in the proposed contract; and that all statements in said proposal or bid are true.

SIGNATURE _____

TITLE _____

COMPANY NAME _____
Bidder, if the Bidder is an individual
Partner, if the Bidder is a Partnership
Officer, if the Bidder is a Corporation

Subscribed and sworn to before me

This_____day of_____, 20_____.

My Commission expires_____, 20_____.

LEFT BLANK

Contractor Certification of Efforts to Fully Comply with Contracting, Employment and Training Provisions of Section 3

The bidder represents and certifies that as part of its bid/offer it:

D Is a Section 3 Business concern.

A Section 3 Business concern means a business concern:

1. That is 51% or more owned by Section 3 Resident(s); or
2. Whose permanent, full-time employees include person at least 30% of whom are current Section 3 residents, or within the last three years of the date of first employment with the business concern were Section 3 residents; or
3. That provides evidence of a commitment to subcontract in excess of 25% of the dollar value of all subcontracts to be awarded to business concerns that meet the qualifications set forth in paragraph 1 or 2 herein.

D Is Not a Section 3 Business concern but who has and/or will continue to seek compliance with Section 3 by certifying to the following efforts as being undertaken.

EFFORTS TO AWARD SUBCONTRACTS TO SECTION 3 BUSINESS CONCERNS:
(Check all that apply)

D By contacting business assistance agencies, minority contractors associations and community organizations to inform them of the contracting opportunities and requesting their assistance in identifying Section 3 businesses which may solicit bids for a portion of the work.

D By advertising contracting opportunities by posting notices, which provide general information about the work to be contracted and where to obtain additional information, the common areas of the applicable development(s) owned and managed by the Housing Authority.

D By providing written notice to all known Section 3 business concerns of contracting opportunities. This notice should be in sufficient time to allow the Section 3 business concerns to respond to bid invitations.

D By following up with Section 3 business concerns that have expressed interest in the contracting opportunities.

D By coordinating meetings at which Section 3 business concerns could be informed of specific elements of the work for which subcontract bids are being sought.

D By conducting workshops on contracting procedures and specific contracting opportunities in a timely manner so that Section 3 business concerns can take advantage of contracting opportunities.

D By advising Section 3 business concerns as to where they may seek assistance to overcome barriers such as inability to obtain boding, lines of credit, financing, or insurance, and aiding Section 3 businesses in qualifying for such bonding, financing, insurance, etc.

D Where appropriate, by breaking out contract work into economically feasible units to facilitate participation by Section 3 business concerns.

D By developing and utilizing a list of eligible Section 3 business concerns.

D By actively supporting and undertaking joint ventures with Section 3 businesses

EFFORTS TO PROVIDE TRAINING AND EMPLOYEMENT TO SECTION 3 RESIDENTS
(Check all that apply)

D By entering into a “first source” hiring agreements with organizations representing Section 3 residents.

D By establishing training programs, which are consistent with the requirements of the Department of Labor, specifically for Section 3 residents in the building trades.

D By advertising employment and training positions to dwelling units occupied by Category 1 and 2 Section 3 residents.

D By contacting resident councils and other resident organizations in the affected housing development to request assistance in notifying residents of the training and employment positions to be filled.

D By arranging interviews and conducting interviews on the job site.

D By undertaking such continued job training efforts as may be necessary to ensure the continued employment of Section 3 residents previously hired for employment opportunities.

_____

Authorized Signature of the Bidder & Date

LEFT BLANK

SECTION 3 AND MBE **PRE-AWARD COMPLIANCE CERTIFICATION**	Housing Authority of the City of Tampa Contracting & Procurement 1529 West Main Street, Suite 213 Tampa, Florida 33607	
1. Contractor Name & Address (street, city, state, zip):	2. Contract Number and Description:	3. Dollar Amount of Contract:
	4. Contact Person:	5. Phone Number:
	6. Contracting Period:	7. Date Report Submitted:

Part I: Employment and Training of Section 3 Residents (If Prime Contractor is Section 3 Owned Check Here) D

The employment and training component of section 3 applies to the prime contractor and all sub-contractors providing construction services and professional services to the Tampa Housing Authority. It is the responsibility of the Prime Contractor to enforce these same requirements within any sub-contracts.

Instructions: Complete items A, B and C and adjoining worksheet

A. Total Number of Current Employees? _____

B. Total Number of Anticipated New Hires & Trainees? _____

C. Total Number of Section 3 New Hires & Trainees? _____
(the established goal is 30% of Line B)

Adjoining worksheet

(A) Job Category	(B) Number of anticipated new hires and trainees	(C) Number of column (B) that will be Section 3 residents
Professional		
Technical		
Office/Clerical		
Construction by Trade (list)		
Other (List)		
Total		

Part II: Subcontract awards – Section 3 and MBE (If Prime Contractor is Section 3 Owned Check Here) D

The contracting component of section 3 and minority-owned business participation apply to all prime contractors and sub-contractors providing construction services, professional services, and supplies to the Tampa Housing Authority's project. It is the responsibility of the prime contractor to enforce the same requirements within any sub-contracts.

Instructions: All contractors must complete item D. Complete item E for construction contracts only. Complete item F for professional service and supplier contracts only. All contractors must complete item G.

D. Total dollar amount of all sub-contracts anticipated for this project? $_____

Applies to construction contracts only:
E. Total amount of anticipated Section 3 sub-contract awards? $_____
(The established goal is 10% of Line D)

Applies to professional service contracts and suppliers:
F. Total amount of anticipated section 3 sub-contract awards? $_____
(The established goal is 3% of Line D)

Applies to all contracts:
G. Total amount of anticipated minority-owned business contract awards? $_____
(The established goal is 20% of Line D) A minority-owned business is an entity that is 51% owned or controlled by one or more of the following minority group members: Black Americans, Hispanic Americans, Native Americans, Asian Pacific Americans, Asian Indian Americans and Hasidic Jewish Americans.

Part III: Certification

As a duly authorized representative of the prime contractor, it is hereby agreed that the prime contractor and all sub-contractors will make every effort to achieve at least the minimum levels for compliance with Section 3 and Minority- Owned Business participation goals. It is further understood that the undersigned will enforce and ensure compliance within all sub-contracts.

Signature:	**Print Name and Title**	**Date**

LEFT BLANK

SWORN STATEMENT UNDER SECTION 287.133(3)(A), FLORIDA STATUTES, ON PUBLIC ENTITY CRIMES

(To be signed in the presence of notary public or other officer authorized to administer oaths.)

Before me, the undersigned authority, personally appeared _____ who, being by me first duly sworn, made the following statement:

1. The business address of
   (name of Offeror or business) is.

2. My relationship to _____(name of Offeror or business) is _____(Relationship such as sole proprietor, partner, president, vice president).

3. I understand that a public entity crime as defined in Section 287.133 of the Florida Statutes includes a violation of any state or federal law by a person with respect to and directly related to the transaction of business with any public entity in Florida or with an agency or political subdivision of any other state or with the United States, including, but not limited to, any proposal or contract for goods or services to be provided to any public entity or such an agency or political subdivision and involving antitrust, fraud, theft, bribery, collusion, racketeering, conspiracy or material misrepresentation.

4. I understand that "convicted" or "conviction" is defined by the Florida Statutes to mean a finding of guilt or a conviction of a public entity crime, with or without an adjudication of guilt, in any federal or state trial court of record relating to charges brought by indictment or information after July 1, 1989, as a result of a jury verdict, non-jury trial, or entry of a plea of guilt or no contest.

5. I understand that "affiliate" is defined by the Florida Statutes to mean (1) a predecessor or successor of a person or a corporation convicted of a public entity crime, or (2) an entity under the control of any natural person who is active in the management of the entity and who has been convicted of a public entity crime, or (3) those officers, directors, executives, partners, shareholders, employees, members, and agents who are active in the management of an affiliate, or (4) a person or corporation who knowingly entered into a joint venture with a person who has been convicted of a public entity crime in Florida during the preceding 36 months.

6. Neither the Offeror or contractor, nor any officer, director, executive, partner, shareholder, employee, member or agent who is active in the management of the Offeror or contractor, nor any affiliate of the Offeror or contractor has been convicted of a public entity crime subsequent to July 1, 1989. (Draw a line through paragraph 6 if paragraph 7 below applies.)

7. There has been a conviction of a public entity crime by the Offeror or contractor, or an officer, director, executive, partner, shareholder, employee, member or agent of the Offeror or contractor who is active in the management of the Offeror or contractor or an affiliate of the Offeror or contractor. A determination has been made pursuant to Section 287.133(3) by order of the Division of Administrative Hearings that it is not in the public interest for the name of the convicted person or affiliate to appear on the convicted vendor list. The name of the convicted person or affiliate is_____ a copy of the order of the Division of Administrative Hearings is attached to this statement. (Draw a line through paragraph 7 if paragraph 6 above applies.)

_____ _____

(Signature) (Print name)

STATE OF
COUNTY OF

The foregoing instrument was acknowledged before me this_____ day of,_____ by _____, who is personally known to me or who has produced _____ as identification and who did take an oath.

_____ Notary Public

My Commission Expires:_____

EXHIBITS

A. EBL PROTOCOL

B. EBL QUESTIONAIRE

C. HUD GUIDELINES

D. SECTION 3 CONTRACTORS LIST

E. DAVIS BACON

LEFT BLANK

EXHIBIT A

LEFT BLANK

5301 West Cypress Street
Tampa, Florida 33607

P. O. Box 4766
Tampa, Florida 33677

MAIN OFFICE
PH: (813) 341-9101

www.thafl.com

ELEVATED BLOOD LEVEL (**EBL**) PROCEDURE

1. Parent/ Guardian, Medical Provider, Hillsborough County Public Health (HCPH) submits a laboratory blood test from a certified laboratory to their Apartment Complex office. The office staff will date stamp a copy of the report and the resident will initial the date stamp of the lab report shows a blood lead level of 10 ug/dl or greater on any child 7 or under.

2. Property staff will immediately fill out the seven (7) page questionnaire designated for EBL children. The questionnaire is to be filled out by THA staff ***ONLY*** (no exceptions). When notified by a medical provider or HCPH, THA will wait no longer than seven (7) days for a copy of the laboratory report and questionnaire to be provided before ordering a lead survey. When notified by a Parent/Guardian THA will wait for verification from a certified laboratory, medical provider, or HCPH.

3. It is **mandatory** of the filled out questionnaire and copy of accompanying EBL blood lab report to be submitted by the property office within 24 hours to the Department of Energy Services & Special Projects.

4. Upon receipt of these documents, Department of Energy Services & Special Projects staff will date stamp and initial documents as received.

5. The Environmental Coordinator will immediately contact a qualified testing firm to schedule a Lead Based Paint & Risk Assessment Inspection of the apartment.

6. Test results will be identified to the Environmental Coordinator, by the testing firm within 48 hours of the completion of the tests. The total time from notification to receipt of lead survey results is not to exceed 15 days.

7. Positive test results require that the Environmental Coordinator contact the Property Manager to obtain the address and correct bedroom size information to accommodate the required transfer. The Environmental Coordinator will be responsible for acquiring the verification that the "transfer" apartment is also tested to comply with all necessary HUD requirements. Should the vacant apartment test positive, the Environmental Coordinator will schedule an abatement contractor to abate the apartment, or chose another vacant apartment if abatement is not feasible. Once the abatement is completed, the Environmental Coordinator will coordinate the transfer of the resident. The vacated apartment will then be scheduled for abatement and upon completion of the abatement the Property Manager will be notified to schedule the apartment for vacancy preparation and future rental.

   In some situations relocation may not be required due to the ability to have an abatement contractor remove and replace architectural components such as windows, doors, or door frames that are coated with lead based paint.

8. However, if the apartment the resident is residing in does not show lead levels above the HUD guidelines, the Environmental Coordinator will send the resident a copy of the test results and no transfer to another apartment location will be required.

9. Reference Item 8 in this situation, THA will refer the resident to HCHD for case management and periodically check the status of the EBL.

10. All non-dwelling THA owned areas commonly used by an EBL child under 7 years of age will be tested. Test results will be provided to Parent/Guardian of the EBL child in compliance with 24 CFR 35. Should a non-resident child who visits or uses a THA property of childcare report an EBL, the facility will be tested in compliance with 24 CFR 35.

LEFT BLANK

EXHIBIT B

LEFT BLANK

Department of Energy Services and Special Projects

QUESTIIONNAIRE
FOR
RESIDENT CHILDREN

WITH DOCUMENTATION OF ELEVATED BLOOD LEAD LEVELS

FOR CLARITY

THIS DOCUMENT IS TO BE FILLED OUT BY PROPERTY MANAGERS *ONLY!*

General Information **FILLED OUT BY:**_____

TITLE:_____

Resident Information

Resident Name:_____**SS#**_____

Child (s) Name:_____

Address:_____

Property:_____

Telephone:_____

How Many Children Reside In Your Apartment:_____

#1 Name:_____**Age:**_____**D.O.B.**_____

#2 Name:_____**Age:**_____**D.O.B.**_____

#3 Name:_____**Age:**_____**D.O.B.**_____

****Use back of this form if more space is necessary**

Has Child/Children been tested for EBL:_____**if yes where:**_____

Clinic Name:_____

Address:_____**Phone #** _____

Test Results: **Child #1**_____ **Child #2**_____ **Child #3**_____

****use back of this form if more space is necessary**

_____
Initials

When did you/your family move into this apartment:_____

List all of the addresses that the child has resided in during the past 3 years:

Dates of Residency	**Address (include City and State) Unit #**
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Other Locations your Child spends time in During the Day:

Day Care Center _____**Yes**_____**No** **If Yes:**_____
Address

Preschool _____**Yes**_____**No** **If Yes:**_____
Address

Day Care Home _____**Yes**_____**No** **If Yes:**_____
Address

School _____**Yes**_____**No** **If Yes:**_____
Address

Friend's Home _____**Yes**_____**No** **If Yes:**_____
Address

Relative's Home _____**Yes**_____**No** **If Yes:**_____
Address

WHERE ARE SOME OF THE LOCATIONS YOUR CHILD LIKES TO PLAY/HIDE:
(include rooms, closets, porches, etc.)
Please be specific
Inside the home: **(**if more space is required use back of form)
Where, example: kitchen, bedroom etc: _____

_____ _____

_____ _____

_____
Initials

Outdoors: (if more space is required use back of form)
Where, front yard, playground etc. _____

_____ _____

_____ _____

_____ _____

Neighbors: (if more space is required use back of form)
List Address _____

_____ _____

_____ _____

What is the source of drinking water for the family?

Faucet/Tap water	**Yes_____**	**No**
Private Well	**Yes_____**	**No**
Bottled Water	**Yes_____**	**No_____**

Other (specify):_____

If Faucet/Tap water is used for drinking, please answer the following:

a) **From which faucets does family obtain *drinking* water:**

_____

b) **Do you use the water immediately or does it run for awhile first?**

_____

c) **Is Faucet/Tap water used to prepare infant formula, powdered mile or juice?**
If yes, do you use hot or cold water **Hot_____** **Cold_____**
If no, what source do you obtain water from:_____

Have you noticed any peeling or deteriorated paint on the following:

Outside Fences	**Y_____**	**N_____**
Play Structures	**Y_____**	**N_____**
Railings	**Y_____**	**N_____**
Interior Ceilings	**Y_____**	**N_____**
Interior Walls	**Y_____**	**N_____**
Building Exterior	**Y_____**	**N_____**
Windows,	**Y_____**	**N_____**
Stairs	**Y_____**	**N_____**
Doors	**Y_____**	**N_____**

Other (explain)_____

_____
Initials

ADDITIONAL FAMILY INFORMATION:

Do you or anyone who visits, and/or lives in your home work at any of the following occupations or use the following items in their employment or hobbies?:

Paint Removal	**Y_____**	**N_____**	**Name:**_____
Sandblasting	**Y_____**	**N_____**	**Name:**_____

Welding or heat gun	**Y_**	**N**	**Name:_____**
Chemical Strippers	**Y_**	**N**	**Name:_____**
Remodeling/Demolition or Salvage work	**Y_**	**N**	**Name:_____**
Plumbing	**Y_**	**N**	**Name:_____**
Repairing radiators	**Y_**	**N**	**Name:_____**
Smelting metal	**Y_**	**N_____**	**Name:_____**
Foundry work	**Y_**	**N_____**	**Name:_____**
Auto Body Work	**Y_**	**N**	**Name:_____**
Employed by Gun Range	**Y_**	**N**	**Name:_____**
Battery Making	**Y_**	**N_____**	**Name:_____**
Paint Factory	**Y_**	**N**	**Name:_____**
Creating Ammunition or explosives	**Y_**	**N**	**Name:_____**
Making/Repairing Jewelry	**Y_**	**N**	**Name:_____**
Making Pottery	**Y_**	**N**	**Name:_____**
Chemical, oil, glass factory	**Y_**	**N**	**Name:_____**
Cable Splicing	**Y_**	**N**	**Name:_____**
Ship Yard employee	**Y_**	**N_____**	**Name:_____**

List places where household members or close family or frequent visitors are employed: (use other side if more space is required)

NAME	RELATIONSHIP	WHERE EMPLOYED	OCCUPATION

When you do the laundry are work clothes separated from other laundry Y_ N___

Has anyone in the household done any of the following?:

Removed paint or varnish from items in the house. If yes, what item:_____	**Y_____**	**N_____**
Soldered electric parts	**Y_____**	**N_____**
Applied glaze to pottery/ceramic objects	**Y_____**	**N_____**
Done stained glass	**Y_____**	**N_____**
Used artist paints	**Y_____**	**N_____**

Initials

Goes hunting or target shooting/reloads bullets	**Y_____**	**N_____**
Make bullets or fishing sinkers	**Y_____**	**N_____**
Do auto body repair at home	**Y_____**	**N_____**
Does child suck his/her fingers	**Y_____**	**N_____**
Does child put painted objects into their mouth?	**Y_____**	**N_____**

Example: crib rails, window sills, putty from around windows etc.

Does child chew on metal objects? **Y_____** **N_____**
Example: toy soldiers, jewelry, beads, electronic items, etc.
Does child chew or eat paint chips **Y_____** **N_____**
Or newspapers or magazines:
Does child play with cosmetics, talcum powder **Y_____** **N_____**
Does child regularly visit building built prior to
1980 with renovation activity going on **Y_____** **N_____**
Does Child take any folk medicine remedies such as Alarcon, Alkohl,
Azarcon, Bali Goli, Coral Ghassard, etc **Y_____** **N_____**
Does child have a favorite cup or eating utensil **Y_____** **N_____**
Does Child have a pet that spends time outside **Y_____** **N_____**

LIST TYPICAL MEAL FOR CHILD:

Breakfast _____
_____
Lunch _____
_____
Dinner _____
_____
Snacks _____

Does the Child eat the following foods daily:

Dairy Products	**Y_____**	**N_____**	**_____x day**
Cereals	**Y_____**	**N_____**	**_____x day**
Meats	**Y_____**	**N_____**	**_____x day**
Dark Green Vegetables	**Y_____**	**N_____**	**_____x day**
Fruits	**Y_____**	**N_____**	**_____x day**
Other Vegetables	**Y_____**	**N_____**	**_____x day**
Vitamins	**Y_____**	**N_____**	**_____x day**
Iron Tablets	**Y_____**	**N_____**	**_____x day**

Are imported cosmetics such as Kohl, Surma, Ceruse used in the home **Y___N___**
Are any liquids stored in metal, pewter or crystal containers **Y___N____**
What containers are used to prepare, serve and store child's food_____
_____
Does family cook in ceramic cookware? **Y_____** **N_____**
Does family use imported canned items regularly **Y_____** **N_____**

_____
Initials

How often does family do the following:

Sweep floors _____
Wet mop floors _____
Vacuum floors _____
Wash window sills _____
(inner and outer sills)
coverings in dwelling **Carpet Vinyl Wood Other**_____ **Floor**

Do you have a door mat Y___N____

IMPORTANT INFORMATION !!

Date of most recent blood level (EBL) test _____

Address of Test Location_____

_____

Has child had previous blood tests for lead poisoning Y___N____
If yes, list location and date of test: (if more space required use back of paper)

_____

What, if anything, did the doctor explain about lead poisoning?_____

_____

Did a social worker tell you about lead poisoning? Y___N____
What is your general understanding about elevated blood levels and its affects:

_____

_____

Has the child been behaving abnormally lately? If yes, in your own words, describe this behavior:_____

_____

_____

Is child:

More irritable than normal	**Y___**	**N___**
Unusual Poor Appetite	**Y___**	**N___**
Unusual forgetfulness,	**Y___**	**N___**
Unusual muscle weakness	**Y___**	**N___**
Unusually poor attention span	**Y___**	**N___**
Unusually tired	**Y___**	**N___**
Unusual memory loss	**Y___**	**N___**
Unusual temper tantrums	**Y___**	**N___**
Unusual weight loss	**Y___**	**N___**
Unusual headaches	**Y___**	**N___**
Unusual tremors	**Y___**	**N___**
Unusual stomach aches	**Y___**	**N**

_____
Initials

CHILDS DEVELOPMENT(describe if acceptable with childs age)

Speech_____

Motor Skills_____

Overall Development_____

Does child have a brother/sister/playmate or other household member with elevated blood level (EBL)? Y____N___

If yes, who_____

Where do you feel your child was exposed to a lead hazard?(be specific)

_____

I UNDERSTAND THE ABOVE QUESTIONS AND HAVE ANSWERED THEM HONESTLY AND TO THE BEST OF MY ABILITY:

_____ _____

Parent/Guardian of Child **Property Manager/Witness**

Date:_____

LEFT BLANK

EXHIBIT C

LEFT BLANK

Chapter 7: Lead-Based Paint Inspection

Intentionally Left Blank

Chapter 7: Lead-Based Paint Inspection

How to Do It

1. See Chapters 3, 5 and 16 for guidance on when a lead-based paint inspection is appropriate. A lead-based paint inspection will determine:

   - Whether lead-based paint is present in a house, dwelling unit, residential building, housing development, or child-occupied facility, including common areas and exterior surfaces; and
   - If present, which building components contain lead-based paint.

   The U.S. Department of Housing and Urban Development (HUD) and the U.S. Environmental Protection Agency (EPA) define an inspection as 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. The sampling protocols in this chapter fulfill that definition.

2. The client should hire a certified (licensed) lead-based paint inspector or risk assessor (see 40 CFR part 745). Lists of certified lead-based paint inspectors and risk assessors can be obtained from the EPA website at: ***www.epa.gov/oppt/lead/pubs/traincert.htm***. Laboratories recognized by EPA, under its National Lead Laboratory Accreditation Program (NLLAP), for analysis of lead in paint can also be found at ***www.epa.gov/oppt/lead/pubs/nllap.htm***.

3. The inspector should use the HUD/EPA standard for lead-based paint of equal to or greater than 1.0 mg/cm^2 or 0.5% by weight, as defined by Title X of the Housing and Community Development Act of 1992 (unless HUD and EPA have lowered the standard). If the applicable standard in the jurisdiction is more stringent, the procedures in this chapter will need to be modified. For purposes of the HUD/EPA Lead-Based Paint Disclosure Rule, 1.0 milligrams per square centimeter (mg/cm^2) or 0.5% by weight are the standards that must be used (see Appendix 6) as of the publication of this edition of these *Guidelines*. If a State, Tribe or local government has an EPA-authorized plan for certifying lead-based paint inspectors and has lower lead standards, those lower lead standards would apply to inspections (but not to the Lead Disclosure Rule; paint with lead below the federal threshold is not considered lead-based paint for purposes of that Rule).

   There are other analytical techniques that may be used by a laboratory with NLLAP recognition for analysis of lead in paint.

4. Obtain the *XRF Performance Characteristic Sheet (PCS)* for the X-Ray Fluorescence (XRF) lead paint analyzer to be used in the inspection. It will specify the ranges where XRF results are positive, negative or inconclusive, the calibration check tolerances, and other important information. Only devices with a posted PCS may be used for lead paint inspections. If you use a XRF without a current PCS, or do not follow the requirements of the PCS, the work will be considered invalid, and not an inspection or paint testing, as applicable, and the work will have to be re-done. To obtain the appropriate *XRF Performance Characteristic Sheet,* contact the National Lead Information Center Clearinghouse (1-800-424-LEAD) or download it from the Internet at ***www.hud.gov/offices/lead/lbp/hudguidelines/allpcs.pdf***. *XRF Performance Characteristic Sheets* have been developed by HUD and EPA for most commercially available XRFs. (Hearing- or speech-challenged individuals may access this number through TTY by calling the toll-free Federal Relay Service at 800-877-8339.) *Report lead paint amounts in mg/cm^2* because this unit of measurement does not depend on the number of layers of

non-lead-based paint and can usually be obtained without damaging the painted surface. All measurements of lead in paint should be in mg/cm^2, unless the surface area cannot be measured or if all paint cannot be removed from the measured surface area. In such cases, concentrations may be reported in weight percent (%) or parts per million by weight (ppm).

5. *If the XRF instrument has a radioactive source, follow the radiation safety procedures* explained in this chapter, and as required by the U.S. Nuclear Regulatory Commission and applicable State and local regulations when using XRF instruments.

6. Take at least three calibration check readings before beginning the inspection. Additional calibration check readings should be made at least every 4 hours, after inspection work has been completed for the day, or according to the manufacturer's instructions, whichever is most frequent. If the instrument is to be turned off during the course of an inspection, calibration checks should always be done before the instrument is turned off and again after it has been warmed up (calibration checks do not need to be done each time an instrument enters an automatic "sleep" state while still powered on).

7. When conducting an inspection in a multi-family housing development or building, obtain a complete list of all housing units, common areas, and exterior site areas. Determine which can be grouped together for inspection purposes based on similarity of construction materials and common painting histories. In each group of similar units, similar common areas, and similar exterior sites, determine the minimum number of each to be inspected from the tables in this chapter. Random selection procedures are explained in this chapter.

8. For each unit, common area, and exterior site to be inspected, identify all testing combinations in each room equivalent. A testing combination is characterized by the room equivalent, the component type, and the substrate. A room equivalent is an identifiable part of a residence (e.g., room, house exterior, foyer, etc.). Painted surfaces include any surface coated with paint, shellac, varnish, stain, paint covered by wallpaper, or any other coating. Wallpaper should be assumed to cover paint unless building records or physical evidence indicates no paint is present.

9. Take at least one individual XRF reading on each testing combination in each room equivalent. For walls, take at least four readings (one reading on each wall) in each room equivalent. A different visible color does not by itself result in a separate testing combination. It is not necessary to take multiple XRF readings on the same spot, as was previously recommended, unless the PCS requires such for the XRF instrument being used.

10. Determine whether to correct the XRF readings for substrate interference by consulting the *XRF Performance Characteristic Sheet.* If test results for a given substrate fall within the substrate correction range, take readings on that bare substrate scraped completely clean of paint, as explained in Section IV.E of this chapter.

11. Classify XRF results for each testing combination. Readings above the upper limit of the inconclusive range are considered positive, while readings below the lower limit of the inconclusive range are considered negative. Readings within the inconclusive range (including its boundary values) are classified as inconclusive. Some instruments have a threshold value separating ranges of readings considered positive from readings considered negative for a given substrate. Readings at or above the threshold are considered positive, while readings below the threshold are considered negative.

12. In single-family housing inspections, all inconclusive readings must be confirmed in the laboratory, unless the client wishes to assume that all inconclusive results are positive. Such an assumption may reduce the cost of an inspection, but will probably increase subsequent abatement, interim control, and maintenance costs, because laboratory analysis often shows that testing combinations with inconclusive readings do not in fact contain lead-based paint. Inconclusive readings cannot be assumed to be negative.

13. In multi-family dwelling inspections, XRF readings are aggregated across units and room equivalents by component type. Use the flowchart provided in this chapter (Figure 7.3) to make classifications of all testing combinations or component types in the development as a whole, based on the percentages of positive, negative, and inconclusive readings.

14. If the inspector collected paint-chip samples for analysis, they must be analyzed by a laboratory recognized under the EPA's National Lead Laboratory Accreditation Program (NLLAP) for analysis of lead in paint, and collected in accordance with ASTM E 1729, Standard Practice for Field Collection of Dried Paint Samples for Subsequent Lead Determination, or equivalent. Paint-chip samples are collected when the overall results for a component type are inconclusive by XRF, or were not measured by XRF, or if the inspector chooses to do so if the paint is deteriorated. They may be collected by a properly trained and certified inspector or others, if permitted by State law and recognized by EPA. Paint-chip samples should contain all layers of paint (not just peeled layers) and must always include the bottom layer. If results will be reported in mg/cm^2, including a small amount of substrate with the sample will not significantly bias results. Substrate material should not, however, be included in samples reported in weight percent. Paint from 4 square inches (25 square centimeters) should provide a sufficient quantity for laboratory analysis. Smaller surface areas may be used, but only if the laboratory indicates that a smaller sample is acceptable. In all cases, the surface area sampled must be recorded.

15. The client or client's representative should evaluate the quality of the inspection using the procedures in this chapter.

16. The inspector will prepare an inspection report indicating if and where lead-based paint is located in the unit or the housing development (or building). Inspection reports contain detailed information on the following:

    - Who performed the inspection;
    - Date(s);
    - Inspector's certification number;
    - All XRF readings;
    - Classification of all surfaces into positive or negative (but not inconclusive) categories, based on XRF and laboratory analyses;
    - Specific information on the XRF and laboratory methodologies;
    - Housing unit and sampling location identifiers;
    - Results of any laboratory analyses; and
    - Additional information described in Section IV of this chapter.

17. The report should include a statement that the presence of lead-based paint and the report must be disclosed by the owner (seller / lessor) to prospective new buyers (purchasers) and renters (lessees) of target housing prior to obligation under a sales contract or lease, except that the disclosure does not have to be made when the property is being leased if it is lead-based paint free. (See the discussion of Lead Disclosure Rule in Appendix 6.) The suggested language in the boxes in Section I.A.4 may be used.

I. Introduction

A. Purpose

This chapter explains methods for performing lead-based paint inspections in housing to determine:

- Whether lead-based paint is present in a house, dwelling unit, residential building, housing development, or child-occupied facility, including common areas and exterior surfaces; and
- If present, which building components contain lead-based paint.

The information presented here is intended for both inspectors and persons who purchase inspection services (clients). This chapter provides an inspection protocol, methods for determining the quality of an inspection, and information on how to locate certified lead inspectors.

Defining lead-based paint. Title X ("ten") of the Housing and Community Development Act of 1992, defines lead-based paint inspection (in two places, with slightly different formatting of the same wording) as:

> a surface-by-surface investigation to determine the presence of lead-based paint as provided in section 302(c) of the Lead-Based Paint Poisoning Prevention Act and the provision of a report explaining the results of the investigation. (15 U.S.C. 2681(7), for use by EPA and its stakeholders; and 42 U.S.C. 4851(12), for use by HUD and its stakeholders)

This definition in Title X is based on, and mentions, the earlier Lead-Based Paint Poisoning Prevention Act (Public Law 91-695), enacted in 1971, which described an inspection in its section 302(c) as being an:

> inspection of all intact and nonintact interior and exterior painted surfaces of housing subject to this section for lead-based paint using an approved x ray fluorescence analyzer, atomic absorption spectroscopy, or comparable approved sampling or testing technique. A certified inspector or laboratory shall certify in writing the precise results of the inspection. If the results equal or exceed a level of 1.0 milligrams per centimeter squared or 0.5 percent by weight, the results shall be provided to any potential purchaser or tenant of the housing. (42 U.S.C. 4822(c))

The sampling and testing protocols in this chapter fulfill the definition of lead-based paint inspection, in providing guidance on selecting building components of housing to sample and/or test them and the methods for determining whether they are coated with lead-based paint.

Section 302(c) of the 1971 act, above, established the threshold for lead-based paint as a surface concentration (or "loading") on the basis of weight of lead per area of surface, at 1 mg/cm^2, or a weight concentration on the basis of a weight of lead per weight of paint, at 0.5% by weight. That section also has wording providing for HUD to review the lead-based paint threshold and reduce it if "reliable technology makes feasible the detection of a lower level and medical evidence supports the imposition of a lower level." As of the publication of this edition of these *Guidelines*, in response to a petition received by the EPA on August 10, 2009, HUD and EPA are collaboratively considering whether to lower the threshold level of lead-based paint; they are also looking into whether to lower the lead dust hazard standards.

HUD, consistent with EPA, CDC and OSHA, notes that paint with lead that is deteriorated or disturbed, even if its lead content is below the current EPA and HUD standards, may still pose a human health hazard, this depends largely on how much lead-contaminated dust is generated from the paint and where

that dust is dispersed. Accordingly, HUD recommends, in these *Guidelines*, using lead-safe methods of working with paint that is known or presumed to have lead in it, whether or not it is lead-based paint.

1. Disclosure of Inspections

Federal law requires the disclosure of knowledge of lead-based paint and lead-based paint hazards, or that there is no such knowledge, when owners sell or rent most pre-1978 housing, known as "target" housing. Therefore the results (that is, reports and records) of lead-based paint inspections (as discussed in this Chapter) and risk assessments (as discussed in Chapter 5) must be disclosed to prospective renters (lessees, tenants) of target housing prior to entering into a new lease and renters renewing an old lease (unless the results were previously disclosed to them), if lead-based paint is found, and to prospective purchasers prior to obligation under a sales contract for target housing, whether or not lead-based paint is found. If the inspection described in this chapter finds that lead-based paint is not present in units which are to be leased, the dwelling unit and, for multi-family housing, all other dwelling units characterized by the inspection are exempt from disclosure requirements for rental actions. However, for dwelling units which are being sold (not leased), the owner still has certain legal responsibilities to fulfill under Federal law *even if no lead-based paint is identified.* See the HUD and EPA regulations in 24 CFR part 35, and 40 CFR part 745, respectively, for additional details, and see the regulatory overview in Appendix 6.

You may contact the National Lead Information Center Clearinghouse (1-800-424-LEAD) to obtain HUD and EPA brochures, question-and-answer booklets, the regulations mentioned above (and the descriptive preamble to those regulations), and other information on lead-based paint disclosure. (Hearing- or speech-challenged individuals may access this number through TTY by calling the toll-free Federal Relay Service at 800-877-8339.) See section IV for recommended inspection report language regarding these disclosure requirements.

2. Limitation of this Inspection Protocol

The protocol described here is not intended for investigating housing units where children with elevated blood lead levels are currently residing. Such a protocol can be found in chapter 16 or from the State or local health department; the most stringent investigation protocol should be used.

3. Documentation of Results

The complete set of forms provided at the end of this chapter for use in single-family and multi-family housing may be used; similar forms or computerized reports may also be used to document the results of inspections.

4. Owner's Use of Inspection Reports in Lead Disclosure

In the final report on the inspection, the inspector should advise the client (typically the property owner or manager) that, if the housing is target housing, the owner has certain responsibilities under the Lead Disclosure Rule when the property is being sold or leased, or when a lease is being renewed with revisions. In general, lead disclosure is required in these circumstances, except that disclosure does not have to be made when the target housing is being leased if the inspection has found that it is lead-based paint free.

See the discussion of Lead Disclosure Rule (24 CFR part 35, subpart A, or 40 CFR part 745, subpart F) in Appendix 6 of these *Guideline*). The suggested language in the boxes in Section IV.I.3, Final Report, below, may be used in the cases of lead-based paint being identified, or not identified, in target housing.

B. Qualifications of Inspectors and Laboratories

1. Where to Find Inspectors and Laboratories

Lists of EPA and State-licensed (certified) inspectors can be obtained from the National Lead Information Center Clearinghouse at 800-424-LEAD (5323). The Clearinghouse can also help you locate the appropriate State agency contact to obtain lists of State-licensed (certified) inspectors and other information.

You can go to EPA's Lead Abatement Professionals page, ***http://www.epa.gov/oppt/lead/pubs/traincert.htm***, and click on the map for individual states and tribes which are authorized by EPA to operate their own lead certification programs. For other states, you can click on the Where You Live link on the left column, or go directly to ***http://www.epa.gov/oppt/lead/pubs/leadoff1.htm***, to find the contact information for the EPA Regional Lead Coordinators.

Laboratories recognized under the EPA's National Lead Laboratory Accreditation Program (NLLAP) are updated monthly, and are available at ***http://www.epa.gov/oppt/lead/pubs/nllaplist.pdf***.

2. Qualifications of Inspectors

An inspector must be certified (licensed) by the State or tribe where the testing is to be done if the State or tribe has an EPA-authorized inspection certification program. If the State does not have such a program, the inspector must be certified by EPA. The list of EPA-authorized states and tribes is at the EPA's Lead Abatement Professionals web page identified above.

C. Other Sources of Information

Other sources of information and materials needed for using this protocol include an XRF Performance Characteristic Sheet, U.S. Nuclear Regulatory Commission and State radiation protection regulations, and standards issued by the American Society for Testing and Materials (ASTM). The National Institute of Standards and Technology (NIST) produces Standard Reference Materials (SRMs) and provides supporting documentation for these materials.

1. XRF Performance Characteristic Sheet

An XRF Performance Characteristic Sheet (PCS) defines acceptable operating specifications and procedures for each model of X-Ray Fluorescence (XRF) lead-based paint analyzer. An inspector must follow the XRF Performance Characteristic Sheet for all inspection activities. XRF PCSs are available from the National Lead Information Center Clearinghouse or through the HUD website at ***http://www.hud.gov/offices/lead/lbp/hudguidelines/allpcs.pdf***. If an XRF analyzer does not have a PCS, or if it is not used, or if the data are not analyzed, in accordance with its PCS, the actions undertaken with it are neither a lead-based paint inspection nor paint testing.

2. XRF Radiation Protection Regulations

Regulations that govern radioactive sources used in XRFs are available from State radiation protection agencies (see ***http://nrc-stp.ornl.gov***)and the Nuclear Regulatory Commission (NRC) . The NRC may be contacted toll-free at (800) 368-5642, or ***http://www.nrc.gov/about-nrc/organization/fsmefuncdesc.html***. (Hearing- or speech-challenged individuals may access this number through TTY by calling the toll-free Federal Relay Service at 800-877-8339.) Employers of individuals who use XRF that have radioactive sources should also see OSHA's Ionizing Radiation standard, 29 CFR 1910.1096, and NRC's Standards for Protection Against Radiation, 10 CFR Part 20.

3. ASTM and NIST Standards

Other helpful information and standards are available from ASTM International at (610) 832-9585, or ***www.astm.org/Standard/index.shtml*** including:

- ASTM E1605 Standard Terminology Relating to Lead in Buildings
- ASTM E1613 Standard Test Method for Determination of Lead by Inductively Coupled Plasma Atomic Emission Spectrometry (ICP-AES), Flame Atomic Absorption Spectrometry (FAAS), or Graphite Furnace Atomic Absorption Spectrometry (GFAAS) Techniques
- ASTM E 1645 Standard Practice for Preparation of Dried Paint Samples by Hotplate or Microwave Digestion for Subsequent Lead Analysis
- ASTM E1729 Standard Practice for Field Collection of Dried Paint Samples for Subsequent Lead Determination
- ASTM E1775 Standard Guide for Evaluating Performance of On-Site Extraction and Field-Portable Electrochemical or Spectrophotometric Analysis for Lead
- ASTM E1979 Standard Practice for Ultrasonic Extraction of Paint, Dust, Soil, and Air Samples for Subsequent Determination of Lead
- ASTM E2052 Standard Guide for Evaluation, Management, and Control of Lead Hazards in Facilities (As of the publication of this edition of these *Guidelines,* this withdrawn standard being reinstated pending comprehensive updates.)
- ASTM E2120 Standard Practice for Performance Evaluation of the Portable X-Ray Fluorescence Spectrometer for the Measurement of Lead in Paint Films

NIST (301-975-2200 or ***http://www.nist.gov/***; hearing- or speech-challenged individuals may access this number through TTY by calling the toll-free Federal Relay Service at 800-877-8339.) has developed a series of paint films that have known amounts of lead-based paint and can be used for calibration check purposes. As of the publication of this edition of these *Guidelines,* NIST Standard Reference Material 2579a is available (see section IV.D, below).

D. Paint Testing for Inspections and Risk Assessments

While risk assessments determine the presence of lead-based paint *hazards,* inspections determine the presence of *lead-based paint*. The paint chip sampling and measurement procedures used in

lead-based paint inspections are similar to the procedures for paint sampling used in risk assessment. However, the number of paint measurements or samples taken for a paint inspection is, generally, considerably greater than the number of paint samples required for a risk assessment, because risk assessments measurements for lead in paint are only made for deteriorated paint, not all paint. Inspections measure lead in both deteriorated and intact paint, which involves many more surfaces. Risk assessments always note the condition of paint on surfaces; inspections may not. For dwellings in good condition, a full risk assessment may be unnecessary, and a lead hazard screen risk assessment may be conducted. In a lead hazard screen or risk assessment, the certified risk assessor tests only painted surfaces in deteriorated condition for their lead content. See chapter 5 for methods to determine the condition of paint when conducting a risk assessment.

E. Most Common Inspection Method

Portable XRF lead-based paint analyzers are the most common primary analytical method for inspections in housing because of the demonstrated ability to determine if lead-based paint is present on many surfaces and to measure the paint without destructive sampling or paint removal, as well as the high speed and low cost per sample (see Figure 7.1). Portable XRF instruments expose a building component to electromagnetic radiation in the form of X-rays or gamma radiation. In response to radiation, each element, including lead, emits energy at a fixed and characteristic level. Emission of characteristic x-rays is called "X-Ray Fluorescence," or XRF. The energy released is measured by the instrument's fluorescence detector and displayed. The inspector must then compare this displayed value (reading) with the threshold or inconclusive range specified in the XRF Performance Characteristic Sheet (PCS) for the specific XRF instrument being used, and the specific substrate beneath the painted surface (see section IV.F, below). For instrument – substrate combinations that have a threshold:

FIGURE 7.1 One type of XRF instrument displays its reading of a testing combination.

- If the reading is less than the threshold, then the reading is considered negative for lead-based paint.
- If the reading is greater than or equal to the threshold, then the reading is considered positive.

For instrument – substrate combinations that have an inconclusive range:

- If the reading is less than the lower boundary of the inconclusive range, then the reading is considered negative.
- If the reading is within the inconclusive range, including its boundary values, then the reading is considered inconclusive.
- If the reading is greater than the upper boundary of the inconclusive range, then the reading is considered positive.

As of the publication of this edition of these *Guidelines*, the detection elements and software of all of the XRF analyzers for which HUD has issued PCSs, all of the inconclusive ranges and/or thresholds are based on 1.0 mg/cm^2, so that positive and negative readings are consistent with the HUD definition of

lead-based paint for identification and disclosure purposes. Laboratory analysis is recommended to confirm inconclusive XRF results, as mentioned in Section I.G, below; alternatively, the paint can be presumed to be lead-based paint.

F. XRF Performance Characteristic Sheets and Manufacturer's Instructions

When an XRF instrument is used for testing paint in target housing or pre-1978 child-occupied facilities, it must have a HUD -issued XRF Performance Characteristic Sheet. XRFs must be used in accordance with the manufacturer's instructions and the PCS. The PCS contains information about XRF readings taken on specific substrates, calibration check tolerances, interpretation of XRF readings (see section I.E, above), and other aspects of the model's performance.

If discrepancies exist among the PCS, the HUD *Guidelines* and the manufacturer's instructions, the most stringent guidelines should be followed. For example, if the PCS has a lower (more stringent) calibration check tolerance than the manufacturer's instructions, the PCS should be followed.

These *Guidelines* and the PCS are applicable to all XRF instruments that detect K X rays, L X rays, or both. Most XRF instruments in use at the time of publication of this edition of these *Guidelines* detect K-shell fluorescence (X-ray energy), some instruments, L-shell fluorescence, and some, both K and L fluorescence. In general, L X rays released from greater depths of paint are less likely to reach the surface than are K X rays, which makes detection of lead in deeper paint layers by L X rays alone more difficult. However, L X rays are less likely to be influenced by substrate effects.

G. Inspection by Paint-chip Analysis

Performing inspections by the sole use of laboratory paint-chip analysis is not recommended because it is time-consuming, costly, and requires extensive repair of painted surfaces. Laboratory analysis of paint-chip samples *is* recommended for inaccessible areas or building components with irregular (non-flat) surfaces that cannot be tested using XRF instrumentation. Laboratory analysis is also recommended to confirm inconclusive XRF results, as specified on the applicable XRF Performance Characteristic Sheet, or at the inspector's professional judgment. Some newer laboratory analytical methods can provide results within minutes (see section I.H, below). Only laboratories recognized under the EPA NLLAP may be used for analyzing samples of paint in target housing or pre-1978 child-occupied facilities. Laboratory analysis is more accurate and precise than XRF, but only if great care is used to collect and analyze the paint-chip sample. Laboratory results of paint chip samples should be reported as mg/cm^2. Appendix 1 of these *Guidelines* explains why units of mg/cm^2 are not dependent on the number of overcoats of lead-free paint and why such units of measure are therefore more reliable than weight percent. The dimensions of the area from which a paint-chip sample is removed must be measured as accurately as possible (to the nearest millimeter or 1/16th of an inch) and the sample has to include every layer of paint with minimal substrate included.

Although laboratory results can also be reported as a percentage of lead by weight of the paint sample, percents should only be used when it is not feasible to use mg/cm^2. These two units of measure are not interchangeable. Laboratory results should be reported as mg/cm^2 if the surface area can be accurately measured and if all paint within that area is collected.

In mg/cm^2 measurements, keep the amount of substrate material as small as possible so that the inclusion of the substrate in the sample risks biasing the results as little as possible. However, if reporting weight percent measurements, no substrate may be included because the substrate will "dilute" the amount of lead reported. If a visual examination shows that the bottom layer of paint appears to have "bled" into the substrate, a very thin upper portion of the substrate should

be included in the sample to ensure that all lead within the sample area has been included in the sample. Direct the laboratory to report lead in mg/cm^2 if significant amounts of substrate are included in the sample. If the classification of presence or absence of lead-based paint based on weight percent and mg/cm^2 do not agree (e.g., weight percent exceeds the standard while mass per area value is below the standard) and the contradictory results cannot be resolved the report should state that lead-based paint is present.

See section VI for additional information on laboratory analysis.

H. Additional Means of Analyzing Paint

Methods of analyzing lead in paint are available in addition to XRF and laboratory paint-chip analysis, including transportable instruments and chemical test kits. Because some of these methods involve paint removal or disturbance, repair is needed after sampling, unless the substrate will be removed, encapsulated, enclosed, or repainted before occupancy (see section VI), or if analysis shows that the paint is not lead-based paint, and leaving the damage is acceptable to the client and/or the owner.

1. Mobile Laboratories

Portable instruments that employ anodic stripping voltammetry (ASV) and potentiometric stripping analysis (PSA) are now available. Their use is described in ASTM E1775-07 Standard Guide for Evaluating Performance of On Site Extraction and Field Portable Electrochemical or Spectrophotometric Analysis for Lead, (***www.astm.org/Standard/index.shtml***) which may be used as a basis for evaluating the performance of on-site extraction and electrochemical and spectrophotometric analyses.

In states and tribal lands where EPA is operating a lead program, paint samples for an inspection must be analyzed by a laboratory or testing firm recognized by EPA under the National Lead Laboratory Accreditation Program (NLLAP). If, in these states, an NLLAP laboratory wishes to perform on-site analyses of paint samples, it may do so if its NLLAP recognition includes the type of laboratory operation to be used, whether a mobile laboratory, or a field sampling and measurement organization. See the NLLAP Laboratory Quality System Requirements (LQSR). (As of the publication of this edition of these *Guidelines*, NLLAP was using Revision 3.0 of the LSQR, dated November 5, 2007. ***http://www.epa.gov/lead/pubs/lqsr3.pdf***, especially pages 1-2, 7, 12, and 18-19.) In states or tribal lands where the state or tribe is operating an EPA-authorized lead program, the same requirements generally apply, although there may be some differences.

2. Chemical Test Kits

Chemical test kits, also known as spot test kits, are intended to show a color change when a part of the kit makes contact with the lead in lead-based paint. Because of how long it has been since the application of lead-based paint in residential units was banned, often the surface coat does not contain significant levels of lead. Therefore many spot test kits require exposing all the layers of paint by slicing or some other method.

One type of chemical test kit is based on the formation of lead sulfide, which is black, when lead in paint reacts with sodium sulfide. Another is based on the formation of a red or pink color when lead in paint reacts with sodium rhodizonate.

Although EPA did not find chemical spot test kits sufficiently reliable for use in lead-based paint inspections, and the Agency recommended that they not be used (EPA, 1995b), it appeared that some spot test kits, when used by trained professionals, may be reliable as negative screens (NIST, 2000). During its development of its 2008 Lead Renovation, Repair and Painting Program (RRP) rule (see Appendix 6), EPA published "Lead Paint Test Kit Development; Request for Comments" (71 Federal Register 13561-13563, March 16, 2006) in order to encourage the further development of this method. In the RRP Rule, EPA described criteria for lead test kits that detect lead in paint (***http://www.epa.gov/lead/pubs/testkit.htm***).

Specifically, at 40 CFR 745.88(b)(4) and (c), the RRP rule requires a test kit newly recognized (i.e., after September 1, 2010) by EPA to meet both:

- The negative response criterion: That a false negative response (a negative response, indicating that lead-based paint is not detected) occurs no more than 5 percent of the time for paint at or above the current standard for lead-based paint (1.0 mg/cm^2 or 0.5 percent by weight), with 95 percent confidence; and
- The positive response criterion: That a false positive response (a positive response, indicating that lead-based paint is detected) occurs no more than 10 percent of the time for paint below the current standard for lead-based paint), with 95 percent confidence.

As of the publication of this edition of these *Guidelines*, a lead test kit can be EPA-recognized (see the list at ***http://www.epa.gov/lead/pubs/testkit.htm***) for determining, for RRP rule use, that lead-based paint is not present if it meets EPA's negative response criterion, above. EPA's recognition of such kits will last until EPA publicizes its recognition of the first test kit that meets both the negative response and positive response criteria outlined in the RRP rule. (40 CFR 745.88(b)(3).) As of the publication of this edition of these *Guidelines*, EPA had recognized three lead test kits for use in complying with the false negative response criterion of the RRP rule, but no test kit that meet both its false positive and false negative criteria. Accordingly, when a certified renovator obtains a negative response from an EPA-recognized test kit, i.e., indicating that lead-based paint is not detected, the certified renovator may use the response as part of determining whether the renovation project is exempt from the RRP Rule (but this does not provide an exemption from the Lead Disclosure Rule or the Lead Safe Housing Rule, which require lead-based paint inspections to support the exemption). Similarly, when a certified inspector or risk assessor obtains a negative response from an EPA-recognized test kit – but not a positive response – the response may be mentioned in a lead-based paint inspection, hazard screen or risk assessment report.

HUD and EPA may fully recommend chemical spot test kit use at some point after the publication of this edition of these *Guidelines* for lead-based paint inspections if the technology is demonstrated to be equivalent to XRF or laboratory paint-chip analysis in its ability to properly classify painted surfaces into positive, negative, and, if appropriate, inconclusive categories, with appropriate estimates of the magnitude of sampling and analytical error. XRF Performance Characteristic Sheets currently provide such estimates for XRFs, and analytical error is

well-described for laboratory analysis. Information on test kits or other new technologies for testing for lead in paint can be obtained from the lead test kits website above, and the EPA contact listed there, and from the National Lead Information Center Clearinghouse (1-800-424-LEAD) (hearing- or speech-challenged individuals may access this number through TTY by calling the toll-free Federal Relay Service at 800-877-8339) (***http://www.epa.gov/oppt/lead/pubs/nlic.htm***).

II. Summary of XRF Radiation Safety Issues

Radiation hazards associated with the use of XRFs that use radioactive sources are covered in detail in section VII. The shutter of an XRF must never be pointed at anyone, even if the shutter is closed. Inspectors should wear radiation dosimeters to measure their exposure, although excessive exposures are highly unlikely if the instruments are used in accordance with the manufacturer's instructions. If feasible, persons should not be near the other side of a wall, floor, ceiling, or other building component surface being tested.

III. Definitions

Definitions of several key terms used in this chapter are provided here. Although other definitions are available, the definitions and descriptions in this chapter should be used when conducting lead-based paint inspections.

a) **Building Component Types** – A building component type consists of doors, windows, walls, and so on that are repeated in more than one room equivalent in a unit and have a common substrate. If a unique building component is present in only one room, it is considered to be a testing combination. Each testing combination may be composed of more than one building component (such as two similar windows within a room equivalent). Component types can be located inside or outside the dwelling. For example, typical component types in a bedroom would be the ceiling, walls, a door and its casing, the window sash, window casings, and any other distinct surface, such as baseboards, crown molding, and chair rails. If trends or patterns of lead-based paint classifications are found among building component types in different room equivalents, an inspection report may summarize results by building component type, as long as all measurements are included in the report. For example, the inspection may find that all doors and door casings in a dwelling unit are coated with LBP (are "positive").

b) **Lead-based paint** – As of the publication of this edition of these *Guidelines,* lead-based paint means paint or other surface coatings that contain lead equal to or greater than 1.0 mg/cm^2 or 0.5 percent by weight. (Equivalent units for the weight concentration are: 5,000 µg/g, 5,000 mg/kg, or 5,000 ppm by weight.) Surface coatings include paint, shellac, varnish, or any other coating, including wallpaper that covers painted surfaces.

c) **Lead loading** – The mass of lead in a given surface area of a substrate. Lead loading is typically measured in units of milligrams per square centimeter (mg/cm^2). It is also called area concentration.

d) **Room equivalent** – A room equivalent is an identifiable part of a residence, such as a room, a house exterior, a foyer, a staircase within a housing unit, a hallway within a housing unit, 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, three for each of the units of a side-by-side duplex, or four for freestanding houses) are generally treated as a single room equivalent if the paint history appears to be similar. For multi-family developments or apartment buildings, common areas and exterior sites are treated as separate types of units, not as room equivalents (see section V.C.1 for further guidance).

e) **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 (PCS). For example, the concrete substrate type includes poured concrete, precast concrete, and concrete block.

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

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

f) **Testing Combination** – A testing combination is a unique combination of room equivalent, building component type, and substrate. Visible color may not be an accurate predictor of painting history and is not included in the definition of a testing combination. Table 7.1 lists common building component types that could make up distinct testing combinations within room equivalents. The list is not intended to be exhaustive. Unlisted components that are coated with paint, varnish, shellac, wallpaper, stain, or other coating should also be considered as a separate testing combination.

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

   - Window casings, stops, jambs and aprons are typically a single testing combination
   - Interior window mullions and window sashes are a single testing combination – do not group interior mullions and sashes with exterior mullions and sashes
   - Exterior window mullions and window sashes are a single testing combination
   - Door jambs, stops, transoms, casings and other door frame parts are a single testing combination
   - Door stiles, rails, panels, mullions and other door parts are a single testing combination
   - Baseboards and associated trim (such as quarter-round or other caps) are a single testing combination (do not group chair rails, crown molding or walls with baseboards)
   - Painted electrical sockets, switches or plates can be grouped with walls

Each of these building parts should be tested separately if there is some specific reason to believe that they have a different painting history. In most cases, separate testing will not be necessary.

Table 7.1 Examples of Interior and Exterior Building Component Types

Commonly Encountered Interior Painted Components That Should Be Tested Include:

Air Conditioners	Counter Tops	Radiators
Balustrades	Crown Molding	Shelf Supports
Baseboards	Doors and Trims	Shelves
Bathroom Vanities	Electrical Fixtures, Painted	Stair Stringers
Beams	Fireplaces	Stair Treads and Risers
Cabinets	Floors	Stools and Aprons
Ceilings	Handrails	Walls
Chair Rails	Newel Posts	Window Sashes and Trim
Columns	Other Heating Units	

Exterior Painted Components That Should Be Tested Include:

Air Conditioners	Fascias	Railing Caps
Balustrades	Floors	Rake Boards
Bulkheads	Gutters and Downspouts	Sashes
Ceilings	Joists	Siding
Chimneys	Handrails	Soffits
Columns	Lattice Work	Stair Risers and Treads
Corner boards	Mailboxes	Stair Stringers
Doors and Trim	Painted Roofing	Window and Trim

Other Exterior Painted Components Include:

Fences	Storage Sheds & Garages
Laundry Line Posts	Swing sets and Other Play Equipment

Table 7.2 provides six examples of different testing combinations. The first example is a wooden bedroom door. This is a testing combination because it is described by a room equivalent (bedroom), component (door), and substrate (wood). If one of these variables is different for another component, that component is a different testing combination. For example, if a second door in the room equivalent is metal, two testing combinations, not one, would be present.

Table 7.2 Examples of Distinct Testing Combinations

Room Equivalent	Building Component	Substrate
Master Bedroom (Room 5)	Door	Wood
Master Bedroom (Room 5)	Door	Metal
Kitchen (Room 3)	Wall	Plaster
Garage (Room 10)	Floor	Concrete
Exterior	Siding	Wood
Exterior	Swing set	Metal

Test Location – The test location is a specific area on a testing combination where either an XRF reading or a paint-chip sample will be taken. For doors separating rooms, each side of the door is assigned to the room equivalent it faces and is tested separately. The same is true of door casings. For prefabricated metal doors where it is apparent that both sides of the door have the same painting history, only one side needs to be tested.

IV. Inspections in Single-Family Housing

Single-family housing inspections should be conducted by a State- or EPA-certified (licensed) lead-based paint inspector using the following seven steps, some of which may be done at the same time:

- List all testing combinations, including those that are painted, stained, shellacked, varnished, coated, or wallpaper which covers painted surfaces.
- Select testing combinations.
- Perform XRF testing (including the calibration check readings).
- Collect and analyze paint-chip samples for testing combinations that cannot be tested with XRF, that had inconclusive XRF results, or for client-approved confirmation of XRF results.
- Classify XRF and paint-chip results.
- Evaluate the work and results to ensure the quality of the paint inspection.
- Document all findings in a plain language summary and a complete report; include language in both the summary and the report indicating that the information must be disclosed to tenants and prospective purchasers in accordance with Federal law (24 CFR part 35 or 40 CFR part 745) (see Appendix 6).

A. Listing Testing Combinations

Develop a list of all testing combinations in all interior rooms, on all exterior building surfaces, and on surfaces in other exterior areas, such as fences, playground equipment, and garages. The "Single-Family Housing LBP Testing Data Sheet" (see Addendum 2) or a comparable data collection instrument may be used for this purpose. An inventory of a house may be completed either before any testing or on a room-by-room basis during testing. HUD encourages inspectors to take the inventory before beginning any testing. This provides the inspector with an overview of the housing to be inspected, identify problems, and helps the inspector organize the inspection work activities.

1. Number of Room Equivalents to Inspect

Test all room equivalents inside and outside the dwelling unit. The final report must include a final determination of the presence or absence of lead-based paint on each testing combination in each room equivalent. For varnished, stained, or similar clear-coated floors, measurements in only one room equivalent are permissible if it appears that the floors in the other room equivalents have the same coating.

Some testing combinations have multiple parts. For example, a window testing combination could theoretically be broken down into the interior sill (stool), exterior sill, trough, sash, apron, parting bead, stop bead, casing, and so on. Because it is highly unlikely that all these parts will have different painting histories, usually they should not be considered separate testing combinations unless their professional judgment and field condition dictate otherwise. (Inspectors should regard parts of building components as separate testing combinations if they have evidence that different parts have separate, distinct painting histories). Windows and doors would typically have at least two combinations, interior and exterior. See the definition of testing combination (section III, above) for guidance on which building component parts may and may not be grouped together.

2. Number of Testing Combinations to Inspect

Inspect each testing combination in each room equivalent, unless similar building component types with identical substrates (such as windows) are all found to contain lead-based paint in the first five interior room equivalents. In that case, testing of that component type in the remaining room equivalents may be discontinued, *if and only if* the purchaser of the inspection services agrees beforehand to such a discontinuation. The inspector should then conclude that similar building component types in the rest of the dwelling unit also contain lead-based paint. For example, if an inspector finds that baseboards in the first five room equivalents are all positive, the inspector – with the client's permission – may conclude that all remaining room equivalents in the unit contain positive baseboards. This is sometimes referred to as a "positive stop."

Because it is highly unlikely that testing combinations *known* (and not just presumed) to have been replaced or added to the building after 1977 will contain lead-based paint, they need not be tested. If the age of the testing combination is in doubt, it should be tested.

FIGURE 7.2 Child's bed showing teeth marks in the painted surface. Paint should be tested for lead.

3. Painted Furniture

Painted furniture that is physically attached to the unit (for example, a built-in desk or dresser) should be included in the inspection as a testing combination. Other painted furniture may also be tested, depending on the client's wishes. Children's furniture (such as cribs or playpens), especially if built before 1978, may contain lead-based paint and can be tested, subject to the client's wishes (see Figure 7.2). Imported products may be more suspect, and therefore tested. Check that the entire face plate of the XRF is flush to a painted surface of the furniture. If this is not possible, the piece of furniture must be presumed to be coated with lead-based paint, or a chip may be taken for lead analysis by an EPA-recognized laboratory.

4. Ceramic Tile and Other Fixtures

Some inspectors and risk assessors test non-paint surfaces such as unpainted ceramic tile and porcelain bathtubs for lead content because these items may be a source of lead exposure during demolition or renovation. These items are not considered lead-based paint; their presence does not need to be included in disclosure under the Lead Disclosure Rule (see Appendix 6). Lead-containing ceramic tile is not a common cause for childhood lead poisoning. However, surface abrading and demolition activities such as breaking or crushing may release lead. For this reason, some inspectors and risk assessors include ceramic tile and bathtubs in pre-rehabilitation inspections/risk assessments and reference the OSHA lead in construction standard (29 CFR 1926.62) in their reports (see Appendix 6).

Ceramic tiles are still available with lead glaze; these are being sold and installed in homes. HUD's American Healthy Homes Survey found some tiles with lead loadings of 1.0 mg/cm^2 or more in homes built after 1977. (HUD, 2011)

5. Building Component Types

Results of an inspection may be summarized by classifying component types across room equivalents if patterns or trends are supported by the data.

6. Substrates

Several types of XRF instruments do not require "substrate correction," needed to correct a systematic bias in an XRF instrument resulting from interference from substrate material beneath the paint. (See Section IV.E, below.) However, all substrates across all room equivalents should be grouped into one of the six substrate categories (brick, concrete, drywall, metal, plaster, or wood) shown on the XRF Performance Characteristic Sheet for the instrument being used. Substrate correction procedures, if required, can then be applied for all building component types with the same substrate. For example, the substrate correction procedure for wooden doors and wooden baseboards can use the same substrate correction value.

B. Number and Location of XRF Readings

1. Number of XRF Readings for Each Testing Combination

XRF testing is required for at least one location per testing combination, except for interior and exterior walls, where four readings should be taken, one on each wall. Analysis (Westat, 1996) of EPA data show a median difference in spatial variation of only 0.1 mg/cm^2 and a change in classification (positive, negative, or inconclusive) occurs less than 5 percent of the time as a result of different test locations on the same testing combination. (Westat, 1996) Multiple readings on the same testing combination or testing location are, therefore, unnecessary, except for interior and exterior walls.

Because of the large surface areas and quantities of paint involved, and the possibility of increased spatial variation, take at least four readings (one reading on each wall) in each room equivalent. (For room equivalents with fewer than four walls, test each wall.) For each set of walls with the same painting history in a room equivalent, test the four largest walls. Classify each wall based on its individual XRF reading. If a room equivalent has more than four walls, calculate the average of the readings, round the result to the same number of decimal places as the XRF instrument displays, and classify the remaining walls with the same painting history as the tested walls, based on this rounded average. When the remaining walls in a room equivalent clearly do not have the same painting history as that of the tested walls, test and classify the remaining walls individually. For exterior walls, select at least four sides and average the readings (rounding the result as described above) to obtain a result for any remaining sides. If there are more than four walls and the results of the tested walls do not follow a classification pattern (for example, one is positive and the other three are negative), test each wall individually.

2. Location of XRF Readings

The selection of the test location for a specific testing combination should be representative of the paint over the areas that are most likely to be coated with old paint or other lead-based coatings. Thus, locations where the paint appears to be thickest should be selected. Locations where paint has worn away or been scraped off should not be selected. Areas over pipes, electrical surfaces, nails, and other possible interferences should also be avoided if possible. All layers of paint should be included and the XRF probe faceplate should be able to lie flat against the surface of the test location.

If no acceptable location for XRF testing exists for a given testing combination, a paint-chip sample should be collected and sent to a lead laboratory recognized by NLLAP for analysis of lead in paint. The sample should include all paint layers and should be taken as unobtrusively as possible. Because paint-chip sampling is destructive, a single sample may be collected from a wall and used to characterize the other walls in a room equivalent (see section VI for additional details on paint-chip sampling). For greater reliability, consider collection and analysis of more than one sample.

3. Documentation of XRF Reading Locations

Descriptions of testing combinations must be sufficiently detailed to permit another individual to find them. While it is not necessary to document the *exact* spot or the *exact* building

component on which the reading was taken, it is necessary to record the *exact* testing combination measured. Current room uses or colors can change and should not be the only way of identifying them. A numbering system, floor plan, sketch or other system may be used to document which testing combinations were tested. While HUD does not require a standard identification system, one that could be used is as follows:

a) **Side identification**

Identify perimeter wall sides with letters A, B, C, and D (or numbers or Roman numerals). Side A for single-family housing is the street side for the address. Side A in multi-family housing is the apartment entry door side.

Side B, C, and D are identified clockwise from Side A as one faces the dwelling; thus Wall B is to the left, Wall C is across from Side A, and Side D is to the right of Side A.

Each room equivalent's side identification follows the scheme for the whole housing unit. Because a room can have two or more entries, sides should not be allocated based on the entry point. For example, giving a closet a side allocation based on how the room is entered would make it difficult for another person to make an easy identification, especially if the room had two closets and two entryways.

b) **Room Equivalent Identification**

Room equivalents should be identified by both a number and a use pattern (for example, Room 5-Kitchen). Room 1 can always be the first room, at the A-D junction at the entryway, or it can be the exterior. Rooms are consecutively numbered clockwise. If multiple closets exist, they are given the side allocation: for example, Room 3, Side C Closet. The exterior is always assigned a separate room equivalent identifier.

c) **Sides in a Room**

Sides in an interior room equivalent follow the overall housing unit side allocation. Therefore, when standing in any four-sided room facing Side C, the room's Side A will always be to the rear, Side B will be to the left, and Side D will be to the right.

d) **Building Component Identification**

Individual building components are first identified by their room number and side allocation (for example, the radiator in Room 1, Side B is easily identified). If multiple similar component types are in a room (for example, three windows), they are differentiated from each other by side allocation. If multiple components are on the same wall side, they are differentiated by being numbered left to right when facing the components. For example, three windows on Wall D are identified as windows D1, D2, and D3, left to right. If window D3 has the only old original sash, it is considered a separate testing combination from the other two windows. Codes or abbreviations for building components and/or locations may be used in order to shorten the time needed for data entry. If codes or abbreviations are used, the inspection records and the inspection report must include a table showing their meaning.

A sketch of the dwelling unit's floor plan is often helpful, but is not required by this protocol. Whatever documentation is used, a description of the room equivalent and testing combination identification system must be included in the final inspection report.

C. XRF Instrument Reading Time

The recommended time to open an XRF instrument's shutter to obtain a single XRF result for a testing location depends on the specific XRF instrument model and the mode in which the instrument is operating. The *XRF Performance Characteristic Sheet* provides information on this issue.

To ensure that a constant amount of radiation is delivered to the painted surface, the open-shutter time that permits radiation from the radioactive source to strike the painted surface and then stimulate florescence in the paint that reaches the instrument's detector must be increased as the source ages and the source weakens. Almost all commercially available XRF instruments automatically adjust for the age of the source. (Some instruments adjust for source decay in some but not all modes; operators should check with the manufacturers of their instruments to determine whether these differences need to be accommodated). The following formula should be employed for instruments that use radioactive sources and that requiring manual adjustment of the open-shutter time:

$$\text{Open-Shutter Time} = 2^{(\text{Age}/\text{Half-life})} \times \text{Nominal Time}$$

where:

- Age is the age (in days) of the radioactive source, starting from the date the manufacturer says the source had its full radiation strength;
- *Half-life* is the time (in days) it takes for the radioactive material's activity to decrease to one-half its initial level; and
- *Nominal Time* is the recommended nominal number of seconds for open-shutter time to expose the surface to the X-rays from the radioactive source, when the source is at its full radiation strength, and is obtained from the *XRF Performance Characteristic Sheet*.

For example, if the age of the radioactive source is equal to its half-life (the length of time in which the number of radioactive atoms is reduced to one half of the current number of radioactive atoms), the open-shutter time should be twice the nominal time in order to get the same amount of exposure to the radiation from the decaying source. XRFs that use radioactive sources typically use cobalt-57 (with a half life of 270 days) or cadmium-109 (with a half life of 464 days). Thus, if the recommended nominal time for a particular model of XRF instrument is 15 seconds on the date of manufacture of the source, the open-shutter time should be doubled to 30 seconds 270 days later for cobalt sources and 464 days later for cadmium sources. This would be repeated at the same half-life intervals for each source as it decays further. For example, at 540 days (i.e., two half-lives) after manufacture of an XRF instrument of this model if it has a cobalt source should have its open-shutter time be 60 seconds (i.e., two times two, or four times the nominal time), at 810 days (i.e., three half-lives), 120 seconds (i.e., two multiplied by itself three times, that is, eight times the nominal time), and so on.

XRF Performance Characteristic Sheets (PCS) typically report different inconclusive ranges or thresholds (see section IV.G, below) for different nominal times and different substrates. This may affect the number of paint-chip samples that must be collected as well as the length of time required for the inspection. Some XRF devices have different modes of operation with different nominal reading times. Inspectors must use the appropriate inconclusive ranges and other criteria specified on the PCS for each XRF model, mode of operation and substrate. For example, inconclusive ranges specified for a 30-second nominal reading cannot be used for a 5-second nominal reading, even for the same instrument and the same substrate.

Inspectors should record the source age (or the date the manufacturer says the source had its full radiation strength) in the field notes for the inspection. Optionally, the inspector may include this information in description of the XRF testing method in the inspection report.

D. XRF Calibration Check Readings

In addition to the manufacturer's recommended warm up and quality control procedures, the XRF operator should take the quality control readings recommended below, unless these are less stringent than the manufacturer's instructions. Quality control for XRF instruments involves readings to check calibration. Most XRFs cannot be calibrated on-site; actual calibration can only be accomplished in the factory. You should also review ASTM E211900, Standard 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.

1. Frequency and Number of Calibration Checks

For each XRF instrument, two sets of XRF calibration check readings are recommended at least every 4 hours. The first is a set of three nominal-time XRF calibration check readings to be taken before the inspection begins. The second occurs either after the day's inspection work has been completed, or at least every 4 hours, whichever occurs first. To reduce the amount of data that would be lost if the instrument were to go out of calibration between checks, and/or if the manufacturer recommends more frequent calibration checks, the calibration check can be repeated more frequently than every 4 hours. If the XRF manufacturer recommends more frequent calibration checks, the manufacturer's instructions should be followed. Calibration should also be checked before the XRF is turned off (for example, to replace a battery or before a lunch break) and after it is turned on again. For example, if an inspection of a large house took 6 hours, there would be three calibration checks: one at the beginning of the inspection, another after 4 hours, and a third at the end of the inspection.

If the XRF is not turned off as the inspector travels from one dwelling unit to the next, calibration checks do not need to be done after each dwelling unit is completed. For example, in multi-family housing, calibration checks do not need to be done after each dwelling unit is inspected; once every 4 hours is usually adequate. Some inspectors do a calibration check between units for two reasons: first, if the instrument goes out of calibration during the inspection of the unit, only that unit needs to be reinspected, and, second, if the inspector inadvertently misses a calibration check, the period between checks is less likely to exceed 4 hours.

Some instruments automatically enter a "sleep" or "off" state when not being used continually to prolong battery life. It is not necessary to perform a calibration check before and after each "sleep" state episode, unless the manufacturer recommends otherwise.

2. Calibration Check Standard Materials

Portable XRF calibration check readings are taken on the National Institute of Standards and Technology (NIST) Standard Reference Material (SRM) or NIST Certified Reference Material using the nominal 1.0 mg/cm^2 paint film (or nearly 1.0 in older sets) within the SRM. The complete set of paint films can be obtained by calling (301) 975-2200 or using the NIST SRM site at ***http://www.***

nist.gov/srm/index.cfm . As of the publication of this edition of these *Guidelines*, the SRM for ***Lead Paint Films for Portable XRF Analyzers*** is a set of paint films numbered SRM 2579a, its cost was $397. (At some point, this SRM may be depleted and NIST may begin selling another SRM in its place; its number (possibly 2579b) may be found by searching the NIST SRM site for "Lead Paint Films," or asking NIST staff for an SRM for Lead Paint Films)

Calibration checks should be taken through the SRM paint film with the film positioned at least 1 foot (0.3 meters) away from any potential source of lead. The NIST SRM film should not be placed on a tool box, suitcase, or surface coated with paint, shellac, or any other coating to take calibration check readings. Rather, the NIST SRM film should be attached to a solid (not plywood) wooden board or other non-metal rigid substrate such as drywall, or attached directly to the XRF probe. The SRM should be positioned so that readings of it are taken when it is more than 1 foot (0.3 meters) away from a potential source of error. For example, the NIST SRM film can be placed on top of a 1 foot (0.3 meter) thick piece of Styrofoam or other lead-free material, as recommended by the manufacturer before taking readings.

3. Recording and Interpreting Calibration Check Readings

Each time calibration check readings are made, three readings should be taken. These readings should be taken using the nominal time which will be used during the inspection, selected from among those specified in the PCS. The open shutter time should be adjusted, if necessary, to reflect the age of the radioactive source (see section IV.C, above). The readings can be recorded on the "Calibration Check Test Results" form (Form 7.2 in Addendum 2), on a comparable form, or stored in the instrument's memory, and printed out or transferred to a computer later. The average of the three calibration check readings should be calculated, rounded to the same number of decimal places as the XRF instrument displays, and recorded on the form.

Large deviations from the NIST SRM value will alert the inspector to problems in the instrument's performance. If the observed calibration check average is outside of the acceptable calibration check tolerance range specified in the instrument's PCS, the manufacturer's instructions should be followed to bring the instrument back into control. A successful calibration check should be obtained before additional XRF testing is conducted. Readings not accompanied by successful calibration checks at the beginning and end of the testing period are unreliable and should be repeated after a successful calibration check has been made. If a backup XRF instrument is used as a replacement, it must successfully pass the initial calibration check test before retesting the affected test locations. (Current sheets are available at ***www.hud.gov/offices/lead/lbp/hudguidelines/allpcs.pdf***.)

This procedure assumes that the HUD/EPA lead-based paint standard of 1.0 mg/cm^2 is being used. If a different standard is being used, other NIST SRMs should be used to determine instrument performance against the different standard (see Section IV D 2). At the time of the publication of this edition of these *Guidelines*, , however, no method for determining XRF performance characteristics using different standards has been developed.

E. Substrate Correction

XRF readings are sometimes subject to systematic biases as a result of interference from substrate material beneath the paint. The magnitude and direction of bias depends on the substrate, the specific XRF instrument being used, and other factors such as temperature and humidity. Results

can be biased in either the positive or negative direction and may be quite high.

1. When Substrate Correction Is Not Required

Some XRF instruments do not need to have their readings corrected for substrate bias on any substrate. Other instruments may only need to apply substrate correction procedures on specific substrates and/or when XRF results are below a specific value. The *XRF Performance Characteristic Sheet* should be consulted to determine the requirements for a specific instrument and each mode of operation (e.g., nominal time, or time required for intended precision). XRF instruments which do not require correction for any substrate, or require corrections on only a few substrates, have an advantage in that they simplify and shorten the inspection process.

2. Substrate Correction Procedure

XRF results are corrected for substrate bias by subtracting a correction value determined separately in each house for each type of substrate where lead paint values are in the substrate correction range indicated on the XRF Performance Characteristic Sheet (PCS). In single-family housing, the substrate correction value is determined using the specific instrument(s) used in that house. The correction value (formerly called "Substrate Equivalent Lead" or "SEL") is an average of six XRF readings, with three taken from each of two test locations that have been scraped visually clean of their paint coating. The locations selected for removal of paint should have an initial XRF reading on the painted surface of less than 2.5 mg/cm^2, if possible. If all initial readings on a substrate type are greater than 2.5 mg/cm^2, the locations with the lowest initial reading should be chosen. Because available data indicate that surfaces with XRF readings in excess of about 3.0 mg/cm^2 or 4.0 mg/cm^2 are almost always coated with lead-based paint, and since bleed-through of lead into the substrate may occur, or pipes and similarly interfering building components may be behind the material being evaluated, locations with such high readings should be avoided for substrate correction.

After all XRF testing has been completed but before the final calibration check test has been conducted, XRF results for each substrate type should be reviewed. If any readings fall within the range for substrate correction for a particular substrate, obtain the substrate correction value.

On each selected substrate requiring correction, two different testing combinations must be chosen for paint removal and testing. For example, if the readings are inconclusive for some wooden baseboards, select two baseboards, each from a different room. If some wooden doors also require substrate correction, the inspector should take substrate correction readings on one door and one baseboard. Selecting the precise location of substrate correction should be based on the inspector's ability to remove paint thoroughly from the substrates, the similarity of the substrates, and their accessibility. The XRF probe faceplate must be able to be placed over the scraped area, which should be completely free of paint or other coatings.

The size of the area from which paint is taken depends on the size of the analytical area of the XRF probe faceplate; normally, the area is specified by the manufacturer. To ensure that no paint is included in the bare substrate measurement, the bare area on the substrate should be slightly larger than the analytical area on the XRF probe faceplate.

In all, six readings must be taken for each substrate type that requires correction. All six must be averaged together. Take three readings on the first *bare* substrate area. Record

the substrate and XRF readings on the "Substrate Correction Values" form (Form 7.3 in Addendum 2) or a comparable form. Repeat this procedure for the second *bare* substrate area and record the three readings on the same form. Substrate correction values should be determined using the same instrument used to take readings on the painted surfaces. If more than one XRF model was used to take readings, apply the substrate correction values as specified on each instrument's PCS.

Compute the correction value for each substrate type that requires correction by computing the average of all six readings as shown below and recording the results on the "Substrate Correction Values" form. The formula given below should be used to compute the substrate bias correction value for XRF readings taken on a bare substrate that is not covered with NIST SRM film. A different formula should be used when SRM film must be placed over the bare substrate. The PCS specifies when this correction is necessary and provides the formula for computing the correction value.

For each substrate type requiring substrate correction, transfer the correction values to the "Single-Family Housing LBP Testing Data Sheet" (Form 7.1). Correct XRF readings for substrate interference by subtracting the correction value from each XRF reading.

Example: Suppose that a house has 50 testing combinations with wood substrates. The PCS states that a correction value for XRF results taken on those wood testing combinations that have values less than 4.0 mg/cm^2 must be computed. Select two test locations from the testing combinations that had uncorrected XRF results of less than 2.5 mg/cm^2. Completely remove the paint from these two test locations and take three nominal-time XRF readings on the bare substrate at each location. The six XRF readings at the two random locations are:

Master Bedroom Wood Door (mg/cm^2)			Kitchen Wood Baseboard (Room 4) (mg/cm^2)		
First	Second	Third	First	Second	Third
1.32	0.91	1.14	1.21	1.03	1.43

The correction value is the average of the six values:

Correction value = (1.32 + 0.91 + 1.14 + 1.21 + 1.03 + 1.43) mg/cm^2 / 6 = 1.17 mg/cm^2

In this same house, three different wood testing combinations were inspected for lead-based paint and the XRF results are: 1.63 mg/cm^2, 3.19 cm/mg^2, and 1.14 mg/cm^2. Correcting these three XRF measurements for substrate bias produce the following results:

First corrected measurement = 1.63 mg/cm^2 – 1.17 mg/cm^2 = 0.46 mg/cm^2

Second corrected measurement = 3.19 mg/cm^2 – 1.17 mg/cm^2 = 2.02 mg/cm^2

Third corrected measurement = 1.14 mg/cm^2 – 1.17 mg/cm^2 = -0.03 mg/cm^2

The third corrected result shown above is an example of how random error in XRF measurements can cause the corrected result to be less than zero. (Random measurement error is present whenever measurements are taken). Note that correction values can be either positive or negative. In short, negative corrected XRF values should be reported if supported by the data.

Finally, suppose an XRF result of 1.24 mg/cm^2 has a correction value of negative 0.41 mg/cm^2. Subtracting a negative number is the same as adding its positive value. Therefore, the corrected measurement would be:

Corrected result = 1.24 mg/cm^2 – (-0.41 mg/cm^2) = 1.24 mg/cm^2 + 0.41 mg/cm^2 = 1.65 mg/cm^2

3. Negative Values

If more than 20 percent of the corrected values are negative, the instrument's lead paint readings and/or the substrate readings are probably in error. Calibration should be checked and substrate measurements should be repeated.

F. Discarding Readings

If the manufacturer's instructions call for the deletion of readings at specific times, *only* readings taken at those specific times should be deleted. Similarly, readings between a successful calibration check and a subsequent unsuccessful calibration check must be discarded. Readings should not be deleted based on any criteria other than what is specified by the manufacturer's instructions or the *HUD Guidelines.* For example, a manufacturer may instruct operators to discard the first XRF reading after a substrate change. If so, *only* the first reading should be discarded after a substrate change.

G. Classification of XRF Results

XRF results are classified as positive, negative, or inconclusive.

A positive classification indicates that lead is present on the testing combination at or above the HUD/EPA standard; as of the publication of this edition of these *Guidelines,* the standard is 1.0 mg/cm^2. A positive XRF result is any value greater than the upper bound of the inconclusive range, or greater than or equal to the threshold, as specified on the applicable XRF Performance Characteristic Sheet (PCS).

A negative classification indicates that lead is not present on the testing combination at or above the HUD/EPA standard. A negative XRF result is any value less than the lower bound of the inconclusive range, or less than the threshold, specified on the PCS.

An *inconclusive* classification indicates that the XRF cannot determine with reasonable certainty whether lead is present on the testing combination at or above the HUD/EPA standard. An inconclusive XRF result is any value falling within the inconclusive range on the PCS (including the boundary values defining the range). In single-family housing, all inconclusive results should be confirmed by analysis by a laboratory recognized by EPA, under NLLAP, for analysis of lead in paint, unless the client wishes to assume that all inconclusive results are positive.

Positive, negative, and inconclusive results apply to the actual testing combination and to any repetitions of the testing combination that were not tested in the room equivalents. Positive results also apply to similar component types in room equivalents that were not tested. For example, suppose that one baseboard in a room equivalent is tested, and that the inspector decided that all four baseboards are a single testing combination. The single XRF result applies to all four baseboards in that room equivalent.

When an inconclusive range is specified on the PCS, the inconclusive range includes its upper and lower bounds. XRF results are classified as 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 otherwise. For example (as in the table below), if the inconclusive range is 0.51 mg/

cm^2 to 1.49 mg/cm^2, an XRF result of 0.50 mg/cm^2 is considered negative, because it is less than 0.51; a result of 0.6 mg/cm^2 is inconclusive; and a result of 1.5 mg/cm^2 is positive. Results of 0.51 mg/cm^2, 1.00 mg/cm^2, or 1.49 mg/cm^2 would be inconclusive. If the instrument reads to only one decimal place (such as 0.5 mg/cm^2), the reading is treated as having a 0 in the second decimal place (as if the reading were 0.50 mg/cm^2) for classifying the result with respect to its inconclusive range.

	Inconclusive Range in PCS		
	Lower limit (mg/cm^2)	Upper limit (mg/cm^2)	
Reading (mg/cm^2)			**Classification**
0.50	Below lower limit		Negative
0.51	At lower limit		Inconclusive
0.60	Above lower limit	Below upper limit	Inconclusive
1.00	Above lower limit	Below upper limit	Inconclusive
1.49		At upper limit	Inconclusive
1.50		Above upper limit	Positive

Different XRF models have different inconclusive ranges, depending on the specific XRF model and the mode of operation. The inconclusive range may also be substrate-specific.

In some cases, the upper and lower limits of the inconclusive range are equal; that value is called the *threshold*. If the reading is less than the threshold, then the reading is considered negative. If the reading is equal to or greater than the threshold, then the reading is considered positive.

Use of the inconclusive range and threshold is detailed in the performance characteristic sheet. The categories include substrate-corrected results, if substrate correction is indicated. XRFs with *only* threshold values listed on the PCS are advantageous in that classifications of results are either positive or negative (no XRF readings are inconclusive).

Note that the final inspection report should **not** list inconclusive readings as a third category in addition to positive and negative. There are two options for addressing inconclusive readings:

- A paint chip may be sampled and sent to a laboratory recognized by EPA, under NLLAP, for analysis of lead in paint.
- If the client agrees, all inconclusive readings may be assumed to be positive. It is not permissible to assume any inconclusive reading is negative.

H. Evaluation of the Quality of the Inspection

The person responsible for purchasing inspection services – the homeowner, property owner, housing authority, prospective buyer, occupant, contractor, etc.; also known as the client – should consider evaluating the quality of the work using one or more of the methods listed below. Evaluation methods include direct observation, immediate provision of results, repeated testing, and time-and-motion analysis. Direct observation of the inspection should be used whenever possible. If this quality evaluation is to be conducted, the inspection contract should outline the financial penalties that will occur

if an inspector fails to perform as contracted during any visit. The certified lead-based paint inspection firm remains responsible, of course, for performing the inspection properly, even when the client, or a representative, has evaluated the quality of the work.

1. Direct Observation

An evaluation of a lead-based paint inspection is best made if a knowledgeable observer is present for as much of the XRF testing as possible. This is the only way to ensure that all painted, varnished, shellacked, wallpapered, stained, or other coated testing combinations are actually tested, and that all XRF readings are recorded correctly. Employ as the observer someone who is trained in lead-based paint inspection and who is independent of the inspection firm.

If it is not feasible for the client or the client's representative to be present throughout the inspection, that person should conduct unannounced and unpredictable visits to observe the inspection process. The number of unannounced visits will depend on the results of prior visits. When observing ongoing XRF testing, review the test results for the room equivalent currently being tested and for the previously inspected room equivalent. Even if the first visit is fully satisfactory, follow-up visits should be conducted throughout the inspection.

2. Immediate Provision of Results

The client, or a representative, should ask the inspector to provide copies or printouts of results on completed data forms immediately following the completion of the inspection or on a daily basis. Alternatively, the client, or a representative, should visually review the inspector's written results to ensure that they are properly recorded for all surfaces that require XRF testing. If surfaces have been overlooked or recorded incorrectly, the inspection process should be stopped and considered deficient. Clients should retain daily results to ensure that the data in the final report are the same as the data collected in the home.

3. Repeated Testing of 10 Surfaces

Data from HUD's private housing lead-based paint hazard control program show that it is possible to successfully retest painted surfaces without knowing the exact spot which was tested.

Select 10 testing combinations at random from the already compiled list in the "Single-Family Housing LBP Testing Data Sheet" for retesting (see forms in Addendum 2 of this chapter). Observe the inspector during the retesting. If possible, the same XRF instrument used in the original inspection should be used in the retesting. If the XRF instrument used in the original inspection is not available and cannot be returned to the site, use an XRF of the same model for retesting. Use the same procedures to retest the 10 testing combinations. The 10 repeat XRF results should be compared with the 10 XRF results previously made on the same testing combinations.

The repeat readings and the original readings should not be corrected for substrate bias for the purpose of this comparison. The average of the 10 repeat XRF results should not differ from the 10 original XRF results by more than the retest tolerance limit. The procedure for calculating the retest tolerance limit is specified in the PCS. If the limit is exceeded, the procedure should be repeated using 10 different testing combinations. If the retest tolerance limit is exceeded again, the original inspection is considered deficient.

4. Time-and-Motion Analysis

Anyone who contracts for a lead-based paint inspection can also perform a simple check to determine if the inspector had sufficient time to complete the number of housing units reported as being tested in the time allotted. Usually, inspections require at least 1 to 2 hours per housing unit using technology in common use at the time of publication of these *Guidelines*, with the number of rooms and the complexity of the surfaces among the factors that affect the inspection duration. A one-bedroom apartment may require considerably less time. If the inspector's on-site time is significantly less than the expected duration, the situation should be looked into further to determine if the inspector actually completed the work described in the report.

I. Documentation in Single-Family Housing

1. Data Forms

Data can be recorded on handwritten forms, electronically, or by a combination of these two methods. XRF readings can be entered on handwritten forms, such as the set of forms provided in Addendum 2 – Data Collection Forms (or comparable forms). Because handwriting and keyboard entry can result in transcription errors, handwritten and keyboard-entered forms should be examined for missing data and copying errors.

2. Electronic Data Storage

Electronic data storage is recommended only if the data recorded are sufficient to allow another person to find the testing combination that corresponds to each XRF reading. Electronically stored data should be printed in hard copy either daily or at the completion of the inspection, unless the inspector (or the inspection firm) has an electronic data archiving procedure in place. The data should be examined for extraneous symbols, extra data, and missing data, including missing test location identification. In most cases, electronic data storage is supplemented by manual data recording of sampling location, operator name, and other information, although some XRF instruments allow at least some of this supplemental information to be stored on the instrument.

3. Final Report

The final report must include both a summary and complete information about the site, the inspector, the inspection firm, the inspection process, and the inspection results. Report writing is an important element of completing lead-based paint inspections. The professional responsibilities of an inspector include writing reports that are well-written, understandable, and meet EPA requirements. Clients, such as owners, are encouraged to request report revisions for clarity and regulatory compliance.

The full report should include a complete data set, including:

- Date of each inspection.

- Address of building.
- Date of construction.
- Apartment numbers (if applicable).
- Name, address, and telephone number of the owner or owners of each residential dwelling or child-occupied facility.
- Name, signature, and certification number of each certified inspector and/or risk assessor conducting testing.
- Name, address, and telephone number of the certified firm employing each inspector and/or risk assessor, if applicable.
- Each testing method and device and/or sampling procedure employed for paint analysis, including quality control data and, if used, the serial number of any x-ray fluorescence (XRF) device.
  - It is typical to include the name of the instrument manufacturer and model number, as well.
- Specific locations of each painted component tested for the presence of lead-based paint.
  - It may be helpful to provide the numbering system or sketches that identify building components and room equivalents.
- The results of the inspection expressed in terms appropriate to the sampling method used.
  - The report should start with a plain-language summary of the results of the inspection.
    - As part of its overview of the results of the inspection, the summary should answer two questions:
      - Is there lead-based paint in the house?
      - If lead-based paint is present, where is it located?
  - The report should include the final classification of all testing combinations into positive or negative categories, including a list of testing combinations, or building component types and their substrates, which were classified but not individually tested (see below).
  - It is typical to include tables or listings of all XRF readings (including calibration check readings), and of the results of any paint-chip analyses that were performed (including the name, address, telephone number and NLLAP recognition number of the laboratory(ies) that conducted the analyses). If codes or abbreviations for building components and/or locations have been used in order to shorten the time needed for data entry, the inspection report must include a table showing their meaning.

As noted above, *the final report should* ***not*** *list inconclusive readings as a third category in addition to positive and negative.* The report should include the actual readings for any testing combinations for which readings were inconclusive, and were classified as positive by assumption, **or** which, after the XRF testing, were analyzed by a laboratory recognized by EPA, under NLLAP, for analysis of lead in paint, and what the results of that analysis were, including the paint level and whether or not it is lead-based paint.

Note that final classifications are needed for building component types and their substrates that were not actually tested in the single-family property. For example, if the client wants to suspend testing on testing combinations that were found to be positive in the first five room equivalents and are assumed to be positive in the remaining rooms, the final report should list those testing combinations that are assumed to be positive.

The summary should also contain language regarding disclosure, such as one of the following blocks of text, based on whether lead-based paint was found or was not found, respectively:

Recommended Report Language On Disclosure Where Lead-Based Paint Was Identified in Target Housing

Results of this inspection must be provided to new lessees (tenants) and prospective buyers 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 be provided by the owner to prospective buyers and it must be made available to prospective tenants, and to renewing tenants if they have not been provided the information previously. The inspector's plain language summary of the report must be provided to the client (e.g., property owner or manager) when the complete report is provided. The landlord (lessor) or seller is also required to distribute an educational pamphlet approved by the U.S. Environmental Protection Agency and include the Lead Warning Statement in the leases or sales contracts to ensure that parents have the information they need to protect their children from lead-based paint hazards. Complete disclosure requires the landlord/sellers and renters/buyers (and their agents) to sign and date acknowledgement that the required information and materials were provided and received. Also, prospective buyers must be provided the opportunity to have their own lead-based paint inspection, lead hazard screen or risk assessment performed before the purchase agreement is signed; the standard period is 10 days, but this period may be changed or waived by agreement between the seller and prospective buyer. EPA regulations require the inspector to keep the inspection report for at least 3 years.

(See section IV of chapter 7 of the HUD *Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing* for further details; see ***www.hud.gov/lead***.)

Recommended Report Language For Disclosure Where No Lead-Based Paint Was Identified in Target Housing

The results of this inspection indicate that no lead in amounts greater than or equal to 1.0 mg/cm^2 in paint was found on any building components, using the inspection protocol in chapter 7 of the *HUD Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing (current Revision as of the date of the inspection).* However, some painted surfaces may contain levels of lead below 1.0 mg/cm^2, which could create lead dust or lead-contaminated soil hazards if the paint is turned into dust by abrasion, scraping, or sanding. This report should be kept by the inspector and the owner, and all future owners for the life of the dwelling. EPA regulations require the inspector to keep the inspection report for at least 3 years.

Sales: Disclosure is required when selling this dwelling. The complete report must be provided by the owner (seller) to prospective buyers. The inspector's plain language summary of the report must be provided to the client (e.g., property owner or manager) when the complete report is provided. The seller is required to distribute the report, an educational pamphlet approved by the U.S. Environmental Protection Agency, and include the Lead Warning Statement in the sales contract to ensure that parents have the information they need to protect their children from lead-based paint hazards. Complete disclosure requires the seller (and any agents) to sign and date acknowledgement that the required information and materials were provided and received. Furthermore, prospective buyers must be provided the opportunity to have their own lead-based paint inspection, lead hazard screen and/or risk assessment performed before the purchase agreement is signed; the standard period is 10 days, but this period may be changed or waived by agreement between the seller and prospective buyer.

Leases: This dwelling qualifies for the exemption in 24 CFR part 35 and 40 CFR part 745 for target housing being *leased* that is free of lead-based paint, as defined in the rule. No disclosure is required when renewing a lease or leasing this dwelling to new tenants.

(See section IV of chapter 7 of the HUD *Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing* for further details; see ***www.hud.gov/lead***.)

Detailed documentation of the XRF testing should also be provided in the full report, including the raw data upon which it was based. The single-family housing forms provided at the end of this chapter or comparable forms would serve this purpose.

For a leased home, where no lead-based paint is identified during an inspection, the building owner is exempt from the requirements of the disclosure rule. However, when a housing unit with no lead-based paint is being sold, the owner still has responsibilities under the Disclosure Rule (e.g., providing a lead hazard information pamphlet to potential buyers), so owners should take measures to ensure the preservation and availability of the reports for the life of the building. For

leasing properties where no lead-based paint is identified, it is strongly recommended that owners retain inspection reports for the life of the building, in order to prove that leases in the building are exempt from the disclosure rule. Owners may wish to make arrangements with inspectors to store their copy of the report for longer than the 3 years required of the inspector (40 CFR 745.227(i); this also applies to risk assessment reports). (See Appendix 6 for more information on the Disclosure Rule.)

V. Inspections in Multi-family Housing

This section emphasizes the additional considerations for random sampling of large housing buildings or projects. The protocols mentioned in earlier sections are not repeated here. It will be necessary to read section IV on single-family housing to implement the protocol for multi-family housing.

Use of the multi-family protocol is less time-consuming and more cost effective than inspecting all units in a given housing development or building because in most instances a pattern can be determined after inspecting a fraction of the units. The number of units tested is based on the date of construction and the number of units in the housing development.

- For purposes of this chapter only, multi-family housing is defined as any group of more than four units that are similar in construction from unit to unit.

A. Statistical Confidence in Dwelling Unit Sampling

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, separately (that is, do *not* add the number of units, common areas and exterior sites, and then use the table for the total). For pre-1960 or unknown-age buildings or developments 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 1960-77 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 4000 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.

If lead levels in *all* units, common areas or exterior sites tested are found to be below the 1.0 mg/cm^2 standard, these sample sizes provide 95 percent confidence that:

- For pre-1960 housing units, less than 5 percent or fewer than 50 (whichever is less) units, common areas or exterior sites, have lead at or above the standard; and
- For 1960 to 1977 housing units, less than 10 percent or fewer than 50 (whichever is less) units, common areas or exterior sites, have lead at or above the standard.

The National Survey of Lead and Allergens in Housing (***http://www.hud.gov/offices/lead/researchers.cfm***) showed that there are fewer lead paint hazards in 1960-1977 housing than in older housing (Jacobs et al., 2002). A higher margin of error was allowed for 1960-1977 housing units to focus resources on housing with the greatest hazards. Refer to Appendix 12 of these *Guidelines* for the statistical calculations for this table. The Appendix shows the details of the calculation for pre-1960-1977 housing, which are the same for 1960-1977 housing except for using the 10 percent criterion rather than the 5 percent criterion used for older housing.

Although the data set used to develop sample sizes in multi-family housing was not randomly selected from all multi-family housing developments in the nation (no such data set is available), analyses drawn from the data are likely to err on the side of safety and public health for at least two reasons: First, the prevalence and amounts of lead-based paint are highest in pre-1960 housing developments. The sampling approach used here focuses inspection efforts on buildings where a greater chance of lead-based paint hazards exist.

The statistical rationale and calculations used to develop sample sizes in multi-family housing is based on a data set which contains approximately 164,000 XRF readings from 23,000 room equivalents in 3,900 units located in 65 housing developments. Statistical and theoretical analyses completed for HUD are available through the Lead Clearinghouse at 1-800-424-LEAD and in Appendix 12.

Second, and perhaps more important, none of the 65 developments had lead-based paint in 5 to 10 percent of the units. That indicates lead-based paint in this range is likely to be quite rare and that plausible increases in sampling to improve detection in this range will fail to improve confidence in the results significantly. Most painting follows a pattern: Property owners or managers often paint all surfaces, all components within a room, or similar components in all rooms in a unit when there is tenant turnover. It is unlikely that lead-based paint distributions are completely random, as assumed in the 1995 edition of the *Guidelines.* From the available data, there appears to be no significant benefit to increasing the number of units to be sampled to detect a prevalence rate of 5 to 10 percent, because few developments are likely to be in that range. In short, the sampling design presented here will yield a more targeted, cost-effective approach to identifying lead-based paint where it is most likely to exist.

B. Selection of Housing Units, Common Areas, and Exterior Site Areas.

The first step in selecting housing units is to identify buildings in the development with a common construction based on written documentation or visual evidence of construction type. Such buildings can be grouped together for sampling purposes. For example, if two buildings in the development were built at the same time by the same builder and appear to be of similar construction, all of the units in the two buildings can be grouped for sampling purposes, as can the common areas, and exterior site areas. Units can have different sizes, floor plans, and number of bedrooms and still be grouped allowing use of table 7.3 to determine the minimum number to be inspected. Similar common areas can be grouped for sampling purposes using the table to determine the minimum number to be inspected, as can similar exterior sites. (Do *not* add the number of units, common areas and exterior sites, and then use the table for the total.)

Table 7.3 Number of Units to be Tested in Multi-family Building or Developments*

Number of Similar Units, Similar Common Areas, or Similar Exterior Sites	Pre-1960 or Unknown-Age Building or Development: Number of Units to Test *	1960-1977 Building or Development: Number of Units to Test *
1-10	All	All
11-13	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
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

Number of Similar Units, Similar Common Areas, or Similar Exterior Sites	Pre-1960 or Unknown-Age Building or Development: Number of Units to Test *	1960-1977 Building or Development: Number of Units to Test *
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
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

* For brevity, "Number of Units" and "Number of Units to Test" are used, but the number to test is the same for similar units, similar common areas, and similar exterior sites.

The specific units to be tested should be chosen *randomly* from a list of all units in each building or buildings. (For brevity, just "units" are mentioned in describing the random selection procedure, but the procedure is the same for similar units, similar common areas, and similar exterior sites.) The "Selection of Units" form (Form 7.4) or a comparable form may be used to aid in the selection process. A complete list of all units in each group should be used and a separate identifying sequential number must be assigned to each unit. For example, if apartment addresses are shown as 1A, 1B, 2A, 2B etc., they must be given a sequence number (1, 2, 3, 4, etc.).

Obviously, units without identifiers could not be selected for inspection and would thus bias the sampling scheme. The list of units should be complete and verified by consulting building plans or by a physical inspection of the development.

Specific units to be tested should be selected randomly using the formula below, and a table of random numbers or the random number function on a calculator. Tables of random numbers are often included in statistics books. Today's common full-function computer spreadsheet software products (e.g., Apple's Numbers, Corel's Quattro Pro, Microsoft's Excel, and OpenOffice.org's Calc,)[1] have random number generator functions of sufficient quality for use in lead-based paint inspections. Inspectors are, therefore, advised to use them to obtain the random numbers, which can then be used to select the specific numbered units. A unit number is selected by rounding up the product of the random number times the total number of units in the development to the *next* whole number. That is:

Housing Unit number = Random number *times* Total number, rounded *up,* where:

Housing Unit number = the identification number for a unit in a list;

Random number = a random number between 0 and 1; *and*

Total number = the total number of units in a list of units.

For example, if there is a total of 50 units in the development, and one of the random numbers is 0.196411, the product of the total number of units *times* that random number (50 x 0.196411) is 9.82055, which is rounded up to 10, which would point to the 10th unit on the list of units.

The same unit may be selected more than once by this procedure. For example, another of the random numbers in the 50-unit development example above could be 0.18347, for which the product (50 x 0.18347) would be 9.1735, which is also rounded up to 10, pointing to the same 10th unit on the list. Because each unit should be tested only once, duplicate selection should be documented and then the duplicate unit should be discarded. The selection procedure should be continued until an adequate number of units have been selected.

The "Selection of Units" form (Form 7.4 in Addendum 2) is completed by filling in as many random numbers as are needed in the appropriate column. Numbers for the third column are obtained by multiplying the total development size by each random number. Numbers for the fourth column are obtained by rounding up from the previous calculation to the next whole number. If the whole number in the fourth column has already been selected, that selection should not be entered again. The notation "DUP" should be entered to show that the selection was a duplicate. This process should continue until the required number of distinct sample numbers has been selected. Common areas and exterior room equivalents should be identified at this time, but they are not considered to be separate units. Addendum 1, Examples of Lead-Based Paint Inspections, includes detailed guidance on the random selection procedure in multi-family housing, and other information about single-family and multi-family inspections.

[1] Product names are provided for reference, without endorsement of the products or their manufacturers.

C. Listing Testing Combinations and Common Areas

The "Multi-family Housing LBP Testing Data Sheet" form (Form 7.5 in Addendum 2) – or a comparable form – should be used to list the testing combinations in each unit, common area and exterior site that was selected for inspection. In multi-family housing, the inventory of testing combinations often will be similar for units that have the same number of bedrooms. The inspector should, however, list testing combinations that are unique to each tested unit. For example, some units may contain built-in cabinets while others do not. The selection of testing combinations should, therefore, be carried out independently in each inspected unit.

As in single family housing, take readings on all testing combinations in all room equivalents in each unit selected for testing. However, common areas need to be identified and tested as well.

Common Areas

Similar common areas and similar exterior sites must always be tested, but in some cases they can be sampled in much the same way that dwelling units are. Common areas and building exteriors typically have a similar painting history from one building to the next. In multi-family housing, each common area (such as a building lobby, laundry room, or hallway) can be treated like a dwelling unit. If there are multiple similar common areas, they may be grouped for sampling purposes in exactly the same way as regular dwelling units are. However, dwelling units, common areas and exterior sites cannot all be mixed together in a single group.

All testing combinations within each common area or on building exteriors selected for testing must be inspected. This includes playground equipment, benches and miscellaneous testing combinations located throughout the development. The specific common areas and building exteriors to test should be randomly selected, in much the same way as specific units are selected using random numbers. (See section IV.B, above.)

The number of common areas to test should be taken from Table 7.3. In this instance, common areas and building exteriors can be treated in the same way as housing units (although they are not to be confused with true housing units).

D. Classification of XRF Results in Multi-family Housing

The inspector should record each XRF reading for each testing combination on the "Multi-family Housing LBP Testing Data Sheet," (Form 7.5) or a comparable form, and indicate whether that testing combination was classified as positive, negative, or inconclusive as described previously for single-family housing.

When the inspection is completed in all of the selected units and the classification rules have been applied to all XRF results, the "Multi-family Housing: Component Type Report" form (Form 7.6) or a comparable form should be completed. Building component types – groups of like components constructed of the same substrate in the multi-family housing development – are aggregated on this form. For example, grouping all interior walls would create an appropriate component type if all walls are plaster. Grouping all doors would not be appropriate; however, if some doors are metal and some are wood. At least 40 testing combinations of a given component type in a multi-family housing development must be tested to obtain the desired level of confidence in the results for that component type. (Refer to Appendix 12 of these *Guidelines* for the statistical rationale for this minimum number of component types to test.) If fewer than 40 testing combinations of a given component type were tested, test additional combinations of that component type. If fewer than 40 components of a given type exist in the units to be tested, test all of the components that do exist.

In some cases additional sampling of the specific component may not be necessary. If no lead at or above the standard is found on that component type, additional measurements should be taken in other units to increase the sample size to 40. However, if all or most of the sampled component types are positive, no further sampling is needed, provided that the building owner agrees with this reduction of testing. For example, if 20 out of 60 doors are tested, and the majority is positive for lead-based paint, all similar doors in the buildings may be presumed positive; only those doors tested and found negative may be treated as negative. Note that the inspector and owner may not presume a component is negative. All required XRF testing and/or laboratory analysis must be completed to conclude that any or all components included in a given component type are negative.

On the "Multi-family Housing: Component Type Report" form, the substrate and the component for each component type should be recorded under the heading "Description" (for example, wooden interior doors), as should the total number of testing combinations included in the component type. In addition, for each component type, the aggregated positive, negative, and inconclusive classifications should be recorded as described below. Record the number and percentage of testing combinations classified as:

- **Positive** for lead-based paint. This is based upon a positive XRF reading in accordance with the XRF's Performance Characteristic Sheet;
- **Low Inconclusive** for lead-based paint. This is based on having XRF readings less than the midpoint of the XRF's inconclusive range (if the XRF instrument does not have an inconclusive range (that is, it has a threshold value), this aggregation element should not be provided);
- **High Inconclusive** (high) for lead-based paint. This is based on having XRF readings equal to or greater than the midpoint of the XRF's inconclusive range (if the XRF instrument does not have an inconclusive range (that is, it has a threshold value), this aggregation element should not be provided); and
- **Negative** for lead-based paint.

The "Multi-family Decision Flowchart" (figure 7.3) should be used to interpret the aggregated XRF testing results in the "Multi-family Housing: Component Type Report" form. The flowchart is applied separately to each component/substrate type (wood doors, metal window casings, etc.) and shows one of the following results:

- **Positive:** Lead based-paint is present on one or more of the components.
- **Negative:** Lead based-paint is not present on the components throughout the development. (Lead may still be present at lower loadings and hazardous leaded dust may be generated during modernization, renovation, repair, remodeling, maintenance, painting or other disturbances of painted surfaces.)

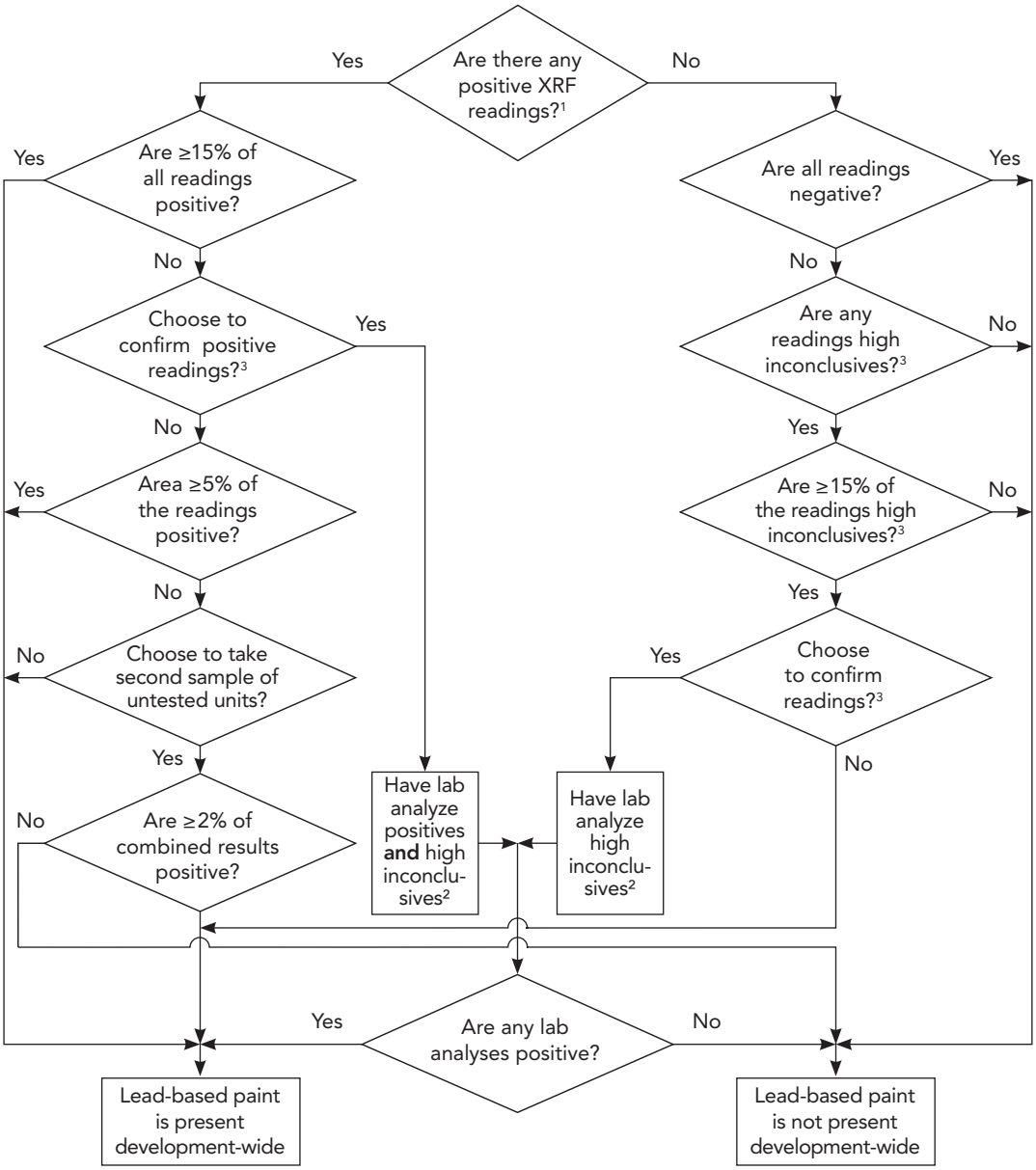
These results are obtained by following the flowchart. The decision that lead-based paint is present is reached with 99 percent confidence if 15 percent or more of the components are positive. (Refer to Appendix 12 for the statistical rationale for this percentage.) The decision that lead-based paint is not present throughout the development is reached if:

(1) 100 percent of the tested component types are negative, or

(2) 100 percent of the tested component types are classified as either negative or inconclusive *and* all of the inconclusive classifications have XRF readings less than the midpoint of the inconclusive range for the XRF in use.

- Note that the midpoint of the inconclusive range is *not* a threshold; it is used only for classifying XRF readings in multi-family housing in conjunction with information about other XRF readings as

FIGURE 7.3 Multi-family Decision Flowchart



[1] "Positive," "negative," and "inconclusive XRF readings are determined in accordance the XRF instrument's Performance Characteristic Sheet (PCS) as described in Chapter 7 of the HUD *Guidelines for the Evaluation and Control of Lead Hazards in Housing*.

[2] A high inconclusive reading is an XRF reading at or above the midpoint of the inconclusive range (if it equals) around 1.0 mg/cm^2 for the instrument model that is used (see PCS).

For example, if the model's PCS states the inconclusive range is 0.41 to 1.39, then the midpoint would be 0.90. A high inconclusive reading would be from 0.90 to 1.39, and a low inconclusive reading would be from 0.41 to 0.39.

[3] You may assume any part or coating contains lead-based paint, even without XRF or laboratory analysis. Similarly, you may confirm any XRF reading by laboratory analysis.

described here. (See section 2 below for guidance on what to do when the percentage of positive readings is less than 5%.)

- For cases with greater than or equal to 5% positives *and* less than 15% positives, as well as no positives but greater than 15% high inconclusives, some confirmatory laboratory testing may be needed to reach a final conclusion, unless the client wishes to assume the validity of the XRF results and that all inconclusives are positive.
  - For each testing combination with an inconclusive XRF reading at or above the midpoint of the inconclusive range, a paint-chip sample should be analyzed by a laboratory recognized by the EPA NLLAP for the analysis of lead in paint.
  - If all the laboratory-analyzed samples are negative, it is not necessary to test inconclusive XRF results below the midpoint of the inconclusive range.
  - If, however, *any* laboratory results are positive on a component type, all inconclusives equal to or above the midpoint of the inconclusive range should be analyzed, or they should be presumed to be positive.
- Once all laboratory results have been reported, the "Multi-family Housing: Component Type Report" form should be updated to include the laboratory results and classifications (either positive or negative).

The "Multi-family Decision Flowchart" is based on data collected by EPA in a large field study of XRF instruments (EPA 1995b). Percentages were chosen so that, for each component type, there is a 98 percent chance of correctly concluding that lead-based paint is either absent on all components or present on at least one component of a given type. Thus, the probability that a tested component type will be correctly classified is very high.

Percentages of positive or inconclusive results are computed by dividing the number in each classification group by the total number of testing combinations of the component type that were tested. For example, if 245 wooden doors in a multi-family housing development were tested and 69 were classified as inconclusive with XRF readings less than the midpoint of the inconclusive range, 28 percent [(69 / 245) x 100 percent = 28.2 percent] should be recorded on the form in the "<1.0 percent" columns under the heading "Inconclusive."

1. Unsampled Housing Units

If a particular component type in the sampled units is classified as positive, that same component type in the unsampled units is also classified as positive. For those cases where the number of positive components is small, further analysis may determine if there is a systematic reason for the specific mixture of positive and negative results.

For example, suppose that a few porch railings tested negative, but most tested positive. Examination of the sample results in conjunction with the building records showed that the porch railings classified as positive were all original and the railings classified as negative were all recent replacements. The records did not reveal which units had replaced railings, and due to historic preservation requirements, the replacement railings were identical in appearance to the old railings. Thus, all unsampled original porch railings could be classified as positive, and all unsampled recently replaced porch railings could be classified as negative if at least 40 of the replaced porch railings had been tested.

2. Fewer than 5% Positive Results

Where a small fraction of XRF readings, less than 5 percent, of a particular component type are positive, several choices are available:

- First, the inspector may confirm the results by laboratory analysis, which is considered definitive when performed as described in section VI, below; a laboratory lead result of 1.0 mg/cm^2 or greater (or 0.5 percent by weight or greater) is considered positive.
- Second, the inspector may select a second random sample (using unsampled units only) and test the component type in those units. If less than 2.5% of the combined set of results is positive, the component type may be considered as having lead-based paint in isolated locations, but not having lead-based paint development-wide, with a reasonable degree of confidence. Individual components that are classified positive should be considered as being lead-based painted and managed or abated appropriately.
- Finally, if the client chooses not to confirm the results by laboratory analysis and not to take a second set of measurements, then the component type should be considered as having lead-based paint development-wide.

The inspector may wish to advise the client that the cost of additional XRF testing or laboratory analysis is usually much less than the cost of lead abatement or interim control projects. This is of particular interest in the situation where few results are positive, because there is a significant chance that the paint, development-wide, may not be lead-based.

Whatever approaches are used, all painted individual surfaces found to be positive for lead must be included in the inspection report, regardless of development-wide conclusions.

E. Documentation in Multi-family Housing

The method for documentation is identical for multi-family and single-family housing (see section IV.I), with the following exception: Use forms 7.2 through 7.6 for multi-family housing (see Addendum 2) or comparable forms, not the single-family housing forms.

When lead-based paint has been found in some units it must be managed or treated as such in those units, even if the inspection indicates that it is not present development-wide.

VI. Laboratory Testing for Lead in Paint-chip Samples

For inconclusive XRF results, areas that cannot be tested using an XRF instrument, and for client-approved confirmation of XRF, a paint-chip sample should be collected using the protocol outlined here and in Appendix 13.2 of these *Guidelines* and/or ASTM E1729, Standard Practice for Field Collection of Dried Paint Samples for Subsequent Lead Determination. The sample should be analyzed by a laboratory recognized under the EPA National Lead Laboratory Accreditation Program (NLLAP) for the analysis of lead in paint using the analytical method(s) it used to obtain the laboratory's recognition. If a paint-chip sample cannot be collected, the inspection report should include a list of surfaces where paint-chip samples were needed but not taken; the paint on these components is presumed positive.

A. Number of Samples

Only one paint-chip needs to be taken for each testing combination. Additional samples can be collected as a quality control measure, if desired, and are recommended.

B. Size of Samples

The paint-chip sample should be taken from a 4-square-inch (25-square-centimeter) or larger area that is representative of the paint on the testing combination, as close as possible to any XRF reading location and, if possible, unobtrusive (see Figure 7.4). This area may be a 2 by 2 inch (5 by 5 centimeter) square, or a 1 by 4 inch (2½ by 10 centimeter) rectangle, or have any other dimensions that equal at least 4 square inches (25 square centimeters). Regardless of shape, the dimensions of the surface area must be accurately measured (to the nearest 1/16th of an inch or millimeter) and recorded, so that laboratory results can be reported in mg/cm^2. Results should be reported as percent by weight if the dimensions of the surface area cannot be accurately measured or if all paint within the sampled area cannot be removed. In these cases, lead should be reported in ppm or percent by weight, *not* in mg/cm^2. Smaller surface areas can be used if acceptable to the laboratory. The 4-square-inch (25-square-centimeter) area practically guarantees that a sufficient amount of paint will be collected for laboratory analysis. As a result, samples will sometimes weigh more than required for some laboratory analysis methods. Smaller-sized paint-chips may be collected if permitted by the laboratory (see ASTM E1729). In all cases, the inspector should consult with the NLLAP-recognized laboratory selected regarding specific requirements for the submission of samples for lead-based paint analysis.

FIGURE 7.4 Preparing to take a paint-chip sample for laboratory analysis.

C. Inclusion of Substrate Material

Inclusion of small amounts of substrate material in the paint-chip sample will result in minimal error if results are reported in mg/cm^2, but including any amount of substrate can result in less precise results, with worse effect as the amount of substrate increases. Substrate material shall not be included if results are to be reported in weight percent (or ppm) (see Figure 7.5).

FIGURE 7.5 Removing paint-chip sample.

D. Repair of Sampled Locations

Property owners or managers should ensure that areas from which paint-chip samples are collected should be repaired and cleaned, unless the area will be removed, encapsulated, enclosed,

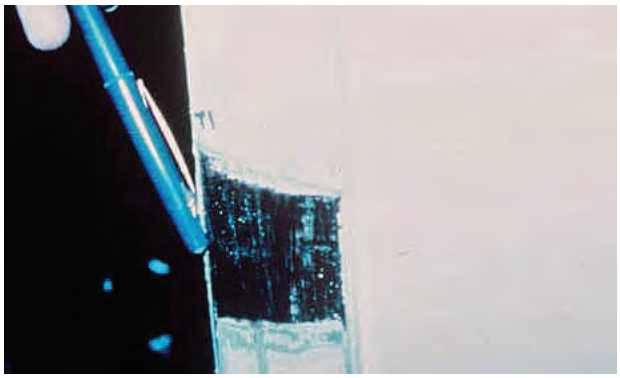


FIGURE 7.6 Damage caused by removal of paint-chip from substrate.

or repainted before occupancy. (Lead-based paint inspectors and risk assessors are not generally responsible for repainting, unless specified in their contracts.) Repairs can be completed by repainting, spackling, or any other method of covering that renders the bare surface inaccessible. Cleanup should be done with wet wiping and rinsing, and it should be done on both the surface and the floor underneath the surface sampled. The new covering or coating should have the same expected longevity as new paint or primer. Repair is not necessary if analysis shows that the paint is not lead-based paint and leaving the damage is acceptable to the client and/or the owner (see Figure 7.6).

E. Classification of Paint-chip Sample Results

Any paint inspections may be carried out using only paint-chip sampling and laboratory analysis at the option of the client, such as the property owner or manager or other purchaser of the inspection services. This option is not recommended because it is time consuming, costly, and requires extensive repairs. Paint-chip sampling also has opportunities for errors, such as inclusion of substrate material (for results in weight percent), failure to remove all paint from an area (including paint that has bled into a substrate) and laboratory error. Nevertheless, paint-chip sampling generally has a smaller error than does XRF and is, therefore, appropriate as a final decision-making tool. Laboratory results of 1.0 mg/cm^2 or greater, or 0.5 percent or greater, are to be considered positive. If the laboratory reports both mg/cm^2 and weight percent for a sample, if either result is positive, use that one for final classification, or both, if they are both positive. In the rare situation where more than one paint-chip sample from a single testing combination is analyzed, the combination is considered positive if any of those samples is positive. All other results are negative. No inconclusive range is reported for laboratory measurements.

F. Units of Measure

Results should be reported in mg/cm^2, the primary unit of measure for lead-based paint analyses of surface coatings. Results should be reported as percent by weight only if the dimensions of the surface area cannot be accurately measured or if not all paint within the sampled area can be removed. In these cases, results should not be reported in mg/cm^2, but in weight percent.

Weight measurements are usually reported as micrograms per gram (µg/g), milligrams per kilogram (mg/kg), or parts per million (ppm) by weight. For example, a sample with 0.2 percent lead may also be reported as 2,000 µg/g lead, 2,000 mg/kg lead, or 2,000 ppm lead.

G. Sample Containers

Samples should be collected in sealable rigid containers such as screw-top plastic centrifuge tubes, rather than plastic bags which generate static electricity and make quantitative transfer of the entire paint sample in the laboratory impossible. Paint-chip collection should include collection of all the paint layers from the substrate, but collection of actual substrate should be minimized. Refer to ASTM E 1729 and Appendix 13 of these *Guidelines* for further details on collection of paint-chip samples.

H. Laboratory Analysis Methods

Several standard laboratory technologies are useful in quantifying lead levels in paint-chip samples. These methods include, but are not limited to, Atomic Absorption Spectroscopy (AAS), Inductively Coupled Plasma-Atomic Emission Spectroscopy (ICP-AES), Anodic Stripping Voltammetry (ASV), and Potentiometric Stripping Analysis (PSA).

For analytical methods that require sample digestion, samples should be pulverized so that there is adequate surface area to dissolve the sample before laboratory instrument measurement. In some cases, the amount of paint collected from a 4-square-inch (25-square centimeter) area may exceed the amount of paint that can be analyzed successfully. It is important that the actual sample mass analyzed not exceed the maximum mass the laboratory has successfully tested using the specified method. If subsampling is required to meet analytical method specifications, the laboratory must homogenize the paint-chip sample (unless the entire sample will eventually be analyzed and the results of the subsamples combined). Without homogenization, subsampling would likely result in biased, inaccurate lead results (see ASTM E 1645 Standard Practice for Preparation of Dried Paint Samples by Hotplate or Microwave Digestion for Subsequent Lead Analysis, and ASTM E1979 Standard Practice for Ultrasonic Extraction of Paint, Dust, Soil, and Air Samples for Subsequent Determination of Lead).

If the sample is properly homogenized and substrate inclusion is negligible, the result can be reported as a loading, in milligrams per square centimeter (mg/cm^2), the preferred unit, or as percent by weight, or both. The following equation should be used to report the results in milligrams per square centimeter:

$$mg/cm^2 = \frac{\text{weight of lead from sample subsample (in mg)} \times \left(\frac{\text{total sample weight (in g)}}{\text{subsample weight (in g)}} \right)}{\text{area (in } cm^2\text{)}}$$

To report results in weight percent, the following equation should be used:

$$\text{Weight percent} = \frac{\text{weight of lead from subsample (in µg)}}{\text{subsample weight (in µg)}} \times 100\%$$

To report results in micrograms per gram (µg/g), the following equation should be used:

$$\mu g/g = \frac{\text{weight of lead from subsample (in µg)}}{\text{subsample weight (in g)}}$$

If the laboratory reports results in both mg/cm^2 and weight percent, and if one result is positive and the other negative, the sample is classified as positive.

Whatever the preparation techniques of paint-chip samples (including homogenization, grinding, and digestion), and instrument selection and operation selected, the inspector should verify, prior to the collection and submission of samples, that the laboratory is approved to perform the appropriate analytical methodologies. Methods should be applied to paint-chip materials of approximately the same mass and lead loading (also called area concentration, measured in mg/cm^2) as those samples anticipated from the field.

Because of the potential for sample mass to affect the precision of lead readings, laboratory analysis reference materials processed with field samples for quality assurance purposes should have close to the same mass as those used for paint-chip samples. Refer to ASTM E1645 or equivalent methods for further details on laboratory preparation of paint-chip samples, and refer to ASTM E1613, ASTM E2051, or equivalent methods on analysis of samples for lead, and the related E1775 Guide for Evaluating Performance of On-Site Extraction and Field-Portable Electrochemical or Spectrophotometric Analysis for Lead.

I. Laboratory Selection

A laboratory used for lead-based paint analysis must be recognized under EPA's National Lead Laboratory Accreditation Program (NLLAP) for analysis of lead in paint, with one exception. The exception is for analyzing samples collected where States or Tribes operate an EPA-authorized lead-based paint inspection certification program that has paint testing requirements different from the EPA requirements, in which case the State or Tribal requirements must be followed. NLLAP-recognized laboratories are required to use the same analytical methods for analyzing the sample that they used to obtain NLLAP recognition.

EPA established NLLAP to provide the public with laboratories that have a demonstrated capability for analyzing lead in paint-chip, dust, and/or soil samples at the levels of concern stated in these *Guidelines*. NLLAP monitors the analytical proficiency, management and quality control procedures of each laboratory participating in the program. NLLAP does not specify or recommend analytical methods. Information on this program can be obtained by calling the National Lead Information Center at 1-800-424-LEAD. (Hearing- or speech-challenged individuals may access this number through TTY by calling the toll-free Federal Relay Service at 800-877-8339.) Useful information on the NLLAP program is available on the EPA web site at ***http://www.epa.gov/lead/pubs/nllap.htm***.

To participate in NLLAP, a laboratory must, as summarized on the EPA's NLLAP web page, ***http://www.epa.gov/lead/pubs/nllap.htm***:

- Be accredited by an organization EPA recognizes as an accrediting body for lead sample analysis. As part of the accreditation process, a laboratory undergoes a systems audit, including an on-site visit, by one of the accrediting bodies. To apply for accreditation as a lead sample analysis laboratory recognized under NLLAP, laboratories contact an accrediting body. NLLAP specifies quality control and data reporting requirements, as described in its "Laboratory Quality System Requirements," (LQSR) which, as of the publication of this edition of these *Guidelines*, was in version 3 (***http://www.epa.gov/lead/pubs/lqsr3.pdf***). EPA has developed a Model Memorandum of Understanding (***http://www.epa.gov/lead/pubs/nllapmou.pdf***) for other organizations, including States and Tribes, to become NLLAP accrediting bodies. As of the publication of these *Guidelines*, EPA recognized three such NLLAP accrediting bodies.

- Participate successfully in the periodic (currently quarterly) Environmental Lead Proficiency Analytical Testing Program (ELPAT), administered by the AIHA Proficiency Analytical Testing Programs, LLC (an affiliate of the American Industrial Hygiene Association (AIHA)) in cooperation with the Centers for Disease Control and Prevention's (CDC's) National Institute for Occupational Safety and Health (NIOSH), and EPA. The proficiency testing samples used in ELPAT consist of various levels of lead in paint, dust, and soil matrices. An accredited laboratory is recognized only for the analysis of only those matrices for which it is proficient; the laboratory

decides which matrices it will analyze for lead for purposes of obtaining NLLAP recognition. Field-portable XRF measurement of lead in paint does not involve collecting a sample of the paint, so it is not covered by NLLAP, and the measurements need not be performed by an NLLAP-recognized laboratory. See Chapter 7 for further guidance.

Field-portable XRF analysis has been used for measurement of lead in dust (Sterling, 2000; Harper, 2002) or soil (EPA, 2004; Binstock, 2009) with varying degrees of success; these methods do involve collecting a sample of the medium, so samples collected from target housing or pre-1978 child-occupied facilities, must be analyzed by a laboratory recognized by NLLAP for analysis of lead in the particular medium. The laboratory may be a mobile laboratory, field sampling and measurement organization, or a fixed-site laboratory, as discussed in Section II.E.6, above.

Information on NLLAP, including an up-to-date list of fixed-site and mobile laboratories recognized by NLLAP, can be obtained on the EPA web site at ***http://www.epa.gov/lead/pubs/nllap.htm***, or by calling the National Lead Information Center at 800-424-LEAD. (Hearing- or speech-challenged individuals may access this number through TTY by calling the toll-free Federal Relay Service at 800-877-8339.)

J. Laboratory Report

The laboratory report for analysis of paint samples for lead should include both identifying information and information about the analysis. At a minimum, this should include the information outlined in the LQSR version 3's section 5.10.2, Test Reports. In addition to the minimum requirements in that section, test reports containing the results of sampling must include specified sampling information, if available. (Inspectors may find the LQSR version 3's Appendix I, Acronyms and Glossary of Terms Associated with the NLLAP, helpful.)

VII. XRF Hazards

As the U.S. Nuclear Regulatory Commission (NRC) notes, "ionizing radiation (such as x-rays and cosmic rays) is more energetic than non-ionizing radiation. Consequently, when ionizing radiation passes through material, it deposits enough energy to break molecular bonds and displace (or remove) electrons from atoms. This electron displacement creates two electrically charged particles (ions), which may cause changes in living cells of plants, animals, and people." (***www.nrc.gov/about-nrc/radiation/health-effects/radiation-basics.html***)

XRF instruments used in accordance with the manufacturer's instructions will not cause significant exposure to ionizing radiation. The operator should be trained by the instrument's manufacturer (or equivalent), instrument's shutter should never be pointed at anyone, even if the shutter is closed, it should be in the operator's possession at all times, it should not be dropped or tossed, and no one should ever defeat or override any of its safety mechanisms.

Some portable XRF instruments used for lead-based paint inspections contain one or more radioactive isotopes that emit X-rays and gamma radiation; some portable XRF instruments use an X-ray tube to generate X-rays. Proper safety training and handling of these instruments is required to protect the instrument operator and any other persons in the immediate vicinity during XRF usage.

A. Licenses and Certifications for Using XRFs with Radioactive Sources

In addition to training and certification in lead-based paint inspection, a person using a portable XRF instrument for inspection that has (one or more) radioactive X-ray sources must have valid licenses or permits from the appropriate Federal, State, and local regulatory bodies to possess (through ownership or lease), and to operate, such an instrument.

All portable XRF instrument operators should be trained by the instrument's manufacturer (or equivalent). XRF operators using an instrument with a radioactive source should provide related training, licensing, permitting, and certification information to the person who has contracted for their services before an inspection begins. Depending on the State, such operators may be required to hold three forms of proof of competency: manufacturer's training certificate (or equivalent) for the operator, a radiation safety license for the firm or entity using the XRF, and a State lead-based paint inspection certificate or license to perform the requested inspection services. To help ensure competency and safety, HUD and EPA recommend that clients hiring inspectors who will use XRF instruments with a radioactive source hire only those who hold all three forms of proof of competency.

The regulatory body responsible for oversight of the radioactive materials contained in portable XRF instruments depends on the type of material being handled. Some radioactive materials are federally regulated by the NRC; others are regulated at the State level. States are generally categorized as "agreement" or "non-agreement" States. An agreement State has an agreement with NRC to regulate radioactive materials that are generally used for medical or industrial applications. (***www.nrc.gov/about-nrc/state-tribal/agreement-states.html***) (Most radioactive materials found in XRF instruments are regulated by agreement States). For non-agreement States, NRC retains this regulatory responsibility directly. At a minimum, however, most State agencies require prior notification that a specific XRF instrument is to be used within the State. Fees and other details regarding the use of portable XRF instruments vary from State to State. Contractors who provide inspection services must hold current licenses or permits for handling XRF instruments, and must meet any applicable State or local laws or notification requirements.

Requirements for radiation dosimetry by the XRF instrument operator (wearing dosimeter badges to monitor exposure to radiation) are generally specified by State regulations, and vary from State to State. In some cases, for some isotopes, no radiation dosimetry is required. Because the cost of dosimetry is low, it should be conducted, even when not required, for the following four reasons:

- XRF instrument operators have a right to know the level of radiation to which they are exposed during the performance of the job. In virtually all cases, the exposure will be far below applicable exposure limits.
- Long-term collection of radiation exposure information can aid both the operator (employee) and the employer. The employee benefits by knowing when to avoid a hazardous situation; the employer benefits by having an exposure record that can be used in deciding possible health claims.
- The public benefits by having exposure records available to them.
- The need for equipment repair can be identified more quickly.

B. Safe Operating Distance

FIGURE 7.7 Lead inspectors should operate XRF instruments at a safe distance from others.

All XRF Instruments: XRF instruments used in accordance with manufacturer's instructions will not cause significant exposure to ionizing radiation. But the instrument's shutter should never be pointed at anyone, even if the shutter is closed. The safe operating distance between an XRF instrument and a person during inspections depends on the source type, radiation intensity, quantity (if any) of radioactive material, and the density of the materials being surveyed. As the radiation source intensity increases, the required safe distance also increases. Placing materials, such as a wall, in the direct line of fire, reduces the required safe distance. Persons should not be near the other side of a wall, floor, ceiling or other surface being tested. Operators should verify that this is indeed the case prior to initiating XRF testing activities, and check on it during testing (see Figure 7.7).

XRF Instruments with Radioactive Sources: According to NRC rules regarding radioactive sources of radiation, the radiation dose to a member of the general public must not exceed 2 millirems per hour. (10 CFR 20.1301(a)(2). (The regulation can be found through ***http://ecfr.gpoaccess.gov/***, or at ***http://www.nrc.gov/reading-rm/doc-collections/cfr/part020/part020-1301.html***.) This can be compared to the 0.07 millirems per hour the NRC says is the average American radiation dose. One of the most intense sources used in portable XRF instruments is a 40-millicurie ^{57}Co (Cobalt-57) radiation source. Other radiation sources in current use for XRF testing of lead-based paint generally produce lower levels of radiation. Generally, an XRF operator conducting inspections according to manufacturer's instructions would be exposed to radiation well below the regulatory level. One study found that exposures to radiation during operation of a Scitec MAP 3 XRF were 132 microrem/day (Wisconsin, 1994). Typically, XRF instruments with lower gamma radiation intensities can use a shorter safe distance provided that the potential exposure to an individual will not exceed the regulatory limit.

If these practices are observed, the risk of excessive exposure to ionizing radiation is extremely low and will not endanger any inspectors or occupants present in the dwelling.

References

Binstock, 2009. Binstock, D.A.; Gutknecht, W.F. McWilliams, A.C. "Lead in Soil - An Examination of Paired XRF Analysis Performed in the Field and Laboratory ICP-AES Results," *International Journal of Soil, Sediment and Water*. 2:2(1), 2009. ***http://scholarworks.umass.edu/intljssw/vol2/iss2/***

EPA, 1995b. U.S. Environmental Protection Agency, *A Field Test of Lead-Based Paint Testing Technologies: Technical Report,* EPA 747-R-95-002b, May 1995.

EPA, 2004. U.S. Environmental Protection Agency, X-ray Fluorescence (XRF) Instruments. Frequently Asked Questions (FAQ). ***http://epa.gov/superfund/lead/products/xrffaqs.pdf***

Harper, 2002. Harper M, Hallmark TS, Bartolucci AA. A comparison of methods and materials for the analysis of leaded wipes. *J. Environmental Monitoring,* 4(6):1025-33, December 2002. ***http://pubs.rsc.org/en/Content/ArticleLanding/2002/EM/b208456m***

HUD, 2011. U.S. Department of Housing and Urban Development, American Healthy Homes Survey: Lead and Arsenic Findings. April 2011. ***http://portal.hud.gov/hudportal/documents/huddoc?id=AHHS_REPORT.pdf***

Jacobs, 2002. Jacobs David E., Robert P. Clickner, Joey Y. Zhou, Susan M. Viet, David A. Marker, John W. Rogers, Darryl C. Zeldin, Pamela Broene, and Warren Friedman. The prevalence of lead-based paint hazards in U.S. housing. *Environmental Health Perspectives*. 2002 Oct; 110(10): A599-606. ***http://www.ncbi.nlm.nih.gov/pubmed/12361941***

NIST, 2000. Rossiter, W.J., Jr., M. G. Vangel, M.E. McKnight and G. Dewalt, *Spot Test Kits for Detecting Lead in Household Paint: A Laboratory Evaluation,* National Institute of Standards and Technology, U.S. Department of Commerce, May 2000. NISTIR 6398. ***http://fire.nist.gov/bfrlpubs/build00/PDF/b00034.pdf***

Sterling, 2000. Sterling DA, Lewis RD, Luke DA, Shadel BN. A portable x-ray fluorescence instrument for analyzing dust wipe samples for lead: evaluation with field samples. Environmental Research, 83(2):174-9, June 2000. ***http://www.sciencedirect.com/science/article/pii/S0013935100940581***.

Westat, 1996. Westat, Inc., "An Analysis and Discussion of the Single Family Inspection Protocol Under the 1995 HUD Guidelines: Draft Report."

Wisconsin 1994. Wisconsin Department of Health and Social Services, memo from Mark Chamberlain dated April 28, 1994.

Addendum 1: Examples of Lead-Based Paint Inspections

A. Example of a Single-Family Housing Inspection

The inspector completed the "Single-Family Housing LBP Testing Data Sheet," recording "bedroom (room 5)" as the room equivalent and listing "plaster" as the first substrate. The completed inventory of testing combinations in the bedroom indicated the presence of wood, plaster, metal, and drywall substrates. Brick and concrete substrates were not present in the bedroom. Descriptions of all testing combinations in the bedroom were recorded. Completed form 7.1, Single Family LBP Test Data Sheet, shows the completed inventory for all testing combinations in the bedroom. (Completed forms are found in Addendum 2, after the blank forms.)

Before any XRF testing, the inspector noted the date and starting time in her field notes, and then performed the manufacturer's recommended warm up procedures. The film was placed more than 12 inches (0.3 meters) away from any other surface. The inspector then took three calibration check readings (1.18 mg/cm^2, 0.99 mg/cm^2, and 1.07 mg/cm^2) on the NIST SRM with a lead level of 1.02 mg/cm^2. Results of the first calibration check readings were recorded on the "Calibration Check Test Results" form (see Completed Form 7.2).

The inspector then averaged the three readings (1.08 mg/cm^2), and computed the calibration difference (1.08 mg/cm^2 - 1.02 mg/cm^2 = 0.06 mg/cm^2) and compared this to the calibration check tolerance shown in the *XRF Performance Characteristic Sheet* (see Completed Form 7.2) for the particular XRF make, model and testing mode used. The calibration difference was not greater than the 0.20 calibration check limits around the NIST SRM standard of 1.02 mg/cm^2, that is, the difference was within the range of 0.82 mg/cm^2 to 1.22 mg/cm^2, inclusive. The instrument was considered in calibration, and XRF testing could begin.

For each component type measured in a room equivalent, the inspector entered the replication number to record its amount/quantity type in that room equivalent. There were two closet doors in the room that were just like each other, so the replication number was 2. During the inspection, some components were not tested. To maintain a complete inventory of surfaces in the house, the inspector used the applicable code from the list at the bottom of Form 7.1. The codes were CPT = carpeted floor; ED = Entry Denied, for situations in which the owner, tenant or someone else denied the inspector access to the room or to test the particular component; IN = Inaccessible, for physical reasons, such as for situations in which the room was locked, debris in front of a window prevented reaching the window safely, etc.; and NC = Not Coated/Painted surface, for those surfaces that are not varnished, painted, lacquered or otherwise coated.

The inspector recorded the results from the XRF testing in the bedroom on the "Single-Family Housing LBP Testing Data Sheet." At that point, the inspector was able to complete this form only through the XRF Reading column (see Completed Form 7.1). The remainder of the form was completed after the testing combinations in the house were inspected and correction values for substrate bias were computed. The inspector then moved on to inspect the next room equivalent.

The other bedroom, the kitchen, a living room, and a bathroom were also inspected. Three substrates – wood, drywall, and plaster – were found in these room equivalents. XRF testing for lead-based paint was conducted, using the same methodology employed in the first bedroom (room 5). After these five room equivalents were tested, the inspector noticed that all baseboards and all crown molding of the same substrate had XRF values of more than 5.0 mg/cm^2. The client had agreed earlier that testing could be abbreviated in this situation, so no further baseboard and crown molding testing combinations were tested in the remaining room equivalents. All similar remaining untested baseboard and crown molding with identical substrates were classified as positive in the final report based on the results of those tested. The raw data for the tested baseboards and crown moldings were also included in the final report.

Four hours after the initial calibration check readings, the inspector took another set of three calibration check readings. (If the inspection had taken less than 4 hours, as is common, the second calibration check test would have been conducted at the end of the inspection.) The readings were 1.45 mg/cm^2, 1.21 mg/cm^2, and 1.10 mg/cm^2; the inspector recorded the results on the "Calibration Check Test Results" form (Completed Form 7.2). The inspector then averaged the three readings (1.25 mg/cm^2), and computed the calibration difference (1.25 mg/cm^2 - 1.02 mg/cm^2 = 0.23 mg/cm^2) and compared this to the calibration check tolerance shown in the *XRF Performance Characteristic Sheet* on Completed Form 7.2. The calibration difference exceeded the 0.20 calibration check tolerance. The inspector then marked "Failed calibration check" on the data sheets for those room equivalents that had been inspected since the last – successful calibration check test, and consulted the manufacturer's recommendations. After trying, the instrument could not be brought back into control. Consequently, the inspector began using a backup instrument, after performing a calibration check and manufacturer's warm up and quality control procedure. The calibration check test showed that the backup instrument was operating acceptably. The inspector used the backup instrument to reinspect the room equivalents checked with the first instrument, and then all the other room equivalents in the home. Next, because substrate correction was required for all results on wood and metal below 4.0 mg/cm^2 as specified in the *XRF Performance Characteristic Sheet* for the XRF model in use, the inspector prepared to take readings for use in the substrate correction computations. Using the random number function on a calculator and the list of sample location numbers, the inspector randomly selected two testing combinations each with wood and metal substrates where initial readings were less than 2.5 mg/cm^2, removed the paint from an area on each selected testing combination slightly larger than the faceplate of the XRF instrument, took three readings on the bare substrates, and recorded the readings on the "Substrate Correction Values" form (Completed Form 7.3). The inspector calculated the correction values for each substrate by averaging the six readings from the two test locations, rounded the result to the 2 places after the decimal point that the XRF instrument displayed, and recorded the information in the Correction Value row. The inspector then transferred the correction values to the "Single-Family Housing LBP Testing Data Sheet" for each corresponding substrate.

After the inspector had finished taking the readings needed to compute the substrate correction values, the inspector took another set of three calibration check readings. The inspector recorded the results on the "Calibration Check Test Results" form, under Second Calibration Check, for readings taken by the backup XRF instrument (Completed Form 7.2). The second (and final) calibration check average did not exceed the 0.20 calibration check tolerance. The inspector, therefore, deemed the XRF testing to be complete.

The inspector then calculated the corrected readings by subtracting the substrate correction value from each XRF result taken on a wood or metal substrate. The substrate correction value was obtained by averaging readings on bare surfaces that had initially measured less than 2.5 mg/cm^2 with the paint still on the surface (Completed Form 7.3). The inspector also used the inconclusive ranges obtained from the XRF Performance Characteristic Sheet (0.41 mg/cm^2 to 1.39 mg/cm^2) for the particular XRF make, model and testing mode used, for all substrates except plaster (inconclusive range 1.01 mg/cm^2 to 1.09 mg/cm^2). Based on the valid window sill XRF readings, including substrate corrections for wood, there were initially 10 positive results, 2 inconclusive results, and 3 negative results in the bedroom. The two inconclusive results required paint-chip sampling with laboratory confirmation; this resulted in one positive and one negative result.. When she completed entering information into the tables, and turned off and stored her equipment, the inspector noted the date and ending time of the inspection in her field notes.

B. Example of Multi-family Housing Inspection

This section presents a simple example of a multi-family housing development inspection. An actual inspection would have many more testing combinations than are provided here.

The inspector's first step was a visual examination of the development to be tested. During this pre-testing review, buildings with a common construction and painting history were identified and the date of construction – 1962 – was determined. The construction and painting history of all the units was found to be similar, so that units in the development could be grouped together for sampling purposes. The inspector determined that the development had 55 units, and by consulting Table 7.3, determined that 22 units should be inspected.

The inspector used the "Selection of Housing Units" form (Completed Form 7.4) to randomly select units to inspect. The total number of units, 55, was entered into the first column of the form. The random numbers generated from a calculator (a computer's spreadsheet program or database program could have been used as well) were entered into the second column. The first random number, 0.583, was multiplied by 55 (the total number of units), and the product, 32.0 (which showed the first decimal place of the 32.065 calculator result), was entered in the third column. The product was rounded up from 32.1 to 33, and 33 was written in the fourth column, indicating that the 33rd unit would be tested. Other units were selected using the same procedure. When a previously selected unit was chosen again, the inspector crossed out the repeated unit number and wrote "DUP" (for duplicate) in the last column. The inspector continued generating random numbers until 35 distinct units had been selected for inspection.

Some detailed guidance on the random selection process is as follows:

- An option, if more than half of the units are to be inspected, is to randomly determine the units that would *not* be inspected and then to select the remaining units for inspection.
- Random numbers: When using the random number, which will be a long string of digits, you may use just a few decimal place digits of the random number for the calculation:
  - When there are under 100 units being inspected, you may use just the first three decimal places.
  - For more than 100 units, you may use just the first four decimal places,
  - For more than 1000 units, you may use just the first five decimal places.

— Option: If you are using a computer to do the multiplication as well as generating the random number, you may use the random number as the computer generates it, without shortening it.

✦ Multiplications: In order to be clear on the form about how units are selected when the multiplication gives a result close to a whole number, the following procedure (or an equivalent procedure) should be used:

— If the first decimal place of the product is from .1 to .8 (such as 55 times 0.107 = 5.885 in the second row of the filled-in Form 7.4), you may record and use just the **first** decimal place (such as 5.8). The housing unit number, which is the round-up to the next whole number, is 6 in this case.

— If the first decimal place of the product is .0 (such as 55 times 0.873 = 48.015 in the third row of the form), or .9 (such as 55 times 0.636 = 34.980 in the fourth row from the bottom of the form), you may record and use just the **first two** decimal places, 48.01 and 34.98 in these two cases. The housing unit numbers, which are the round-ups to the next whole number, are 49 and 35 in these two cases.

— Options: You may record and use the first two decimal places for all multiplications. If you are using a computer to do the multiplication as well as generating the random number, you may let the computer do the calculation without shortening the product. An example of the formulas that could be used is the following (showing the first three rows of the spreadsheet):

1	Total Number of Units	Random Number*	Random Number times Total Number of Units #	Round up for Unit Number to be Sampled
2	55	=RAND()	=A2*B2	=INT(C2+1)
3	55	=RAND()	=A3*B3	=INT(C3+1)

After identifying units to be inspected, the inspector conducted an inventory of all painted surfaces within the selected units. The inspector completed Form 7.5, the "Multi-family Housing LBP Testing Data Sheet" for every testing combination found in each room equivalent within each unit. This multi-family Form 7.5 is intentionally the same as the single family Form 7.1, and the instructions on using the form for single family housing, in Section A of this Addendum 1, above, apply to using it for multi-family housing. (Completed forms are found in Addendum 2, after the blank forms.) Completed Form 7.5 is an example of the completed inventory for the bedroom of the first unit to be inspected. The inventory showed that the bedroom was composed of four substrates and eight testing combinations of the following components: (1) one ceiling beam, (2) two doors, (3) four walls, (4) one window casing, (5) two door casings, (6) three shelves, (7) two support columns, and (8) one radiator. Where more than one of a particular component was present, except walls, one was randomly selected for XRF testing. Component location descriptions were recorded in the "Test Location" column. Drywall and brick substrates were not present in the bedroom.

Testing combinations not common to all units were added to the inventory list. The inspector also noted which types of common areas and exterior areas were associated with the selected units, identified each of these common and exterior areas as a room equivalent, and inventoried the corresponding testing combinations **based on the appropriate number of common areas and exteriors as is required by table 7.3.**

The inspector inventoried the remaining 34 units selected and their associated types of common areas and exterior areas before beginning XRF testing in the development. Alternatively, the inspector could have inventoried each room equivalent as XRF testing proceeded.

After completing the inventory, the inspector went to the first unit selected for sampling, and noted the date and starting time in her field notes. She then performed the XRF manufacturer's recommended warm up and quality control procedures successfully. Then the inspector took three calibration check readings on a 1.02 mg/cm^2 NIST SRM film. The calibration check was accomplished by attaching the film to a wooden board and placing the board on a flat wooden table. Readings were then taken with the probe at least 12 inches (0.3 meters) from any other potential source of lead. The following readings were obtained: 1.12, 1.00, and 1.08 mg/cm^2. These calibration check results were recorded on the "Calibration Check Test Results" form (Completed Form 7.2). The difference between the first calibration check average and 1.02 mg/cm^2 (NIST SRM) was not greater than the 0.3 mg/cm^2 calibration check tolerance limit obtained from the *XRF Performance Characteristic Sheet* for the particular XRF make, model and testing mode used, indicating that the XRF instrument was in calibration and that XRF testing could begin. (See the single-family housing example, in section A, above, of this addendum, for a description of what to do when the calibration check tolerance is exceeded.)

The inspector began XRF testing in the bedroom by taking one reading on each testing combination listed on the inventory data sheet. XRF testing continued until all concrete, wood, and plaster component types were inspected in the bedroom. The XRF readings were recorded on the "Multi-family Housing LBP Testing Data Sheet" form (Completed form 7.5). According to the XRF Performance Characteristic Sheet (PCS), the XRF instrument in use did not require correction for substrate bias for any of the substrates encountered in the development, so the XRF classification column was completed at that time. The inspector used the rules for classifying the XRF readings as positive, negative, or inconclusive. The inspector also used the inconclusive ranges obtained from the PCS (0.41 mg/cm^2 to 1.39 mg/cm^2). The midpoint of the inconclusive range was then calculated to be 0.90 mg/cm^2 ([0.41 mg/cm^2 + 1.39 mg/cm^2]/2 = 0.90 mg/cm^2). The results of the classifications were recorded in the Classification column of the "Multi-family Housing LBP Testing Data Sheet" form. Classifications for all testing combinations within the unit were computed in the same manner as for the bedroom.

Once inspections were completed in all of the 35 selected units of the development, the inspector completed the "Multi-family Housing: Component Type Report" form (Completed Form 7.6). A description of each component type was recorded in the first column, the total number of each tested component type was entered in the second column, and the number of testing combinations classified as positive for each component type from the "Multi-family Housing LBP Testing Data Sheet" (Completed Form 7.5) was calculated and entered in the third column. The inspector then did the same for the testing combinations classified as negative, that is, XRF readings up to and including 0.40 mg/cm^2, and for inconclusive classifications with XRF readings less than the midpoint of the inconclusive range, that is, XRF readings from 0.41 mg/cm^2 to 0.89 mg/cm^2, and for inconclusive classifications with XRF readings equal to or greater than the mid-point of the inconclusive range, that is 0.90 mg/cm^2 to 1.39 mg/cm^2. Using these readings and the total number of the component type sampled, the inspector computed and recorded the percentages of positive, negative, and inconclusive classifications for each component type.

After entering the number of testing combinations for each component type in the "Multi-family Housing Component Type Report" form, the inspector noticed that only 34 wood door casings had been inspected. Because it is necessary to test at least 40 testing combinations of each component type, the inspector arranged with the client to test six more previously untested door casings. Additional units were randomly selected from the list of unsampled units. An initial calibration check test was successfully completed and the six door casings were tested for lead-based paint. Another calibration check test indicated that the XRF instrument remained within acceptable limits. The inspector then updated the "Multi-family Housing: Component Type Report" form by crossing out with one line the row of the form that showed the original, insufficient number of component types for testing; the inspector then wrote the information on the full 40 wood door casings in a new row.

The inspector used the "Multi-family Decision Flowchart" (figure 7.3) to evaluate the component type results. Because 100 percent of the plaster walls and metal baseboards tested negative for lead, the inspector concluded that no lead-based paint had been detected on any plaster walls or metal baseboards in the development, including those in uninspected units, and entered "NEG" in the Overall Classification column. The inspector also observed that shelves, hall cabinets, and window casings had no positive results. For all of the other component types, 15% or more of the readings for each type were positive; after choosing *not* to perform additional XRF readings or laboratory analysis on those components, that is, to rely on the XRF readings, the inspector entered "POS" in the Overall Classification column for them. For the shelves, all the XRF results were negative or inconclusive and less than 0.90 mg/cm^2 ("low inconclusive") so the inspector, in accordance with the flowchart, entered "NEG" in the Overall Classification column. The hall cabinets and window casings were classified as inconclusive with some readings greater than or equal to 0.90 mg/cm^2 ("high inconclusive"). The inspector determined that over 15 percent of the readings taken on these component types were high inconclusives. The inspector chose to take additional samples for laboratory analysis, to see if any or all of the samples would be determined to be negative by laboratory analysis.

The inspector collected paint-chip samples from the inconclusive component types, but only from testing combinations where XRF readings were equal to or greater than 0.90 mg/cm^2, the midpoint of the inconclusive range. Paint-chip samples were taken from 32 sampling locations: 12 hall cabinets, 7 window casings and 13 metal radiators. The paint-chip samples were collected from a 4-square-inch (25 square-centimeter) surface area on each component. Each paint-chip sample was placed in a hard-shelled plastic container, sealed, given a uniquely-numbered label, and sent to the laboratory for analysis. A chain of custody form describing the samples was included in the submission. When she competed entering the information on the form, and turned off and stored her equipment, the inspector noted the date and ending time of the inspection in her field notes.

The laboratory returned the results to the inspector, who entered the laboratory results and classifications on the appropriate "Multi-family Housing LBP Testing Data Sheet" (Form 7.5). Laboratory results of all 7 paint-chip samples taken from the window casings were classified as negative. The laboratory results of 5 samples from the hall cabinets were classified as positive, and 7 as negative. The metal radiator results were classified as 9 positives and 4 negatives.

The "Multi-family Decision Flowchart" was applied to the results shown in the "Multi-family Housing: Component Type Report" to determine the appropriate classification for each component type. The inspector classified all shelves and window casings as negative, based either on the XRF substrate-corrected readings and the laboratory confirmation analysis, respectively. Therefore,

no further lead-based paint testing was required for the shelves and window casings. About 9.1 percent (none positive by XRF analysis and 5 positive by lab analysis of the 55 that were inspected) of all hall cabinets in the housing development had lead-based paint. About 70 percent of the metal radiator paint chips were positive by lab analysis.

Final decisions made by the development client regarding the hall cabinets and radiators that have some lead-based paint were based on various factors, including:

- The substantially lower cost of inspecting all hall cabinets in the development versus replacing all of those cabinets;
- The higher cost but shorter time frame to strip or replace radiators without testing versus testing and only treating radiators with lead-based paint;
- Future plans, including renovating the buildings within three years; and
- The HUD/EPA disclosure rule requirements regarding the sale or rental of housing with lead-based paint.

In this case, the client chose to remove the positive and untested radiators to be stripped offsite and reinstalled. The client also arranged for testing hall cabinets in all of the unsampled units to determine which were positive, and which were negative. To verify the accuracy of the inspection services, the client asked the inspector to retest 10 testing combinations. The retest was performed according to instructions obtained from the *XRF Performance Characteristic Sheet.* The client appointed an employee to randomly select 10 testing combinations from the inventory list of 2 randomly selected units. The employee observed the inspector retesting the 10 selected testing combinations, using the same XRF instrument and procedures used for the initial inspection. A single XRF reading was taken from each of the 10 testing combinations. The average of the 10 repeat XRF results was calculated to be 0.674 mg/cm^2, and the average of the 10 previous XRF results was computed to be 0.872 mg/cm^2. The absolute difference between the two averages was computed to be 0.198 mg/cm^2 (0.872 mg/cm^2 minus 0.674 mg/cm^2). The Retest Tolerance Limit, using the formula described in the *XRF Performance Characteristic Sheet* for the particular XRF make, model and testing mode used, was computed to be 0.231. Because 0.198 mg/cm^2 is less than 0.231 mg/cm^2, the inspector concluded that the inspection had been performed competently. The final summary report also included the address of the inspected units, the date(s) of inspection, the starting and ending times for each inspected unit, and other information described in section V.I of chapter 7.

At the end of the work shift, the inspector took a final set of three calibration check readings using the same procedure as for the initial calibration check. The following readings were obtained: 0.86, 1.07 and 0.94 mg/cm^2. The average of these readings is 0.97 mg/cm^2. The difference between 0.97 mg/cm^2 and the NIST SRM's 1.02 mg/cm^2 is -0.08 mg/cm^2, which is not greater in magnitude than the 0.30 mg/cm^2 calibration check tolerance for the instrument used. The inspector recorded that the XRF instrument was in calibration, and that the measurements taken between the first and second calibrations could be used.

Addendum 2:
Data Collection Forms

1. Single Family Housing LBP Testing Data Sheet (Form 7.1) – Blank
2. Single Family Housing LBP Testing Data Sheet (Form 7.1) – Completed
3. Calibration Check Test Results (Form 7.2) – Blank
4. Calibration Check Test Results (Form 7.2) – Completed
5. Substrate Correction Values (Form 7.3) – Blank
6. Substrate Correction Values (Form 7.3) – Completed
7. Selection of Housing Units (Form 7.4) – Blank
8. Selection of Housing Units (Form 7.4) – Completed
9. Multi-family Housing LBP Testing Data Sheet (Form 7.5) – Blank
10. Multi-family Housing LBP Testing Data Sheet (Form 7.5) – Completed
11. Multi-family Housing: Component Type Report (Form 7.6) – Blank
12. Multi-family Housing: Component Type Report (Form 7.6) – Completed

Single-Family Housing LBP Testing Data Sheet

Page _____ of _____

Address/Unit No. _____ Date _____

Room Equivalent _____

XRF Serial No. _____ Inspector Name _____ Signature _____

Sample ID#	Substrate	Component	Color	Test Locations	XRF Reading	Correction Value	Result	Classification (pos, neg, inc)	Laboratory Result	UNITS	Final Classification
										mg/cm² %	
										mg/cm² %	
										mg/cm² %	
										mg/cm² %	
										mg/cm² %	
										mg/cm² %	
										mg/cm² %	
										mg/cm² %	
										mg/cm² %	
										mg/cm² %	
										mg/cm² %	
										mg/cm² %	
										mg/cm² %	
										mg/cm² %	
										mg/cm² %	
										mg/cm² %	
										mg/cm² %	
										mg/cm² %	
										mg/cm² %	
										mg/cm² %	
										mg/cm² %	
										mg/cm² %	
										mg/cm² %	
										mg/cm² %	
										mg/cm² %	

Single-Family and Multifamily Testing LBP Testing Data Sheet

Address/Unit No. 918 Fenway Drive **Date** August 19, 2012

Room Equivalent Bedroom 1 (Room 5)

XRF Serial No. RS-1967 **Inspector Name** Mo Smith **Signature** Mo Smith

Sample ID#	Substrate	Component	Replication Number**	Test Locations*	XRF Reading	Correction Value	Result	Classification (pos, neg, inc)	Laboratory Result	Choose units	Final* Classification (pos or neg)
819.1	Plaster	Wall	5	Wall A Center	1.12 mg/cm²	NA	1.12 mg/cm²	POS		mg/cm² ppm	
819.2	Plaster	Wall	5	Wall B Left	0.92 mg/cm²	NA	0.92 mg/cm²	NEG		mg/cm² ppm	POS
819.3	Plaster	Wall	5	Wall C Right	1.31 mg/cm²	NA	1.31 mg/cm²	POS		mg/cm² ppm	
819.4	Plaster	Wall	5	Wall D Right	1.12 mg/cm²	NA	1.12 mg/cm²	POS		mg/cm² ppm	
819.5	Drywall	Wall	4	Closet Wall A	1.81 mg/cm²	NA	1.81 mg/cm²	POS		mg/cm² ppm	
819.6	Drywall	Wall	4	Closet Wall B	1.62 mg/cm²	NA	1.62 mg/cm²	POS		mg/cm² ppm	
819.7	Drywall	Wall	4	Closet Wall C	2.11 mg/cm²	NA	2.11 mg/cm²	POS		mg/cm² ppm	
819.8	Drywall	Wall	4	Closet Wall D	1.85 mg/cm²	NA	1.85 mg/cm²	POS		mg/cm² ppm	
819.9	Wood	Window Sill	3	Wall C Left	2.23 mg/cm²	NA	2.23 mg/cm²	POS		mg/cm² ppm	
819.10	Wood	Window Sash	3	Wall C Left	2.40 mg/cm²	NA	2.40 mg/cm²	POS		mg/cm² ppm	
819.11	Wood	Door	2	Wall A Center	4.20 mg/cm²	NA	4.20 mg/cm²	POS		mg/cm² ppm	
819.12	Metal	Door Frame	2	Wall A Center	5.50 mg/cm²	NA	5.50 mg/cm²	POS		mg/cm² ppm	
819.13	Wood	Baseboard	4	Wall D Right	>9.9 mg/cm²	NA	>9.9 mg/cm²	POS		mg/cm² ppm	
819.14	Wood	Chair rail	1	Wall B Center	1.0 mg/cm²	NA	1.0 mg/cm²	INC	5400	mg/cm² (ppm)	POS
										mg/cm² ppm	
	While one wall (sample 819.2) was determined to be negative by XRF, the walls as a whole in this room are classified as positive because of the variability in painted surfaces due to patching and repairs has the average lead loading be 1.12 mg/cm²; specifically, (1.12 + 0.92 + 1.31+ 1.12)/4 = 1.12, which is at least 1.0.									mg/cm² ppm	
										mg/cm² ppm	
										mg/cm² ppm	
	Sample 819.14 was inconclusive, for this XRF, at 1.0 mg/cm². Laboratory testing confirmed LBP. with the paint concentration being at least 5000 ppm.									mg/cm² ppm	
										mg/cm² ppm	

* Maintain a complete inventory of surfaces, components or rooms that are not tested. Use CPT=Carpeted floor; ED=Entry Denied; IN=Inaccessible; NC=Not Coated/Painted surface

** **No. of Replications:** The number of times a specific room equivalent, component, substrate, and color combination occurs. For example, if four walls are characterized by the same testing combination, the number of replications would be four.

Calibration Check Test Results

Address/Unit No. _____

_____

Device _____

Date _____ XRF Serial No. _____

Contractor _____

Inspector Name _____ Signature _____

NIST SRM Used _____ mg/cm^2 Calibration Check Tolerance Used _____ mg/cm^2

First Calibration Check

NIST SRM			First Average	Difference Between First Average and NIST SRM*
First Reading	Second Reading	Third Reading		

Second Calibration Check

NIST SRM			Second Average	Difference Between Second Average and NIST SRM*
First Reading	Second Reading	Third Reading		

Third Calibration Check *(if required)*

NIST SRM			Third Average	Difference Between Third Average and NIST SRM*
First Reading	Second Reading	Third Reading		

Fourth Calibration Check *(if required)*

NIST SRM			Fourth Average	Difference Between Fourth Average and NIST SRM*
First Reading	Second Reading	Third Reading		

* If the difference of the Calibration Check Average from the NIST SRM film value is greater than the specified Calibration Check Tolerance for this device, consult the manufacturer's recommendations to bring the instrument back into control. Retest all testing combinations tested since the last successful Calibration Check test.

Calibration Check Test Results

Address/Unit No. Fenway Gardens Housing Complex
Oldtown, Maryland 21334

Device WXY Company, Inc. XRF 2.1

Date August 19, 2012 **XRF Serial No.** RS-1967

Contractor RIGAH PG Testing, Inc

Inspector Name Mo Smith **Signature** Mo Smith

NIST SRM Used 1.02 mg/cm² **Calibration Check Tolerance Used** _____ mg/cm²

First Calibration Check Initial reading 8:43 AM

NIST SRM			First Average	Difference Between First Average and NIST SRM*
First Reading	Second Reading	Third Reading		
1.12	1.00	1.08	1.07	0.05

Second Calibration Check Midday Reading: 11:35 AM

NIST SRM			Second Average	Difference Between Second Average and NIST SRM*
First Reading	Second Reading	Third Reading		
0.86	1.07	0.89	0.94	-0.08

Third Calibration Check *(if required)* End of testing 2:22 PM

NIST SRM			Third Average	Difference Between Third Average and NIST SRM*
First Reading	Second Reading	Third Reading		
1.45	1.21	1.10	1.25	0.23
Failed Calibration Check				

Fourth Calibration Check *(if required)*

NIST SRM			Fourth Average	Difference Between Fourth Average and NIST SRM*
First Reading	Second Reading	Third Reading		

*** If the difference of the Calibration Check Average from the NIST SRM film value is greater than the specified Calibration Check Tolerance for this device, consult the manufacturer's recommendations to bring the instrument back into control. Retest all testing combinations tested since the last successful Calibration Check test.**

Substrate Correction Values

Address/Unit No. _____

_____

Date _____ XRF Serial No. _____

Inspector Name _____ Signature _____

Use this form when the *XRF Performance Characteristics Sheet* indicates that correction for substrate bias is needed.

_____

_____

Substrate			Brick	Concrete	Drywall	Metal	Plaster	Wood
Location	1	First Reading						
		Second Reading						
		Third Reading						
	2	First Reading						
		Second Reading						
		Third Reading						
Correction Value (Average of the Six Readings)								

Transfer Correction Value for each substrate to the 'Correction Value' column of the LBP Testing Data Sheet.

Notes:

Substrate Correction Values

Address/Unit No. 918 Fenway Drive
Oldtown, Maryland 21334

Date August 19, 2012 **XRF Serial No.** RS-1967

Inspector Name Mo Smith **Signature** Mo Smith

Use this form when the *XRF Performance Characteristics Sheet* indicates that correction for substrate bias is needed.

Substrate			Brick	Concrete	Drywall	Metal	Plaster	Wood
Location	1	First Reading				0.10		
		Second Reading				0.09		
		Third Reading				0.09		
	2	First Reading				0.10		
		Second Reading				0.09		
		Third Reading				0.11		
Correction Value (Average of the Six Readings)						0.10		

Transfer Correction Value for each substrate to the 'Correction Value' column of the LBP Testing Data Sheet.

Notes: Metal: Location 1 - Door frame, Side B, Room 2 (Dining room)
Location 2 - Door Frame, Side C, Room 3 (Kitchen)

Selection of Housing Units

Page _____ of _____

Testing Site _____ Year Built _____ Date _____

Inspector Name _____ Signature _____ Number of Distinct Units to be Sampled

Total Number of Units	Random Number*	Random Number times Total Number of Units #	Round up for Unit Number to be Sampled	Distinct Unit Number

* Obtain from a hand-held calculator, spreadsheet or database.

Round down to 1 decimal place (e.g., 23.7), except if x.0+or x.9+, then round down to 2 decimal places (e.g., 47.02 or 34.98).

Selection of Housing Units

Testing Site Fenway Gardens Housing Complex Year Built 1962 Date August 16, 2012

Inspector Name Mo Smith Signature Mo Smith Number of Distinct Units to be Sampled 22

Total Number of Units	Random Number*	Random Number times Total Number of Units #	Round up for Unit Number to be Sampled	Distinct Unit Number
55	0.583	32.0	33	1
55	0.107	5.8	6	2
55	0.873	48.01	49	3
55	0.085	4.6	5	4
55	0.961	52.8	53	5
55	0.111	6.1	7	6
55	0.575	31.6	32	7
55	0.241	13.2	14	8
55	0.560	30.8	31	9
55	0.884	48.6	49	DUP
55	0.341	18.7	19	10
55	0.851	46.8	47	11
55	0.574	31.5	32	DUP
55	0.221	12.1	13	12
55	0.103	5.6	6	DUP
55	0.375	20.6	21	13
55	0.625	34.3	35	14
55	0.395	21.7	22	15
55	0.095	5.2	6	DUP
55	0.772	42.4	43	16
55	0.761	41.8	42	17
55	0.515	28.3	29	18
55	0.855	47.02	48	19
55	0.679	37.3	38	20
55	0.636	34.98	35	DUP
55	0.622	34.2	35	DUP
55	0.323	17.7	18	21
55	0.431	23.7	34	22

* Obtain from a hand-held calculator, spreadsheet or database.

Round down to 1 decimal place (e.g., 23.7), except if x.0+or x.9+, then round down to 2 decimal places (e.g., 47.02 or 34.98).

Multifamily Housing LBP Testing Data Sheet

Page _____ of _____

Address/Unit No. _____ Date _____

Room Equivalent _____

XRF Serial No. _____ Inspector Name _____ Signature _____

Sample ID#	Substrate	Component	Color	Replication Number	Test Location	XRF Reading	Correction Value	Corrected Reading	Classification (pos, neg, inc)	Laboratory Result	UNITS	Laboratory Classification
											mg/cm² %	
											mg/cm² %	
											mg/cm² %	
											mg/cm² %	
											mg/cm² %	
											mg/cm² %	
											mg/cm² %	
											mg/cm² %	
											mg/cm² %	
											mg/cm² %	
											mg/cm² %	
											mg/cm² %	
											mg/cm² %	
											mg/cm² %	
											mg/cm² %	
											mg/cm² %	
											mg/cm² %	
											mg/cm² %	
											mg/cm² %	
											mg/cm² %	
											mg/cm² %	
											mg/cm² %	
											mg/cm² %	
											mg/cm² %	
											mg/cm² %	

Single-Family and Multifamily Testing LBP Testing Data Sheet

Address/Unit No. 918 Fenway Drive **Date** August 19, 2012

Room Equivalent Bedroom 1 (Room 5)

XRF Serial No. RS-1967 **Inspector Name** Mo Smith **Signature** Mo Smith

Sample ID#	Substrate	Component	Replication Number**	Test Locations*	XRF Reading	Correction Value	Result	Classification (pos, neg, inc)	Laboratory Result	Choose units	Final* Classification (pos or neg)
819.1	Plaster	Wall	5	Wall A Center	1.12 mg/cm²	NA	1.12 mg/cm²	POS		mg/cm² ppm	
819.2	Plaster	Wall	5	Wall B Left	0.92 mg/cm²	NA	0.92 mg/cm²	NEG		mg/cm² ppm	POS
819.3	Plaster	Wall	5	Wall C Right	1.31 mg/cm²	NA	1.31 mg/cm²	POS		mg/cm² ppm	
819.4	Plaster	Wall	5	Wall D Right	1.12 mg/cm²	NA	1.12 mg/cm²	POS		mg/cm² ppm	
819.5	Drywall	Wall	4	Closet Wall A	1.81 mg/cm²	NA	1.81 mg/cm²	POS		mg/cm² ppm	
819.6	Drywall	Wall	4	Closet Wall B	1.62 mg/cm²	NA	1.62 mg/cm²	POS		mg/cm² ppm	
819.7	Drywall	Wall	4	Closet Wall C	2.11 mg/cm²	NA	2.11 mg/cm²	POS		mg/cm² ppm	
819.8	Drywall	Wall	4	Closet Wall D	1.85 mg/cm²	NA	1.85 mg/cm²	POS		mg/cm² ppm	
819.9	Wood	Window Sill	3	Wall C Left	2.23 mg/cm²	NA	2.23 mg/cm²	POS		mg/cm² ppm	
819.10	Wood	Window Sash	3	Wall C Left	2.40 mg/cm²	NA	2.40 mg/cm²	POS		mg/cm² ppm	
819.11	Wood	Door	2	Wall A Center	4.20 mg/cm²	NA	4.20 mg/cm²	POS		mg/cm² ppm	
819.12	Metal	Door Frame	2	Wall A Center	5.50 mg/cm²	NA	5.50 mg/cm²	POS		mg/cm² ppm	
819.13	Wood	Baseboard	4	Wall D Right	>9.9 mg/cm²	NA	>9.9 mg/cm²	POS		mg/cm² ppm	
819.14	Wood	Chair rail	1	Wall B Center	1.0 mg/cm²	NA	1.0 mg/cm²	INC	5400	mg/cm² (ppm)	POS
										mg/cm² ppm	
	While one wall (sample 819.2) was determined to be negative by XRF, the walls as a whole in this room are classified as positive because of the variability in painted surfaces due to patching and repairs has the average lead loading be 1.12 mg/cm²; specifically, (1.12 + 0.92 + 1.31+ 1.12)/4 = 1.12, which is at least 1.0.									mg/cm² ppm	
										mg/cm² ppm	
										mg/cm² ppm	
	Sample 819.14 was inconclusive, for this XRF, at 1.0 mg/cm². Laboratory testing confirmed LBP. with the paint concentration being at least 5000 ppm.									mg/cm² ppm	
										mg/cm² ppm	

* Maintain a complete inventory of surfaces, components or rooms that are not tested. Use CPT=Carpeted floor; ED=Entry Denied; IN=Inaccessible; NC=Not Coated/Painted surface

** **No. of Replications:** The number of times a specific room equivalent, component, substrate, and color combination occurs. For example, if four walls are characterized by the same testing combination, the number of replications would be four.

Multifamily Housing: Component Type Report

Page _____ of _____

Address/Unit No. _____

_____

Date _____ XRF Serial No. _____

Inspector Name _____ Signature _____

Description	Number of Readings	POSITIVE		INCONCLUSIVE*				NEGATIVE		Comp. Type Classif.
		Number	Percent	Low		High		Number	Percent	
				Number	Percent	Number	Percent			

1997 Revision

Form 7.6

* Lower Boundary: _____ Upper Boundary: _____ Midpoint: _____

Multifamily Housing: Component Type Report

Address/Unit No. Fenway Gardens Housing Complex

Date August 19, 2012 **XRF Serial No.** RS-1967

Inspector Name Mo Smith **Signature** Mo Smith

Description	Number of Readings	POSITIVE		INCONCLUSIVE*				NEGATIVE		Comp. Type Classification
				Low		High				
		Number	Percent	Number	Percent	Number	Percent	Number	Percent	
Wood Shelves	83	4	4.8	5	6.0	9	10.8	65	78.3	NEG
Wood Doors	110	40	36.4	12	10.9	8	7.3	50	45.5	POS
Wood door Casings	34	6	17.6	5	14.7	5	14.7	18	52.9	POS
Wood Hall Cabinets	60	5	8.3	8	13.3	12	20.0	35	58.3	POS
Wood Window Stools	110	60	54.4	30	27.3	10	9.1	10	9.1	POS
Wood Window Casings	63	0	0.0	0	0.0	0	0.0	63	100	NEG
Plaster Walls	110	0	0.0	10	9.1	9	8.2	91	82.7	NEG
Concrete Support Columns	40	40	100	0	0.0	0	0.0	0	0.0	POS
Concrete Ceiling Beams	40	40	100	0	0.0	0	0.0	0	0.0	POS
Metal Baseboards	45	0	0.0	0	0.0	0	0.0	45	100	NEG
Metal Gutters	50	20	40.0	8	16.0	2	4.0	20	40.0	POS
Brick Stairway	50	10	20.0	4	8.0	6	12.0	30	60.0	POS
Metal Radiators*	55	0	0.0	11	20.0	13	23.6	31	56.4	POS
Wood Door Casings	40	12	30.0	5	12.5	5	12.5	18	45.0	POS
Metal Radiators* Retest of high inconclusive	13	9	69.2					4	30.7	POS

2012 Revision

Form 7.6

* Lower Boundary: 0.80 Upper Boundary: 1.10 Midpoint: 0.95

Addendum 3: XRF Performance Characteristics Sheets

For current XRF Performance Characteristics Sheets, see the HUD website at: ***http://www.hud.gov/offices/lead/guidelines/hudguidelines/Allpcs.pdf***.

EXHIBIT D

LEFT BLANK

HOUSING AUTHORITY OF THE CITY OF TAMPA
SECTION 3 CONTRACTORS LIST
Updated August 20, 2017

Company Name	Services Provided	Contact Name	Company Address	Contact Phone	Email
3-Vets, Inc.	Construction Painting, installation of windows and doors, construction / contract administration	Reggie Tim	1907 E. Hillsborough Ave., Suite 101 Tampa, FL 33610	813-237-8387 / 813-232-3894(fax)	vetinds@aol.com
Amack's Cleaning Service	General cleaning services	Alexis Mack	10422 Avelar Ridge Drive, Riverview, FL 33578	813-390-0644	lexmack63@gmail.com
Arcor Trading, Inc.	Painting, waterproofing	Juan Restrepo / Luis Arguello	P.O. Box 4149, Tampa, FL 33677	813-446-3225	luisgamin55@gmail.com
BJ Construction II, Inc.	General Construction	Ron Richardson	235 W. Brandon Blvd., Unit 182, Brandon, FL 33511	813-347-3028	Rrich13@bjconstruction2.com
BJ Enterprise II, Inc.	Real Estate, marketing, print shop and internet services	Ron Richardson	235 W. Brandon Blvd., Unit 182, Brandon, FL 33511	813-347-3028	Rrich13@bjconstruction2.com
Classie Ladies' Cleaning Serv ice	General cleaning services	Classie McMillen	P.O. Box 16924, Tampa, FL 33687	813-856-8092	ClassieLadie35@gmail.com
D & R United Cleaning Services, Corp.	New Construction, Commercial and Residential cleaning	Diana Rebaza	1611 Prowmore Drive, Brandon, FL 33511	407-435-7032	drunitedcleaning@hotmail.com ; rebazadiana2007@hotmail.com
Darryl Ward's Painting	Construction Painting	Darryl Ward	27232 Big Sur Drive, Wesley Chapel, FL 33544	813-918-3806	dwmonavie@gmail.com
Faithful Cleaning Service To The Rescue	Commercial and Residential cleaning services	Michelle Henry	11307 N. 50th Street, Tampa, FL 33617	813-210-3616	faithfulcleaningservice17@yahoo.com

**The Tampa Housing Authority's Certified Section 3 Contractor list is included for information only and does not reflect all possible certified Section 3 businesses. There may be other agencies that maintain Section 3 contractor listings that bidders and proposers may also consider.*

HOUSING AUTHORITY OF THE CITY OF TAMPA
SECTION 3 CONTRACTORS LIST
Updated August 20, 2017

Full of Hope Cleaning Services	Construction and Janitorial Cleaning	Hope Terrible	6913 Bon Air Dr., Apt. C Tampa, FL 33617	813-992-5382	hterrible@yahoo.com
I. B. B., Inc.	install privacy walls, retaining walls, buffer walls, sound walls, security walls, animal containment walls, enclosures, fencing, etc	Donald Burkett	2804 Lutz Lake Fern Rd., Tampa, FL 33558	813-949-4786	donb@burint.com
Johnson & Johnson Janitorial	Janitorial Cleaning, Construction Cleaning, Enviromental Services	Janice and Earl Johnson	7901 Bahia Ave., Tampa, FL 33619	813-629-6565 / 813-677-7317	Janice.johnson33@verizon.net
Johnson Hauling	Concrete stucco block, tree trimming, painting	Eugene Johnson	709 E. Lake Ave., Tampa, FL 33603	813-417-9116	johnsonhauling78@gmail.com
NuTech Roofing & Construction	Licensed Roofing Contractor, Licensed general contractor	Ramiro Rubio	11806 Baytree Drive, Riverview, FL 33569	813-787-9800	rrubio.group@gmail.com
Paramount Trim, Inc.	Trim, finishes, cabinetry, licensed general contractor	Walid Benkhaffed	7419 Savannah Lane, Tampa, FL 33637	813-927-1082	paramounttrim@yahoo.com
Pipeline Construction, LLC	Site preparation and underground utilities	Christopher Lee	1313 33rd Avenue, Tampa, FL 33603	813-927-6646	pipelinecontractingLLC@yahoo.com

**The Tampa Housing Authority's Certified Section 3 Contractor list is included for information only and does not reflect all possible certified Section 3 businesses. There may be other agencies that maintain Section 3 contractor listings that bidders and proposers may also consider.*

HOUSING AUTHORITY OF THE CITY OF TAMPA
SECTION 3 CONTRACTORS LIST
Updated August 20, 2017

Special "K" Cleaning and Service Co.	**Janitorial Cleaning and Window Cleaning**	**Lear Johnson Lockley**	**1112 Union Street, Tampa, FL 33607**	**813-258-9593**	
Sunbelt Constructing Company LLC	Flooring	Mark Stalsitz	3109 Reseda Court, Tampa, FL 33618	813-312-4460	sunbelt.mark@gmail.com
SunScape Grounds Maintenance	Landscape and Lawn Maintenance	Demond Bryant	3624 18th Street N., Tampa, FL 33603	813-376-8755 / 813-247-3100	sunscapegmi@verizon.net
Z's Fine Furniture, Inc.	Kitchen and bathroom cabinets install and refacing, furniture	Gina and Michael Zayas	4401 W. Jean Street, Tampa, FL 33614	813-323-3893 / 813-309-2339	mikezcabinets@gmail.com

For Questions Regarding Section 3, please contact
Kelli Wyly, Administrative Assistant, Housing Authority of the City of Tampa
Office of Real Estate Development, 5301 W Cypress Street, Tampa, Florida 33607
813-341-9101 ext. 2760 or e-mail at kelli.wyly@thafl.com

A searchable list of local MBE (Minority Business Enterprise) certified businesses can be found at the City of Tampa's website here: https://tampa.diversitysoftware.com/FrontEnd/VendorSearchPublic.asp?TN=tampa&XID=846
or at the Hillsborough County website here:
https://hillsboroughcounty.diversitycompliance.com/FrontEnd/SEARCHCERTIFIEDDIRECTORY.asp

**The Tampa Housing Authority's Certified Section 3 Contractor list is included for information only and does not reflect all possible certified Section 3 businesses. There may be other agencies that maintain Section 3 contractor listings that bidders and proposers may also consider.*

EXHIBIT E

LEFT BLANK