Chapter 8: Resident Protection and Worksite Preparation

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How to Do It

1. If possible, perform the work in a vacant unit. If this is not possible, relocate residents if the work in their unit will last for more than a short time. If residents must remain inside the dwelling during work, appropriate containment and barrier systems as described in this chapter should be installed. Never permit residents to enter a work area where work disturbing known or presumed lead-based paint, or cleanup of lead-contaminated dust or sol, is underway. See Section IV, Temporary Relocation.

2. Determine requirements for relocation, isolation of work areas, and other worksite preparation measures based on the type and extent of the work and the amount of dust that will be generated. Use guidance in Section III of this chapter. Avoid high-dust jobs and procedures, if at all possible.

3. Perform pre-renovation education about lead-based paint hazards as required by EPA regulations and some State, tribal and/or local requirements. Consider providing pre-renovation education even if the regulations do not require doing so.

4. Determine if the dwelling will require pre-cleaning before worksite containment. (See Section II.E.) If the paint is severely deteriorated and paint chips or dust or debris are present, vacuum the floor before protective sheeting is laid down.

5. Implement relocation plan, if needed, and begin worksite preparation.

6. Restrict access to the work area. As noted above, never permit residents to enter the work area. When clearance or cleaning verification is performed, entry should be denied until cleaning is complete, and clearance or cleaning verification, as applicable, has been achieved. If clearance or cleaning verification has not been achieved at the end of the day, keep the barriers in place overnight and instruct residents not to enter the work area. Exceptions to these rules are available for elderly residents and hardship cases. See Section IV.A.5.

7. Conduct daily cleanup. See the Cleanup row of Table 8.1.

8. Perform a visual examination daily. Conduct this examination to ensure that dust, debris and residue outside the contained work area are removed, and that the contained area has been cleaned up adequately by the daily cleanup.

9. Perform final cleanup after work is finished. See the Cleanup row of Table 8.1.

10. Do not allow residents to reoccupy the work area until a clearance examination, or cleaning verification, as applicable, has been passed. See the item 10, Clearance, in the How to Do It list at the start of Chapter 11.

11. Notification of residents. The property owner or manager should notify residents of what lead-based paint hazards were controlled and how, and the results of the clearance examination or cleaning verification, as applicable – HUD recommends that the residents be notified whether or not the work is federally assisted (if the work is not federally assisted, only the person who ordered the work must be informed of its results).

I. Introduction

Many forms of paint-disturbing work, including renovation, maintenance, and rehabilitation, as well as lead hazard controls, generate varying amounts of leaded dust, paint chips, and other lead-contaminated materials. This chapter describes ways to protect residents and the environment from exposure to, or contamination from, these materials. Some types of work require complete isolation, or containment, of the work area and/or full evacuation of the residents and their belongings. Other jobs require much less site preparation and containment.

Containment refers to various methods of preventing leaded dust from migrating beyond the work area. It includes a variety of measures, including the simple use of disposable, impermeable protective sheeting as drop cloths, the sealing of doors and vents with such sheeting using tape, and measures taken by workers to keep from tracking leaded dust into non-work areas. The required degree of containment depends upon a number of considerations, including: the amount of dust that will be generated (which is affected by the nature of the work and the work practices that are used); resident re` possibilities; the size of the work area; the duration of the job; whether the work is interior or exterior or both; the construction skill levels of workers applicable to their performing specific tasks on the job; and whether there will be air movement within an interior work area due to open windows.

Generally speaking, only small-scale activity should be conducted in occupied units; significant lead hazard control work should be performed in units from which residents have been temporarily relocated or units that are otherwise vacant. Worksite preparation is needed for both interim controls and abatement work. It is also recommended, and sometimes required, for renovation and maintenance jobs if lead-based paint is or may be disturbed.

This chapter describes the general principles behind resident protection and proper worksite preparation. Guidance is provided for interior work, exterior work, window work, and soil-lead hazard control.

Activities that are required by HUD or EPA are identified in this chapter as being "required" or as actions that "must" be done. Activities that are not required by HUD but are recommended by these *Guidelines* are identified as being "recommended" or as actions that "should" be done. Activities that may be done at the discretion of the owner, manager, or contractor are identified as "optional."

II. General Requirements and Other Guidance

A. Small Areas of Paint Disturbance, and Basic Good Work Practices

HUD and EPA regulations do not require the resident protection and worksite preparation practices described in this chapter for non-abatement work if the total amount of disturbed painted surfaces falls within what the HUD Lead Safe Housing Rule (LSHR) (see Appendix 6) refers to as a *de minimis amount*, i.e., a very small area that can be repaired without trained workers, lead-safe work practices or a clearance examination. This small area threshold, which applies to HUD-assisted and HUD-owned housing (and work on other housing that uses the LSHR threshold, inclusive of state and local laws) referred to here as the *de minimis*, is a disruption of no more than:

+ 20 square feet (2 square meters) on exterior surfaces;

+ 2 square feet (0.2 square meters) in any one interior room or space; or

+ 10 percent of the total surface area on an interior or exterior type of component with a small surface area, such as window sills, baseboards, and trim.

EPA excludes from coverage under its Renovation, Repair, and Painting (RRP) Rule (see Appendix 6), a somewhat larger area of interior work than HUD does under its Lead Safe Housing Rule, but does not have an exclusion for work on small amounts of components with small surface areas. EPA's regulatory exclusion is for what the agency calls "minor repair and maintenance activities," which are those that disrupt no more than:

+ 6 square feet or less of painted surface per room for interior activities; or +

20 square feet or less of painted surface for exterior activities;

provided that:

+ the work practices prohibited or restricted by the RRP Rule are not used; and

+ the work does not involve window replacement or demolition of painted surface areas.

(Note that the EPA does not have a minimum size threshold for coverage of its lead abatement rule (see Appendix 6), and that some State, Tribal and local regulations may not recognize these thresholds and may cover work above a smaller threshold or work of any size, however small.)

However, dry scraping or dry sanding even a small amount of lead-based paint can create a lot of lead-contaminated dust, so these *Guidelines* recommend that the following minimal good work practices always be observed when disturbing paint in pre-1978 housing, unless it is known that all layers of paint to be disturbed are not lead-based paint: (the Lead Safe Housing Rule does allow for a limited exception from lead-safe work practices (LSWP; see Section II.D of Chapter 11) on post-1977 components):

1) Never use the prohibited methods of paint removal that are described in Section III.C.1 of Chapter 6 and Section II.D.1 of Chapter 11; and

2) When disturbing paint, always keep residents and pets out of the work area while work is underway and until after the cleanup, and clean the work area thoroughly after finishing, preferably with both high efficiency particulate air (HEPA) vacuuming and wet cleaning.

FIGURE 8.1 Prohibiting resident entry into work area by use of containment barrier.

B. Resident Entry into Work Area Prohibited

In projects covered by the HUD LSHR, and/or the EPA RRP Rule *residents must never be permitted to enter the work area while work is under way. Furthermore, resident reentry into the work area is permitted only after the area has been cleaned and, if required, has passed clearance* (under the LSHR or, optionally, under the RRP Rule) *or cleaning verification* (under the RRP Rule) (see Figure 8.1). While the two rules allow residents to remain in the work area when work that disturbs less the applicable small area threshold is being conducted, both agencies strongly discourage that practice.

All of the worksite preparation strategies discussed in this chapter are based on this fundamental approach. While residents may not be present inside the work area for work covered by the regulations, it is possible for the residents to remain inside other parts of the dwelling during some types of work, or to

leave for the day and return to the dwelling at night after cleaning, visual evaluation for dust, debris and residue outside of the contained area, and collection of dust samples.

C. Pre-Renovation Education

EPA's RRP regulations amended the Pre-Renovation Education requirements (PRE) by requiring that people who perform renovation of most pre-1978 housing for compensation provide a lead renovation pamphlet to owners and occupants before beginning the renovation (40 CFR 745.84). (See below for information on the pamphlet.) The information contained in the lead renovation pamphlet that is given to owners and occupants before beginning the renovation should be provided in appropriate format(s) to meet the needs of all residents including persons with limited English proficiency and in formats that may be needed for persons who are visually or hearing impaired (Executive Order 13166, derived from Title VI of the Civil Rights Act of 1964).

Renovation is defined in the regulation broadly as "the modification of any existing structure, or portion thereof, that results in the disturbance of painted surfaces, unless that activity is performed as part of an abatement as defined by this part" (40 CFR 745.223). Note that EPA requires resident protection whenever abatement of lead-based paint hazards is being conducted (40 CFR 745.227(e)(5)).

This pre-renovation education requirement does *not* apply to minor repair and maintenance activities, as described above, emergency renovations; renovations of components that have been found by a certified lead-based paint inspector or a certified renovator to be free of lead-based paint; or housing that is not target housing (housing built after 1977, housing that is exclusively for the elderly or persons with disabilities (provided a child of less than 6 does not reside there), and zero-bedroom units).

Emergency renovations are those activities that were not planned but result from a sudden, unexpected event (such as non-routine failures of equipment) that, if not immediately attended to, presents a safety or public health hazard, or threatens equipment and/or property with significant damage; and also interim controls performed in response to an elevated blood lead level in a resident child (see Chapter 16). The RRP rule requires that before work begins, the contractor must give the occupants the EPA pamphlet titled "Renovate Right: Important Lead Hazard Information for Families, Child Care Providers and Schools" in English, and "Guía de Prácticas Acreditadas Seguras para Trabajar con el Plomo para Remodelar Correctamente" ("Remodelar Correctamente") in Spanish, or any State or Tribal pamphlet approved by EPA for the same purpose.

Copies of "Renovate Right" can be obtained from the National Lead Information Center, at 1-800-424-LEAD, or by downloading it from the EPA's or HUD's web site. As of the publication of these *Guidelines*, the pamphlet is available in English and Spanish:

FIGURE 8.2 EPA "Renovate Right" Pamphlet.

+ On the EPA website, the English version is available at *http://www.epa.gov/lead/pubs/renovaterightbrochure.pdf*, and the Spanish version, at *http://www.epa.gov/lead/pubs/renovaterightbrochure-esp.pdf*.

+ On the HUD website, the English version is available at: http://portal.hud.gov/hudportal/documents/huddoc?id=renovaterightbrochure.pdf.

State or Tribe is authorized to operate its lead program for abatement, at *http://www.epa.gov/oppt/lead/pubs/traincert.htm*, and/or for renovation, at *http://www.epa.gov/lead/pubs/renovation.htm*. Links are provided to individual authorized abatement and renovation programs if they are available. Addresses and links of the EPA Regional Lead Coordinators are provided for States and Tribal areas for which EPA operates the certification and accreditation programs, at EPA's Where You Live lead page, at *http://www.epa.gov/lead/pubs/leadoff1.htm*. The sites also provide the forms and instructions provided to apply for accreditation or certification for EPA-operated programs. You can get additional assistance from the National Lead Information Center (NLIC) at 800-424-LEAD (5323); hearing- or speech-challenged individuals may access this number through TTY by calling the toll-free Federal Relay Service at 800-877-8339.

D. Written Occupant Protection Plan for Abatement Projects

EPA regulations require that a written occupant protection plan be developed for all abatement projects (40 CFR 745.227(e)(5)). The term "abatement," as defined by EPA, "means any measure or set of measures designed to permanently eliminate lead-based paint hazards." It "does not include renovation, remodeling, landscaping or other activities, when such activities are not designed to permanently eliminate lead-based paint hazards, ... even though these activities may incidentally result in a reduction or elimination of lead-based paint hazards." (40 CFR 745.223). The occupant protection plan is required to:

+ be unique to the dwelling or facility;

+ be developed before the abatement;

+ describe the measures and procedures that will be taken to protect the occupants from exposure to lead-based paint hazards; and

+ be prepared by a certified lead-based paint abatement supervisor or certified project designer.

E. Site Assessment and Pre-Cleaning

If structural deficiencies exist, they have to be corrected before the site can be prepared for paint-disturbing work (see Figures 8.3 and 8.4). Worksite preparation, resident, environmental, and worker protection is required to be provided if the structural repairs will involve disturbance of surfaces coated with lead-based paint.

If the paint is deteriorated and there are paint chips or dust or debris present, vacuum the floor before protective sheeting is laid down (see the next subsection). Vacuuming will prevent the paint chips from being ground into dust by the workers' feet. Wet cleaning usually is not required for pre-cleaning.

FIGURE 8.3 Structural deficiency.

FIGURE 8.4 Example of structural deficiency needing repair prior to work.

F. Vacuums: HEPA vs. non-HEPA

Vacuum cleaners used for cleaning up dust as a lead hazard control measure must be high efficiency particulate air (HEPA) vacuums if the work is covered by OSHA's Lead in Construction rule, EPA's RRP Rule, or HUD's LSHR. (See Appendix 6, and, in particular, 29 CFR 1926.62(h)(4), 40 CFR 745.85(b)(2)(A) and (B), and 24 CFR 35.145 and 150(b), respectively.)

HEPA vacuums differ from conventional vacuums in that they contain high-efficiency filters that are capable of trapping extremely small, micron-sized particles. These filters can remove particles of 0.3 microns or greater from air at 99.97 percent efficiency or greater. (A micron is 1 millionth of a meter, or about 0.00004 of an inch.) See figure 8.5.

There is more to a vacuum than the filter. Other important factors that determine the effectiveness of a vacuum are velocity suction (which is a function of the motor, the design of the suction tool, and the extent to which the rest of the system does not release air before it is supposed to), quality of construction (which may determine the durability of the machine and whether there are air pressure leaks before the filtration), and whether the vacuum has special tools, such as a crevice tool. (See the further discussion of "Selecting a vacuum" in Chapter 11, section V.B.2.)

G. Worker Protection

Workers must be protected from exposure to lead by wearing protective clothing, practicing personal hygiene, and using lead-safe work practices (see Figure 8.6). Regardless of the size or dustiness of the job, OSHA requires that employers perform exposure monitoring of workers to determine the

FIGURE 8.5 One example of a commercial-type HEPA vacuum.

FIGURE 8.6 Inadequate worker protection during a large overhead paint stripping project. Depending on exposure, this worker should be wearing protective clothing, long chemical-resistant gloves and a respirator; and should also be protected against falls.

FIGURE 8.7 Placing coffee station in the work area is an unsafe work practice.

protective measures that are needed. Refer to 29 CFR 1926.62(g), Protective Work Clothing and Equipment, for specific requirements. These protective measures will help protect workers' families, because leaded dust will not be brought home, and will contribute to protecting the homes where they are working from lead contamination. Generally, protective clothing can include eye protection (always recommended), coveralls, head and hair protection (a painter's hat or a hard hat), disposable cotton gloves, latex/rubber gloves (when using detergents), disposable booties, and, if applicable, appropriate respiratory protection.

Personal hygiene includes the following "don'ts:"

+ No smoking;

+ No eating;

+ No drinking (see Figure 8.7 for an unsafe work practice);

+ No chewing; and

+ No applying cosmetics in the work area.

Workers who perform these "don't" activities with lead on their hands put themselves at risk of ingesting lead. Workers should always wash their face and hands with soap and water before eating, drinking, or smoking and before leaving the site. Clothing should be changed before leaving the worksite. Tools should be cleaned.

Paint-removal practices described in Section II.D of Chapter 11 reduce the amount of dust created by the work and thus the likelihood of worker exposure. For complete information on worker protection, consult Chapter 9.

H. Lead-Safe Work Practices

Workers performing paint-disturbing work should use lead-safe work practices, in accordance with guidance at Section II.D of Chapter 11. Overall, this means that workers must never use prohibited paint-removal practices, should work wet to dampen dust spread (except where this would create an electrical safety hazard), and should clean up thoroughly after the work. During paint-disturbing work, painted surfaces should be wetted with a fine mist of water or water mixed with a surfactant before scraping or sanding to reduce generation of airborne paint dust, followed by wet HEPA vacuuming. Appropriate consideration should be given to potential electrical hazards that may be created by the presence of water. In addition, the occupant protection and worksite preparation measures described in this chapter are part of lead-safe work practices.

I. Debris Control

In general, see the discussion of debris control throughout Table 8.1, below.

In *occupied dwellings*, ensuring that cleaning of interior and exterior work areas is conducted as the work progresses and at the end of each work day or work shift is essential for conducting paint-disturbing work safely. Neither debris nor protective sheeting may be left outside the dwelling overnight or in any area where passersby, especially children, could come into contact with these materials. These practices prevent the spread of lead-contaminated dust. EPA's RRP rule requires dust to be contained at the end of each work day regardless of whether the dwelling is occupied.

These *Guidelines* additionally note that *continual cleaning* is especially important when residents are present in the dwelling while work is in progress, or when residents return in the evening after work has been completed for the day. (See Section IV, Temporary Relocation, below.) When residents cannot be relocated and work is staged to proceed room by room, clearance standards may be more difficult to meet because dust from moved furniture may cause recontamination. In this situation, it is recommended that furniture be cleaned before moving it to an area where work and cleaning have been completed.

All debris is required to be handled and disposed of in accordance with the standards outlined in Chapter 10.

III. Worksite Preparation

A. Introduction

This section provides guidance on worksite preparation for interior and exterior paint-disturbing work, and it provides separate guidance for work on windows and for soil-lead hazard control. All recommendations in this section include the use of lead-safe work practices, including, most importantly, compliance with prohibitions against certain paint-removal practices described in Section II.D of Chapter 11.

The general purpose of worksite preparation is to minimize, contain, and control dust and debris created by the work. There are five objectives for worksite preparation:

+ Protect residents and workers from exposure to lead in dust, paint chips, and other debris created by the work.
+ Protect residents' belongings from contamination with lead.
+ Leave the surfaces of dwellings and common areas free of dust-lead hazards.
+ Protect the exterior environment, both on and off the subject property, from contamination.
+ Protect adjacent homes from contamination.

The measures recommended in this chapter help protect workers from exposing themselves to lead in dust, contaminating their cars and homes, and endangering their children.

Factors affecting the worksite preparation measures needed for a specific job include the following:

- The amount and spread of dust likely to be created by the job, which in turn is affected by the size of the surfaces needing work; the location of the work (e.g., ceiling vs. lower wall); and the nature of the work and the methods being used. For example, the enclosure of walls may require a lower worksite preparation level than the wet scraping of a large area because enclosure will disturb less paint and generate less dust. Similarly, demolition associated with replacement of deteriorated components will probably require a higher containment level than the wet scraping of a small area.
- The amount of air movement in the work area.
- The location of residents.
- The building layout.
- The proximity of the building to other properties.
- The extent to which there will be other construction or abatement work (e.g., renovation or asbestos abatement) that will be concurrent or sequential with the work being planned.
- Worker protection needs may also be a factor.

EPA's RRP rule requires that dust not leave the work area. These *Guidelines* are performance-oriented and are not specifications. It is possible to devise a unique worksite preparation approach for an individual dwelling if it achieves the five objectives stated above and if clearance, if required, is achieved. Containment measures should be designed to prevent the release of lead-containing dust, which can be spread by workers' shoes or by airborne dust.

Whatever combination of containment measures is selected, the levels of lead in dust outside the containment area must not rise above clearance levels. A previously conducted risk assessment, or selective dust testing conducted for this purpose, will indicate if hazardous dust-lead levels exist outside the containment area. If dust-lead levels rise in the course of the work, it is reasonable to conclude that the dust was released from the containment area and that the containment system is ineffective. Dust sampling is usually conducted no farther than 10 feet away from the containment area, but this may vary if visual monitoring indicates that dust may have spread farther than 10 feet. If deviations from the worksite preparation plans described below are contemplated, then the performance of the containment system should be determined by a person certified in the State to collect dust samples. This flexibility permits owners to select the most cost-effective strategy while also protecting the public health and the environment.

B. Interior Worksite Preparation

These *Guidelines* provide, in Table 8.1, two sets of recommendations for *interior* work (not including windows) – one for "low-dust" jobs and one for "high-dust" jobs. (Recommendations for window work are provided in Section III.D, below.)

The approach of categorizing a project by the amount of dust it may generate ("high dust" / "low dust"), in order to describe suitable measures taken to protect the safety of the housing for each category, is analogous to the approach OSHA uses for characterizing worker exposures to lead and the suitable protective measures for workers taken for exposures in each worker airborne lead exposure range, although the residential protection "high" / "low" distinction is defined based on the spread of leaded dust, rather than the airborne dust levels, and is less quantitative.

A low-dust job is work that creates a small amount of dust that will not spread beyond 6 feet from the painted surfaces being disturbed. A high-dust job creates a large amount of dust that is expected to spread beyond 6 feet from the working surfaces. Work disturbing more than 10 square feet of painted surface per room is likely to be a high-dust job, while work that disturbs less than 10 square feet will probably be a low-dust job. These are very rough indicators, however. Dust spread depends on the elevation of the work surface, air movement, and whether methods are used to dampen dust dispersal as well as reduce the amount of paint being disturbed and the amount of dust being generated.

All work involving lead-based paint should be performed in a manner that minimizes all dust production. *High-dust operations should be avoided if at all feasible*. All work should be designed to reduce all dust generation to protect children, workers and residents using work practices and procedures such as wet work practices and the use of tools with attached HEPA-vacuum exhaust.

Table 8.1 Interior Worksite Preparation (Not Including Windows)

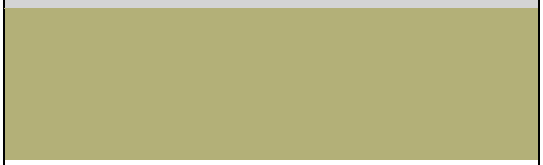
Note: This table does not relieve employers from the exposure assessments and other requirements of OSHA regulations. For example, employers are responsible for determining whether a work area is at or above the Action Level or Permissible Exposure Limit for airborne lead, and undertaking any required engineering controls, administrative controls and personal protective equipment controls.

Description	Low-Dust Jobs	High-Dust Jobs (High-dust operations should be avoided if at all feasible.)
Typical Types of Work	A low-dust job creates a small amount of dust that will not spread beyond 6 feet from the painted surfaces being disturbed, depending on the type of work performed. Work that disturbs less than 10 square feet of painted surface per room will probably be a low-dust job, again depending on the type of work performed. The following tasks are also generally considered low-dust jobs: routine repairs, such as re-hanging doors, replacing or repairing door locks, patching small holes in walls, small electrical repair jobs, and routine repainting that involves a small amount of wet scraping and/or wet sanding for surface preparation. Enclosure and encapsulation may be low-dust jobs if little surface preparation and disturbance of paint is required.	A high-dust job creates a large amount of dust that is expected to spread beyond 6 feet from the working surfaces, depending on the job. Work disturbing more than 10 square feet of painted surface per room is likely to be a high-dust job. The following are also generally considered high dust-generating activities: demolition of painted surfaces, including removal of interior walls, paneling, baseboards, door casings or frames, cabinets, flooring, or ceilings; pulling up old wall-to-wall carpeting improperly (see Chapter 11); paint scraping of large areas, such as a whole room, even when done wet; using a circular or reciprocating saw on painted surfaces; and removing dry residue and paint after using chemical strippers.
Resident Location	Residents must be outside the rooms where the work will be done until after final clearance is achieved (or, if cleaning verification is being conducted, after the cleaning is verified), i.e., after results of dust sampling show that dust-lead levels are below applicable standards (or visual examination of the cleaning verification wipe indicates that the cleaning is verified). If the housing or the work is federally-assisted, the resident relocation provisions of HUD's Lead Safe Housing Rule (LSHR) must be followed. The LSHR requires residents to be temporarily relocated to a suitable, decent, safe, and similarly accessible dwelling unit that does not have lead-based paint hazards – see Section IV.B,	SAME AS FOR LOW-DUST JOBS, EXCEPT that HUD recommends temporary relocation of residents to a suitable, decent, safe, and similarly accessible dwelling unit that does not have lead-based paint hazards, for jobs lasting more than five consecutive calendar days even if neither the housing nor the work is not covered by the LSHR.

Description	Low-Dust Jobs	High-Dust Jobs (High-dust operations should be avoided if at all feasible.)
Resident Location (continued)	below, on how to determine if the relocation unit is acceptable – except in certain situations, including those below. It requires relocation of residents for jobs lasting more than five consecutive calendar days and has other requirements (See Appendix 6 and the LSHR at 24 CFR 35.1345(a)(2).). If residents are not being temporarily relocated, the worksite must be contained and the work and clearance or cleaning verification, if they will be conducted, will not be completed in one 8-hour work day, residents must have lead-safe access to sleeping areas, and bathroom and kitchen facilities. If bathrooms are not accessible, residents should be relocated, unless alternative arrangements can be made (e.g., use of a neighbor's bathroom). If construction will result in other hazards (such as exposed electric wires), then residents should be relocated. The dwelling unit and the worksite should be secured, and occupants' belongings protected from contamination.	
Containment and Barrier Systems	To catch dust, paint chips, and other debris created by the work, place a single layer of impermeable protective sheeting (e.g., plastic) on the floor extending at least 6 feet out in all directions from each painted surface being disturbed. Workers should extend protective sheeting farther if they think dust generated by the work will spread, or in fact is spreading, beyond 6 feet. When dust and debris spread beyond 6 feet, workers should follow high-dust methods, depending on the job. If work on the flooring is part of the job, it is generally not necessary to put protective	Place two layers of protective sheeting on the entire floor of rooms where work is being done, in passageways used by workers going to and from the work area, and other areas used for storage of tools or debris. Two layers of protective sheeting should be used for all jobs in which damage to the sheeting is likely. (See Figure 8.8.) Usually the top sheet will be damaged and the bottom sheet will protect the floor. Torn or punctured sheeting should be repaired each day. Protective sheeting on floors should be a heavy-duty, disposable, impermeable

Description	Low-Dust Jobs	High-Dust Jobs (High-dust operations should be avoided if at all feasible.)
Containment and Barrier Systems (continued)	sheeting on the floor if the non-floor work is low dust. Protective sheeting on floors should be a heavy-duty, disposable, impermeable covering, such as polyethylene or vinyl plastic sheeting to resist tearing or puncture during the work. Plastic sheeting of 6 mils thickness is generally recommended for floors, but a thinner grade may be satisfactory for jobs of short duration with light traffic and no abrasion. Adhesive-backed floor protection films may be useful. Protective sheeting on floors must be able to withstand vacuuming the work area. Do not use cloth canvas drop cloths; they can transfer retained leaded dust from job to job. Do not track dust off the protective sheeting onto unprotected flooring. Workers and others leaving the work area must clean themselves before they do in order not to track dust off of plastic sheeting. Wear disposable non-skid shoe covers ("booties") when on protective sheeting and remove them each time you step off the sheeting. Alternatives to using booties are: (1) wipe both the top and bottom of your shoes with a damp paper towel each time you step off the sheeting;  **FIGURE 8.8 Floor plastic in work area.**	covering, such as polyethylene or vinyl plastic sheeting of 6 mils or greater thickness to resist tearing or puncture during the work. . Adhesive-backed floor protection films may be useful. Protective sheeting on floors must be able to withstand vacuuming. Workers and others leaving the work area must clean themselves before they do in order not to track dust off of plastic sheeting. Lighter impermeable sheeting, such as "painter's poly," may be used to protect immovable objects within the work area. Do not use cloth drop cloths; they can transfer retained leaded dust from job to job. If only a few rooms in a dwelling unit are being treated, install protective sheeting with a simple airlock flap on doorways to avoid having to clean and clear the entire dwelling. Even if the entire dwelling is to be cleaned and cleared, it is helpful to install protective sheeting in doorways to work areas to reduce the spread of dust. Simple airlocks are constructed using two sheets of protective sheeting. The first one is taped on the top, the floor, and both sides of the doorway with a vertical fold in the middle to allow slack. Next, cut a slit about 6 feet high down the middle of the plastic; do not cut the slit all the way down to the floor. Tape the second sheet of plastic, placed on the side of the first sheet facing the work area, across the top of the door only, so that it acts as a flap. The flap should open into the work area. (See illustrated guidance on this method in the *Lead Paint Safety Field Guide* (HUD, 2001), page 46.) Doorways within a containment area need not be sealed if the work area is isolated from the rest of the unit. If the entire dwelling unit is being treated, cleaned and cleared, doorways need not be sealed.

Description	Low-Dust Jobs	High-Dust Jobs (High-dust operations should be avoided if at all feasible.)
Containment and Barrier Systems (continued)	(2) clean the bottom of your shoes using a tack pad (a large sticky pad that is taped to the protective sheeting and helps remove dust) every time you step off the sheeting; and (3) remove shoes every time you step off the protective sheeting. The drawbacks to these alternatives are: (1) heavily treaded work boots may be difficult to clean; (2) the effectiveness of the tack pad may become compromised after a period of use; and (3) going without shoes in non-work areas is risky to the feet. A physical barrier should be placed at doorways to prevent inadvertent access by residents. If the work and collection of clearance dust samples will not be completed in one day, there should be an overnight barrier that is locked or firmly secured to prevent access to rooms where work is being done (see Figure 8.9). Children should not have access to protective sheeting because of the suffocation hazard. All personnel, tools, and other items, including the exteriors of containers of waste, must be kept free of dust and debris before leaving the work area.  **FIGURE 8.9 Plastic barrier between living space and work area.**	Place protective sheeting on the floors of passageways to be used by workers going from high-dust work areas to the outside. This facilitates daily cleanup of the work areas and encourages workers to use the protected passageways. Do not track dust off the protective sheeting onto unprotected floor. Wear disposable non-skid shoe covers ("booties") when on protective sheeting and remove them each time you step off the sheeting. Alternatives to using booties are: (1) wipe both the top and bottom of your shoes with a damp paper towel each time you step off the sheeting; (2) clean the bottom of your shoes using a tack pad (a large sticky pad that is taped to the protective sheeting and helps remove dust) every time you step off the sheeting; and (3) remove shoes every time you step off the protective sheeting. The drawbacks to these alternatives are: (1) heavily treaded work boots may be difficult to clean; (2) the effectiveness of the tack pad may become compromised after a period of use; and (3) going without shoes in non-work areas is risky to the feet. If the work and clearance will not be completed in one day, there should be an overnight barrier that is locked or firmly secured to prevent access to rooms where work is being done. Children should not have access to protective sheeting (suffocation hazard). All personnel, tools, and other items, including the exteriors of containers of waste, must be kept free of dust and debris before leaving the work area.

Description	Low-Dust Jobs	High-Dust Jobs (High-dust operations should be avoided if at all feasible.)
Warning Signs	If residents are present, place warning signs at the entry to work-area rooms or the containment area and at each main and secondary entryway to the building or, for work in multi-family housing, the unit; if the work is to be done in a common area, place the warning signs at the entries to that area (see Figure 8.10 and 11). Warning signs should be in the language(s) understandable to residents and workers. Recommended wording is: "Warning. Lead Work Area. Poison. No Smoking or Eating." Wording can be adapted as appropriate to project-specific conditions. The EPA's RRP rule has sign requirements for renovations (see Appendix 6). OSHA warning signs are required when worker exposures exceed OSHA's permissible exposure limit for airborne lead; see Chapter 9.  FIGURE 8.10 Interior warning sign.	SAME AS FOR LOW-DUST JOBS.  FIGURE 8.11 Exterior warning sign for project shown in Figure 8.10

Description	Low-Dust Jobs	High-Dust Jobs (High-dust operations should be avoided if at all feasible.)
Ventilation	To contain dust, air movement should be minimal in work areas while painted surfaces are being disturbed and while cleaning is being conducted. Fans should be turned off, and windows should be closed. The HVAC system should be turned off. Forced-air duct vents within the work area of surfaces being treated and at least 6 feet beyond should be covered with protective sheeting and taped. Doorways in the work area must be closed, and covered with plastic sheeting or other impermeable material. (If volatile substances are to be used, such as certain types of paint strippers, a source of fresh air should be provided and manufacturer's instructions followed in order to ensure protection of the workers. Open windows usually are the available source of fresh air. An alternative source of fresh air to open windows is negative air; see Section V, below. If windows are to be opened, then, in order to minimize dispersal of leaded dust, open as few windows as need be to protect the works, use high-dust containment methods (see above), and conduct the work with the volatile substances first followed by other paint-disturbing work with the windows closed.) Painting can be done with windows open and HVAC system on, provided the work has passed clearance or cleaning has been verified, and paint fumes will not be carried to other areas causing danger or discomfort.	SAME AS FOR LOW-DUST JOBS.

Description	Low-Dust Jobs	High-Dust Jobs (High-dust operations should be avoided if at all feasible.)
Furniture and Resident's Belongings	Remove drapes, curtains, furniture, rugs, and other resident belongings from the work area, that is, to at least 6 feet away from surfaces being treated, and cover and seal with taped impermeable protective sheeting all large furniture and other large items that cannot be moved (see Figure 8.12). If there will be air movement due to open windows, remove all belongings from rooms in which work is being done or cover and seal with taped protective sheeting.	SAME AS FOR LOW-DUST JOBS.  **FIGURE 8.12** **Items that are too large to move should be sealed completely and taped.**
Cleanup	**Daily cleanup:** The purposes of daily cleanings are: (1) to help assure that workers will not be exposed to accumulated dust-lead; (2) to make it more likely that the work area will pass the initial clearance examination after one final cleanup; and (3) to protect residents after final cleanup. If residents are present in part of the dwellings, daily cleaning provides protection against accidental resident exposure, especially after work hours. The longer the job lasts, the more important the daily cleaning. The "daily" procedures below apply to each work shift if the work is being done on more than one shift. Daily cleaning includes: (1) wrapping or bagging debris and storing same in a secure area; (2) vacuuming (using HEPA vacuums throughout) protective sheeting on floors and belongings; (3) vacuuming other horizontal surfaces within at least 6 feet of treated surfaces; (4) vacuuming and wet cleaning of floors used as passageways to the work areas (except that wet cleaning is not necessary if passageways can be reliably secured during non-work hours) any	NEARLY THE SAME AS FOR LOW-DUST JOBS, except that cleaning of horizontal surfaces should extend through the entire containment area, not just within 6 feet of the work surfaces.

Description	Low-Dust Jobs	High-Dust Jobs (High-dust operations should be avoided if at all feasible.)
Cleanup (continued)	areas used for storage of tools and debris; and (5) patching and repairing of protective sheeting and simple airlock flaps as needed. Contaminated objects need to be properly wrapped before removing from the work area (see Figure 8.13). Do not store dust, debris and other waste inside the dwelling overnight. Instead, transfer the waste to a locked secure area or container that prevents release of, and access to, dust and debris. **Final cleanup:** The final cleanup includes: (1) cleaning and removal of protective sheeting from the floor and belongings and discarding of same; (2) vacuuming and wet cleaning all horizontal surfaces (including window troughs) within at least 6 feet in all directions of all disturbed painted surfaces (cleaning beyond the 6 feet perimeter is recommended as a safety precaution if dust generated by the work may have spread beyond 6 feet); (3) cleaning all window troughs; and (4) vacuuming and wet cleaning the floor in adjacent areas used as pathways to the work areas. See Chapter 14 for further guidance on cleaning before, during, and after hazard control and other paint-disturbing work.	**FIGURE 8.13 Removal and wrapping contaminated carpet.**
Monitoring Effectiveness of Containment	The project supervisor must make sure that dust generated by paint-disturbing work has not spread beyond the containment area. Conduct visual monitoring while paint-disturbing work is underway and while workers are stepping off the protective sheeting on the work-area floor. Checking the quality of the effectiveness of containment is optional for low-dust jobs but is encouraged for low-dust jobs lasting longer than 5 consecutive days. (If the quality check is to be conducted, see the procedures for high-dust jobs.)	The project supervisor must make sure that dust generated by paint-disturbing work has not spread beyond the containment area. Conduct visual monitoring while paint-disturbing work is underway and while workers are stepping off the protective sheeting on the work-area floor. HUD recommends that the project supervisor (certified renovator) check the quality of the effectiveness of containment of high-dust jobs as follows:

Description	Low-Dust Jobs	High-Dust Jobs (High-dust operations should be avoided if at all feasible.)
Monitoring Effectiveness of Containment (continued)		+ For high-dust jobs scheduled to be in containment for up to 5 consecutive days: — Supplement the project oversight with cleaning verification. — Specifically, at the end of *each* work day (or work shift if the work is being done on more than one shift), perform the cleaning verification of the floor of the living area outside the containment that is at greatest risk of contamination (usually the living area closest to the work area). + It is essential that the cleaning verification be performed before daily cleaning to determine if the containment system was effective in protecting the occupants that day. + For high-dust jobs scheduled to be in containment for more than 5 consecutive days, or turns out to take that long: — Supplement the project oversight with dust-wipe testing. — Specifically, a dust-wipe sample should be collected at the end of *each* work day (or work shift if the work is being done on more than one shift) from the floor of the living area outside the containment that is at greatest risk of contamination (usually the living area closes to the work area). + It is essential that the sample be collected *before* daily cleaning to determine if the containment system was effective in protecting the occupants that day, and

Description	Low-Dust Jobs	High-Dust Jobs (High-dust operations should be avoided if at all feasible.)
Monitoring Effectiveness of Containment (continued)		that the location of the sample not be known in advance to the person(s) or firm(s) conducting the job. — Sampling, analysis and use of dust tests. + Samples for this purpose should be collected by a certified risk assessor, lead-based paint inspector, or sampling technician. The wipe sample should be collected in accordance with Appendix 13.1, or similar protocol. + Dust-wipe samples should be sent to a laboratory recognized for analysis of lead in dust by the National Lead Laboratory Accreditation Program (NLLAP) (or an EPA-authorized State/ Tribal-required alternative). One-day service (or faster, if desired to expedite the project) should be ordered. + Lead levels in the floor dust should be less than the applicable floor dust standard for clearance (the Federal standard as of the publication of this edition of these *Guidelines* is 40 µg of lead per square foot). + If the dust-lead level is above clearance standards or if the cleaning is not verified, the person in charge should immediately: — Clean the areas represented by the failed clearance testing or cleaning verification.

Description	Low-Dust Jobs	High-Dust Jobs (High-dust operations should be avoided if at all feasible.)
Monitoring Effectiveness of Containment (continued)		— Review all elements of the worksite preparation and occupant protection for the job, make improvements where feasible (e.g., repairing torn contaminant barriers), and reaffirm strict compliance by all workers with lead-safety procedures. — If dust-lead levels are found to exceed the clearance standard a second time, residents must be relocated and must not be allowed to reenter the dwelling until final cleanup and documented compliance with clearance standards or cleaning verification is achieved. ▯ If a work-crew supervisor (certified renovator) can document that the containment is effective (that is, for the area outside containment that was checked, the wipe sample is below the dust-lead clearance standard, or the area passed cleaning verification) for 3 or more consecutive dwelling units in which the work crew used the same hazard-control techniques on high-dust jobs, then the frequency of checking high-dust jobs can be reduced to 1 in every 10 dwelling units for that supervisor.

C. Worksite Preparation for Exterior Paint-Disturbing Work

For exterior paint-disturbing work, worksite preparation is dependent on several factors: the amount of dust created; how high up the work surfaces are; how near the work surfaces are to other properties; weather conditions; the location of the residents; and whether people must pass in and out of the building during the work. A porch, balcony, or deck is considered to be exterior, unless it is enclosed by screens or windows, in which case it is considered to be an interior room for the purpose of worksite preparation. Only one set of instructions is provided because the same approach is used for low-dust and high-dust exterior jobs.

1. Resident Location

Residents may remain inside dwellings outside of which exterior work is being done, but must be away from the work area for the duration of the exterior project until final cleanup and exterior clearance have been completed. Alternatively, residents may leave their dwellings during workdays and return to the interior (not the exterior work area) after daily cleanup at the end of each workday (presuming the work is done during just the day shift), or residents may temporarily relocate for the duration of the project. Remaining residents must have lead-safe access to entry/egress pathways. (For longer-duration HUD-assisted interior work, the Lead Safe Housing Rule (LSHR) requires that residents be relocated; see Section IV, Temporary Relocation, below, Appendix 6, and the LSHR at 24 CFR 35.1345(a)(2).)

Workers should tightly close or seal windows, doors, and other building openings within 20 feet of surfaces being disturbed during exterior work. Remaining residents should be instructed not to open windows within 20 feet of ongoing work. Daily cleanup of horizontal surfaces within 20 feet of disturbed surfaces is essential.

2. Containment and Barrier System

Place one layer of disposable impermeable plastic (not landscape fabric, geotextiles, or cloth) protective sheeting (typically at least 6 mil thick to resist tears) on the ground, weighted down by heavy objects, and extending far enough from the work surfaces to adequately collect all falling paint chips and debris. EPA's RRP rule requires that the sheeting extend at least 10 feet in all directions beyond working surfaces when work is on the ground floor, or a sufficient distance to collect falling paint debris, whichever is greater, if feasible; these criteria are also appropriate for abatement work. As a general guide, if work is above the ground floor, sheeting should extend 20 feet. These distances apply unless an adjacent building or other obstacle interferes (see Figure 8.14, and the following paragraph). Being up high and exposed to wind currents, dust created by scraping an exterior above the ground floor has the potential to contaminate a large area. Scaffolding with vertical shrouding or staging on pump jacks are other options. Vertical shrouding on scaffolding generally should be used if work is close to a sidewalk, street, or another property, or if work will be conducted at a height of more than three stories.

If an adjacent building, building wing, or property line is closer than the distance the sheeting should extend (10 feet or 20 feet, as applicable), provide as much protection as feasible. For example, if the adjacent building is on the same property as project building, or is owned by the same owner, protective sheeting should be placed on the facing side of the adjacent building within 10, or 20, feet of the work area, as described above.

FIGURE 8.14 Exterior containment of polyethylene sheeting lines the narrow walkway between two houses. Notice the abatement worker in the background.

FIGURE 8.15 Exterior containment on building and window; ladder kept on plywood.

(See figure 8.14) If the adjacent building is owned by another owner, an effort should be made to coordinate with that owner to allow protective sheeting to be installed on that owner's ground and building.

Tape and/or staple protective sheeting to wood siding or ribbon board so there are no gaps between sheeting and building. A wood strip may have to be attached to a masonry wall. Build a curb at the edge of the protective sheeting to prevent contaminated runoff and reduce blowing of debris off the sheeting. If power washing is planned, extra care is needed to contain runoff. Weigh sheeting down with two-by-fours or similar objects. In hot weather, take care not to burn out vegetation under plastic sheeting. White plastic is less harmful than black or clear. Do not place ladder feet on top of plastic sheeting. Cut slots in the sheeting and place ladder feet on the ground and repair slots with tape when the ladder is moved. Alternatively, place a large, sturdy piece of plywood on the sheeting and put the ladder on the plywood (see Figure 8.15). If power washing is planned, a certified abatement supervisor with experience with such methods should design special containment and water-collection measures.

Keep all windows, doors, and other building openings within 20 feet of working surfaces (including openings in adjacent buildings) tightly closed or sealed with protective sheeting unless entry to the interior is needed. If possible, require use of an alternative entryway for existing entryways closer than 20 feet. If an entrance must be used that is closer than 20 feet, place a shroud above and on the sides of the entrance and install a simple airlock flap at the door (see the Containment and Barrier Systems row of Table 8.1, above). In addition, install a tack pad inside the door so shoes can be cleaned off.

If residents are remaining in the dwellings or returning at the end of the day, at least one lead-safe entryway must be made available. Do not work on front and rear porches at the same time unless there is a third entry.

3. Playground Equipment, Toys, Sandbox, and Outdoor Furniture

Remove all movable items to at least a 20-foot distance from working surfaces. Items that cannot be readily moved to a 20-foot distance must be sealed with taped protective sheeting.

4. Security

Erect temporary fencing or barrier tape at a 20-foot perimeter around working surfaces (or less if distance to the next building or sidewalk is less than 20 feet). If practical, require use of an alternative entryway for any entrance within 20 feet of working surfaces. If not, install a shroud, simple airlock flap, and tack pad, as described above. Use a locked metal bin, locked covered truck, or locked room to store debris securely before disposal.

5. Warning Signs

Post warning signs on the building and at a 20-foot perimeter around the building (or less if distance to next building or sidewalk is less than 20 feet). Warning signs should be in a language understandable to residents (see Figures 8.10 and 8.11). Recommended wording is: "***Warning. Lead Work Area. Poison. No Smoking or Eating.***" Some states have specific sign requirements, and wording can be adapted as appropriate to project-specific conditions. See EPA's RRP rule for sign requirements for renovations. You may also use barrier tape (see Figure 8.16).

If an employee's exposure to lead is above the permissible exposure limit (PEL) of 50 $\mu g/m^3$ of airborne lead averaged over an 8-hour period, warning signs must be posted at in each work area. The mandatory language for these signs is shown in Chapter 9, Section III.

FIGURE 8.16 Example of barrier tape used as an occupant protection measure.

6. Weather

Do not conduct exterior work if wind speeds are greater than 20 miles per hour or if dust and debris cannot be adequately contained. If chips and debris are blowing off the protective sheeting, work must stop until the wind dies down or adequate containment is installed. In the meantime, cleanup must occur before rain, snow or other precipitation begins.

7. Cleanup

Cleanup should be conducted at the end of each workday, the end of each work shift when work is being done on more than one shift, or when workers are finished in one exterior work area and moving to another, whichever is soonest.

- Remove debris and paint chips and wet clean all horizontal surfaces on the building (e.g., exterior window sills and exposed window troughs, porches, balconies, railings) within 20 feet from working surfaces.

- Remove debris and paint chips from the protective sheeting.

+ Dispose of water that has collected on the protective sheeting in accordance with local rules (usually flushing it down a toilet is acceptable, but do not dump it down a storm drain or a sink, tub, or shower).

+ Clean (either vacuum or wet clean) the protective sheeting.

After cleaning:

+ Fold protective sheeting inward to avoid contamination of the environment. Do not reuse protective sheeting.

+ Visually inspect for and remove any debris and paint chips from the ground, walkways, gardens, shrubbery, and play areas. Refer to Chapter 14 for further guidance on cleaning before, during, and after hazard control and other paint-disturbing work.

+ Do not leave debris or protective sheeting out overnight (or after the final work shift of the day).

+ Keep all debris, protective sheeting, and other disposable material in a secured area that will not allow release of the material, until final disposal. (See Section III.C.4, above.)

D. Worksite Preparation for Windows

Because windows have both interior and exterior sides, workers should protect both interior and exterior spaces from contamination when repairing or replacing old windows or performing interim controls or abatement of lead-based paint hazards on windows. Most window repair and window interim control work can be considered low-dust work if paint surfaces are misted before being scraped and prepared for repainting, and scored before removing small parts like stops and parting beads. However, if the entire window, including the jamb casing, stool, and apron, is being replaced, workers should prepare for high dust generation.

FIGURE 8.17 Pre-cleaning window with HEPA vacuum.

An important consideration in planning dust containment for window work is that the windows may be open during most of the work, creating the potential for wind-blown dust into the interior. Therefore, workers should follow the guidance given in Table 8.1 for interior worksite preparation that protects against wind-blown dust, if window openings are not closed, either by closing the storm window, if present and operable, or by covering the opening with protective sheeting (see Figure 8.17), or if the work is such that the window will not be opened, such as if it is for repair of paint on the underside of the interior sill (see Figure 5.14) or the face of the window frame.

If working on windows from the outside, it may be possible to tack or tape protective sheeting to the interior window casing or wall, completely covering the window opening, and achieve sufficient interior worksite protection. If the interior of the unit is adequately protected, the interior would not need to undergo a clearance examination. Care must be taken in preparation, because attaching sheeting to the interior wall may cause unacceptable damage to the wall surface unless appropriate tape, such as blue painter's tape, is used.

If the window is not sealed to the interior of the unit before it is removed from the outside, interior cleanup and clearance would still be necessary. Also, exterior worksite preparation, as described in Section III.C, is always required for window removal from the outside, and the protective sheeting must be removed and disposed of with care.

Workers should follow other guidance provided in Table 8.1, above, for resident location, barriers, signs, security, ventilation system, furniture protection, weather, cleanup, and clearance.

If working from the inside and there is no operable storm window, workers may be able to tack and tape protective sheeting to the outside window surround or wall, completely covering the window opening, so that dust and debris will not fall on exterior surfaces other than the window sill. If there is an operable storm window, workers may either install the sheeting as described above, or put tape across the gaps between the storm window sashes and frame, and between storm window sashes. This will preclude the blowing of dust into the interior, and it will also provide adequate protection of the exterior so further exterior worksite preparation may not be necessary. (Of course, the protective sheeting must be removed and disposed of with care, and exterior cleanup and visual assessment for dust, debris and residue should still be done.) If this method is not used, the interior and preparation based on either low- or high-dust generation, as appropriate, and protecting against wind-blown air. As noted in Section III.B and Table 8.1, high-dust operations should be avoided if at all feasible; planning for window replacement projects should include sufficiently stringent precautions and controls to minimize the likelihood of the project becoming a high-dust project.

E. Worksite Preparation for Soil-Lead Hazard Controls

Disturbing lead-contaminated soil poses the risk of generating dust that can contaminate building surfaces, both interior and exterior, and adjacent yard and paved areas. The most effective way to reduce dust generation is to continually dampen the soil as it is being disturbed. This should always be done. However, workers should take care not to over-water the soil. Excessive dampening of the soil is likely to cause runoff and require the use of major curbing methods, such as bales of hay.

If the soil-lead hazard control method being used involves minimal disturbance of the bare soil (as may be the case when the soil is covered with bark, mulch, sod, gravel, landscaping fabric, paving stones, or asphalt paving) and if the soil is kept damp during the work, adequate worksite preparation is to place protective sheeting on ground surfaces, porches, etc. within at least 6 feet of the work area on all sides and to tightly close or seal all building openings within at least 10 feet. These distances are minimum guidance. Supervisors should visually monitor dust spread and adjust the containment if needed during a particular project.

If, however, the soil is being shoveled, cultivated, rototilled, or otherwise subjected to major disturbance, protective sheeting on the ground should extend at least 10 feet from the soil, and all building openings within 20 feet of the work area should be tightly closed or sealed. Of course, this should be accompanied by periodic dampening of the soil during the work.

Perform daily and final cleanup. Follow the cleanup guidance for exterior paint-disturbing work (see Section III.C.7, above), except, of course, references to paint chips apply only if the soil was visibly contaminated with them.

IV. Temporary Relocation

Temporary relocation means that occupants currently living in a dwelling intend to return to that unit once the work is finished. There are many possible variations – from requesting residents to vacate the unit for just one workday (leaving their belongings in the unit and returning at the end of the day) to moving everything out for several weeks or months. Temporary relocation of residents can be disruptive, complicated, and costly. Careful planning of relocation pays off in good client relationships, cost containment, and efficiency in conducting the work. This section provides answers to some of the most common questions about relocation.

A. When Is Relocation Necessary and What Are the Options?

Temporary relocation of residents is generally recommended when work is undertaken that will disturb painted surfaces known or suspected to contain lead-based paint and the work will occur throughout much of the dwelling over several days. (If the work does not disturb lead-based paint, dust-lead hazards or soil-lead hazards, relocation is usually not necessary as a lead-exposure protection measure.) Temporary relocation is clearly necessary if residents cannot have safe access to bathrooms, sleeping areas, and kitchen facilities (or alternative eating arrangements) during non-work hours.

Safe access includes the absence of other significant safety, health, or environmental hazards in addition to lead hazards (e.g., toxic fumes, on-site disposal of hazardous waste, or exposed electrical wiring).

There are, however, several exceptions and options that may be considered in deciding whether it is necessary for residents to temporarily relocate and, if so, for how long and whether furniture and other belongings must be moved.

1. Work Is a Small Area

If only a small amount of paint is being disturbed, that is, an amount below HUD's *de minimis* threshold for HUD-assisted projects, or EPA's minor repair and maintenance work threshold for unassisted projects, special measures to protect residents from exposure to leaded dust are not required (see Section II.A, above, for a definition of the HUD and EPA area threshold definitions). However, basic precautions are strongly recommended. These include: never using prohibited paint-removal practices (see Chapter 11, Section II.D.1), and cleaning the work area thoroughly after work is completed. Also, if a child under age 6 resides in or accesses the unit or area, keep residents out of the work area until after final cleanup.

2. Work Is Only on the Outside

Residents and their belongings may remain inside the dwelling if the work is only on the exterior and building openings (windows, doors, vents) within 20 feet of disturbed paint surfaces are tightly closed or sealed and cleaned afterward, *and* an entryway is provided that is free of dust-lead hazards, soil-lead hazards, and debris.

3. Work and Clearance Take Only One Day

If the work, final cleanup, and clearance can be achieved (i.e., results of dust sampling received from the laboratory and found to be acceptable) in one work day, residents need to be out of

the work area or the unit only for that day and can return with full access to the unit at the end of the day. As a practical matter, however, completion of the work and achievement of clearance in one day may not be a realistic goal. It usually takes an additional day to get the results of the laboratory analysis. However, as discussed in Unit IV.E, below, methods (including portable X-ray fluorescence (XRF) analysis and anodic stripping voltammetry) exist for reliably analyzing wipe samples on-site instead of in a fixed laboratory, which may provide testing results much more quickly than fixed-laboratory analysis by avoiding transportation of the samples to the laboratory and handling time within the laboratory. A laboratory that is recognized under NLLAP for mobile source lead dust analysis may be used for clearance. This approach may be particularly helpful for multi-family projects, in which a work crew may be working on a unit while the clearance test analysis is being performed on the crew's preceding unit. Sometimes work areas do not pass clearance the first time, so recleaning and additional dust sampling is required, which may require an additional day, even if the dust-lead analysis is rapid.

4. Work Area Is Limited and Work Is of Short Duration

Relocation is usually not necessary or is necessary only for workday hours if the work: takes less than five days; is being conducted in only one or two rooms; and if exclusion from those rooms does not preclude safe resident ingress and egress to the unit and safe access to kitchen (or alternative eating arrangements), bathroom, and sleeping areas. Furniture and other belongings can be moved out of the workrooms, or covered and sealed with protective sheeting and tape. It is recommended, however, that residents who remain in their units or vacate only during workday hours while such limited area work is being conducted be required to sign a statement that: (1) they understand that there may be lead-based paint hazards in both specified work areas and traffic areas used by workers outside the work areas in spite of a thorough cleaning of such areas; and (2) they agree not to enter the work areas until they are notified by a specified responsible party that the areas have passed clearance (or cleaning verification, if applicable).

Theoretically, such arrangements, in which residents remain in the unit or are absent during the workday but return for the night, can continue for an extended period of time. As a practical matter, however, there are limits to how long people will comply with such procedures. HUD regulations pertaining to housing receiving Federal assistance for the residents to live there or for the work allow this type of arrangement to continue for no more than five calendar days (24 CFR 35.1345(a)(2)(iv)). If residents are to be allowed back in the unit during the night, it is necessary that workers thoroughly clean, at the end of each work day, not only the work areas but also the floors of the pathways used by workers to and from the work areas. Installing protective sheeting on these pathways facilitates cleaning. If a decontamination area is used in a large multi-family project, cleaning is necessary only from the work areas to the decontamination area.

5. Exception for Elderly Residents

Because of the added difficulties that may accompany the relocation of elderly residents, it is acceptable to make special exceptions to normal relocation policy for them. This exception is acceptable for work to be done in housing for the elderly. (As stated in the Lead Safe Housing Rule, housing for the elderly means retirement communities or similar types of housing reserved for households composed of one or more persons 62 years of age or more, or other age if recognized as elderly by a specific Federal housing assistance program; it is not merely housing occupied by the elderly.) If elderly residents are permitted to stay in their units when temporary relocation would normally be required, they should be fully informed about

the nature of the work and the hazards that may be generated; they should be required to sign an informed consent form before the work begins; and, of course, children should not be permitted in the unit. If the resident declines to sign, the property owner and the contractor will have to determine whether or not the job will be performed. Figure 8.18 is an example of an informed consent form. No such policy or form should be implemented without advice from the contractor's legal counsel.

Figure 8.18 Sample Informed Consent Form for Residents of Housing for the Elderly.

I/We, the undersigned,

☐ choose to remain in my/our home while _____
(Description of work)

is being performed;

or

☐ choose to relocate to another unit while the work is being performed;

and

☐ I/We have made this choice having read and understood the following:

1. I am/At least one of us is at least 62 years old.
2. My/Our home was built before 1978 and is housing designated for the elderly.
3. I/We have received the pamphlet *"Protect Your Family From Lead in Your Home"* and the pamphlet *"Renovate Right: Important Lead Hazard Information for Families, Child Care Providers and Schools"* (*"Renovate Right"*), and am/are aware of the health hazards that are posed by lead-based paint in general and that can be created by renovation, painting, repair or lead abatement work
4. I/We have been given a description of work that will be done in my/our home and understand that during the course of the work, lead hazards may be created in the work area. These hazards will be taken care of before the job is considered complete.
5. I/We may stay in my/our home but I/we may not enter the work area while work is being performed.
6. I/We will not allow children under age six or women of childbearing age to visit or reside in my/our home while work is being done, because visiting or residing may pose a health risk.
7. I/We waive rights to all damages. I/We agree to hold harmless

   _____
   (The housing owner, public housing agency, or other responsible party)

   for any damages due to lead poisoning that occur as a result of the work on these premises.

_____	_____	_____	_____
Name	Date	Name	Date

B. What Relocation Units Are Acceptable?

Relocation dwellings should be acceptable to residents so that they will not attempt to return to their own dwellings during paint-disturbing work. Generally, dwellings serving as temporary relocation units should, at minimum, meet applicable housing codes. If they are HUD-assisted, they should meet the regulatory standards, e.g., housing quality standards (24 CFR 982.401) or physical condition standards (24 CFR 5.703). If they were constructed before 1978 and are not HUD-assisted, they should also pass a visual assessment; that is, they should have no deteriorated paint and no visible dust or debris. If a dwelling constructed before 1978 is to be occupied by a relocated household for more than 100 days or if it is used repeatedly for temporary relocation (such as a lead-safe unit operated by a community program) with occupancy periods totaling more than 100 days, it should be found to be lead-safe by a risk assessor before the first occupancy begins, and at least annually thereafter. In addition, these units should be adequately equipped with furniture, cooking facilities, refrigerators, televisions, and toys (except for items that will be moved with the residents). Relocation is usually a substantial undertaking, involving not only the movement of people and their possessions, but also the coordination of mail, phone, school, and community changes. Whenever possible, children should continue to attend the same school during the relocation period, even though this may involve finding special transportation. Due to their complex nature, relocation considerations may dictate the scheduling of the project. Destination options include staying with relatives or friends, a designated relocation unit owned or leased by a local organization, a hotel or motel (usually the most costly and least desirable option for families with children), or a temporarily vacant unit in the same multi-family property. If the Lead Safe Housing Rule requires relocation of the family to a temporary unit during work, the unit to which the family is relocated must not have lead-based paint hazards (24 CFR 35.1345(a)(2)).

C. Allowing Reoccupancy after Interim Clearance

In some rehabilitation jobs, it may be efficient to conduct all lead hazard control or abatement work first, using qualified firms and workers, and then, following a preliminary or "interim" clearance (see Chapter 15 for details), conduct other rehabilitation work that will not affect lead-based painted surfaces with firms or workers who are not certified for lead hazard control work or renovation work that may affect lead-based painted surfaces. Clearance is conducted after the hazard control or abatement work to document that the contractor has completed the job correctly. This clearance is sometimes called "interim clearance." The question may arise in such cases whether temporarily relocated residents can return after interim clearance is achieved but before all rehabilitation is finished. The general answer depends on the nature of the post-clearance rehabilitation work and how much dust will be created. Additional guidance is provided below. However, for units controlled under HUD's Lead Hazard Control grant program, and some local regulations, units in which rehabilitation work occurs following lead hazard control must pass a final clearance prior to re-occupancy by the residents (see the HUD Office of Healthy Homes and Lead Hazard Control's Policy Guidance 99-01, posted at: ***http://portal.hud.gov/hudportal/HUD?mode=disppage&id=POLICY_GUIDANCES***).

Most rehabilitation activities generate a lot of dust. In old houses, such dust may be contaminated with lead even if the components being disturbed are not coated with paint that is considered lead-based paint under Government regulations. There are two reasons for this: (1) existing paint that is not lead-based paint can still contain lead; (2) dust under or behind floors or walls can be contaminated from accumulations that are decades old. Therefore, in old homes that have been found to contain lead-based paint hazards, it is recommended that there be a final clearance after all paint-disturbing work is

finished, even if there was an interim clearance previously and the follow-up work did not disturb lead-based painted surfaces. For this reason, it is recommended that relocated residents usually not return until after all paint-disturbing work is completed and final clearance is achieved.

If, however, the paint-disturbing work performed after interim clearance will disturb less than a *de minimis* amount of paint (see Section II.A, above), final clearance is not necessary and residents can return after the interim clearance. If the paint being disturbed exceeds the *de minimis* but is known not to be lead-based paint, residents can return. But in each case, i.e., if the *de minimis* applies or if the paint is not classified as lead-based paint, the precautions listed at the end of Section II.A, above, should be followed when disturbing paint in pre-1978 housing, unless it is known that all layers of disturbed paint have been applied after 1977: (1) never use the prohibited methods of paint removal that are described in Section III.C.1 of Chapter 6, or Section II.D of Chapter 11, and (2) when disturbing paint *in housing occupied by children of less than 6 years of age*, clean the work area thoroughly after finishing, preferably with a HEPA vacuum and wet cleaning, and always keep residents out of the work area while work is underway and until after the unit has passed clearance.

The approach above also applies to work that is not being cleared but is having its cleaning verified, that is, the work is covered by EPA's RRP Rule but not HUD's Lead Safe Housing Rule, and the paint-disturbing work performed after interim cleaning verification has been passed will be a minor repair and maintenance activity.

D. Who Should Pay?

If relocation of tenants is required as a result of an activity assisted by the Federal Government, the requirements of the Uniform Relocation Act (formally, the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (42 U.S.C. § 4601 et seq.) and its implementing regulations at 49 CFR Part 24, may be triggered (see ***www.hud.gov/offices/cpd/library/relocation/index.cfm***). Relocation is usually considered to be part of the cost of lead hazard control.

E. How Can Costs Be Minimized?

One approach to minimizing relocation costs is to reduce the time period of temporary relocation. It may be possible to streamline the work so it proceeds quickly, especially if contractors are offered financial incentives to do so. Also, in some circumstances, it may be possible to stage the work, as discussed above, so residents can return before nonhazardous renovation is finished.

Another approach is to minimize specific relocation costs by taking competitive bids or negotiating favorable rates for rental units for relocation, and costs of packing, moving, and storage. Prices should be based on actual expenses, however, not on a per-dwelling-unit rate.

Some local program administrators have found that the most cost-effective approach is to give residents a direct dollar payment to find another place to live temporarily. Beware, however, that if the work takes longer than expected and thus the residents' costs are higher than was planned, people may return to the unit before it is ready. This approach may work in conjunction with temporary relocation to a relative's or friend's home.

Still another approach is to try to move most of the residents only once, rather than both out and back in. This permanent relocation can work with multi-building projects in which residents of the first building are relocated, work is performed in that building, and then residents of the

next building are permanently relocated to the first building, and so on. Variations on this include residents moving from one floor to another, from one wing of a building to another, etc. Some residents may like this; some may not. For projects receiving federal assistance for the housing or the work, such permanent relocation may trigger requirements of the Uniform Relocation Act; see Section IV.D. Open communication with residents about the project and the owner's approach to lead safety may help in addressing concerns about relocation.

Finally, on-site dust testing may save time and money. Methods exist for reliably analyzing wipe samples on-site instead of in a fixed laboratory. These include portable X-ray fluorescence (XRF) analysis and anodic stripping voltammetry (ASV) (EPA, 2002b; Clark, 2002). These methods may provide testing results much more quickly than fixed-laboratory analysis by avoiding transportation of the samples to the laboratory and handling time within the laboratory. This approach may be particularly helpful for multi-family projects, in which a work crew may be working on a unit while the clearance test analysis is being performed on the crew's preceding unit. Thus they may reduce relocation difficulties and facilitate cooperation among all parties.

In States and Tribal areas where EPA is operating the lead risk assessment certification program, dust wipe samples for a clearance examination must be analyzed by a laboratory or testing firm recognized by EPA under the National Lead Laboratory Accreditation Program (NLLAP). In these States or Tribes, an NLLAP laboratory may perform on-site analyses of dust-wipe samples only if specifically accredited and NLLAP-recognized to do so. In States or Tribal lands where the State or Tribe is operating an EPA-authorized lead program, the same requirements generally apply, although there may be some differences (EPA, 2002a). While EPA clearance regulations and program procedures apply only to abatement activities and to renovations in which clearance is being conducted, HUD regulations and many State regulations apply the same procedures to non-abatement activities.

However, any person who is trained and otherwise qualified to operate the XRF instrument (such as licensed in accordance with State regulations on the use of devices with radioactive elements) or conduct the ASV (or other sampling and analytical) method may use one of these methods to conduct *preliminary* dust testing to determine whether a clearance area is clean and ready for the clearance examination, if allowed in the State or Tribal area. A person conducting a preliminary screen does not have to be a technician working for an NLLAP-recognized laboratory. Owners and contractors may wish to use such screening tests to minimize the likelihood of clearance failure. (See Chapter 15, Section VI.A.3, "On-Site Clearance.")

F. Communicating with Residents

Clear and documented communication with residents about the many details of relocation will facilitate a smoothly operating program. Administering organizations should establish policies, procedures, and assigned responsibilities to maximize efficiency of temporary relocation and assure that all program participants are treated in a consistent manner. Among the subjects that should be covered with residents are:

+ The need for and importance of temporarily relocating to protect the health of residents and their children.

+ The fact that residents must stay out of the work areas until permitted to return, and how that permission will be handled.

+ Approximately how long the relocation will last, and how delays in allowing residents to return to their dwellings will be handled.

+ The standards for the relocation unit, who is responsible for identifying it, and how that will be done.

+ Detailed procedures for handling relocation, including such matters as packing, moving, storage, and caring for personal belongings, utilities, mail, security of the temporarily vacant unit, care for pets, and any special transportation needs (such as to and from school).

+ What costs will be paid by the administering organization, limits on certain costs, and method of payment.

+ The residents' responsibility not to damage the relocation unit.

It is recommended that policies and procedures on these matters be put in writing and that residents indicate their agreement by signing such documents. These policies and procedures should be made available to meet the needs of all residents including persons with limited English proficiency.

V. Negative Pressure Zones ("Negative Air" Machines)

In asbestos abatement work and lead-based paint removal work on structural steel, it is common to create worksites that are under negative pressure in comparison to the outside of the containment structure. A negative pressure zone is usually created by blowing air out of the work area through a HEPA filter, while air intake is restricted to a lower flow rate than the exhaust. This process causes any air leakage to move *into* the containment area instead of *out* of the containment area. It also reduces dust fall and worker exposure by removing contaminants from the airstream through constant filtration.

Under OSHA's lead in construction standard, a "competent person" determines the appropriate ventilation controls, considering such factors as the safety of workers, occupancy of adjacent areas, whether exterior windows are available to provide dilution ventilation, or if negative air is more appropriate where scraping of surfaces treated with paint strippers may potentially release both volatile substances and lead simultaneously. The standard says that a competent person is a person capable of identifying existing and predictable lead hazards in the surroundings or working conditions, who has authorization to take prompt corrective measures to eliminate them, and who makes frequent and regular inspections of job sites, materials, and equipment as part of a program to ensure that workers are not exposed to excessive levels of airborne lead. (29 CFR 1926.62, paragraphs (b), (c), (e)(2), and (e)(2)(iii) . For further information about competent persons, see OSHA's Competent Person page, *https://www.osha.gov/SLTC/competentperson/*.)

Due to the different aerodynamics of dust particles from leaded and asbestos fibers, negative pressure zones do not appear to be necessary for most forms of residential paint-disturbing work. Most lead-based paint abatement projects in the public housing program have not found it necessary to use negative air machines. However, there are two specific situations where the use of a negative pressure zone would be appropriate in a residential setting.

The first case involves floor sanding. Even if the lead-based paint or lead-containing varnish has already been removed, leaded dust generation is likely to be quite high due to residual dust in the flooring. Enclosing old flooring with new flooring is the recommended course of action. However, if old flooring must be restored, then negative pressure zones should be established. Up to 10 air changes per hour should be provided and all exhaust air must be passed through a HEPA filter.

If the floor to be sanded has been coated with varnish with low lead levels, negative air may not be necessary. One study has found that tight dust containment of the work area before the work, using engineering controls during sanding and careful cleanup afterwards can reduce worker exposure to dust and facilitate clearance of the worksite. The engineering controls used in this study included using HEPA vacuum exhaust attachments on sanding tools such as edgers and buffers and using drywall dust bags inside the canvas bags of drum floor sanding machines (Wisconsin, 2003).

The second case involves abrasive blasting, which is likely to produce extremely high levels of airborne leaded dust (NIOSH, 1992b) and should not be permitted in housing since other methods are readily available. One report indicated that the exterior sandblasting of a school resulted in 27,100 µg/g of lead in the soil at a nearby residence, and nearly 100,000 µg/g in the soil at the school (Peace, 1983). If for some reason abrasive blasting without local exhaust ventilation is performed on the interior of a dwelling, a full containment structure with HEPA filtration and adequate airflow should be required. Such a containment system would also be necessary if the exterior of a dwelling were blasted, usually resulting in "tenting" an entire building (i.e., erecting a temporary tent-like structure around a building or one face of a building). This setup may also be necessary in cases of major demolition where wet work practices cannot be used to adequately dampen dust.

For nearly all types of paint-disturbing work, windows should be kept closed to prevent dust and chips from leaving the unit. If volatile chemicals will be used, adequate ventilation must be provided, either by opening windows during the use of the chemicals or by supplying air through a HEPA air-handling machine.

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