IMPACT OF UNTREATED FIRE ESCAPES ON INTERIOR DUST LEAD LOADINGS
Final Report

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Prepared for:

New York City Department Housing Preservation and Development and the New York City Department of Health, Lead Poisoning Prevention Program

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1. Introduction

The New York City Department of Health Lead Poisoning Prevention Program was interested in investigating the relationship between lead-based paint on untreated fire escapes and interior dust lead loadings within treated units. The purpose of this study was to determine whether dust lead loadings on the sills and floors of treated rooms located directly adjacent to untreated fire escapes (called "fire escape rooms") were significantly higher than those collected from the same components in a nearby room (i.e., the control room) located within the same dwelling.

Under the supervision of the New York Department of Housing Preservation and Development, with funding received under HUD's Lead-Based Paint Hazard Reduction Program, the rooms included in this study had been treated for lead hazards six to roughly 24 months prior to this study, with one-third of units completely abated, and the remaining units having major lead abatement work performed. Window replacement occurred in 19 units and window treatment (e.g., painting, paint stabilization, etc.) in the remaining 25 units.

2. Sample Methodology

In accordance with study sampling protocols developed in collaboration with the University of Cincinnati (see Appendix A), the following types of samples were collected from each dwelling unit:

- XRF measurements of the platform, handrail, and structural member (e.g., stair stringer, bracket support) of the fire escape; of the window sill immediately inside the fire escape room; and of the window sill in the control room. XRF measurements were collected using a RMD LPA-1 that had been adjusted to provide readings above 9.9 mg/cm^2.
- Interior floor dust wipe samples immediately below the window leading to the fire escape and below a window in the control room (i.e., the same windows that are XRF-tested).
- Interior window sill dust wipe samples from the same windows described above.

Samples were collected by three certified risk assessors from the Department of Health or the Department of Housing Preservation and Development. Samples were sent to an EPA National Lead Laboratory Accreditation Program (NLLAP)-recognized laboratory at the University of Cincinnati for analysis. The laboratory has shown evidence of its proficiency in dust lead analysis under the Environmental Lead Proficiency Analytical Testing Program (ELPAT). All wipe samples were analyzed for total lead according to EPA SW-846, with a method detection limit of 2 µg/sample. (This MDL value was determined prior to changes in NLLAP protocols for listing values that are below laboratory reporting limits.)

If possible, samples were collected from at least one apartment unit on each floor of a building. In each unit, dust wipe samples were collected before XRF testing of the fire escape to ensure that the dust samples did not include dust tracked from outside the unit. In addition to the sample collection, a visual assessment of the substrate and condition of paint on the untreated fire escapes was also performed.

To ensure similar environmental conditions, the inspector attempted to select the control room along the same wall as the fire escape room; however, due to the configuration of New York apartments, only about half were located on the same side of the apartment building as the fire escape room. Regardless of the side of the building, the control room chosen was the one that had a window and was located closest to the fire escape room. No bathrooms were sampled.

In addition to the samples noted above, exterior sill (i.e., window trough) samples were collected from the window that opened onto the fire escape (see Appendix B); however, since no trough samples were collected from the window in the control room, these data were not used in this study. Only data from the post-intervention period (generally six to approximately 24 months after intervention was completed) are summarized in this report. The same series of samples were also collected from eight pre-intervention (Phase 1) units (see Appendix B); however, these data were not included in this report since dust lead loadings in these untreated units were likely to be quite different from those in the treated units.

All data were hand-entered in the field onto three forms (see Appendix A), then entered onto an Excel spreadsheet (Appendix B).

3. Building and Dwelling Unit Characteristics

As shown in Table 1, the twelve buildings included in this study were generally built in the early 20th century (i.e., constructed between 1905 and 1931), low-rise (3- to 6-story) and of varying size (8 units to 46 units per building). Of the 44 dwelling units sampled for this study, five were located on the first story, 11 on the second story, nine on the third story, 11 on the fourth story, and four each on the fifth and sixth stories. At the time of sample collection, 29 of the 44 units were occupied, 14 were vacant, and one had no occupancy information available.

Table 1: Building and Dwelling Unit Characteristics

Building Elevation	Number of Buildings	Number of Units in Building/Number of Units Tested	Year of Construction
6-Story	2	36/5	1926
		46/5	1925
5-Story	4	25/4	1907
		27/4	1927
		42/4	1913
		42/4	1913
4-Story	5	8/1	1931
		8/2	1931
		16/2	1905
		24/3	1905
		27/4	1922
3-Story	1	17/6	1928
Total:	12	318/44	

4. Lead Paint Content and Condition

A. Fire Escape Components. As shown in Table 2, most fire escape platforms were in good to fair condition, with the higher paint lead levels (i.e., greater than 10 mg/cm^2) tending to be found on platforms that were in good condition. The three platforms with paint in poor condition had relatively lower paint lead content. Similarly, the majority of handrails and structural members (e.g., stair stringers, bracket supports) were in good or fair condition. Only three handrails and three structural members tested had paint in poor condition, but again, these tended to have lower paint lead levels than the handrails and structural members that were in good or fair condition.

Table 2: Paint Condition and Lead Content of Fire Escape Components

Component	Number of Units with Paint in Specified Condition[a]		Range of Lead Paint Concentrations (mg/cm^2)	Median Lead Paint Concentration (mg/cm^2)
Platform	Good:	18	2.4-24	5
	Fair:	23	0.7-9.9	4.3
	Poor:	3	0.9-5.5	3.2
Handrail	Good:	18	1.6-21	7.7
	Fair:	23	0.2-18	5.7
	Poor:	3	1.6-7.8	2
Structural Member	Good:	17	0.6-34.3	9.9
	Fair:	24	1.6-18	10
	Poor:	3	3-9.7	5.4
Total Fire Escape	--	44	0.2-34.3	7.4[b]

[a]Good Condition=paint intact and does not chalk; fair=largely intact with cracks and chipping; poor=peeling, chalking, blistering, flaking, or separated from surface.
[b]Value is the median of the geometric mean lead paint concentrations found on the platform, handrail, and structural member of fire escapes.

B. Window Sills. As noted in the introduction, study rooms had been treated for lead hazards 6 to roughly 24 months prior to this study, with window replacement occurring in 19 units and window treatment in the remaining 25 units. The vast majority of window sills in both rooms were in good condition and did not contain lead-based paint (see Table 3). The surface condition of window sills in both rooms was similar, with over 90 percent being in good condition (96% of sills in fire escape room, and 93% in control room), and none being in poor condition. Lead content of paint on sills in both rooms was also low compared with the lead content of paint on the fire escape: only two sills in the fire escape room (both in good condition) had concentrations exceeding 1 mg/cm^2 (1.4 and 1.6 mg/cm^2, respectively), while only one sill in the control room was above this level (4.4 mg/cm^2) and in good condition. Based on a paired t-test, there was no significant difference between paint lead content on windows in the fire escape room compared with that on windows in the control room (p=0.51).

Table 3: Paint Condition and Lead Content of Windows

Component	Number of Units with Paint in Specified Condition[1]	Range of Lead Paint Concentrations (mg/cm^2)
Window in Fire Escape Room	Good: 42 Fair: 2 Poor: 0	0-1.6 0-0.2 --
Window in Control Room	Good: 41 Fair: 3 Poor: 0	0-4.4[2] 0-0.2 --

[1]Good Condition=paint intact and does not chalk; fair=largely intact with cracks and chipping; poor=peeling, chalking, blistering, flaking, or separated from surface.
[2]With the exception of one reading at 4.4 mg/cm^2, all XRF readings were less than 1 mg/cm^2.

5. Dust Lead Loadings and Statistical Analyses

As shown in Table 4, median floor dust lead loadings in both rooms were well below the joint HUD/EPA guidance clearance standard of 100 $\mu g/ft^2$, while median interior window sill dust lead loadings were below a standard of 500 $\mu g/ft^2$. Floor dust lead loadings in the two rooms were similar, with no significant differences between geometric means found based on a t-test (p=0.56). Likewise, for interior window sills, geometric mean dust lead loadings in the fire escape room were not statistically different from those in the control room based on a t-test (p=0.12) or a Kolmogorov-Smirnov test (p=0.51). (Based on previous studies showing that lead dust wipe data are generally log-normally distributed, all statistical tests were performed on log-transformed data.) Interestingly, however, a signed rank test did show a marginally statistically significant difference between the median sill dust lead loadings in the control room versus the fire escape room (p=0.045).

Dust lead loading data were then stratified according to whether windows in the fire escape rooms were located along the same wall or along a different wall than windows in the control rooms. Control room windows that are located along the same wall may have been located closer to the fire escapes than windows located along a different wall. Also, windows along the same wall are likely exposed to similar external conditions than windows located along different walls. Based on a paired t-test, for either category (i.e., windows along the same wall or windows along a different wall), no significant difference in dust lead loadings was found for either floors (p=0.91 for same wall, p=0.31 for different wall) or sills (p=0.13 for same wall; p=0.60 for different wall) in fire escape rooms versus control rooms.

The potential influence of dwelling elevation on differences in dust lead loadings in fire escape rooms versus control rooms was also analyzed, but was not found to have a significant effect. When loadings were categorized according to the elevation of the dwelling unit (i.e., unit located on first or second floor versus units located more than two stories above the ground level), no significant differences in dust lead loadings (based on a paired t-test) were found for either floors (p=0.72 for stories 1or 2; p=0.66 for stories 3 and higher) or sills (p=0.27 for stories 1 or 2; p=0.30 for stories 3 and higher) in fire escape rooms versus control rooms.

A mixed model was conducted to determine whether the paint lead levels and paint condition on fire escapes significantly affected sill dust lead loadings in the two rooms, but no significant effect was found based on a 3-factor interaction between the presence of the fire escape, paint lead level, and paint condition (p=0.93)

Finally, dust lead loadings were stratified in order to determine whether distance of the unit from the top story of the building could have an impact. Dust lead loadings were separated into two groups: data from units that were located less than 2 floors from the top story of the building, and data from units that were located more than 2 floors from the top. Again, no significant differences in dust lead loadings were found based on a paired t-test for either floors (p=0.63 for <2 stories from top; p=0.76 for 2 or more stories from top) or sills (p=0.12 for <2 stories from top; p=0.59 for 2 or more stories from top) in fire escape rooms versus control rooms.

Table 4: Dust Lead Loading Results for Floors and Window Sills in Fire Escape Room and Control Room

	Dust Lead Loading (µg/ft^2)					
Component	**# of Samples**	**5th %tile**	**25th %tile**	**Median**	**75th %tile**	**95th %tile**
Floor under window in fire escape room	44	5	8	16	38	133
Floor under window in control room	44	4	8	18	38	84
Interior window sill—window in fire escape room	44	48	139	333	635	4,151
Interior window sill—control room	44	40	95	234	540	2,151

6. Discussion

Statistical tests generally indicated that, based on the study data collected, fire escapes did not appear to contribute significantly to floor dust lead loadings in rooms connected to fire escapes. For window sills, one of the three statistical tests run (the signed rank test) indicated a marginal significant difference between dust lead loadings in the control room versus the fire escape room. This finding is supported by circumstantial evidence suggesting that the untreated fire escapes do impact window sill loadings. For example, across the range of results, dust lead loadings on fire escape room sills were consistently higher than those on control room sills (see Table 4). Indeed, 28 of the 44 fire escape room sills had higher dust lead loadings than those in the control room.

In addition, sill dust lead loadings in both rooms were unexpectedly high, especially considering that units had recently undergone major lead hazard control work, and no important interior source of lead was present in most units. Therefore, an exterior source is likely the cause of the high sill loadings. Other than untreated fire escapes, exterior lead dust sources primarily include airborne particulate emissions from smokestacks, neighboring construction or demolition work, and disturbed leaded street dust. No information concerning these potential exterior sources was collected during this study; however, they may have impacted sill dust lead loadings in both the control room and the fire escape room, making it more difficult to "single out" untreated fire escapes as a major source. The study was originally designed to account for these other exterior sources by requiring that the fire escape room and the control room be located along the same wall and subject to the same environmental conditions; however, this requirement could not be met for almost half of the study units.

The presence of exterior source(s) of lead dust is to some extent supported by sill dust lead loadings on the first and second floors of buildings (medians in fire escape room and control room equal 377 $\mu g/ft^2$ and 250 $\mu g/ft^2$, respectively), which exceeded sill loadings on the third to sixth floors (medians in fire escape room and control room equal 290 $\mu g/ft^2$ and 230 $\mu g/ft^2$, respectively). This pattern is expected if lead is from the street, from adjacent buildings, or from fire escapes.

In addition to the problem of other exterior lead dust sources, the difficulty in discerning a strong statistical difference between sill dust lead loadings is likely due to the high degree of spatial variability associated with dust lead wipe sampling in general. A sample size of 44, although large enough to allow statistical analyses to be conducted, was not likely powerful enough to "tease out" untreated fire escape effects from spatial variability and the other exterior sources of lead dust.

The good condition of many of the fire escapes involved in this study, as well as the relatively lower concentrations of lead in the paint of fire escapes that were in poor condition, may have also influenced the results, making it more difficult to discern a difference between dust lead loadings on floors and window sills in the two rooms. Alternatively, however, if the only deteriorated section of the fire escape happened to be located near the top of the building, its deterioration could be a source of lead contamination for all floors below, including control rooms if their windows are located within range of this falling material.

7. Conclusions and Recommendations

Although statistical results generally indicated that fire escapes do not contribute significantly to the dust lead loadings in rooms connected to the fire escapes, the study had major limitations that preclude drawing any firm conclusions. Future study is needed to decisively determine the impact, if any, of untreated fire escapes on interior dust lead loadings, particularly on window sills. Future studies should include the following:

- A larger number of units sampled, to increase the power of any statistical analyses and help overcome the spatial variability problems generally associated with dust wipe sampling.
- For each sample collected, an increase in the amount of window sill space sampled in each room (e.g., collecting a sample from the entire window sill); this increase would also reduce the problem associated with spatial variability.
- Limitation of the study to control room windows and fire escape room windows located along the same wall, to control for other exterior air lead exposure sources (e.g., street dust).

- Study of a series of units in a building that follow the fire escape from the top to the bottom of the building in a vertical line. Also, measurement of the distance of the control room window from the fire escape and its alignment relative to the fire escape would help in determining whether the room is truly a control or may be at least partially impacted by the fire escape.
- Collection of information on other factors potentially influencing sill dust lead loadings, such as tenant cleaning practices and the frequency of opening and shutting windows.

The above recommendations are crucial in determining whether untreated fire escapes adversely impact the long-term success on interior lead hazard control work.

APPENDIX A
FIRE ESCAPE STUDY PROTOCOLS

Appd 11

XRF and Dust Sampling

Before entering the building, a staff member should visually survey where the fire escapes are located and whether or not they are accessible to permit exterior dust vacuum sampling. Every attempt should be made to gain access to one apartment per floor containing a fire escape. Upon gaining access to a household, a floor map (form 12) will be drafted if one does not exist already. The window containing the fire escape should be identified, as well as a window in an adjacent room where sampling will take place. The inspector should also ask if the family uses the fire escape for any purpose, then record the answer on the form 28.

Dust Sample Locations and Rationale

In order to assess the relationship between lead paint on fire escapes and associated interior and exterior dust lead levels, two qualifying rooms need to be identified and sampled from.

Room A will contain a window leading to the fire escape.

Room B will ideally have a window facing the same street as the fire escape window. If this is not possible, the room in closest proximity containing a window should be used (bathrooms should not be included in the selection of rooms). This room will be used as a baseline when comparing dust sample data

Dust Sample Collection

Dust Sampling should be performed before XRF testing to ensure that there is not contamination of the sample area caused by dust brought in from fire escape XRF testing.

The condition of the component you are testing, as well as the substrate of the component, should be noted on the Form 28. The naming of walls (A,B,C,D) should be done in a clockwise manner from the entrance to the room and then noted on Forms 12 and 28. The windows you are sampling from should also be noted by placing a "X" on the window as indicated on the form 12.

Dust wipes should be collected following the same protocol used in the HUD Evaluation. In the room containing the fire escape, three samples will be taken in the following order: Floor, window sill, exterior sill.

Controls: Prior to the collection of samples, the first wipe is removed and placed in a labeled tube. This procedure is repeated at the beginning of every apartment visited. This is done to ensure that the wipes have not been contaminated.

0.56 ft²

Floor: A 9" x 9" template will be used to take a single sample from the floor immediately below the sill associated with the fire escape as well as an adjacent room.

.0625 ft²

Window Sill: A 9" x 1" template will be used to take a single sample from either the left side or right side of the window sill associated with the fire escape and a window sill from an adjacent room. The side where the sample is taken is dependent on what HUD phase the building is in at the present time. Taking it from the correct side ensures that we are not sampling from the same area that HPD inspectors sample. They are as follow:

Phase 1: Left side
Phase 2: Right side
Phase 3: Left side
Phase 4: Right side

.0625 ft²

Exterior Sill: A 9" x 1" template will be used (if this is not possible, then area must be measured) to take a single wipe sample from the window associated from the fire escape

Note: In order to prevent cross contamination of samples, it is essential that gloves are changed and discarded after each sample.

XRF Testing

Portable XRF lead in paint analyzers will be used to determine the levels of lead in paint coatings on fire escapes and windows opening on to those fire escapes. XRF testing will commence after dust sample collection is completed. Calibration of the XRF will occur in every apartment. The calibration consists of taking three readings (Test mode for MAP-4, time-corrected mode for LPA-1) from each side of the calibration block provided with the instrument. The calibration must fall within a specific range (as indicated by manufacturer) in order to commence testing.

Once the instrument is properly calibrated, you should begin your visual inspection of the fire escape (paint condition, substrate), and both the fire escape window and the adjacent window. Note the absence of any components, and explain why a component cannot be tested (unpainted, not present). Document all of the above listed information on either form 27 or 15.

XRF Sample Locations

Three assays (quick mode for LPA-1, screen for MAP4) will be performed on the following three components of the fire escape:

Platform: The area of the fire escape where people would walk on

Handrail: The area used to hold on to while walking or climbing stairs

Structural Member: stair stringer, bracket support, manufacturer's emblem

Three assays (quick mode for LPA-1, screen for MAP4) will also be performed on the window immediately inside of the fire escape, on the following components:

Window Sill

Repeat the aforementioned XRF testing on the window located in the adjacent room.

All XRF readings should be documented on Form 27.

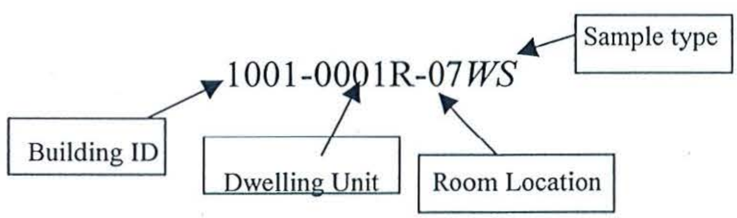
Note: In order to properly test all of the components of the fire escape, it may be necessary to climb on to the fire escape. Great care should be taken when climbing onto and off of the fire escape. Make sure the fire escape is firmly attached and no visible hazards are evident. If for any reason you feel that the fire escape is not structurally sound, document situation and do not attempt testing.

Labeling of samples

Labels should be completed before entering the field. The format of the label is the following:

Building ID-Dwelling Unit-Room location sample type

For Example,



Forms

The forms used to record dust sample information and XRF readings were developed by the University of Cincinnati, Department of Environmental Health. The forms used are:

- **Form 12- Floor Plan and Property Sketch (1 per household)**
- **Form 15 – XRF Paint Inspection & Testing – Interior Rooms (2 per household)**
- **Form 27 – XRF Paint Testing – Fire Escapes (1 per household)**
- **Form 28 – Dust Sample Collection – Fire Escapes (1 per household)**

These forms can be found in the appendix section of this document. Header information needed for these forms and previously drawn Form 12's can be obtained through the HUD database.

Materials and Supplies

Templates: 9" x 1" needed for window sill and exterior sill dust samples
9" x 9" square, needed for Floor Dust samples

XRF: RMD LPA-1 or Scitec MAP4

Disposable Wipes, any brand approved by the HUD Lead-Based Paint Hazard Control Grant Program

Gloves, non-powdered, latex, disposable

50 ml CP centrifuge tubes, to be used as sample containers

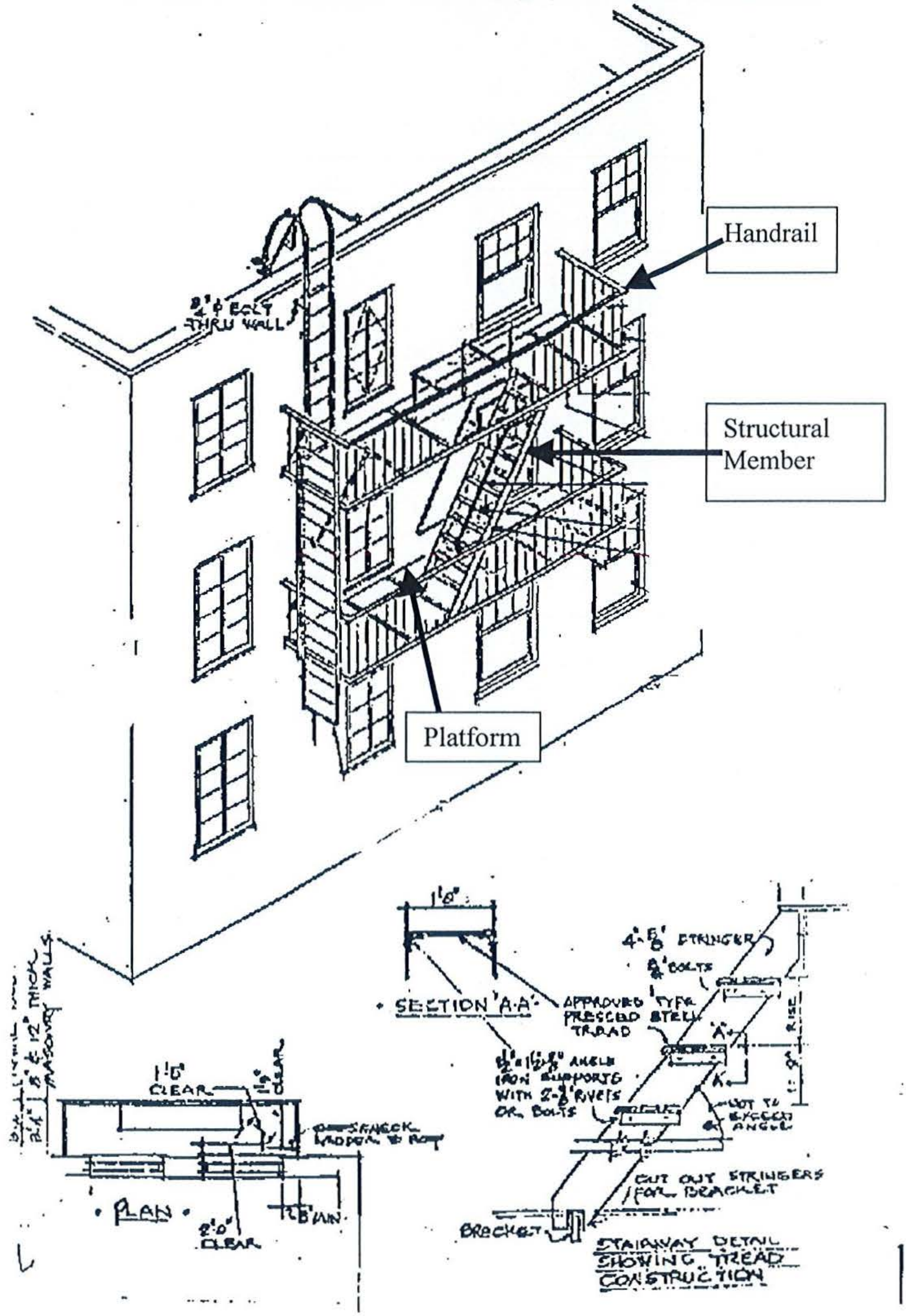
Clipboard

Tape measure

Labels, Avery 5260, needed for the necessary demarcation of samples

Floor Plan and XRF/Dust Sampling Forms, as described below

FIRE ESCAPES AS PER SEC 53 MDL AND FE RULES AND REGULATIONS



Form 28 - Dust Sample Collection - Fire Escapes

New York City Department of Health — **Fire Escape/Exterior Dust Study**

Phase	Grantee	Subsite	Neighborhood	Building	Dwelling Unit	No. of Households	Household ID	Status*

	Household/Last Name	First Name	Home Phone	Work Phone	Relationship to Parent	Relation-ship *Code
Parent						
Parent						
**Contact Person						
Owner						

	St. No.	Street Name	Apt. No.	City	State	Zip Code
Parent (Residence)						
Owner						

Form 19 page number: ☐ Total number of Form 19 pages: ☐

Proximity to Fire Esc.	Room/ Location		Sample Type	Surface Type	Surface Condit'n	Sample area measurements Length(inches)	Width (inches)	Sample Number	Results ug/sq ft
Adjacent									
Adjacent									
Adjacent									
Adjacent									
Adjacent									
Adjacent									
Remote									
Remote									
Field Blank	wipe lot #								
Spiked Sample									

Sample type code: 1=Bare floor - wipe, 2=Window sill, 3=Window well, 4=Carpeted floor - vacuum, 5=Carpeted floor - wipe

Surface type code: 1=Vinyl, 2=Carpet, 3=Bare wood, 4=Painted surface, 5=Concrete, 6=Other

Surface condition code: 1=Good, 2=Fair, 3=Poor

Notes:

01. Do you or others who live here regularly use the fire escape for any purpose? ☐

Code: 1=Yes, 2=No

Date samples obtained:	
Date shipped to lab:	
Laboratory Number:	

Name of Inspector (print name):

Reviewed for Data Center by (print name):

Initials
Date Compiled

(Developed by U of C on 07/07/98)

For Comparison purposes, adjacent = window containing fire Escap
Remote = comparison window

FORM 27 - XRF Paint Testing - Fire Escapes

New York City Department of Health

Fire Escape/Exterior Dust Study

Phase	Grantee	Subsite	Neighborhood	Building	Dwelling Unit	No. of Households	Household ID	Status*

St. No.	Street Name	Apt. No.	City	State	Zip Code
				NY	

Form 27 page number: ____ Total number of Form 27 pages for this dwelling: ____ Room/Location No.: ____

Wall Code	Component Code	Paint Condt'n Code	Substrate Code	ALC mg/sq cm Rdg #1 or Screen Mode	ALC mg/sq cm Rdg #2 or Screen Mode	ALC mg/sq cm Rdg #3 or Screen Mode	ALC mg/sq cm Avg or Test Mode	CLC mg/sq cm	Final Lead Content	Paint Chip Sample No.	Lead Content
	PL		12								
	HR		12								
	SM		12								

Notes:

Paint Code: 1=Good. Paint intact and does not chalk. 2=Fair. Largely intact with cracks & chipping.
3=Poor. Peeling, chalking, blistering, flaking, or separated from substrate.

Substrate Code: 12=Metal 13=Other

Lead Content Code: P=Positive N=Negative I=Inconclusive (take paint chip samples)

Component codes: PL=Platform HR=Handrail SM=Structural member

Reviewed for Data Center by (print nam

Initials	Date of Insp.
ACF	

(Developed by U of C on 07/07/98)

Appd B.

Variable Name	Variable Description
bldgid	Designated ID number for Buiding funded by HUD Lead Grant
Phase	What phase level was the building in when samples were taken
blgdadd	Numerical address of building
bldgst	Street name of building
bldgzip	Zip code of building
bldgboro	Which of the 5 boroughs is the building located
bldgage	Year building was constructed
bldgsize	Number of units in building
bldgelv	Number of floors in building
dwlgid	Apartment number
hhid	Unique ID given to family in building
occstat	Occupied status (refer to HUD National Evaluation Forms)
dwlgelv	What floor is the unit located on
rmidfe	Room identifier of location of Fire Escape
wallfe	Wall where Fire Escape is located
substfe	Substrate of Fire Escape
condplat	Condition of the Platform
xrfplat	XRF value of the platform of the fire escape
condhrl	Condition of the handrail of the fire escape
xrfhrail	XRF value of the handrail of the fire escape
condsmbr	Condition of a structural member of the fire escape
xrfsmbr	XRF value of a structural member of the fire escape
substwfe	Substrate of the Window sill associated with the fire escape
condwfe	Condition of the window sill associated with the fire escape
xrfwfe	XRF value for Sill associated with the fire escape
rmidaj	Room Identifier for room adjacent to fire escape containing room
wallaj	Wall identifier for window located in adjacent room
substwaj	Substrate of window sill of adjacent room
condwaj	Condition of window sill of adjacent room
xrfwaj	XRF value for window sill located in adjacent room
dsillext	Dust value (micrograms per square foot) for exterior window sill associated with fire escape
dslexsam	Dust value (total lead, in micrograms) for exterior window sill associated with fire escape
dflrfe	Dust value (micrograms per square foot) for floor directly under fire escape widow
dflfesam	Dust Value (total lead, in micrograms) for floor directly under fire escape window
dsillfe	Dust value (micrograms per square foot)for window sill associated with fire escape window
dsillsam	Dust value (total lead, in micrograms) for window sill associated with fire escape window
dflraj	Dust value (micrograms per square foot) for floor directly under adjacent window
dflajsam	Dust value (total lead, in micrograms) for floor directly under adjacent window
dsillaj	Dust value (micrograms per square foot) for window sill associated with adjacent window
dsilajsa	Dust value (total lead, in micrograms) for window sill associated with adjacent window

APPENDIX B

FIRE ESCAPE STUDY DATA

APPENDIX B: NEW YORK FIRE ESCAPE STUDY DATA

bldgid	dwlgid	Phase	bldgage	bldgsize	bldgelv	occstat	dwlgelv	rmidfe	wallfe	substfe	condplat	xrfplat	condhrl	xrfhrail	condsmbr	xrfsmbr	substwfe	condwfe
4	2e	4	1926	36	6	3	2	6	b	12	1	2.4	1	4.1	1	0.6	1	1
4	4c	4	1926	36	6	3	4	4	d	12	1	2.5	1	5	1	2.7	1	1
4	3d	4	1926	36	6	3	3	3	c	12	1	9.9	1	9.9	1	9.9	1	1
4	5e	4	1926	36	6	3	5	6	b	12	1	6.3	1	4.4	1	3.8	1	1
4	6c	4	1926	36	6	3	6	4	d	12	2	0.7	2	3.2	2	2.5	1	1
1015	27	4	1913	42	5	1	2	7	c	12	1	2.4	1	1.6	1	3.1	1	1
1015	35	4	1913	42	5	2	3	6	b	12	1	7.1	1	6.3	1	2.6	1	1
1015	51	4	1913	42	5	2	5	7	c	12	2	6.8	2	7.4	2	1.6	1	1
1015	61	4	1913	42	5	3	6	7	c	12	2	4.3	2	1	2	3.2	1	1
1014	3	4	1913	42	5	2	1	3	d	12	2	0.8	2	0.4	2	1.9	1	1
1014	22	4	1913	42	5	2	2	7	b	12	2	2.9	2	0.2	2	4.2	1	1
1014	53	4	1913	42	5	3	4	7	c	12	1	3	1	2.6	1	9.9	1	1
1014	65	4	1913	42	5	3	5	5	d	12	1	4.3	1	2.5	1	2	1	1
3012	4r	3	1931	8	4	2	4	2	b	12	2	3.7	2	2.3	2	3.5	1	1
3011	2r	3	1931	8	4	1	2	2	c	12	3	0.9	3	2	3	5.4	1	1
3011	4r	3	1931	8	4	1	4	2	c	12	3	3.2	3	1.6	3	3	1	1
3017	4b	3	1905	24	4	3	4	6	c	12	2	9.9	2	9.9	2	9.9	1	1
3017	2b	3	1905	24	4	3	2	6	d	12	2	9.9	2	9.9	2	9.9	1	1
3017	3f	3	1905	24	4	3	3	4	c	12	3	5.5	3	7.8	3	9.7	1	1
3024	2c	1	1923	27	4	2	2	7	c	12	3	1.9	3	4.2	3	7.2	1	1
3024	4g	1	1923	27	4	2	4	7	c	12	2	9.9	2	1.4	2	9.9	1	2
3024	3e	1	1923	27	4	2	3	3	c	12	2	5.7	2	9.9	2	9.9	2	2
3029	2e	1	1920	44	9	2	2	3	d	12	1	2	1	5.1	1	7	1	2
3029	3f	1	1920	44	9		3	5	b	12	1	4.5	1	5	1	1.3	1	1
3029	4b	1	1920	44	9	2	4	5	b	12	2	1.9	2	3.2	2	4.1	1	1
3029	5e	1	1920	44	9	1	5	3	d	12	1	1.6	1	6	1	12	1	1
3029	7f	1	1920	44	9	1	7	5	b	12	1	2.2	1	5.1	1	8.1	1	1
3021	a1	3	1922	27	4	2	1	6	a	12	2	5.5	2	7.6	2	10.3	1	1
3021	c1	3	1922	27	4	2	3	6	a	12	2	2.7	2	10.4	2	7.5	1	1
3021	b3	3	1922	27	4	2	2	5	c	12	2	2.9	2	4.7	2	5.9	1	1
3021	d3	3	1922	27	4	1	4	5	c	12	2	3.5	2	5.1	2	14.7	1	1
1007	d5	4	1927	27	5	1	4	5	c	12	1	15.3	1	2.7	1	15.7	1	1
1007	c4	4	1927	27	5	1	3	3	c	12	2	4.3	2	1.3	2	16	c	1
1007	b3	4	1927	27	5	1	2	4	c	12	1	17	1	21	1	12	1	1
1007	a4	4	1927	27	5	1	1	6	c	12	1	24	1	13	1	20	1	1
1006	42	4	1907	25	5	2	4	6	c	12	2	3.7	2	4	2	12	1	1
1006	41	4	1907	25	5	1	4	6	c	12	2	5.6	2	3.9	2	12	1	1
1006	31	4	1907	25	5	1	3	6	c	12	1	2.8	1	5.3	1	11	1	1
1006	22	4	1907	25	5	3	2	6	c	12	2	6.4	2	4.8	2	10	1	1
3007	4b	4	1925	46	6	1	4	8	b	12	2	2.1	2	18	2	18	1	2
3007	5b	4	1925	46	6	2	5	8	b	12	2	8.4	2	18	2	1.7	1	1
3007	6aa	4	1925	46	6	2	6	6	b	12	2	8	2	17	2	2.7	1	1
3007	2g	4	1925	46	6	2	2	5	b	12	1	3.6	1	19	2	18	1	1
3007	6g	4	1925	46	6	1	6	5	b	12	1	6.2	1	17	1	22	1	1
3015	3a	4	1905	16	4	9	3	8	a	12	2	4.5	2	10.2	2	12	1	1
3015	4d	4	1905	16	4	1	4	7	c	12	2	5.7	2	8.4	2	14	1	1
1	1a	4	1928	17	3	3	1	7	c	12	2	3.3	2	6.1	2	15.6	1	1
1	2a	4	1928	17	3	3	2	7	c	12	2	3.2	2	5.7	2	16.7	1	2
1	3a	4	1928	17	3	2	3	7	c	12	1	2.6	1	11.3	1	24	1	1
1	1b	4	1928	17	3	2	1	4	c	12	1	11.3	1	11.7	1	34.3	1	1
1	2b	4	1928	17	3	2	2	4	c	12	1	9.3	1	9.1	1	29.3	1	1
1	3b	4	1928	17	3	2	3	4	c	12	1	5	1	12.7	1	6.1	1	1

APPENDIX B: NEW YORK FIRE ESCAPE STUDY DATA

bldgid	dwlgid	xrfwfe	rmidaj	wallaj	substwaj	condwaj	xrfwaj	dsillext	dslexsam	dflrfe	dflfesam	dsillfe	dsillsam	dflraj	dflajsam	dsillaj	dsilajsa
4	2e	0	4	b	1	1	0	8261.9	520.5	56.8	32	627	39.5	145.6	82	1912.7	120.5
4	4c	0	5	b	1	1	0	16254	103.5	28.4	16	896.8	56.5	43.5	24.5	817.5	51.5
4	3d	0	4	c	1	1	0	3198.4	201.5	24	13.5	269.8	17	58.6	33	1642.6	103.5
4	5e	0	5	c	1	1	0	12309.5	775.5	16.9	9.5	1222.2	77	15.1	8.5	95.2	6
4	6c	0	5	b	1	1	0	1071.4	67.5	24.9	14	174.6	11	18.7	10.5	230.2	14.5
1015	27	0	6	b	1	1	0	769.8	48.5	157.2	88.5	801.6	50.5	19.5	11	365.1	23
1015	35	0	3	c	1	1	0	1134.9	71.5	7.1	4	47.6	3	4.4	2.5	55.6	3.5
1015	51	0	6	d	1	1	0	127	8	4.4	2.5	47.6	3	6.2	3.5	55.6	3.5
1015	61	0	6	d	1	1	0	714.3	45	54.2	30.5	404.8	25.5	8	4.5	150.8	9.5
1014	3	0	6	b	1	1	0.1	230.2	14.5	16.9	9.5	285.7	18	8.9	5	119	7.5
1014	22	0	4	d	1	1	0	79047.6	4980	108.3	61	4150.8	261.5	13.3	7.5	2301.6	145
1014	53	0	6	d	1	1	0	1738.1	109.5	13.3	7.5	142.9	9	20.4	11.5	111.1	7
1014	65	0	4	b	1	1	0	666.7	42	13.5	13.5	396.8	25	27.5	15.5	500	31.5
3012	4r	1.4	4	b	1	1	0.9	3023.8	190.5	57.7	32.5	39.7	2.5	20.4	11.5	420.6	26.5
3011	2r	1.6	2	c	1	1	0.4	5714.6	326	13.3	7.5	301.6	19	38.2	21.5	317.5	20
3011	4r	0	5	c	1	1	4.4	1023.8	64.5	16	9	95.2	6	128.8	72.5	261.9	16.5
3017	4b	0	7	c	1	1	0	1357.1	85.5	56.5	56.5	706.3	44.5	11	11	230.2	14.5
3017	2b	0	7	c	1	1	0	4381	276	17.8	10	484.1	30.5	52.4	29.5	381	24
3017	3f	0.3	5	b	1	1	0.1	11428.6	720	90	90	214.3	13.5	36.5	36.5	95.2	6
3024	2c	0.2	6	c	1	1	0.4	1492.1	94	111.5	115.5	309.5	19.5	70.5	70.5	269.8	17
3024	4g	0.5	3	c	1	2	0	476.2	30	64.5	64.5	1269.8	80	31.5	31.5	1269.9	79.5
3024	3e	0.2	4	b	2	3	0.4	1420.6	89.5	160	160	3936.5	248	387	387	12214.3	769.5
3029	2e	5.4	5	b	1	2	7.9	6836.6	4560	56.8	32	3460.3	218	20.4	11.5	5992.1	377.5
3029	3f	0	4	c	1	1	0	13379.1	7800	24.9	14	333.3	21	43.5	24.5	1325.4	83.5
3029	4b	0.1	4	c	1	1	0.2	387933.3	290950	38.2	21.5	2174.6	137	53.3	30	1015.9	64
3029	5e	3.9	6	c	1	1	0	50520	12630	35.5	20	928.6	58.5	13.3	7.5	476.2	30
3029	7f	0	4	c	1	1	0.2	140.7	82	13.3	7.5	1246	78.5	13.3	7.5	134.9	8.5
3021	a1	0.2	7	a	1	1	0.1	7713.2	2568.5	135.9	76.5	6190.5	390	48	27	396.8	25
3021	c1	0.1	7	c	1	1	0	6419.2	1470	12.4	7	87.3	5.5	17.8	10	1198.4	75.5
3021	b3	0	6	c	1	1	0	2106.2	615	7.1	4	190.5	12	7.1	4	39.7	2.5
3021	d3	0	6	c	1	1	0.1	233.7	71.5	39.1	22	2936.5	185	38.2	21.5	1555.6	98
1007	d5	0	4	c	1	2	0	582.6	194	6.2	3.5	333.3	21	6.2	3.5	47.6	3
1007	c4	0	5	d	1	1	0	964	281.5	8	4.5	381	24	15.1	8.5	103.2	6.5
1007	b3	0	3	b	1	1	0	2964	741	9.8	5.5	476.2	30	8.9	5	166.7	10.5
1007	a4	0.1	5	c	1	1	0	1468.8	305.5	11.5	6.5	563.5	35.5	10.7	6	261.9	16.5
1006	42	0	4	c	1	1	0	142619	8985	133.2	75	51484.1	3243.5	38.2	21.5	2150.8	135.5
1006	41	0	5	c	1	1	0	5492.1	346	8	4.5	976.2	61.5	22.2	12.5	1952.4	123
1006	31	0	5	c	1	1	0.1	1254	79	8.9	5	134.9	8.5	2.7	1.5	254	16
1006	22	0	4	c	1	1	0.1	10428.6	657	8	4.5	333.3	21	26.6	15	31.7	2
3007	4b	0.2	7	b	1	2	0	377.5	115.5	133.2	75	230.2	14.5	75.5	42.5	381	24
3007	5b	0	7	b	1	2	0.2	15	5	9.8	5.5	87.3	5.5	84.4	47.5	579.4	36.5
3007	6aa	0	5	c	1	1	0	19246	1212.5	30.2	17	388.9	24.5	16	9	150.8	9.5
3007	2g	0.2	6	d	1	1	0.3	339.9	94.5	16	9	79.4	5	22.2	12.5	5738.1	361.5
3007	6g	0.3	6	d	1	1	0.1	13663.7	4550	18.7	10.5	190.5	12	16.9	9.5	119	7.5
3015	3a	0	7	a	1	1	0	976.2	61.5	17.8	10	714.3	45	8.9	5	238.1	15
3015	4d	0	6	b	1	1	0.1	769.8	48.5	37.5	37.5	134.9	8.5	73.5	73.5	111.1	7
1	1a	0	6	c	1	1	0	110.5	29.5	8	4.5	79.4	5	8	4.5	47.6	3
1	2a	0	6	c	1	1	0	73	19.5	4.4	2.5	79.4	5	3.6	2	47.6	3
1	3a	0	6	c	1	1	0	203.8	59.5	11.5	6.5	150.8	9.5	8	4.5	7.9	0.5
1	1b	0	5	c	1	1	0	376.7	110	16	9	373	23.5	22.2	12.5	674.6	42.5
1	2b	0	5	c	1	1	0	440.3	107	5.3	3	381	24	4.4	2.5	95.2	6
1	3b	0	5	c	1	1	0	1845.7	448.5	6.2	3.5	642.9	40.5	2.7	1.5	71.4	4.5