

US EPA ARCHIVE DOCUMENT

Appendix H
Residential Paint Assessment Pilot Work Plan



Prepared for:
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DRAFT

Residential Paint Assessment Pilot Work Plan

**Omaha Lead Site
Omaha, Nebraska**

November 6, 2006

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Professional
Environmental Engineers, Inc.

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1.0 Introduction

This work plan describes a pilot study that will be conducted by the Environmental Protection Agency (EPA) at the Omaha Lead Site (Site). The EPA issued an Interim Record of Decision on December 15, 2004, that describes an *interim remedy* to be implemented at the Site. In addition to remediation of lead contaminated soil, the interim remedy also includes stabilization of deteriorating exterior lead-based paint in cases where remediated soils could become recontaminated by loose or flaking lead-based paint falling to the ground and mixing with soil.

The Interim Record of Decision for the Site did not specify the criteria that would be used to determine if a structure would be eligible for paint stabilization under the interim remedy. To date, this type of criteria has not been developed or generally applied by either EPA or any other federal agencies that have programs to address lead hazards, including the U.S. Department of Housing and Urban Development (HUD). Due to the absence of applicable criteria, EPA is conducting this pilot study at the Site intended to 1) develop criteria that will be used to determine eligibility of structures at the site for exterior lead-based paint stabilization, 2) apply the developed criteria to residential structures at the Site in the performance of a lead-based paint stabilization program, and 3) evaluate the validity of the criteria developed during this pilot for determining if the continued protectiveness of the soil cleanup is threatened by the presence of deteriorated lead-based paint on exterior structure surfaces. This pilot study will produce data and general information that will be considered by EPA in selection of a final remedy for the Site. This final remedy will address the remaining properties at the Site not remediated under the interim remedy. Procedures and criteria developed during this pilot study are considered strictly site-specific and are not intended to be applied to other sites or locations without further consideration. .

2.0 Discussion

2.1 Background

The Environmental Protection Agency (EPA) initiated a cleanup of the Site in 1999. The cleanup initially involved excavation of lead-contaminated soils from child-care facilities and residences which housed children with elevated blood-lead levels, and restoration of excavated areas with clean backfill followed by sodding. In August 2002, the scope of the response action was increased to include all residences with soil lead concentrations exceeding 2,500 ppm. The eligibility criteria for a soil cleanup (action level) for residential properties at the Site was lowered to 1,200 ppm in November 2003, and eventually lowered further to 800 ppm.

The cleanup of lead-contaminated soil at the Site is being conducted by EPA under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA), also known as the Superfund Law. The initial soil cleanup work was performed under CERCLA *Removal authority* which provides EPA the ability to respond to a release of hazardous substances on an emergency basis. While the initial cleanup work was proceeding under CERCLA *Removal authority*, EPA began planning under CERCLA *Remedial authority* for the long-term cleanup of the Site, which involves evaluating the continued effectiveness of potential remedies. EPA recognized that properties which had been successfully cleaned up could become recontaminated by the loose and flaking lead-based paint that existed on many of the older structures at the Site. Deteriorating lead-containing paint can potentially fall to the ground, mix with soil, and result in soil-lead concentrations that exceed health-based limits in residential settings. The EPA considers the long-term protectiveness of a soil cleanup to be threatened if a sufficient amount of deteriorated paint is present on a structure that could potentially fall to the ground and recontaminate the surrounding soils.

EPA authority under CERCLA to respond to the release of hazardous substances is generally limited to the cleanup of exterior environmental media, and in most cases excludes consumer products in consumer use (such as house paint). The primary environmental media being addressed at the Site by the EPA response action is lead-contaminated soil. However, the continued effectiveness of the soil cleanup at a property, once completed, is potentially threatened if loose and flaking (deteriorated) lead-based paint is present on the exterior structure surfaces that could fall onto the ground and recontaminate the soil. EPA has determined that CERCLA response authority can be applied to deteriorating exterior lead-based paint in cases where the continued effectiveness of the remedy is threatened.

During the planning for the long-term cleanup at the Site, EPA recognized that additional studies were needed to support a final remedy, but considered the need to move

forward with an interim remedy to expand the scope of the ongoing response action to address the threat posed by deteriorating exterior lead-based paint. The Interim Record of Decision for Site issued by EPA on December 15, 2004, expanded the scope of the response action to include stabilization of deteriorating exterior lead-based paint in cases where the continued protectiveness of the remedy is threatened.

The December 15, 2004, Interim Record of Decision specifies conditions under which properties that are determined to be eligible for soil remediation could also be eligible for stabilization of deteriorated exterior lead-based paint. Lead levels in exterior mid-yard samples must exceed the soil action levels specified in the Interim Record of Decision for the property to be potentially eligible for stabilization of deteriorating lead-based paint. If the soil action levels are exceeded at a property, then structures on that property are eligible for stabilization of deteriorating lead-based paint only if action levels established for lead-based paint are also exceeded. The Interim Record of Decision did not specify quantitative criteria for deteriorated lead based paint that would be used as an action level to determine eligibility for paint stabilization. Instead, EPA intended that the criteria to be used to determine eligibility for paint stabilization would be developed during implementation of the interim remedial action.

To date, EPA has not established generally applicable criteria that could be used to determine if deteriorating lead-based paint threatens the continued protectiveness of a soil cleanup performed under the authority of CERCLA. EPA has promulgated regulatory standards pursuant to Title X of the Toxic Substances Control Act (TSCA) at 40 CFR Part 745 that define lead hazards and establish worker training and certification requirements for lead-based paint abatement and control practices. The TSCA Title X regulations, however, do not establish a level at which deteriorating paint conditions could result in soil concentrations that are not considered protective of human health and the environment under CERCLA. The TSCA Title X regulations are not considered to be applicable or relevant and appropriate to circumstances at the Site

This work plan describes a pilot study which is intended to develop and evaluate criteria that will be applied to properties at the Site to determine if structures on the property are eligible for paint stabilization under the interim remedy. This site-specific pilot study will develop site-specific criteria that can be applied to properties at the Site during the interim remedy, and does not establish a precedent for actions taken by EPA at other sites or locations. The EPA will use the data and information generated during this pilot study to support the selection of a final remedy for deteriorating lead-based paint at the Site, and may or may not consider this approach when evaluating similar circumstances at other sites. The EPA will document the procedures utilized during this pilot study through development of Standard Operating Procedures or their equivalent.

A number of key parameters and assumptions will be evaluated at the Site during and

in conjunction with this pilot study. Some of these key parameters include the depth of soil impacted by paint (mixing depth), the extent of the area surrounding the structure that is potentially impacted by deteriorating paint, and the efficacy and cost effectiveness of different paint stabilization strategies. Much of this information will be collected during the implementation of the pilot study and ensuing paint stabilization activities. For instance, the assumptions regarding mixing depth and the extent of area actually impacted by loose and flaking lead-based paint will be evaluated through additional soil characterization when paint stabilization is performed at properties where soil remediation was previously conducted, allowing an opportunity for recontamination of soils to occur.

2.2 Pilot Study Approach

The primary objective of the interim remedy remains to remove lead-contaminated soils exceeding 400 parts per million (ppm) at residential properties that meet the eligibility criteria for contaminated soil established by the Interim Record of Decision¹. This work plan describes how EPA will determine if a structure on a residential property that is eligible for soil remediation is also eligible for exterior paint stabilization. Houses, detached garages, and other types of buildings are potentially eligible for paint stabilization if deteriorated lead-based paint is present on exterior surfaces. Under the interim soil remedy, EPA is addressing the most highly contaminated properties until additional studies are performed to support a final remedy for the more moderately contaminated properties. Consistent with this approach, EPA is establishing interim criteria for deteriorated exterior paint. EPA intends to apply the criteria developed in this pilot study to only those structures located on properties that are eligible for soil remediation.

The term “stabilization”, as used in this pilot study, involves a process to prepare deteriorated surfaces, typically through wet scraping or wet sanding, followed by application of a primer and topcoat of paint. Paint or other coating material used to stabilize affected surfaces will be color-matched to the extent practicable. All stabilization efforts performed under the interim remedy are strictly voluntary. Stabilization of deteriorated lead-based paint will be performed on eligible structures entirely at the discretion of the respective homeowner. All lead-based paint assessment work and subsequent paint stabilization activities that may result will be performed at no cost to the homeowner or residents.

EPA recognizes that any amount of deteriorating lead-based paint on the exterior

¹ Under the Interim Record of Decision, residential properties are eligible for remediation if one or more mid-yard soil samples exceed 800 parts per million (ppm). In addition, child-care facilities and properties where children with elevated blood lead levels reside are eligible for remediation if one or more mid-yard samples exceed 400 ppm. If the property is eligible for remediation, all soils that test greater than 400 ppm will be removed, including drip-zone soils.

surface of a house or other structure constitutes a potential health threat. As the amount of deteriorating lead-based paint on a structure gets larger, the continued effectiveness of a soil cleanup is increasingly threatened. For the purpose of determining when a structure may be considered eligible for paint stabilization for this particular action, EPA is establishing risk management criteria based upon mixing of deteriorating paint within a specified depth and width of soil. This approach is not intended to characterize risk levels that would result from deteriorating paint falling onto the ground surface, but rather provides a quantitative measure that can be compared to established soil criteria to determine eligibility for paint stabilization.

This pilot study involves the development and use of both quantitative and qualitative criteria for determining the eligibility of structures located on remediated properties for paint stabilization. The quantitative approach involves measuring the amount of deteriorated lead-based paint on a structure, and calculating the concentration of lead in surrounding soils that would result if all of the identified deteriorated paint were to fall to the ground and be mixed with soil as described. In some cases, a significant lead-based paint problem may not be identified using this quantitative approach. For example, severely deteriorated lead-based paint may be observed, but not tested for lead content, on a component of a structure that is inaccessible during the quantitative lead-based paint assessment such as an upper-floor eave or soffit. Without characterizing the lead content of the inaccessible surface, it is not possible to accurately assess the potential impact of any deteriorating paint present on surrounding soil lead concentrations. For this reason, the lead-based paint assessment will also include a qualitative assessment describing any significant deteriorated paint problem that is observed for each structure on remediated properties. If a structure is not determined to be eligible for paint stabilization on the basis of the quantitative approach, but a significant deteriorated paint problem is documented during the lead-paint assessment, then the property will be revisited by an experienced lead hazard control professional to determine if paint stabilization is warranted at a property. This qualitative assessment will be considered by EPA and/or its partnering agencies in determining the eligibility of a structure for paint stabilization.

The quantitative approach for determining eligibility for paint stabilization utilized in this pilot study involves a two-step process. Initially, a lead-based paint assessment will be performed at properties that are eligible for soil remediation under the interim remedy. This lead-based paint assessment, described in Section 3 of this work plan, measures the lead content and dimensions of deteriorated paint observed on structure surfaces. The lead-based paint assessment also measures the footprint of each structure on the property. The second step of the process involves using the data gathered during the lead-based paint assessment to calculate the increase in soil-lead concentration that would result if deteriorating paint were to mix with surface soil surrounding the foundation as described. This soil mixing calculation, described in Section 6 of this work plan, results in a quantitative measure of the potential increase in soil concentration that can be compared to established soil-lead criteria to

determine eligibility for paint stabilization.

For purposes of the lead-based paint assessments performed during this pilot study, deteriorated paint conditions are defined as areas where the exposed surface of the paint (top coat) is no longer intact. Deteriorated painted surfaces include areas where paint is cracked, checked, flaking, blistering, peeling, or otherwise has breaks in the surface of the paint that would allow introduction of moisture beneath the painted surface. The lead-based paint assessment will document the size and lead content of deteriorated painted surfaces on each structure on the property.

Similarly-painted surfaces will be grouped together for each structure for the purpose of the lead-based paint assessment. For example, if all window trim on a house appears to be painted alike, the lead loading of a single section of deteriorated window trim will be measured and applied to the total deteriorated area of all sections of window trim. Lead measurements will be taken using a hand-held XRF (X-ray fluorescence) detector and will be performed on a section of each similarly-painted surface where the presence of lead-based paint (underlying or surficial) is most apparent. The XRF instrument is capable of measuring the total lead content of multiple layers of paint down to the original surface (substrate). The lead loading of each similarly-painted surface will be recorded on the lead-based paint assessment form, and the area of deteriorated paint for each type of similarly-painted surface will likewise be recorded. This information will be used in the subsequent step of the process to determine the amount of lead that is present in deteriorated paint on each structure that could potentially fall onto the ground surface.

The information obtained during the lead paint assessment will be used to calculate the increase in lead concentration that would result if deteriorated paint were to fall onto the ground and mix with soils surrounding the foundation. For purposes of this pilot study, deteriorating lead-based paint on a structure is assumed to fall onto the ground surface within six feet of the foundation and be uniformly mixed with the top one inch of soil. The resulting increase in concentration is then compared to the 400 ppm interim risk management cleanup level established by the Interim Record of Decision. If the resulting concentration of lead in the soils surrounding the structure would increase by more than 400 ppm under these circumstances, then the structure would be considered eligible for exterior paint stabilization.

It is important to note that each and every surface on a structure will not necessarily be stabilized (repainted) if that structure is determined to be eligible for paint stabilization. Generally, only the surfaces with lead paint that are found to threaten the soil cleanup will be stabilized. However, if a particular painted surface is determined to be eligible for paint stabilization, then all of the corresponding similarly-painted surfaces will be eligible for paint stabilization as well. For example, if paint on the siding of a house contains no detectable lead, but the leaded paint on window trim and other painted surfaces is determined to be eligible for paint stabilization, the house siding may not be stabilized, but the other surfaces

that are determined to be eligible will be stabilized. As another example, if a deteriorating paint on a particular set of windows is determined to be eligible for paint stabilization, and the paint on other similarly-painted windows is intact, stabilization of all the similarly-painted windows would be performed. Stabilization will not be limited to repainting only some of the similarly-painted windows on a structure or only a portion of the siding. Eligibility for paint stabilization will apply to all house features within a group of similarly-painted surfaces.

Each structure that is located on a property eligible for soil remediation will be analyzed individually to determine the potential for deteriorated paint on a particular structure to recontaminate the remediated soils surrounding that respective structure. It is assumed, for instance, that deteriorated paint on a detached garage would not threaten the soils surrounding a house located some distance away from the garage. A lead paint assessment and soil mixing calculation will be performed separately for each structure on a property. If a particular structure is determined to be eligible for paint stabilization, it will in no way affect the potential eligibility of other structures on that same property. Each structure will be evaluated independently for eligibility for paint stabilization.

It is EPA's preference to perform the paint stabilization prior to conducting the soil cleanup at eligible properties. Stabilizing the paint beforehand controls the opportunity for recontamination of remediated soils following the soil cleanup. EPA recognizes that soil cleanups have been completed at many properties to date at the Site. If a structure is found to be eligible for paint stabilization at a property where a soil cleanup has been completed, EPA will evaluate any recontamination that may have occurred since completion of the soil cleanup, and take appropriate measures to assure that the cleanup remains protective of human health and the environment. These actions may include, but are not limited to, vacuuming of fallen paint chips or replacement of sod or ground cover. In some instances, removal of soil may be required to restore protectiveness of the original soil cleanup. EPA will work with homeowners to determine the most appropriate measures to assure continued effectiveness of the remedy.

The following sections of this work plan describe in greater detail the specific steps that will be taken to determine if properties at the Site are eligible for exterior lead-based paint stabilization.

3.0 Residential Lead-Based Paint Assessment

Lead-based paint (LBP) assessments will be conducted at previously remediated properties and at properties that are eligible for remediation during the interim remedy. The LBP assessment will determine the lead content and condition of painted exterior surfaces and document the dimensions of each structure for a subsequent soil mixing calculation. This information will be used to determine whether deteriorated paint is eligible for stabilization during the interim remedial action conducted at the Site.

3.1 Access Agreement Signature

The LBP assessment field teams will obtain property owner consent (signed access agreement) to conduct the exterior paint assessment (see Figure 3-1, page 1). Participation in the LBP assessment program will be at the discretion of the property owner. The EPA Task Order Project Officer (TOPO) will be notified of any property owners that decline to participate.

3.2 Visual Inspection

The LBP assessment field team will conduct an initial visual inspection of exterior painted surfaces to assess whether significant chipping, peeling, or otherwise deteriorated paint is observed. If paint deterioration is not observed, the documentation will consist of digital photos and a written statement of no significant deterioration.

3.3 X-Ray Fluorescence (XRF) Readings

If the field team observes greater than ten square feet of deteriorating exterior painted surfaces, readings will be taken using a hand-held XRF detector, to measure the lead content of similarly-painted surfaces. Similarly-painted surfaces are features of the same type that would be expected to be coated with the same type of paint. For example, window trim, door trim, eaves, lattice-work, porch steps and railings, siding, sheds and garages may all be coated with different types of paint and therefore would be considered separate groups of similarly-painted surfaces. The field team will document XRF measurements and provide an estimate of the area of deteriorated paint for each group of similarly-painted surfaces on the LBP Assessment Field Sheet. Separate LBP assessments will be prepared for homes and outbuildings, such as garages and sheds.

3.4 LBP Assessment Field Sheet

The field team will document on the LBP assessment field sheet a general description of structures present on each property and provide a discussion of the overall condition of painted surfaces on each structure. The LBP assessment field sheet will provide a plan view sketch of the property showing dimensions of all structures and major features such as sidewalks, driveways, outbuildings, and patios. The documentation will include a description and/or diagram of the roof eave system (if present) and any other factors or relevant observations that are pertinent to paint conditions at the property. A general narrative will be included describing the observed condition of the painted surfaces for each structure on the property, noting any apparent paint deterioration problems.

**Figure 3-1
LBP Assessment Field Sheet Page 1**


99999

 U.S. Environmental Protection Agency Region VII	Omaha Lead Site Omaha, NE Residential Yard Soils Remedial Design Lead Based Paint Assessments
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PROPERTY ACCESS *(to be completed by property owner)*

Para recibir esta forma en español, por favor llame Debbie Kung al 1-800-223-0425

Black & Veatch Special Projects Corp. (BVSPC) is under contract to the U.S. Environmental Protection Agency (EPA) to assist in the determination of exterior paint condition and lead content at residential properties within the Omaha, Nebraska area. Your cooperation is requested in giving EPA and EPA contractors permission to access your property for the purpose of performing a lead-based paint assessment for structures located on your property. For further information contact the local EPA Public Information Center, at 402-731-3045.

Property Access Granted By _____
(Please Print Name)

(Property Owner Signature) _____
(Date)

NOTE: Granting permission DOES NOT necessarily imply your property will be assessed at this time.

PROPERTY INFORMATION *(to be completed by resident and/or property owner - Please Print)*

Resident Name: _____	Owner Occupied?	Yes	No
Resident Address: 123 S Example ST	OMAHA	NE	68107
	(City)	(State)	(Zip)
Owner Name: _____			
Owner address: _____			
Owner's telephone number - Home: _____		Work: _____	
Age of home: _____ years	Paint Condition:	☐ < 10 ft ² Deteriorated ☐ ≥ 10 ft ² Deteriorated	
General Description of Exterior Materials: (type of siding, and approximate % of exterior painted)			
Description of conditions which could contribute to paint deterioration:			

AUTHORITY FOR ENVIRONMENTAL RESPONSE ACTIONS

The activities to be implemented by EPA under this agreement are pursuant to Section 104 of CERCLA, 42 U.S.C. 9604, for "determining the need for response, or choosing or taking any response action under this title, or otherwise enforcing the provisions of this title."

Access Attempts:

First:

Second:

Third:

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Black & Veatch Special Projects Corp.

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Figure 3-1 (Cont.)
LBP Assessment Field Sheet Page 2

Omaha Lead Site LBP Assessment

 99999

LEGEND: H - N - P - 01 - 12345 BVID Number _____ Sample Number _____ Material: P = Paint _____ Side of Structure: N = North S = South E = East W = West _____ Structure Type: H = House G = Garage S = Shed F = Fence _____				Samples Analyzed XRF Unit: _____ Book: _____ Date: _____ Time: _____ Staff: _____	
Sample Number	Lead Loading	Structure/Feature (Window, siding, porch, etc.)	Substrate (Wood, concrete, etc.)	Color	Deteriorated Area
H - _ - P - 01 - 99999	_____ mg/cm ²	_____	_____	_____	_____ ft ²
H - _ - P - 02 - 99999	_____ mg/cm ²	_____	_____	_____	_____ ft ²
H - _ - P - 03 - 99999	_____ mg/cm ²	_____	_____	_____	_____ ft ²
H - _ - P - 04 - 99999	_____ mg/cm ²	_____	_____	_____	_____ ft ²
H - _ - P - 05 - 99999	_____ mg/cm ²	_____	_____	_____	_____ ft ²
H - _ - P - 06 - 99999	_____ mg/cm ²	_____	_____	_____	_____ ft ²
H - _ - P - 07 - 99999	_____ mg/cm ²	_____	_____	_____	_____ ft ²
H - _ - P - 08 - 99999	_____ mg/cm ²	_____	_____	_____	_____ ft ²
H - _ - P - 09 - 99999	_____ mg/cm ²	_____	_____	_____	_____ ft ²
H - _ - P - 10 - 99999	_____ mg/cm ²	_____	_____	_____	_____ ft ²
H - _ - P - 11 - 99999	_____ mg/cm ²	_____	_____	_____	_____ ft ²
H - _ - P - 12 - 99999	_____ mg/cm ²	_____	_____	_____	_____ ft ²
_ - _ - P - _ - 99999	_____ mg/cm ²	_____	_____	_____	_____ ft ²
_ - _ - P - _ - 99999	_____ mg/cm ²	_____	_____	_____	_____ ft ²
_ - _ - P - _ - 99999	_____ mg/cm ²	_____	_____	_____	_____ ft ²
_ - _ - P - _ - 99999	_____ mg/cm ²	_____	_____	_____	_____ ft ²
_ - _ - P - _ - 99999	_____ mg/cm ²	_____	_____	_____	_____ ft ²
_ - _ - P - _ - 99999	_____ mg/cm ²	_____	_____	_____	_____ ft ²
_ - _ - P - _ - 99999	_____ mg/cm ²	_____	_____	_____	_____ ft ²
_ - _ - P - _ - 99999	_____ mg/cm ²	_____	_____	_____	_____ ft ²
_ - _ - P - _ - 99999	_____ mg/cm ²	_____	_____	_____	_____ ft ²
_ - _ - P - _ - 99999	_____ mg/cm ²	_____	_____	_____	_____ ft ²
_ - _ - P - _ - 99999	_____ mg/cm ²	_____	_____	_____	_____ ft ²
_ - _ - P - _ - 99999	_____ mg/cm ²	_____	_____	_____	_____ ft ²
_ - _ - P - _ - 99999	_____ mg/cm ²	_____	_____	_____	_____ ft ²
_ - _ - P - _ - 99999	_____ mg/cm ²	_____	_____	_____	_____ ft ²
_ - _ - P - _ - 99999	_____ mg/cm ²	_____	_____	_____	_____ ft ²
_ - _ - P - _ - 99999	_____ mg/cm ²	_____	_____	_____	_____ ft ²

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**Figure 3-1 (Cont.)
LBP Assessment Field Sheet Page 3**



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Owner Name: Address: 123 S Example ST	Omaha Lead Site Site Sketch LBP Assessment	North Arrow
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Plan View - Indicate number of stories and perimeter dimensions of structure

Indicate regions of deterioration and describe

(Deterioration could include surfaces that are worn due to friction, checking, cracking and flaking, alligatoring, blistering and/or peeling)

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4.0 Photographs

All structures will be photographed using digital photography. To the extent possible, photographs will capture each view of all structures located on the property. An entry will be made in the field notebook to identify which painted surface is depicted in each photograph. Where possible, the photographs will show the surrounding area and reference objects to identify the subject surface. Photographs will be identified as follows:

- Initials of the photographer, month-day-year, and photo identification number.
- Description of what is being photographed.

For example: GLF-05-30-2006-01

Omaha Lead Site, Photograph of paint on first floor siding, south wall of house at BVID 1234.

5.0 XRF Detector Measurements

XRF detector measurements recorded during performance of LBP assessments will be identified as follows:

H(G,S,F)-N(S,E,W)-P-XX-BVID where:

- 1) H,G,S,F,O = Structure type (H = House, G = Garage, S = Shed, F = Fence, O = Other type of out-building).
- 2) N,S,E,W = Exterior wall orientation (North, South, East, West).
- 3) P = Material (Paint).
- 4) XX = Sample number 00 to 99 for each structure.
- 5) BVID = Unique five digit number assigned to property address.

For example, the 5th consecutive house paint sample taken on the south wall of the house on the property identified by the BVID number 1388 is labeled H-S-P-05-1388.

6.0 LBP Assessment Soil Mixing Calculation Sheet

The LBP Calculation Sheet (See Figure 6-1) is prepared using information recorded on the LBP assessment field sheet. The LBP Calculation Sheets will be used by EPA to determine whether structures on a property are eligible for exterior paint stabilization. The LBP Calculation Sheet is based on the risk-management assumption that all deteriorating lead-based paint falls in a 6-foot wide area surrounding the structure and is uniformly mixed in soil to a depth of one inch. Deteriorated surfaces are considered eligible for paint stabilization if the identified deteriorated paint falling to the ground and mixing with soils as described would increase the lead concentration of lead in the soils surrounding a structure by more than 400 parts per million (ppm).

In order to complete the calculation, LBP Assessment Field Sheet measurements are converted to metric system units (meters and kilograms). The conversion factors are shown on the LBP Calculation Sheet and are described below. Figure 6-1 is an example LBP Calculation Sheet for a property that will require paint stabilization due to the presence of deteriorating lead-based paint. The numbered steps in the LBP Calculation Sheet are explained in the following paragraphs.

6.1 Step 1 -- Building Perimeter

The Building Perimeter is the distance around the footprint of the structure, as recorded on the LBP Assessment Field Sheet site sketch.

6.2 Step 2 – Calculation of Impacted Soil Area

For purposes of this calculation, the impacted soil area is defined as a 6-foot wide strip of soil surrounding the structure. The impacted soil area includes the Building Perimeter multiplied by 6 feet (ft). This calculation does not include the 4 corners, which consist of square areas six (6) feet per side. The area of each square is $6\text{ ft} \times 6\text{ ft} = 36\text{ square feet (ft}^2\text{)}$. The “Impacted Soil Corner Area” adds 144 ft^2 ($4\text{ ft} \times 36\text{ ft}$) to the total impacted soil area. Adding both numbers (Impacted soil area + Impacted soil corner area) gives “Total Impacted Soil Area” in square feet.

6.3 Step 3 – Calculation of Impacted Soil Mass

To calculate the mass of impacted soil, the Impacted Soil Volume is first determined using the assumption that the deteriorating lead-based paint is mixed into the top one inch of soil. One inch equals $1/12\text{ foot} = 0.0833\text{ ft}$. The Impacted Soil Volume is Total Impacted Soil

Area in ft^2 (from step 2) multiplied by 0.0833 ft (area times depth). This Impacted Soil Volume is in cubic feet (ft^3), and is converted to cubic centimeters, as shown on the LBP Calculation Sheet.

The Impacted Soil Volume is then converted to Mass of Impacted Soil by multiplying the estimated bulk density of Omaha area surface soils (1.6 grams per cubic centimeter – g/cm^3) by the volume of soil (Impacted Soil Volume), then converting this number to kilograms (1,000 grams = 1 kilogram [kg]).

6.4 Step 4 – Calculation of Allowable Lead in Impacted Soil

Structures are considered potentially eligible for exterior lead-based paint stabilization if deteriorating paint falling to the ground and mixing as described would increase the lead concentration of surrounding soils by more than 400 ppm.

The Allowable Lead in Impacted Soil is calculated by multiplying the Mass of Impacted Soil (in kilograms from Step 3) by the 400 ppm interim risk management cleanup level². The resulting product (in milligrams) is converted to kilograms by multiplying by 1,000,000.

In the Soil Mixing Calculation Sheet Example (Figure 6-1), the mass of Allowable Lead equals 1.38 kg. This amount of lead in drip zone soils would result in an increased concentration of 400 ppm if dispersed uniformly throughout the Impacted Soil Volume.

6.5 Step 5 – Tabulation of Potential Lead Contamination

The potential lead contamination for each group of similarly-painted surfaces is calculated in Step 5, using information from the LBP Assessment Field Sheet (Figure 3-1) and then added together to determine the total amount of lead present in deteriorated painted surfaces on the structure. The total amount of potential lead contamination is the amount of lead that could fall onto the ground and mix with impacted soils for that particular structure. Following is a brief explanation of each column heading:

- **Sample #** - Identifies the paint sample analyzed using the hand-held XRF unit.
- **Structure/Feature** – The type of structure or feature where the deteriorated paint sample was analyzed.
- **Loading (mg/cm^2)** – The amount of lead detected in mg/cm^2 using the hand-held XRF detector.
- **Deteriorated Area (ft^2)** – The total area in square feet (SF) of the deteriorated paint on the structure for each type of similarly-painted surface.

² Parts per million (ppm) are mathematically equivalent to milligrams per kilogram (mg/kg)

- **Deteriorated Area (cm²)** – Conversion to square centimeters. The conversion factor is 929.03 cm² per square foot.
- **Lead (mg)** – The total amount of lead in each deteriorated area on the structure. This is calculated by multiplying **Loading (mg/cm²)** by **Deteriorated Area (cm²)**.
- **Lead (kg)** – Conversion to kilograms (kg). The conversion factor is 1,000,000 mg per kg.

6.6 Step 6 – Comparison of Potential Lead Contamination to Allowable Lead in Impacted Soil

If the Total amount of potential lead contamination (from Step 5) is greater than Allowable Lead in Impacted Soil (from Step 4), the deteriorated paint on the structure could potentially fall to the ground, mix with impacted soils, and result in increased lead concentrations exceeding 400 ppm. The presence of deteriorated lead-based paint is considered significant enough in this instance to threaten the continued effectiveness of remediated soils, and deteriorated surfaces on the structure would be eligible for paint stabilization.

6.7 Step 7 – Contamination Potential, Highest to Lowest

This table includes the same information presented in Step 5 for those surfaces that are determined to contribute to the potential lead content in deteriorated paint on the structure. In this tabulation, lead-painted surfaces are arranged from the highest amount of potential lead content to lowest. This purpose of including this information is to simplify identification of the primary sources of lead if paint stabilization actions are determined to be necessary.

Figure 6-1 Example LBP Assessment Calculation Sheet

Omaha Lead Site

<ID> - House

Estimate of Potential Contamination due to Deteriorating Lead Paint, based on LBP Assessment Data

Sample Area ID (BVID): NNNNN
Property Address: 123 Example St

Date: 08/16/06
Verified by:

1. Building Perimeter

Building Perimeter: 128 ft

2. Calculation of impacted soil area - 6-foot wide strip around structure:

Impacted Soil Area:	768	ft ²	Assume a 6 foot wide area x house perimeter
Impacted Soil Corner Area:	144	ft ²	4 corners of home at 6-foot by 6-foot
Total Impacted Soil Area:	912	ft ²	perimeter + corner area

3. Calculation of impacted soil mass - assumes lead mixed into the top 1" (0.0833 ft):

Total Impacted Soil Volume:	76.00	ft ³	area x .0833 ft
Unit conversion factor:	28316.8	cm ³ /ft ³	
Impacted Soil Volume:	2152080	cm ³	volume x conversion factor

Assumed soil density:	1.6	g/cm ³	
Mass of impacted soil:	3443329	g	volume x density
Mass of impacted soil:	3443	kg	1,000 g = 1.0 kg

4. Calculation of allowable lead in impacted soil:

Interim ROD Cleanup level:	400	mg/kg	
Allowable Lead in impacted soil:	1.38	kg	mass of impacted soil x 400 mg/kg, divided by 1,000,000

5. Tabulation of potential lead contamination:

Sample #	Structure - Feature	Lead Loading [g/cm ³]	Deteriorated Area [ft ²]	Deteriorated Area [cm ²]	Lead [mg]	Lead [kg]
H-N-P-01	Porch - Column	4.16	1	929	3865	0.004
H-N-P-02	Window - Trim	ND*	1	929	0	0.000
H-N-P-03	Porch - Ledge	42.37	5	4645	196815	0.197
H-N-P-04	Foundation - Lattice	39.78	20	18581	739137	0.739
H-E-P-05	Foundation - Lattice	38.32	10	9290	356004	0.356
H-E-P-06	Window - Trim	43.06	2	1858	80008	0.080
H-S-P-07	Deck - Floor	ND*	5	4645	0	0.000
H-W-P-08	Window - Trim	34.02	8	7432	252845	0.253
H-W-P-09	Foundation - Lattice	ND*	1	929	0	0.000
Total amount of potential lead contamination:					1.629	kg

6. Does the total potential lead contamination exceed the allowable lead in impacted soil?

YES

7. Contamination Potential, Highest to Lowest

Sample #	Structure - Feature	Lead Loading [g/cm ³]	Deteriorated Area [ft ²]	Deteriorated Area [cm ²]	Lead [mg]	Lead [kg]	Sum of Lead [kg]
H-N-P-04	Foundation - Lattice	39.78	20	18581	739137	0.739	0.739
H-E-P-05	Foundation - Lattice	38.32	10	9290	356004	0.356	1.095
H-W-P-08	Window - Trim	34.02	8	7432	252845	0.253	1.348
H-N-P-03	Porch - Ledge	42.37	5	4645	196815	0.197	1.545
H-E-P-06	Window - Trim	43.06	2	1858	80008	0.080	1.625
H-N-P-01	Porch - Column	4.16	1	929	3865	0.004	1.629
Total amount of potential lead contamination:					1.629	kg	

* ND = Non-Detect

7.0 Paint Stabilization Actions

The LBP Assessment Calculation Sheets will be considered in determining if structures are eligible for paint stabilization. The results of the soil mixing calculation will be one tool that is considered by EPA and/or its partnering agencies in determining which structures, or components of structures, are eligible for stabilization. EPA and/or its partnering agencies will visit each property where the soil mixing calculation for a structure results in a lead concentration greater than 400 ppm, and also visit the properties where a significant deteriorating paint problem is noted on the field sheet, regardless of the outcome of the soil mixing calculation. EPA and/or its partnering agencies will inspect paint conditions at all properties where significant deteriorating paint conditions have been identified and determine the specific components of each structure that will be eligible for exterior paint stabilization, in consultation with the homeowner.

- If the total amount of potential lead contamination exceeds the Allowable Lead in Impacted soil, the structure is eligible for paint stabilization. In the example provided (Figure 6-1), the structure is determined to be eligible for paint stabilization due to the results of the LBP Assessment Calculation Sheet. EPA, and/or its partnering agencies, will visit the property to discuss results with the homeowner. In consultation with the homeowner, EPA and/or its partnering agencies will determine the surfaces on the affected structure that are eligible for paint stabilization under the interim remedy. EPA and/or its partnering agencies will proceed with stabilization of designated surfaces only with the consent of the homeowner.
- If the total amount of potential lead contamination does not exceed the Allowable Lead in Impacted Soil, the structure is not eligible for paint stabilization based on the pilot study quantitative approach. In these cases, the LBP Assessment Field Sheet (Figure 3-1) will be reviewed to determine if a significant deteriorating paint problem was observed and noted during the lead-based paint assessment. If a significant deteriorating paint problem was documented, EPA and/or its partnering agencies will return to the property to further assess the need for stabilization. Under certain circumstances, some surfaces could be designated as eligible for paint stabilization despite the results of the LBP Assessment Calculation Sheet. An example of this type of circumstance could involve a badly deteriorated painted surface with a very high lead content that was inaccessible during the lead paint assessment. This could consist of an upper floor surface that was not reachable by field crews during the LBP Assessment. EPA and/or its partnering agencies may designate surfaces as eligible for stabilization in these instances if a finding is made that the continued effectiveness of the remedy is threatened due to deteriorated paint conditions. Stabilization of any surfaces so designated will only proceed with the consent of the homeowner.

8.0 Documentation

All information gathered during the LBP Assessment, including field sheets, notes, and log entries, will be maintained in an organized file structure. The LBP Assessment Calculation Sheet and all records of communication with the homeowner and other interested parties will be retained. The homeowner will be asked to acknowledge by signature whether consent is given for EPA and/or its partnering agencies to proceed with paint stabilization activities. All activities described in this work plan, and any subsequent actions involving paint stabilization will be performed at absolutely no cost to the homeowner or residents.

9.0 Further Information

For further information regarding the EPA paint stabilization program, or any aspect of the Omaha Lead Site cleanup, please contact the EPA Public Information Center at (402) 731-3045.