NMHC National Multi Housing Council®

National Apartment Association

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Office of Pollution Prevention and Toxics
Environmental Protection Agency
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RE: Lead; Renovation, Repair, and Painting Program (40 CFR, Part 745)

Docket EPA-HQ-OPPT-2005-0049

The National Multi Housing Council and the National Apartment Association represent the nation's leading firms participating in the multifamily rental housing industry. Our combined memberships are engaged in all aspects of the apartment industry, including ownership, development, management, and finance. The National Multi Housing Council (NMHC) represents the principal officers of the apartment industry's largest and most prominent firms. The National Apartment Association (NAA) is the largest national federation of state and local apartment associations. NAA is comprised of 190 affiliates and represents nearly 50,000 professionals who own and manage more than 6 million apartments. NMHC and NAA jointly operate a federal legislative program and provide a unified voice for the private apartment industry. NMHC and NAA provide quality apartment homes across the nation. Currently 15.6 million households (13.9 %) live in apartment buildings that have five or more units; 22.5 million households (19.5% of the nations total households) reside on properties that have 2 or more units.

NMHC/NAA appreciates the opportunity to offer comments on this rule as part of our continuing dialogue with the federal government on the issue of lead in the environment. The past 20 years have seen a remarkable reduction in blood lead levels (BLL) across the population. According to the U.S. Department of Health and Human Services report, *Healthy People 2010*, the decline in childhood lead poisoning in the United States represents a public health success. The National Health and Nutritional Examination Survey III (NHANES) finds that the incidence of elevated BLL (10 µg/dL) in the U.S. population decreased 94 percent between the periods of 1988-1991 and 1991-1994.[1] A more recent survey found that the geometric mean BLL for the population aged ≥1 year decreased by 30% from 1991--1994 to 1999—2002. In the period of 1999--2002, there was a 68% reduction overall in BLLs in the population and among children aged 1--5 years, there was a 64% reduction in BLLs in comparison to the 1991--1994 survey.[2]

This significant trend is attributable to public policies that eliminated lead from most gasoline, restricted the sale of household paint containing lead, banned lead from use in solder in food and beverage cans and water supply pipes, and limited the emission of lead from industrial facilities. An editorial note in MMWR asserts that the most recently collected data (1999-2002) "demonstrate progress toward achieving the national health objective for 2010 to eliminate elevated BLLs in children."[3]

As a Nation, we have gone a long way towards identifying and eliminating sources of toxic lead in the residential environment. In a previous report, CDC stated that elevated blood levels were more likely to be found in "children aged 1 to 5 years . . . who were poor, non-Hispanic black, living in large metropolitan areas or in older housing (built prior to 1946). (B)ecause the distribution of risk for

[1] US Public Health Service, "The Third National Health and Nutrition Examination Survey (NHANES III), 1988-1994," National Center for Health Statistics, Division of Health Examination Statistics, Hyattsville, MD, 1997.

[2] Blood lead Levels -- United States , 1999-2002. MMWR May 27, 2005 / 54(20);513-516

[3] id

childhood lead exposure varies widely within the United States, *prevention activities must be conducted at the local level and must be appropriate to the local conditions*" (emphasis added). NMHC/NAA suggest that the children at risk would be best served by a strategy that focuses scarce resources on the problem, where it exists.

When the Residential Lead-based Paint Hazard Reduction Act (Title X; P.L. 102-550) was signed into law in 1993, policy makers were relying on reports that estimated that more than 64 million homes (80 percent of the nation's housing stock) was contaminated with lead-based paint. In 2000, based on an expanded dataset with a more representative survey of the nation's housing stock, this estimate was revised to 38 million households based in part on steps taken by property owners to abate lead on their property and the attrition of properties from the housing stock. According to HUD's *National Survey of Lead and Allergens in Housing*, issued in 2001, fully 85 percent of the 1960-1978 housing stock and 40 percent of the pre-1960 stock are in fact lead-based paint free.

GENERAL COMMENTS: The progress that has been made towards achieving the goals set out by Congress in Title X is evidenced by the significant decline in blood lead levels across the population and the significant decreases in the number of children with heath-threatening BLLs. This information, coupled with what we understand to be the incidence of lead-based paint in the housing stock, leads NMHC/NAA to conclude that the rule that EPA has proposed -- while properly addressing the importance of worker training -- is unnecessarily cumbersome and expensive. As proposed, this rule is likely to create a disincentive for reputable contractors providing repair and renovation services in target properties. The rule that EPA is proposing would apply to any repair activity that would disturb more than 2 square feet of a coated surface in a pre-1978 constructed residence that has not been found to be free of lead-based paint. Among other things, the rule would require workers and firms to be certified on a renewal basis and require extensive record keeping regarding activities undertaken during a repair or renovation event. NMHC/NAA are supportive of the provisions of the rule that seek to improve worker skills in order to prevent the development of lead hazards.

While this rule will affect persons who undertake repairs/renovations in target properties, the inconvenient truth is that the properties that are at highest risk of poisoning children are the properties that are the least likely to see a repairman. This rule will likely have a minimal effect on the deteriorated properties that are most deserving of professional renovation. Furthermore, we believe that childhood lead poisoning can only be eradicated when cities enforce provisions of existing building codes and require that dilapidated housing be repaired in a lead-safe manner or condemned for use.

CONCLUSIONS: NMHC/NAA support the proposition that apartment maintenance technicians receive training on lead safe work practices. We support a performance based approach to this training to provide flexibility for these workers and in recognition of different styles of learning. We believe that no purpose is served by requiring apartment maintenance workers who have already been trained in compliance with the federal Lead Safe Housing rule or various state laws be subject to a re-training requirement under this rule. We would ask that EPA look broadly at worker training courses and endorse courses including the National Apartment Association's Lead Worker Training Course as an option to meet future training requirements under this rule.

In the context of the professional apartment industry which will bear a disproportionate burden of the costs under this rule, we do not believe that EPA has demonstrated the necessity of requiring a certification process for property management firms or individual apartment maintenance technicians that have been trained in the use of lead-safe practices. The demonstrated effectiveness of various other provisions of Title X and state laws support the proposition that the certification of training providers provides a measure of quality control on the training of workers since regulators can request that the training provider furnish course materials and information on individuals who completed the training.

We believe that the evidence that has been gathered to date concerning maintenance practices on apartment properties suggests that a workforce that is trained to leave the jobsite visibly clean can perform maintenance events that may disturb LBP surfaces without leaving behind lead dust hazards. Cleaning up after a job until the worksite passes a visual inspection is the most important determinant of whether a job will pass a dust clearance test. We believe that a performance based approach to cleaning may allow properties the flexibility to use more efficient or cost effective methods while meeting the goal of elimination of lead hazards. To that end, we welcome EPA's encouragement of the production of rapid identification assays that can be used to test substrates involved in repairs.

Lastly, we would ask that EPA re-evaluate the efficacy of the 'per occurrence' notification requirement for routine maintenance events in target apartment properties. Since these events are part of normal property maintenance and not a remodeling event, EPA should permit annual notification and distribution of the pamphlet in lieu of requiring apartment staff to obtain signed notices, distributing multiple copies of the required pamphlet and complying with the associated record keeping. EPA has failed to demonstrate that an annual notification would be less informative than a 'per occurrence' notification for apartment residents in regard to routine property maintenance activities performed by property staff.

SPECIFIC COMMENTS:

TRAINING: The apartment industry has worked closely with the federal government in the development of worker training protocols. In 1994, the industry served on the HUD Taskforce in the development of the HUD Guidelines. Subsequently, NMHC underwrote the development of a training video on lead safe work practices for apartment maintenance workers. NMHC/NAA worked with National Environmental Training Association (NETA) in the development of an apartment worker training course. NAA incorporated a module on lead safe work practices into its Apartment Maintenance Technician training course. EPA has requested comment on whether in the absence of the proposed rule, there would be worker training on lead safe work practices. In the case of the professional apartment industry, the answer is an emphatic yes.

Since 1999, owners and managers of federally assisted property have been required to comply with Section 1012/1013 of Title X (Safe Housing Rule). The rule requires among other things that properties be evaluated for lead hazards and that maintenance personnel are trained in lead safe work practices. HUD has approved several courses for worker training including a course for apartment maintenance technicians and a 'train the trainer' course developed for the National Apartment Association. These courses have been used to train thousands of individuals working in the apartment industry in the use lead safe work practices.

TRAINING COURSE: NMHC/NAA strongly support performance based training rather than the prescriptive approach taken in the proposed rule. The proposed requirement (40 CFR 745.225(6)(vi)) indicates the lead safe worker course must last a minimum of 8 training hours with a minimum of 2 hours devoted to hands on training activities. This proposed requirement is at odds with the training standards widely used under HUD Lead Safe Housing rule (section 1012/1013 of Title X). In addition, several state programs have utilized with success, lead safe worker training programs that last for a period of time ranging from one to four hours. These performance based training programs have successfully enabled rental property owners and renovators alike to become proficient in conducting repairs in a lead safe manner, performing the fundamental visual inspection for dust and debris as well as carrying out dust wipe sampling for laboratory confirmation of dust-lead levels. Studies have shown that workers use lead safe work practices to complete tasks that disturb lead-based paint without leaving behind a lead dust hazard.

NMHC/NAA is concerned that 745.90(a)(1) and 745.225 may exclude the existing apartment maintenance technician training course jointly approved by HUD and EPA and used extensively by

thousands of apartment maintenance personnel and private renovators supporting the rental housing community. These performance oriented courses need to be part of the options for all renovators. We therefore recommend that Section 745.90(a) (1) and 745.225 be amended to recognize the existing training courses that are currently being used to train apartment maintenance technicians who work in federally assisted target housing.

CERTIFICATION OF APARTMENT MAINTENCE WORKERS AND APARTMENT MANAGEMENT FIRMS: Section 403(c)(3) gives EPA the flexibility determines that an category of contractors engaged in renovation or remodeling does not require certification. We respectfully suggest that EPA rely on certified trainers to supply training to apartment maintenance technicians. This model has been found to be effective under the Lead Safe Housing rule. This would also eliminate the need for apartment maintenance technicians or renovators to become licensed in several states and pay several state required fees to accomplish their daily work requirements. It does not appear that EPA has accounted for the fees in their Cost Analysis. These fees are routinely assessed to risk assessors, lead-based paint inspectors and other designated currently list in the regulation.

Furthermore, apartment management firms are already complying with other provisions of Title X that require information about the lead status of the property to be conveyed to residents, including notification when repairs are to be performed. These firms are already subject to extensive record-keeping responsibilities. The additional layer of regulation proposed in this rule to require these firms to seek a certification because their employees are involved in repair activities that may disturb LBP would serve no practical purpose and may well prove a disincentive for firms to retain target properties in their portfolio.

With regard to apartment maintenance workers, NMHC/NAA questions the utility of a mandating a refresher training course on lead safe work practices and a re-certification of workers. Apartment maintenance technicians generally perform a variety of tasks ranging as part of routine property care including an HVAC. The Clean Air Act (Section 608) establishes a technician certification program for technicians who perform maintenance, service, repair, or disposal that could be reasonably expected to release refrigerants into the atmosphere. Workers are not required to be re-trained or re-certified to work with refrigerants. Since 1999, HUD has required that maintenance workers on federally-assisted multifamily target properties be trained in lead safe work practices. This practical experience has not pointed up the need to re-train workers on lead-safe work techniques.

VISUAL INSPECTION and DUST CLEARANCE TESTING: While we find the proposed white glove test to be cumbersome, we believe that there is ample evidence to support the contention that visual inspection can go along way to assuring that lead hazards are removed. In the context of a repair or remodeling event, the lead dust is usually associated with debris—chips, splinters etc—that can be seen with the naked eye and the presence of debris is an indicator to workers that the jobsite required additional cleaning until no visible debris remains.

An analysis of lead dust clearance results in apartment properties performed by Earth Track, Inc. and Industrial Economics, Inc. performed at the request of NMHC is found in Attachment 1. The study examines two sets of clearance testing data collected in target housing. Note: Dust-lead test results have been aggregated by room for the purposes of this analysis. This enables us to compare dust lead levels by room which more closely represents the "work area" EPA references in the proposed rule.

One of the data sets was collected from Maryland properties that had been subject to repairs as part of ‘make-ready’ activities by trained maintenance personnel. These units were unoccupied at the time of

the sampling. Maryland law[4] requires rental properties built before 1950 to use trained workers and use lead safe work practices and risk reduction treatments in preparing properties for re-occupancy. All of the more than 6,000 units in the Maryland sample had been determined as passing a visual inspection by trained dust-lead samplers or risk assessors.[5] Subsequently, state certified risk assessors collected 93,000 dust wipes from the floors and window sills of these units. Exhibit 1 (of Attachment 1) shows that on the basis of visual inspection, 96.7 % of the rooms were correctly rated by maintenance workers as having been left in a lead safe condition following routine repair activities.

The second dataset (the National Data) is reflective of real world conditions in apartment communities in 41 states at the time that the state certified Risk Assessors conducted property risk assessments using the HUD-approved protocol. No special conditions or consideration were applied -- all of the units and common areas subjected to testing were randomly selected. No preference was given to occupied units nor did the testing protocol attach significance to whether a particular unit had children in residence.

The maintenance level was routine for the property with units in all stages of readiness for occupancy or actually occupied. The property management staff would have been aware of the date of construction and would have been providing a federally-mandated disclosure of that fact and the potential for the presence of LBP to residents since 1996. While the staff did not specifically know the lead status of the property (after all that is why the risk assessment was being performed) they would have had some knowledge of the potential hazards associated with lead-based paint. It was noted by the Risk Assessors that the maintenance staff of the various apartment properties had generally not received specific Lead Safe Worker training. (After the property risk assessment was completed, the maintenance staff received specific training lead safe work practices per the Lead Safe Housing rule.)

Lead based paint testing and dust wipes were collected from more than 28,000 apartment units. These apartment units had been subject to typical apartment property management maintenance and represented a mix of occupied and unoccupied apartments all built prior to 1978. Subsequently, 77% of these apartment units were found to contain lead based paint. Analysis of the dust lead test data at the room level revealed that 96.1% of the rooms did not contain a dust hazard level on either the floor or the window sill. Room analysis in apartment units that were determined by XRF testing to be free of lead based paint revealed that 99.3% of the rooms were free of dust lead hazards.

This data supports the contention that apartment maintenance staff using appropriate lead safe work practices can rely on visual inspection to produce lead-safe units. Visual inspection is a strong predictor of workplace condition….if there is visible debris; the area has not been effectively cleaned. EPA has failed to prove the added value of the Cleaning Verification Card to the visual inspection process.

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[4] Annotated Code of Maryland, Environment Article, Title 6 - Toxic, Carcinogenic, and Flammable Substances/Subtitle 8 - Reduction of Lead Risk in Housing.

[5] We are concerned that EPA has apparently been given a false impression of the effectiveness of the treatments and practices proscribed under the Maryland law. Contained in the docket is a report prepared by the National Center for Healthy Homes entitled: *An Evaluation of the Efficacy of the Lead Hazard Reduction Treatments Prescribed in Maryland Environmental Article 6-8*. The study's was intended to assess the extent to which the Maryland's state lead law was having an effect on lead levels in housing. The law which took 1994 and has been responsible for a sharp decline in the incidence of lead levels in children. Unfortunately, this study was deeply flawed and although it is contained in the docket for this rulemaking no information on the recognized deficiencies of the analysis accompany the report as contained in the docket. The study prepared by the National Center was supposed to evaluate lead levels in dust on properties that had passed visual inspection following certain repair activities. Erroneously, dust wipe samples were collected in units that did not pass inspection and were thus not eligible to be dust tested since they did not meet the "cleaned" criteria. 92% of the units that "failed" a visual inspection were demonstrated to have lead dust hazards.

SURFACE TESTING METHODS: EPA states that this rule will spur the development of rapid detection methods that meet the Agency's criteria for reliability in a timely fashion. These analytical tools will be an important adjunct to proper work practices in assuring that workers understand the nature of the surfaces they are working with. Rapid detection assays will enable persons involved in repair or renovators to know in advance if they are dealing with lead-based paint or non-lead-based paint. NMHC/NAA is concerned that section 745.90 (b)(6) – as written appears to exclude the use of XRF or paint chip analysis in order to determine if the component or components is coated with lead-based paint. The section states, "… must use an acceptable test kits to determine …" The definition of "acceptable test kits" appears to exclude the use of XRF technology or paint chip analysis. Both of these methods are widely used in the apartment community and need to be part of the "acceptable test kit" definition. We recommend that EPA amend section 745.90(b)(6) to include the use of standard XRF technology or paint chip analysis.

RELATIONSHIP TO Section 402(b): For routine maintenance activities on professionally owned and maintained multifamily properties, NMHC/NAA believe that the per occurrence notice requiring occupant signatures, delivery of the revised EPA pamphlet and the associated 3 years of record keeping does not protect the public health any more than provision of this material, than an annual notification letter that discusses how the management may have to disturb lead painted surfaces in the course of routine repair events by trained property staff use lead safe work practices. This annual disclosure would be accompanied by the revised EPA brochure. We are seeking the exemption for site property maintenance staff not for other contractors who come onto the premise to conduct repairs or renovation projects. Several real estate trade groups representing the owners of multifamily housing have provided EPA with the results of a survey which found that EPA seriously underestimated the number of routine maintenance events that would trigger 406(b) recordkeeping provisions in a typical occupied apartment home in a well-maintained target property. By insisting on a 'per occurrence' notification rather than an annual notification with accompanying educational material, EPA creates a perverse disincentive for routine maintenance. EPA estimated workers for routine maintenance events in professionally maintained multifamily properties remains burdensome. We have submitted survey results to EPA which show that the Agency seriously underestimated the number of times "covered" activities would be performed on multifamily properties by property maintenance staff that would potentially be subject to the Pre Renovation information Rule (PRIN; Section 406 (b)). EPA staff indicated that the Agency would be revisiting the paperwork requirements of this rule in the context of its work to issue the proposed renovation rule. While we have no issue with disclosing the presence of lead-based paint, we do question the EPA has not proven that giving the pamphlet multiple times in the course of a year to residents of multifamily target housing is of greater educational value than delivering an informed consent notification regarding the presence of lead-based paint on the property and the management's intent to provide appropriate maintenance activities performed using lead-safe work practices. A report by the U.S. General Accounting Office (GAO) cites the PRIN as rule with a burdensome paperwork requirement[6] finds that the paperwork burden imposed on the public by this annual notification to residents of multifamily target housing would be accompanied by a copy of the revised Renovation and Remodeling Pamphlet.

PRESENCE OF CHILD: EPA has requested comment on applicability of regulation to housing that does not currently have a child in residence. EPA has stated that the rule is targeting resources by not applying to all housing just target housing in which children under the age of 6 reside. We think this is an unworkable proposition. The point of the rule is to train workers to work safely in the presence of lead coated surfaces and to leave no lead-containing dust behind. The distinction about whether a child currently resides in the property is improper. A child may subsequently reside or visit the location. While limiting the scope of the proposed rule to child occupied target housing reduced the cost of the rule, it does not make sense if the aim of the rule is to eliminate lead dust hazards associated with

[6] EPA Paperwork: Burden Estimate Increasing Despite Reduction Claims (GAO/GGD-00-59) (2002)

disturbance of lead containing surfaces. EPA should not require contractors to ascertain the familial status of their clients. The rule should be pegged to the potential for creating a lead dust hazard regardless of the age of the occupants.

EFFECT OF RULE ON REPAIRS: EPA has asked for comment on whether the proposed rule will create an environment in which maintenance will be deferred because the cost associated with procuring the services of a certified contractor are too high. Poorly capitalized, older properties which are already at risk for deferred maintenance may find it difficult to meet the increased costs associated with this proposed rule.

We believe that there will be a similar market reaction to certified renovation contractors as there was to certified lead inspection firms. The federally approved protocol for determining the presence of lead costs $375 to 675.00 per single family home and about $19,000.00 for a typical 200 unit pre-1960 constructed apartment property and $10,000.00 for a typical 200 unit post-1960 constructed apartment property.

Although EPA and HUD believed that the disclosure rule (section 1018 of Title X) would create demand for persons to have a home tested at time of transaction. As a practical matter, this has not happened because single family home buyers are very sensitive to cost as they proceed through the purchase transaction. An additional $375-675 fee for LBP testing associated with purchase of a home has been proven to be a deterrent to consumers. On the other hand, professional owned and maintained apartment properties have created the majority of the market for these testing services as this information can then inform maintenance decisions and other business practices. Risk Assessments and to a lesser degree Lead inspections are required on most target properties receiving federal assistance.

VACUUMS: The HUD Guidelines specify that HEPA equipped vacuums be used as part of lead-safe work practices on federally assisted property. However, recent studies have shown that whether or not a work area is properly cleaned depends on more than whether a HEPA vacuum was used by workers. "The primary predictor of vacuum performance proved to be the mechanical action of the floor tool brush that breaks the adhesion of the lead dust with the flooring. …Regular changing of the HVC filter bag was identified as an important service procedure to maintain maximum air velocity at the point of cleaning." [7] The data suggests that more important than the vacuum is the fact that workers are trained to clean up a worksite until all signs of visible dust/dirt are eliminated. When this standard is met, lead-containing dust is also removed from the premises. An analysis of data obtained from risk assessments of target apartment properties found that the adjusted mean of dust test of floors in units found to contain lead-based paint was 13.6 ug/sf. (0.33), well below the hazard level established for floors.[8] As noted above (see discussion at VISUAL INSPECTION and DUST CLEARANCE TESTING), this national data sample looked at apartments that were in an "as is" condition. In most cases, these maintenance technicians on these properties would not have had specialized cleaning equipment.

PROHIBITED PRACTICES: EPA's Abatement rule and HUD's federally assisted housing rule ban certain practices based on the likelihood that these practices will create large scale lead hazards. Several states also ban these practices. Data shows that lead in house dust is present in homes that have never been painted with LBP. NMHC/NAA believe that the Agency should insist on strict

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7 Public Health Institute for California Department of Health Services, Childhood Lead Poisoning Prevention Branch and Environmental Health Laboratory Branch. Evaluation of Household Vacuum Cleaners in the Removal of Settled Lead Dust from Hard Surface Floors. Final Report to U . S. Department of Housing and Urban Development 12/27/02 (revised February 2006)

8 Attachment 1, Exhibit 1.

prohibitions on these techniques unless it can be demonstrated that all of the lead generated by these techniques is captured and not released into the general environment.

DE MINIMIS EXEMPTIONS: NMHC/NAA strongly urge that EPA adopt a rule that is in accord with similar rules already promulgated by HUD. Namely the work area for interior and exterior spaces should be the same under both rules. Differences will lead to massive confusion in the regulated community. Renovators will not know the status of federal assistance received by a property when they perform their work. They should however, be required to use lead safe work practices that are suitable to the job.

SMALL BUSINESS IMPACT: The proposed rule will have a significant impact on small business. Under Small Business Administration (SBA) guidelines, 99 percent of the operators of residential rental housing qualify as small businesses. SBA defines a real estate concern as a small business when its total "annual receipts" are no more than $5 million. "Annual receipts" are defined at 13 CFR 121.104 as "total income" plus "cost of goods sold," in the same manner these terms are defined or reported to the IRS.

EPA's own economic analysis of this rule finds that residential property managers and lessors of residential real estate will bear the largest share of costs in association with the rule. NMHC/NAA supports the conclusions reached by National Association of Realtors and the Institute of Real Estate Management with respect to EPA having seriously underestimated the compliance costs associated with the rule as proposed. The rule as written will serve to devalue much needed older housing without significantly reducing the incidence of lead hazards.

ANALYSIS OF LEAD DUST CLEARANCE IN APARTMENT PROPERTIES

In order to benchmark the ability of professional apartment maintenance technicians to conduct routine repair activities on target properties in a lead-safe manner, NMHC retained Earth Track, who in coordination with Industrial Economics, Inc., analyzed dust wipe datasets that were collected by CONNOR between 1996 and 2006. CONNOR is an environmental testing firm and is licensed to conduct lead screening and testing in each of the states and territories of the United States. A summary of the Earth Track/Industrial Economics report follows:

All lead dust sampling was performed according to the American Society for Testing and Materials Designation E1728 or its Department of Housing and Urban Development equivalent. These requirements designate standard practice for field collection of settled dust samples using wipe sampling methods for lead determination by atomic spectrometry techniques. Dust was allowed to settle for a minimum of 1 hour subsequent to the completion of renovation before lead tests were conducted. The samples were collected by professional Risk Assessors who have been trained through the EPA-accredited Five-day Inspector/Risk Assessor course, and are certified either by state program or by the Environmental Protection Agency, in the case of states that have not been delegated authority. Independent EPA-certified labs conducted all the analysis of the dust clearance tests.

Two data sets were used in this analysis:

Maryland post-renovation data set (MD). CONNOR provided nearly 93,000 lead test results that had been collected from over 6,000 residential units under the Maryland Reduction of Lead Risk in Housing law.[1] 70% of the apartment properties sampled were built between 1900 and 1950; 30% were from units constructed after 1950 and before 1978. The information provided in this sample set contained only units that had been tested for lead subsequent to renovation.

National data set (US). This data was collected by CONNOR on multifamily properties of 5+ units built between from 1832 to 1978 and located in 41 states. According to CONNOR, properties were diverse in terms of grade, location, age, maintenance, and ownership model (e.g., public versus private; 47.68% of the properties received Project – based section 8). CONNOR was retained by property owners and management companies to screen their portfolio of properties for lead hazards and develop hazard control plans. The national data set provided contained roughly 276,000 test results, of which 29% were from units that were found to contain no lead-based paint (LBP). The sample includes Maryland properties as well that were tested as a result of a portfolio-specific testing effort rather than compliance with the Maryland risk reduction law. Properties constructed after the lead paint ban (1978) are not included in this sample.

[1] This law mandates that at least 50% of the owner's affected properties had to be in compliance with lead standards by February 2001, and certified to be so by an accredited private lead inspector. Affected properties under the law incorporate all residential rental units built before 1950. Rental units built between 1950 and 1978 (when lead paint was banned) may be voluntarily brought into compliance. See Maryland Department of the Environment, "Facts About…Rental Property: Phase-in 50% Requirement," July 20, 2005.

The data[2] includes nearly 369,000 lead dust tests from inside residential units. Of this sample, approximately 77 percent of the units tested positive for the presence of lead based paint (LBP). There were 122,190 sill samples from 32,957 apartment units, and 246,561 floor samples from 34,811 units.

I. Summary of Major Findings

1) Post-renovation mean lead levels on both sills and floors in the Maryland sample are lower than the baseline mean lead levels in the national sample for units with LBP. Sill samples in the Maryland dataset were even lower than that found in the national sample of properties without lead paint. Mean lead concentrations in the floor samples for all of the populations were quite close to the commonly-used detection limit of 10 ug/sf.

2) When the maximum test values are examined rather than the mean, 3.3 percent of the Maryland sample and 3.9 percent of the national sample of rooms in properties with LBP surpassed at least one of the hazard thresholds (40 ug/sf for floors and 250 ug/sf for sills established by EPA under Section 403 of Title X).

3) Trends in unit lead concentrations based on building age are most evident in the sill tests for the national sample, showing steady declines over time, beginning well before lead paint was banned. Dust-lead concentrations on sills in the Maryland sample are much lower than those found on sills in properties with LBP in the national sample across all property ages. The mean values for both the Maryland and national samples for floor concentrations were clustered just above the commonly used detection limit of 10 ug/sf.

4) Samples taken from properties containing LBP were associated with higher lead concentrations on average than those without LBP.

III. Data Caveats

All data sets have some limitations in how accurately they reflect the total population and the types of conclusions that may be drawn from them. This section presents a number of caveats regarding the CONNOR data set.

- Sample not randomized. The data provided by CONNOR represent test results conducted by primarily them and by a couple of other licensed risk assessors in a wide range of multifamily housing across the country. It was not randomly drawn from the entire universe of multifamily housing, however, and we did not evaluate the degree to which it is representative of that entire population.

- Maryland's regulatory system**.** Unlike most other states, Maryland requires that contractors be trained in lead risk reduction; that post-renovation tests be conducted by an

[2] Each dust wipe sample in the CONNOR dataset included eleven data fields covering the sample identification number, where the test was conducted within a building, what type of surface was tested, what state the property was located in, when it was built, whether LBP was found, what concentrations of lead were found in the dust, and whether the property contained lead-hazards.

independent party prior to releasing; and that post-renovation lead testing be conducted by a certified party. All of these factors provide incentives for good housekeeping and cleanup during renovation, and are likely to result in lower lead concentrations post-renovation than would occur on average in states that have none of the MD requirements. However, the sample may provide a good indicator of the lead exposure reductions possible through better worker training and post-renovation testing.[3]

- **Aggregating data beyond the single lead test.** Many of the intuitive factors that would be associated with higher lead exposure (poor maintenance of the property, structural problems in property management, building age or construction techniques) would likely apply to the unit overall, not just to a single sample location. As a result, we had a concern that weighting each lead test result equally would distort the overall picture of likely factors associated with lead contamination. Dust –lead test results have been aggregated by room for the purposes of this analysis. This enables us to compare dust-lead levels by room, which more closely represents the "work area" EPA references in the proposed rule. For this reason, we have chosen the apartment "work area" (i.e. room) as the primary focus of our analysis. This was possible because of the sample coding in the CONNOR dataset was the same for all of the locations tested within a single unit.

- **Pre- and Post-Renovation Values.** The Maryland test results are all for dust levels subsequent to renovation; we did not have pre-renovation values. Similarly, while the national data set does not specifically deal with recently renovated units, many of these units would have been renovated at some point(s) in the past. More detail on pre-renovation lead values would shed light on whether the upgrades actually reduced specific lead hazards in a particular residence. Similarly, more information on the renovation history, or other factors, associated with units in the national dataset for which very high lead concentrations have been found, could help improve risk-based targeting for lead control.

[3] Maryland law that requires rental properties built before 1950 to undertake specific risk reduction treatments at the time of unit turnover. Properties may elect to perform (1) a visual inspection followed by third-party dust clearance testing; OR (2) they must perform the following lead hazard reduction techniques: visual review of all exterior and interior painted surfaces; removal and repainting of chipping, peeling, or flaking paint on exterior and interior painted surfaces; repair of any structural defect that is causing the paint to chip, peel or flake that the owner of the affected property has knowledge of or, with the exercise of reasonable care, should have knowledge of; stripping and repainting, replacing, or encapsulating all interior windowsills with vinyl, metal, or other material in a manner and under conditions approved by the department; ensure that caps of vinyl, aluminum or any other material in a manner and under conditions approved by the Department, are installed in all window wells in order to make the window wells smooth and cleanable; except for a treated or replacement window that is free of lead-based paint on its friction surfaces, fixing the top sash of all windows in place in order to eliminate the friction caused by the movement of the top sash; re-hanging all doors necessary in order to prevent the rubbing together of a lead-painted surface with another surface; make all bare floors smooth and cleanable; ensure that all kitchen and bathroom floors are overlaid with a smooth, water resistant covering; and HEPA-vacuuming and washing of the interior of the affected property.

- **Limited data fields.** The data extract analyzed contained 11 data fields. These allowed evaluation of lead concentration levels across different populations of apartments, but did not provide much resolution on the correlation between building, management, and geographical factors and high lead-dust concentrations.

IV. Detailed Information on Key Findings

Finding #1: Post-renovation mean lead levels on both sills and floors in the MD sample are lower than the baseline mean lead levels in the national sample for units with LBP. Sill samples in the Maryland population were even lower than that found in the national sample of properties without lead. Mean lead concentrations in the floor samples for all of the populations were quite close to the commonly used detection limit of 10 ug/sf

Because there is always a concern that careless renovation will disturb existing LBP, boosting exposure for residents, the finding that post-renovation concentrations were relatively low is a positive one. We tried to eliminate a number of factors that could erroneously skew statistics in the direction, and yet the same general pattern remained. The Maryland requirements and regulatory system are one possible explanation for the relatively low lead concentrations found.

Statistical Support

The CONNOR dataset provides information on post-renovation lead concentrations in Maryland apartments with lead-based paint. In addition, the CONNOR dataset has information regarding lead concentrations from a much broader set of apartments (from throughout the United States) with lead-based paint. A comparison of dust lead concentrations in this broader dataset with dust lead concentrations in the Maryland dataset can provide useful information about the degree to which renovation procedures used in Maryland adequately control lead concentrations in dust. As noted on the table, because detection limits varied by sample, to compare the Maryland and national datasets, we needed to adjust any measured value that was below the detection limit of 10 ug/sf up to 10 ug/sf. The impact of this change was to boost all of the means and medians slightly, though the relative comparisons are still meaningful.

There are 92,889 post-renovation dust samples in the CONNOR dataset. The adjusted mean lead concentration in the Maryland sample is 12.5 ug/sf for floor tests and 15.8 ug/sf for sill tests. The floor value is fairly close to the national LBP adjusted mean of 13.6 ug/sf (both of these values are close to the commonly used laboratory detection limit of 10 ug/ml). These values are well below the hazard level of 40 ug/sf. The national adjusted mean for sills was 85.5 ug/sf, nearly five times as high as the MD level but well below EPA's dust hazard level of 250 ug/sf.

The national dataset also includes information about dust lead concentrations from roughly 20,000 apartment units (nearly 77,000 samples) throughout the U.S. that *do not* have lead-based paint. These data provide a useful benchmark for the post-renovation sampling, potentially representing "background" lead levels in apartments. The adjusted mean lead concentration across these sill samples is 26.5 ug/sf, nearly 70 percent higher than the mean post-

renovation lead concentrations observed in the Maryland dataset. Floor sample concentrations for the Maryland dataset are higher than the national sample with no LBP. However, all are close to the commonly used detection limit of 10 ug/sf. We did not have adequate data resolution or time to more carefully evaluate factors that could be contributing to lead dust in properties without LBP.

The validity of this comparison depends on 1) the degree to which the samples in the broader dataset are adequate proxies for the pre-renovation samples in Maryland with respect to characteristics that are related to dust lead concentrations, and 2) the degree to which identical sampling and analysis procedures were followed.

Exhibit 1: Comparison of lead dust concentrations in apartments

	No. of Samples	No. of Units	Unadjusted Mean	Adjusted Mean (std. error of mean)	Adjusted Median	Rooms in Which at Least One Sample Failed Hazard Thresholds *(Note 3)*		
						% Failing Sill test	*% Failing Either Sill or Floor*	*% Passing Both*
Sill Samples				*(Note 1)*	*(Note 2)*			
MD LBP	37,949	6,281	12.1	15.8 (0.3)	10.5	0.5%	3.3%	96.7%
US LBP	63,837	19,270	84.6	85.5 (5.3)	28.0	4.0%	3.9%	96.1%
US No LBP	20,404	7,406	25.0	26.5 (1.5)	11.3	0.8%	0.7%	99.3%
						% Failing Floor Test		
Floor Samples								
MD LBP	54,940	6,554	9.1	12.5 (0.26)	10	3.4%	3.3%	96.7%
US LBP	135,035	20,196	13.6	13.6 (0.33)	10	1.9%	3.9%	96.1%
US No LBP	56,586	8,061	11.0	11.0 (0.26)	10	0.4%	0.7%	99.3%

Notes:

(1) Mean and median lead concentrations are calculated by calculating the mean for each apartment unit and then averaging across all units.

(2) Some laboratories report lead levels below 10 ug/sf as <10 ug/sf while others provide a precise number . To allow comparison across tests and data sets, results below this level were adjusted to 10 ug/sf. The adjusted mean and median values reflect this change.

(3) Lead hazard thresholds are 40 ug/sf for floors and 250 ug/sf for sills. Values in parentheses represent the share of units failing the hazard test.

Finding #2: When the maximum test values are examined rather than the mean, 9.8 percent of the MD sample and 12.5 percent of the national sample of properties with LBP surpassed at least one of the hazard thresholds of 40 ug/sf for floors and 250 ug/sf for sills.

As illustrated in Exhibit 1, a fairly sizable percentage of the lead tests exceed the clearance thresholds. The failure rates are about 20 percent lower for Maryland than for the national LBP sample. However, even for Maryland, nearly one in ten apartments would failure

the hazard test. Additional work would be required to see if these failures are clustered in particular locations, or in properties owned or managed by particular people.

Finding #3: Trends in dust-lead concentrations based on building age are most evident in the sill tests for the national sample, showing steady declines over time, beginning well before lead paint was banned. Sill concentrations in the Maryland sample are much lower than the national LBP sample for all property ages. Both the Maryland and national samples for floor concentrations were clustered just above the commonly used detection limit of 10 ug/sf.

Exhibit 2: Comparison of lead dust concentrations for various subsets of apartment units

	Maryland Post-Renovation (Mean Lead Concentration)	No. of Units	General U.S. Dataset (Mean Lead Concentration)	No. of Units
Sill Samples				
Built Pre-1900	N/A	0	171.1	1,413
Built 1900-1950	14.7	4,366	90.1	13,457
Built 1951-1978	18.2	1,915	44.0	4,400
Floor Samples				
Built Pre-1900	N/A	0	13.1	1,501
Built 1900-1950	12.7	4,611	14.4	13,867
Built 1951-1978	12.3	1,943	11.5	4,828

Notes:
(1) Mean lead concentrations are calculated by 1) calculating the mean for each apartment unit then 2) averaging across all units.
(2) Samples reported with lead concentrations of <10 ug/sf are set to 10 ug/sf , resulting in estimate of mean that is biased upwards.

Age trends are a bit clearer when examining test results by decade, across all properties containing LBP. Exhibit 3a examines sill tests; Exhibit 3b examines floor tests. Lead concentrations are highest for apartments built over 100 years ago. Lead levels decline substantially after 1910, with a second large decline occurring after 1960. In regard to the observed spike in lead dust levels in sill samples for the 1970-78 vintage properties, we are not sure what might be causing it

Exhibit 3a: Comparison of lead dust concentrations for various time periods Window Sill Samples			
Year of Construction	**Number of Samples**	**Number of Units**	**Mean Lead Concentration (ug/sf)**
1800 – 1899	3,938	1,413	170
1900 – 1909	6,223	1,893	153
1910 – 1919	3,073	1,186	69
1920 – 1929	16,285	5,115	65
1930 – 1939	5,666	1,616	119
1940 – 1949	12,948	3,217	83
1950 – 1959	6,200	1,620	68
1960 – 1969	3,951	1,297	24
1970 – 1978	5,553	1,923	43

Exhibit 3 3b: Comparison of lead dust concentrations for various time periods Floor Samples			
Year of Construction	**Number of Samples**	**Number of Units**	**Mean Lead Concentration (ug/sf)**
1800 - 1899	9,545	1,501	13
1900 - 1909	13,337	1,988	18
1910 - 1919	6,962	1,216	11
1920 - 1929	33,835	5,270	13
1930 - 1939	11,216	1,700	17
1940 - 1949	22,859	3,263	15
1950 - 1959	12,000	1,722	12
1960 - 1969	9,993	1,418	11
1970 - 1978	15,288	2,127	11

Caveats:

- While this analysis addresses age and sampling location, it does not adjust for any other important apartment characteristics that may differ across the two datasets. We are unaware of any factors associated with high lead levels that differ markedly between the two datasets, but did not investigate the issue.

- Ideally, one would want to address this issue with data on pre- and post-renovation dust samples from apartments with lead-based paint. If these samples were taken in the same apartments (before and after renovation), in similar locations within the apartments, and using the same procedures for sampling and analysis, then a comparison of the pre- and post-renovation lead concentrations would indicate whether or not the procedures successfully control lead in dust, and might also shed light onto whether renovation actually reduces long-term exposure to lead (perhaps as large source exposure elements such as old painted wooden windows are replaced).

Finding #4: Samples taken from properties containing LBP were associated with higher lead concentrations on average than those without LBP.

Statistical support for this conclusion is found in Exhibit 1, which shows that for the broad sample of U.S. apartments, average sill lead levels are substantially higher (85.5 ug/sf versus 26.5 ug/sf) in apartments with LBP versus those that are LBP-free. The difference in the levels between floor samples was much smaller, only 13.6 ug/sf versus 11 ug/sf.

Finding #5: Some residents living in apartments with LBP are exposed to high concentrations of lead.

The histograms shown in Exhibits 4 through 7 present the distribution on units from very low lead levels to quite high concentrations. Failure rates (shown in Exhibit 1) are fairly high for both LBP datasets, though of the two, the Maryland data set is lower. When we evaluate the maximum lead concentration within each apartment unit, approximately 10 percent of the units had at least one sample with a concentration failing the hazard threshold of either 40 ug/sf on floors or 250 ug/sf on sills. Units with high lead concentrations in dust are found primarily in the sill histograms for MD and the US. These are more prevalent in the national sample than in the Maryland post-renovation data.

Exhibit 4

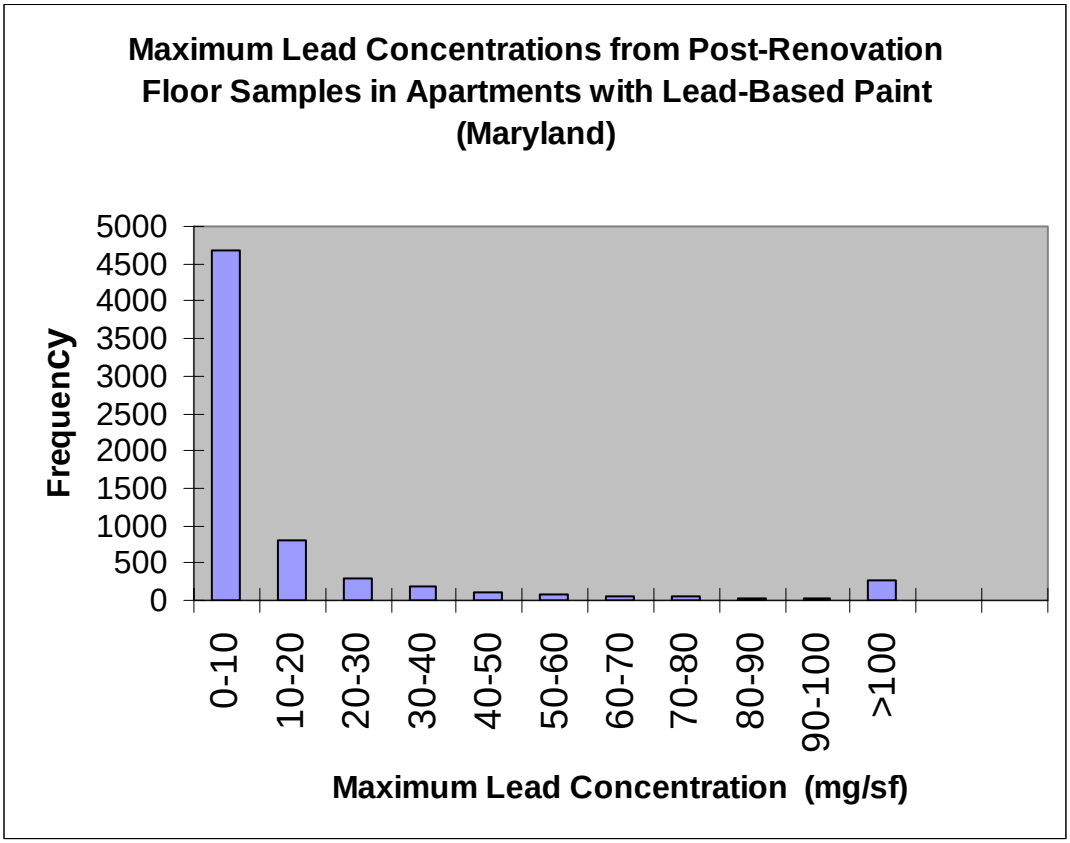

Maximum Lead Concentrations from Post-Renovation Floor Samples in Apartments with Lead-Based Paint (Maryland)
Frequency
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
0-10
10-20
20-30
30-40
40-50
50-60
60-70
70-80
80-90
90-100
>100
Maximum Lead Concentration (mg/sf)

Exhibit 5

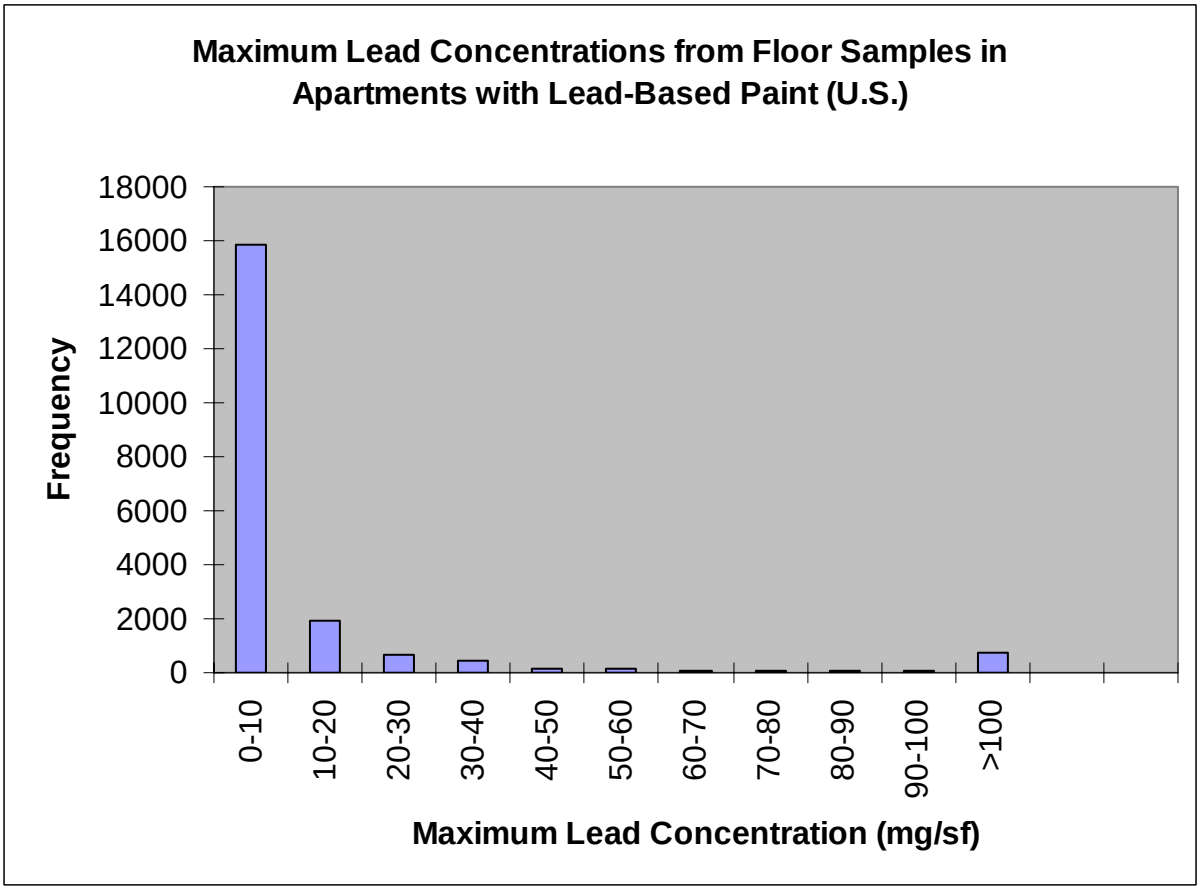

Maximum Lead Concentrations from Floor Samples in Apartments with Lead-Based Paint (U.S.)
Frequency
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
0-10
10-20
20-30
30-40
40-50
50-60
60-70
70-80
80-90
90-100
>100
Maximum Lead Concentration (mg/sf)

Exhibit 6

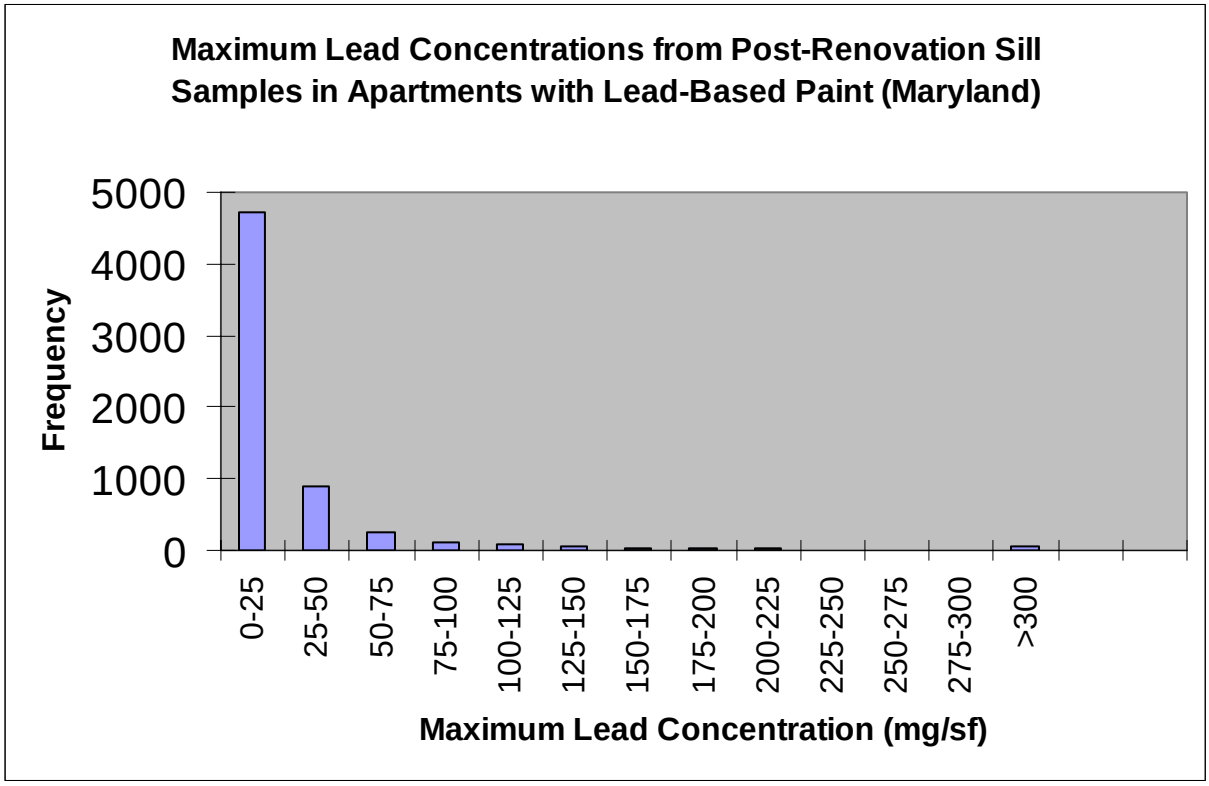
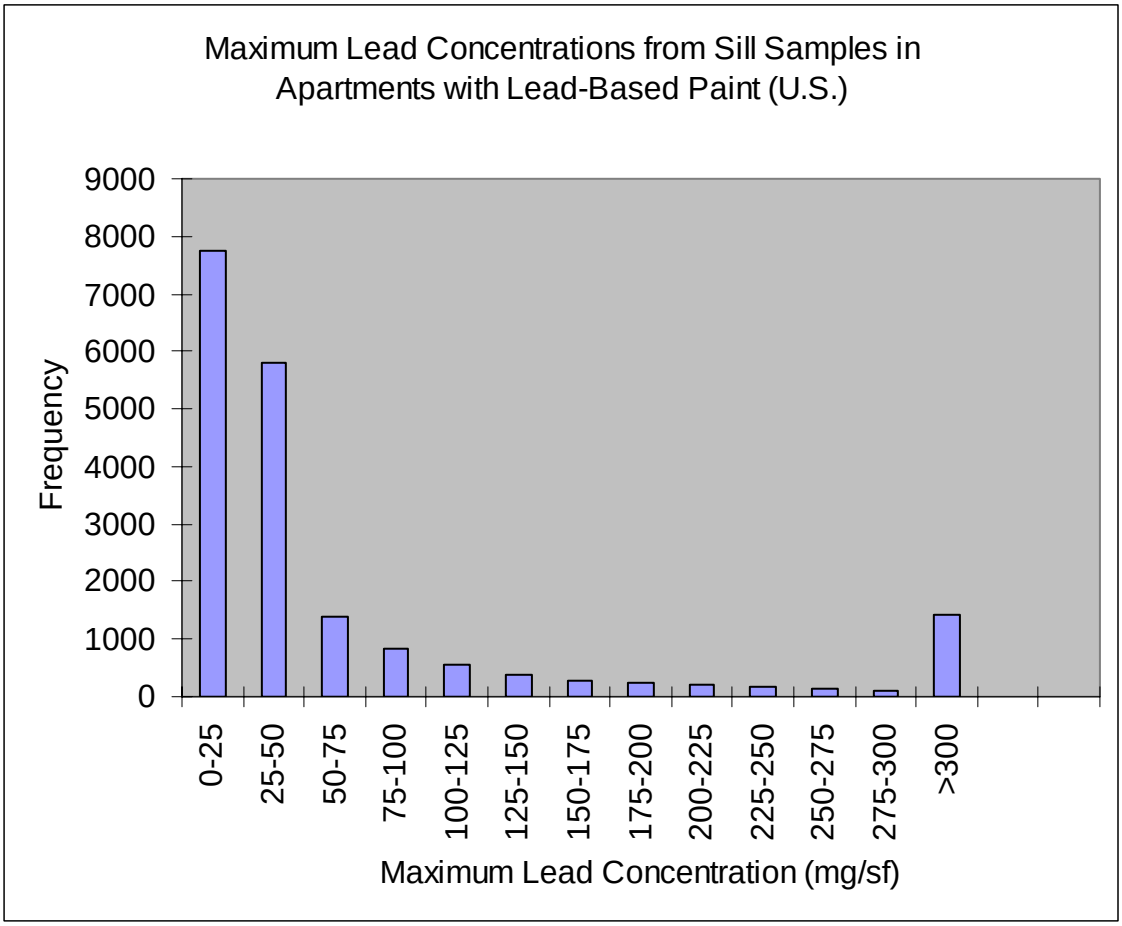

Maximum Lead Concentrations from Post-Renovation Sill Samples in Apartments with Lead-Based Paint (Maryland)
Frequency
5000
4000
3000
2000
1000
0
0-25
25-50
50-75
75-100
100-125
125-150
150-175
175-200
200-225
225-250
250-275
275-300
>300
Maximum Lead Concentration (mg/sf)

Exhibit 7


Maximum Lead Concentrations from Sill Samples in Apartments with Lead-Based Paint (U.S.)
Frequency
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
0-25
25-50
50-75
75-100
100-125
125-150
150-175
175-200
200-225
225-250
250-275
275-300
>300
Maximum Lead Concentration (mg/sf)