ADVISORY 12.6.1 GENERIC HEALTH AND ENVIRONMENTAL SPECIFICATIONS FOR THE ABATEMENT OF LEAD-BASED PAINT WITHIN UNIVERSITY OF CINCINNATI BUILDINGS

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I. INTRODUCTION

Lead-based compounds were a major component of paints used in commercial and residential buildings. While other non-lead pigment materials became more widely used in the 1950's lead continued to be a component of paints. Consequently, many older buildings have surfaces which are covered with one or more layers of paint which contain lead.

In 1973, the U.S. Consumer Product Safety Commission (CPSC) established a maximum lead content in paints of 0.5 percent by weight in a dry film of paint newly applied and in 1978, the allowable lead level was reduced to 0.06 percent.

In 1971, the U.S. Congress passed the Lead-Based Paint Poisoning Prevention Act (LBPPPA, Public Law 91-965, 84 Stat. 2078). The LBPPPA applies to public and Indian housing and covers exterior, as well as, interior intact and non-intact painted surfaces. In accordance with this Act, the Department of Housing and Urban Development, the designated lead Agency, published Interim Guidelines for Hazard Identification and Abatement in Public and Indian Housing on April 1, 1990. The National Bureau of Standards conducted extensive research during the 1970's, now known as the National Institute of Standards and Technology.
The scientific consensus is that the presence of lead based paints in occupied buildings constitute a potential health hazard. Intact lead based painted surfaces pose a potential hazard of lead poisoning through ingestion. Non-intact painted surfaces pose a potential hazard of lead poisoning through ingestion and inhalation. Furthermore, the improper abatement of painted surfaces which contain lead poses a health hazard of lead poisoning to workers, occupants, and those in the general environment.

II. HAZARD RECOGNITION & EVALUATION

2.1 General Toxicology and Industrial Hygiene

In commercial paint products, lead is commonly encountered in its inorganic form. Prolonged absorption of lead and its inorganic compounds will result in the harmful accumulation of the toxic chemical in the human body. Lead poisoning and health impairment can result.

Symptoms of lead poisoning include gastrointestinal disturbances, anemia, neuromuscular dysfunction, encephalopathy, and death. The onset of lead poisoning symptoms are often abrupt: the victim may complain of weakness, weight loss, lassitude, insomnia, and hypotension. There may be accompanying gastrointestinal symptoms of constipation, anorexia, stomach discomfort, and actual colic, which can be excruciatingly painful. Physical signs include pallor, malnutrition, abdominal tenderness, and pallor of the eye grounds. A characteristic blue or blue-black line ("lead-line") may present on gingival tissues, especially when the victim has poor dental hygiene. Symptoms of lead poisoning have been misdiagnosed as other more common illnesses.

Beyond the gastrointestinal symptoms, victims of lead poisoning may show neuromuscular dysfunction, motor weakness, paralysis of the extensor muscles of the wrist ("wrist-drop"), and paralysis of the muscles of the ankles ("foot-drop"). Nephropathy has also been associated with lead poisoning.

The most serious outcome of lead poisoning is encephalopathy and this most frequently occurs in children due to the ingestion of lead based paint found in buildings occupied by children.

Inorganic lead enters the human body by ingestion of solids (or liquids) containing lead, and the inhalation of airborne particulates of lead compounds and of lead fumes. Lead absorption is cumulative. As the elimination of lead from the body is slow and toxic levels can build quickly in the body.

Upon absorption, inorganic lead is distributed in the soft tissues, the highest concentration going to the kidneys and liver. Lead is also circulated in the blood, the inorganic lead being associated with the erythrocytes. Over time, the lead is redistributed, being deposited in bone, teeth and hair.

Excessive exposure to lead during pregnancy has produced neurologic disorders in infants. Occupational exposure to lead has also caused an increase in male reproductive abnormalities, including hypospermia.

While adults, especially workers who handle lead containing material in an occupational setting, will suffer the above lead poisoning symptoms as a result to an over-exposure to inorganic lead, the groups who are at greatest risk from the effects of over-exposure to lead are fetuses, infants, and children under the age of seven. Since the fetus is at risk from high lead levels in the blood of the mother, pregnant women, and women of childbearing age must be cognizant of the hazards posed by over-exposure to lead. Excessive blood lead levels can damage a child's brain and central nervous system. Lead poisoning of children can lead to loss in attention span, impaired hearing, reading disabilities, learning disabilities, delayed cognitive development, reduced IQ scores, mental retardation, seizures, convulsions, coma, and death. However, children (and adults) may suffer from lead poisoning, and yet have no overt signs or symptoms, or symptoms may be vague and general such as headaches, malaise, and stomachaches.

2.2 Specific Evaluation of Hazard Posed by Lead-Based Paint in University of Cincinnati Buildings

As discussed above, lead based paint can enter the human body by way of ingestion and inhalation. Ingestion can occur from the inadvertent eating or swallowing of lead based paint, especially by children. Adults experience a smaller probability of ingesting lead, other than in an occupational setting, including working on the abatement of old lead-based paint. Inhalation can occur if lead-based paint becomes airborne by mechanical action or by exposure to very high temperatures that generate lead fumes or lead impregnated smoke.

2.2.1 Risk to Occupants

University buildings that contain lead-based paints will pose a certain risk to their occupants. For the purpose of classifying and analyzing the risk posed by lead based paint at University buildings to their occupants, the following relative classification scheme is provided:

2.2.1.1 Highest Relative Risk

All University buildings that are occupied for any period of time in any given day by children under the age of seven, and which contain lead-based paint pose the highest risk of lead hazard. Such buildings include but are not limited to the following types:

a) Nurseries and child care centers
b) Teaching classrooms for children
c) Teaching laboratories
d) Hospitals, clinics, and other medical facilities in general
e) Pediatric offices, clinics and hospitals
f) Obstetrics and gynecological offices, clinics and hospitals
g) Married students' residences, apartments, and dormitories
h) Faculty residences, and apartments.
i) Other buildings known to be occupied by children

2.2.1.2 High Relative Risk

All University buildings which are occupied for any period of time in any given day by adults, including pregnant women and women of child-bearing age, and are never occupied by children and which contain lead-based paint pose the next highest risk of lead hazard.

2.2.1.3 Moderate Relative Risk

All University buildings which are occupied for any period of time in any given day by adults, other than pregnant women and women of child-bearing age, and are never occupied by children and which contain lead-based paint pose the next highest risk of lead hazard. This classification of buildings may never be observed in everyday life at the University.

2.2.1.4 Low Relative Risk

All University buildings which are never occupied by people and which contain lead-based paint pose the lowest level of risk of lead hazard. This classification of building may become one of higher risk upon being occupied by people.

2.2.1.5 No Risk

University buildings that do not contain lead-based paints will not pose a lead hazard specific to lead based paint, regardless of occupancy. Only the newest buildings on campus may meet this definition and the absence of lead based paints should be confirmed using approved sampling and analytical protocol.

2.3 Specific Evaluation of Hazard Posed by the Abatement of Lead Based Paints

While intact and non-intact lead based paint in a building may pose a health risk to the occupants of the building, the abatement of lead based paint will pose a definite health risk to the worker performing the abatement. The reason is that any lead based paint abatement activity will cause a disturbance of the lead containing material and will increase the probability of entry of lead containing material into the system of the worker. In addition, improperly conducted abatement of lead-based paint will pose incremental risks to occupants and persons in the general environment.

2.3.1 Risk to Occupants During Lead Paint Abatement

The abatement of lead based paint will pose a risk of inhalation of airborne lead containing material if the surface of the lead paint is broken and small pieces of lead containing particulates are generated by mechanical action (mechanical energy), chemical action (chemical energy), or if lead fumes or smoke containing lead are generated by the application of heat (thermal energy).

Any airborne lead containing material may settle on building surfaces, carpeting, furniture surfaces, and foodstuff kept in the building. This settled dust might pose an ingestion hazard, especially if it is deposited on foodstuff which is later consumer by a person. This settled dust could pose a future inhalation hazard if it becomes airborne once again. Inorganic lead is not known to absorb through the skin.

Any regular occupants of the building will be at increased risk of lead exposure under these conditions.

2.3.2 Risk to Abatement Workers

Abatement of lead based paint will pose a risk of inhalation of airborne lead containing material if the surface of the lead paint is broken and small pieces of lead containing particulates are

generated by mechanical action, chemical action, or if lead fumes or smoke containing lead is generated by the application of heat.

Any airborne lead containing material will settle on the clothing and exposed body surface of the worker and may constitute a potential ingestion hazard, especially during the handling of food. If food and drink are brought into the work area where lead based paint is being removed, airborne lead may settle on the foodstuff and be ingested with the food. Any settled dust can pose a future inhalation hazard if it becomes airborne once again. Inorganic lead is not known to absorb through the skin.

The abatement worker performing the lead based paint abatement will be at risk to lead exposure during these conditions.

2.3.3 Risk to Persons in the General Environment

Airborne lead containing material may escape from the immediate area where the lead paint abatement is being performed into the greater environment. Routes for escape include but is not limited to the following:

a) Windows, doors, and other regular building openings
b) Air recirculation intake openings and other intake openings of the heating, air-
c) conditioning and ventilation system of the building
d) Openings created during construction operations.

Airborne lead that enters an air recirculation duct has the potential to be transported to the larger areas that are serviced by the ventilation system. Such an occurrence will constitute a major environmental failure. Therefore, all openings connected to the ventilation must be carefully sealed and isolated before the commencement of lead based paint abatement in a given room or building area.

Persons to be protected are the occupants of other areas of the building. The risk posed to persons outside the building either from interior or exterior abatement activity is expected to be minimal.

Lead containing material may also contaminate the greater environment during the transportation and disposal of debris from the abatement of lead based paint. All lead containing waste must be properly containerized and disposed in accordance with all applicable federal, state, and local laws and regulations.

Lead containing material may also contaminate the greater environment, especially the homes and families of exposed workers, from the lead deposited on the clothing and persons of workers and other occupants of the building. Work practices and personal hygiene are important elements of a proper abatement operation.

III. AVAILABLE ABATEMENT METHODS

3.1 Generally

When it is necessary to control the health hazards posed by lead based paints to the occupants of the University building, a number of abatement methods are available. Occasion will arise when it is necessary to remove lead-based paint for purposes of building renovation and rehabilitation.

The following abatement methods are currently available for lead based paints:

a) Replacement
b) Rigid Encapsulation
c) Flexible Encapsulation

d) On-site Paint Removal
e) Off-site Paint Removal

3.2.1 Replacement

Replacement is defined as the removal of building components that have lead-painted surfaces and the installing of new components that are free of lead based paint.

Replacement may be applied to windows, doors, cabinets, and other building components that can be removed. Cost effectiveness is maximized when the components to be replaced are in a poor, worn-out condition and contain lead-based paint. Large components are especially suitable for replacement.

Certain advantages can be attained with replacement:

a. Permanent solution to the lead based paint problem
b. Post-abatement clearance standards can be met easily
c. Low lead exposure risk to workers
d. Integrates well into a modernization or rehabilitation program
e. Adds to energy efficiency.

Certain disadvantages may be associated with replacement:

a. Requires skilled labor
b. A large volume of lead containing waste may be generated
c. Large capital cost up front, especially on smaller projects
d. Can result in damage to adjacent substrates

3.2.2 Rigid Encapsulation

Rigid encapsulation is defined as the use of processes which physically isolate the lead based paint and prevent exposure to lead by covering, sealing or otherwise isolating the lead-painted surface with a rigid building material.

Encapsulation should be considered for large surfaces such as walls, ceilings, and floors, as well as, selected building components such as window and door jambs and stair treads. Encapsulation should be used for surfaces which are hard to reach and difficult to remove (e.g. baseboards behind pipes).

Specific examples of rigid encapsulation include the isolation of the lead-based paint behind paneling, gypsum board, plywood, tileboard, sheetgoods, carpeting, aluminum/vinyl products, including floor coverings. All rigid encapsulation should be applied with fasteners and adhesives and installed in accordance with manufacturer's instructions.

Certain advantages can be attained by rigid encapsulation:

a. Generate only low airborne dust levels especially when preparation of surface is minimal
b. Minimizes waste disposal as little waste is generated
c. Cost and time effective for large surface areas

Certain disadvantages are associated with rigid encapsulation:

a. It is not a permanent solution as the lead-based paint is still in the building
b. Requires skilled labor
c. Requires continued routine inspection, and maintenance.

3.2.3 Flexible Encapsulation

Flexible encapsulation is defined as the use of processes which physically isolate the lead based paint and prevent exposure to lead by covering, sealing or otherwise isolating the lead-painted surface with a non-rigid material which bond to the lead-painted substrate. Flexible encapsulation has many limitations.

Flexible encapsulation is only as durable as the substrate to which it is applied. Failure of flexible encapsulants usually occurs as a result of a failure in adhesion between two underlying layers of old paint, failure in adhesion between the old paint and the rigid substrate, failure in adhesion between the flexible encapsulant and the old paint, or failure from improper application of the flexible encapsulant or improper surface preparation.

Flexible encapsulation is an inferior abatement method and should be used in University buildings only as a temporary or emergency measure.

3.2.4 On-Site Removal

On-site removal is defined as the removal of lead-based paint to the bare underlying substrate by using on of the following removal techniques:

a. Heat
b. Chemicals
c. Mechanical action

All on-site removal techniques can potentially generate large amounts of airborne lead in the form of dust, particulates, or fume. This airborne lead can then be deposited on surfaces within the building. Consequently the health risks posed to workers, occupants, and the general environment are greater.

On-site removal is generally more hazardous than the previously described methods. All on-site paint removal methods must be used in strict accordance with manufacturer's instructions and good work practices must be used at all times. Personal protective equipment must be provided and properly used at times when on-site removal is occurring.

3.2.5 Off-Site Removal

Off-site removal is defined as the stripping or removal of lead based paint from building components at the facilities of a professional paint-stripping operation in chemical solvent stripping tanks. Off-site removal requires the disassembly of the component and its shipping to the stripping facility. Upon completion of chemical removal of the lead-based paint, the component must be shipped back to the building and reinstalled. This method is useful for components that cannot be simply replaced for economic or other reasons. The component must be first determined to be resistant to the stripping chemical, or otherwise it may be damaged by during stripping.

Certain other advantages can be attained with off-site removal:

a. Saves the original component for reuse
b. Higher quality of results when compared with on-site removal

Certain disadvantages are associated with off-site removal:

a. Lead paint residue may still remain in difficult to remove areas of the component
b. Certain substrates may break (e.g. glass), or swell(e.g. wood), or dissolve (e.g. glue and putties)
c. Large components may be impossible to disassemble and transport off-site

3.3 Disposal

Lead contaminated waste and debris that are generated from the abatement of lead based paint have been consistently shown to contain sufficient lead compounds that cause the waste to be classified as hazardous waste upon application of the toxic characteristic. Consequently it is recommended that all waste and debris generated during lead based paint abatement be classified as hazardous waste. Large components removed from a building which is coated with lead based paint can be disposed of in a sanitary or construction landfill only after the lead based paint has been removed from the component.

IV. CONTROL TECHNOLOGIES

4.1 Persons to be Protected

During an abatement project involving lead-based paint, the following persons must be protected against excessive exposure to lead:

a. Occupants
b. Abatement workers
c. Persons in the general environment

4.2.1 Protection of Occupants

All building occupants of the immediate area being abated and who will be affected should be notified of the presence of lead and the general hazards of lead prior to the start of any abatement work. All other occupants in the same building should also be notified with the same information. The following information should be provided:

a. Start-up date
b. Completion date
c. Areas to be abated
d. General hazards of lead
e. Need to follow caution and warning signs.

Occupants of the immediate area should be requested to package, cover, or seal their personal belongings to protect them from lead containing dust.

The warning signs should read in legible print:

CAUTION LEAD HAZARD
DO NOT ENTER WORK AREA UNLESS AUTHORIZED

If the surface of lead paint is to be broken during abatement (e.g. during on site removal) then the occupants and their belongings must be temporarily relocated from the work area. They should be allowed to return only after cleanup and final clearance of the area.

Relocation is not mandatory only if:

a. Abatement work is of a very limited scope (e.g., replacement of a door or window, and
b. Abatement and cleanup can be completed in one 8-hour day, or
c. Abatement can be performed exclusively from the exterior of the building and the interior of the building is effectively sealed against exterior dust.

The relocated occupants should be permitted to return only after cleanup and clearance of the abated area.

4.2.2 Protection of Workers

Workers performing the abatement of lead based paint are at higher risk of exposure to lead. The best way to minimize exposure to workers is to use engineering controls and good work practices. A respiratory protection program should be used only after the implementation of engineering controls and good work practices and should not be the sole method of protection against lead exposure. Further, abatement workers should use good work practices to minimize the generation of airborne lead.

The abatement contractor who is employing the abatement worker is responsible for worker protection. The responsibility of the University is limited to informing the contractor of the presence or absence of lead-based paint.

The OSHA General Industry Standard for Lead, 29 C.F.R. 1910.1025 while not legally applicable to construction activities, has provisions which when followed will provide good worker protection against over-exposure to lead. The key elements of the OSHA Lead Standard include:

a. A permissible exposure level of 50 micrograms of lead/cubic meter of air averaged over an 8-hour period
b. An action level of 30 micrograms of lead/cubic meter of air averaged over an 8-hour period
c. Full shift initial exposure monitoring that is representative of each type of work activity
d. Employee notification of lead hazard and monitoring results
e. Use of control technology if exposure is above permissible exposure limit
f. Medical surveillance of workers if exposure is above the action level (including blood lead monitoring)
d. Removal of workers whose blood lead level averages at or above 50 micrograms of lead/100 cubic centimeters of blood

All lead based paint abatement contractors for the University shall comply fully with the OSHA Lead Standard, 29 C.F.R. 1910.1025.

4.2.3 Protection of Persons in General Environment

While low levels of lead are present in soils throughout the United States, it is nevertheless advisable to protect persons who are not the immediate occupants from over-exposure to lead. These persons are expected to be occupants of other areas of the building. The risk posed to persons outside the building either from interior or exterior abatement activity is expected to be minimal.

The most effective engineering control that can be used to protect other occupants is the proper containment or enclosure of the abatement area. A successful abatement project is one during which all lead debris is fully contained in the immediate abatement area and no lead is allowed to escape or disperse to adjacent area of the buildings and to the outside environment. this criterion can be achieved by proper use of containment methods. Special care must be used to prevent escape of lead into the ventilation system of the building.

Further, abatement workers should use care to decontaminate themselves after a work shift so as to prevent the inadvertent transport of lead contamination to their homes and families. All work clothes should be left at the job site. Disposal work coveralls are recommended. The worker should shower at the worksite to remove all lead material deposited on exposed parts of the worker's body.

4.3 Engineering Control Technology
The following classes of engineering control technology are available for lead based paint abatement:

a. Containment (Enclosure) of abatement area
b. Removal of furniture and other personal belongings
c. Covering of all non removable objects
d. Local Negative Air Ventilation using High Efficiency Particulate Absolute (HEPA) filters during removal activity
e. Wetting of surfaces before removal
f. Daily cleanup of debris using HEPA vacuum
g. Final cleanup of surfaces with detergent and water.

4.4 Work Practices
Through good training and diligent observation of good work practices during abatement, the worker can help minimize the generation of lead containing debris. Successful work practices will depend on the way the worker is trained initially, the way the worker is motivated during work, and the way rules are enforced by the contractor's management and by third parties (e.g. OSHA).

4.5. Administrative Controls
Administrative controls include the following:

a. Training of workers in work practices and hazard recognition
b. Airborne lead exposure monitoring
c. Clearance sampling by taking of wipe samples
d. Enforcement of safety rules by management
e. Record-keeping
f. Compliance with OSHA Hazard Communication Standard
g. Use of Warning Signs

4.6 Personal Protective Equipment
The following types of personal protective equipment (PPE) are effective for worker protection. As always, PPE should be used only after all other available engineering controls have been implemented and are the last line of protection for the worker.

a. Respiratory protection (use respirator criteria provided in OSHA Lead Standard 29 C.F.R. 1910.1025(f))
b. Protective coveralls with head cover (preferably disposable)
c. Gloves
d. Eye goggles and face shields
e. Shoe covers
f. On-site shower for workers to use after completion of work shift

Protective coveralls, gloves, eye protection, shoe covers constitute the basic personal protection and should be worn at all times. Disposable coveralls are preferred as these eliminate the need for laundering. Separate shoe covers are preferred as these allow the worker to leave and reenter a work area by removing the shoe covers without removing the coverall as well. Glove material should protect against specific chemicals (e.g. solvents and caustics used during on-site chemical removal of paint). Respirators must be used when airborne levels exceed OSHA levels.

At the end of each work shift, workers should be provided access to heated full body showers which can remove lead containing material which are deposited on their bodies.

V. SPECIFICATIONS FOR THE CONTROL OF ABATEMENT METHODS

5.1 Preliminary Worksite Preparation

A visual inspection of the abatement area shall be made to identify basic pre-existing conditions that can impede the abatement operation or cause it to fail.

An inspection shall be made for the availability of utilities:

a. Heat - Because enclosure and isolation of ventilation systems is normally a part of the controls, portable heating units may be necessary during cold weather. Heaters that burn solids, liquids, or gases are **prohibited** in occupied University buildings. Inadequate heating may cause the failure of chemical strippers, encapsulants and/or paint.

b. Electricity - Electricity must be available for lighting, heating, HEPA vacuum filters and other necessary equipment. Electrical connections and equipment must meet all OSHA electrical safety standards and be adequate to protect employers from electrical shock.

c. Water - The personal hygiene of workers, the need for showers after each work shift and cleanup procedures all require the availability of running water.

An inspection shall be made by the contractor for the integrity of major structures. Existing water leaks can rapidly destroy any new installations. All defects, which can damage new work, shall be repaired by the contractor prior to commencement of abatement. Major structural damage (e.g. rotted floors, stairs, etc. can constitute safety hazards to workers and shall be repaired and made safe by contractor prior to commence of abatement.

5.2 Containment/Enclosure

A successful abatement project requires that all lead containing material be kept within the immediate work area and not be allowed to disperse or escape into adjacent areas of the same building or into the greater environment.

5.2.1 Interior containment

Interior containment refers to the enclosure or isolation of abatement areas inside a building. The purpose of interior containment is to isolate the lead containing material to within the abatement area and to protect occupants and persons in the general environment from lead exposure.

Interior containment shall be necessary whenever a lead-painted surface is broken. Room or interior containment shall consist of the following:

a. All movable objects shall be removed from the work area. Any carpeting present (including wall-to-wall) must be removed if it is to be reused, as it is nearly impossible to clean lead dust from carpets. Workers removing carpeting must wear coveralls and respirators as this activity can generate large amounts of airborne lead containing dust from previous deposits.

b. Exposed surfaces shall be covered with 6-mil plastic and secured with duct tape and 1/2 inch heavy duty staples

c. The work area shall be sealed and isolated from non-work areas. Close all doors and windows that are not being replaced. Other openings to adjoining rooms must be sealed with 6-mil plastic and tape.

d. Ensure that all ventilation registers, plenums, and other ventilation openings are securely sealed. Ensure that all forced air heating and air-conditioning and ventilation systems are turned up centrally. They shall be tagged out and locked out during the project to prevent inadvertent restart.

e. Openings used as entrances must have a double barrier of 6-mil plastic. One sheet is attached to each side the entrance header to give a barrier on both sides of the entrance.

f. All non-movable objects shall be covered with 6-mil plastic and sealed with tape.

g. All floor surfaces shall be covered with a minimum of two layers of 6-mil plastic. The first bottom layer is never removed until the end of the project. The second, top layer can be removed for interim cleanup as needed during the course of abatement. New top layers must be provided after interim cleanup.

h. If a common area such as a public hallway is being abated and alternate entrances or passageways are not available for other occupants of the same building, then a protected passageway shall be created. Safe protected passageways shall be built using building frames and attaching 6-mil plastic to the frames.

5.2.2 Exterior Containment

Exterior containment refers to the enclosure or isolation of abatement areas that are outside a building. The purpose of exterior containment is to prevent the dispersion of lead containing material into the inside of the building and to prevent excessive contamination of the general environment with lead compounds. Exterior abatement activity has the potential to generate large quantities of liquid and/or dry waste.

5.2.2.1 Exterior Containment of Liquid Waste

a. 6-mil plastic shall be placed as close to the building foundation as possible and secured with tape, staples or braces.

b. This plastic covering shall be extended from the foundation for a distance that is sufficient to contain liquid runoff. The outer edge of the plastic shall be raised by the use to two-by-four frames to trap liquid waste.

c. All seams shall be sealed with tape.

d. Sufficient containers (buckets and 55-gallon drums) shall be made available to contain accumulated liquid waste.

e. Liquid caught on the plastic shall be transferred into containers and these shall be transported to a permitted disposal facility.

f. Daily inspections shall be made of the integrity of the plastic covering and any tears and breaks shall be promptly repaired with 6-mil plastic and tape.

5.2.2.2 Exterior Containment of Dry Waste

a. 6-mil plastic shall be placed as close to the building foundation as possible and secured with tape, staples or braces.

b. This plastic covering shall be extended from the foundation for a distance of three feet for every story being abated, with a minimum of five feet. The plastic shall be secured to the ground.

c. All seams shall be sealed with tape.

d. Sufficient containers (buckets and 55-gallon drums) shall be made available to contain accumulated dry waste.

e. At the end of the day, the plastic covering shall be removed with the dry waste on it and transferred into 55-gallon containers and these shall be transported to a permitted disposal facility. A new covering shall replace that removed.

f. Vertical wind barriers of 6-mil plastic attached to a rigid frame shall be constructed when wind speed exceeds 15 mph to prevent wind dispersion of dry waste.

g. Daily inspections shall be made of the integrity of the plastic covering and any tears and breaks shall be promptly repaired with 6-mil plastic and tape.

5.3 Limiting Access

Abatement operations, which cannot be completed and cleaned within an 8-hour period, shall have limited access. Access shall be limited to:

a. Contractor and employees
b. Enforcement officials
c. Authorized University representatives

Disposable shoe covers shall be provided and worn by all who enter the abatement area and they shall be removed before exiting.

5.4. Warning Signs

All abatement areas shall be marked with prominent warning signs which read:

CAUTION: LEAD HAZARD
DO NOT ENTER WORK AREA UNLESS AUTHORIZED

The warning sign shall have bold lettering at least two inches tall and shall have an easy to read color scheme. All non-authorized persons shall obey the warning sign.

5.5 Control of Replacement Operations

Replacement is defined as the removal of building components that have lead-painted surfaces and the installing of new components that are free of lead based paint. The contractor shall meet the following specifications when performing replacement operations:

a. Before removal, the component shall be wetted down with water applied from a spray bottle to control dust generation. However, do not over-soak or cause permanent water damage.

b. Once removed, the component shall be wrapped in 6-mil plastic and sealed in tape for proper disposal.

c. Replacement components shall be installed in accordance with standard construction practices and all applicable building and fire codes.

5.6 Control of Rigid Encapsulation Operations

a. All rigid encapsulating material shall be installed in accordance with manufacturer's instructions and shall meet all applicable building and fire codes.

b. All seams and edges shall be sealed or caulked to prevent escape of dust.

c. Adhesives and screws shall be used in combination whenever possible.

5.7 Control of Flexible Encapsulation Operations

Flexible encapsulation is not recommended for University buildings as a method of abatement of lead-based paint.

5.8 Control of On-Site Removal Operations

All on-site removal operations shall be controlled by the contractor in order to minimize the risk posed by lead containing materials to occupants, workers, and persons in the general environment.

5.8.1. On-Site Heat Removal

Heat removal involves the application of a localized heat source (e.g. heat blower gun) to a surface to cause the paint to blister away from the substrate. The blistered paint must then be manually scrapped with a putty knife or other scrapping tool.

The application of heat to a painted surface will cause the release of vapors and gases which may carry lead containing material into the ambient atmosphere. The contractor shall meet the following specifications when using heat removal:

a. The heat blower gun shall be electrically powered and flameless and be designed for softening paint. It shall have a temperature control or setting which allows it to operate at below 700 degrees Fahrenheit. No heat blower gun shall be operated at 700 degrees Fahrenheit.

b. As heat removal is expected to generate higher levels of airborne lead, all workers in a heat removal operation shall have adequate respirator protection which meets the OSHA Lead Standard, 29 C.F.R. 1910.1025(f).

c. Removal by manual scrapping shall commence promptly after the application of heat. All lead-based paint shall be removed to the bare substrate.

5.8.2 On-Site Chemical Removal

Chemical removal techniques use solvent based and/or caustic based chemicals to dissolve the paint off the substrate. Solvents and caustic are hazardous chemicals. The paint is manually scraped off with a putty knife or other scrapping tool after the application of the chemical remover. The contractor shall meet the following specification when performing chemical removal:

a. Chemical removers shall not contain methylene chloride, a human carcinogen.

b. Chemical removers shall be tested to ensure that they are compatible with the substrate and with neutralizers.

c. Chemical removers shall be applied in accordance with all manufacturers' instructions. They shall not be allowed to penetrate and damage wood, fibrous, or other vulnerable substrates. Scrapping of paint shall begin and be completed promptly after application of the chemical remover.

d. The contractor shall protect adjacent areas and objects from damage by the chemical remover at all times. Any damage resulting from the use of the chemical remover shall be repaired or replaced at the contractor's expense.

e. The contractor shall be responsible for protecting its employees from exposure to the chemical removers and shall comply with all applicable OSHA regulations including compliance with Table Z.1

f. Chemical removers may be flammable and may constitute a fire hazard. The contractor shall ensure that all sources of ignition are extinguished when using flammable chemical removers and shall be responsible for all fire damage.

5.8.3 On-Site Mechanical Removal

The following on-site mechanically removal method, when used by the contractor, shall be controlled to minimize the risk of lead to occupants, workers, and persons in the general environment.

5.8.3.1 Water Blasting

Water blasting shall not be used due to difficulty associated with containing liquid waste.

5.8.3.2 Abrasive Blasting with Vacuum Control

a. Abrasive blasting shall be used only with a vacuum arrangement. The contractor shall ensure that the configuration of the head of the blasting nozzle matches the configuration of the substrate and the vacuum is effective in removing and containing the debris.

b. Blasting media shall be non-toxic and shall be used in accordance with manufacturer's instructions.

c. All lead-based paint shall be removed to the bare substrate. If the substrate is porous or brittle, care shall be used so as to not damage the substrate.

d. All employees of the contractor who perform the blasting shall be fully trained in the use of the blasting equipment and with all health and safety requirements of abrasive blasting.

e. The contractor shall be responsible for protecting its employees from exposure to blasting material and shall comply with all applicable OSHA regulations including compliance with Table Z.

f. The contractor shall protect adjacent surfaces, areas and objects from damage by the blasting operation at all times. Any damage resulting from the blasting operation shall be repaired or replaced at the contractor's expense.

5.8.4 On-Site Mechanical Sanding

a. Mechanical sanding shall be used only with a negative pressure HEPA dust collection and filter attachment.

b. Mechanical sanding shall be used only on flat surfaces which permits the HEPA dust collection and filter attachment to come into tight contact with the surface being sanded. Surfaces shall be wide enough to allow the HEPA to work at maximum efficiency.

c. Mechanical sanding media shall be non-toxic and shall be used in accordance with manufacturer's instructions.

d. All lead-based paint shall be removed to the bare substrate. If the substrate is porous or brittle, care shall be used so as to not damage the substrate.

e. All employees of the contractor who perform the mechanical sanding shall be fully trained in the use of the sanding equipment and with all health and safety requirements of mechanical sanding.

f. The contractor shall be responsible for protecting its employees from exposure to sanding material and shall comply with all applicable OSHA regulations including compliance with Table Z.

g. The contractor shall protect adjacent surfaces, areas and objects from damage by the mechanical sanding operation at all times. Any damage resulting from the blasting operation shall be repaired or replaced at the contractor's expense.

5.8.4 Off-Site Removal

a. Chemical removers used off-site shall not contain methylene chloride, a human carcinogen.

b. Chemical removers used off-site shall be tested to ensure that they are compatible with the substrate and with neutralizers.

c. Chemical removers used off-site shall be applied in accordance with all manufacturers' instructions. They shall not be allowed to penetrate and damage wood, fibrous, or other vulnerable substrates. Any damage resulting from the use of the chemical remover used off-site shall be repaired or replaced at the contractor's expense.

d. The contractor shall be responsible for protecting its employees from exposure to the chemical removers and shall comply with all applicable OSHA regulations including compliance with Table Z.

e. The contractor shall be responsible for the proper disposal of all waste generated by the off-site removal operation.

VI. WORKER PROTECTION

6.1 Contractor's Responsibility

The contractor shall have sole responsibility for the protection of its employees and workers.

6.2 Specific Worker Protection Requirements

The contractor shall meet the following requirements:

a. The contractor shall meet all federal, state, and local occupational safety and health laws and regulations, including but not limited all laws and regulations enforced by the U.S. Occupational Safety and Health Administration, U.S. Environmental Protection Agency, and the Ohio Environmental Protection Agency.

b. Specifically, the contractor shall comply fully with the OSHA Lead Standard, 29 C.F.R. 1910.1025, the OSHA Hazard Communication Standard, 29 C.F.R. 1926.59, as applied to construction, and the OSHA Air Contaminant Standard, Subpart Z, as applied to construction.

c. The contractor shall inform its employees that they are working with lead-based paints and shall train its employees in accordance with 29 C.F.R. 1910.1025(l).

VII. CLEANUP

On-site cleanup is defined as the collection of lead containing waste and debris generated by abatement operations and has consists of interim daily cleanup and final cleanup.

7.1. Interim Daily Cleanup

At the end of each daily work shift, after the cessation of abatement activity, the contractor shall perform the following daily cleanup:

a. Deposit all lead containing waste, including sealing tape, plastic sheets, mop heads, sponges, filters, and disposable protective clothing in plastic bags of 6-mil thickness.

b. Remove and replace all 6-mil plastic used for exterior containment of dry waste.

c. Vacuum clean all surfaces in the abatement area with a HEPA vacuum.

7.2 Final Cleanup

At the end of the abatement operation, the following final cleanup shall be performed:

a. Deposit all lead containing waste, including debris, sealing tape, plastic sheets, mop heads, sponges, filters, and disposable protective clothing in plastic bags of 6-mil thickness.

b. Carefully vacuum clean all surfaces in the abatement area with a HEPA vacuum. Vacuum cleaning shall continue until all no visible residue remains.

c. Carefully remove all 6-mil plastic used for interior and exterior containment.

d. Carefully remove all 6-mil plastic used to cover objects left in the abatement area.

e. Carefully vacuum clean all surfaces with a HEPA vacuum.

f. Wash all floors and washable surfaces with a cleaning solution containing at least 1 ounce of 5 percent trisodium phosphate to each gallon of water.

g. After washing has dried, vacuum with a HEPA vacuum until no visible residue remains.

VIII. DISPOSAL OF LEAD CONTAMINATED WASTE

8.1 Lead Waste is Hazardous Waste

The debris and waste material which result from an lead based paint abatement project contain lead and lead compounds and are regulated under the Resource Conservation and Recovery Act (RCRA) as hazardous waste.

Therefore, all such debris and waste material from a lead abatement project shall be treated as and disposed of by the contractor as hazardous waste. The lead abatement contractor is required to contact the UC Environmental Health & Safety Office (556-4968) to arrange for the transportation and proper disposal of the lead-containing waste.

8.2 Disposal Requirements

The lead waste shall be handled and disposed of in accordance with the following:

a. All waste containing lead-based paint shall be treated and disposed of as hazardous waste, in compliance with all laws and regulations under the Resource Conservation and Recovery Act.

b. The contractor shall comply with all applicable federal, state and local laws and regulations pertaining to the disposal of lead waste.

c. The contractor shall place all 6-mil plastic bags holding lead-containing waste into 55-gallon metal drums. The drums must be marked "HAZARDOUS WASTE--LEAD PAINT" in two-inch high letters using a color that contrasts with the color of the paint on the drum and bear the date that the first bag of waste was placed into the drum.

d. Under the direction of the UC Environmental Health and Safety Office, the drums will be transported by a permitted hazardous material transporter to a permitted Treatment, Storage, Disposal Facility (TSDF) which has the permit and capacity to treat and dispose of the waste in compliance with current RCRA laws and regulations. The TSDF must be on the current University of Cincinnati term contract for chemical waste disposal.

e. Large building components (doors, window frames, shelving, etc.)which are coated with lead based paint can be disposed of in a sanitary landfill as non-hazardous solid waste only if the lead coating is first removed and disposed of as hazardous waste. Therefore, the contractor shall not dispose of building components which are coated with lead based paint in a sanitary or construction landfill without first removing the lead based paint and disposing of the lead containing hazardous waste in accordance with RCRA laws and regulations.

IX. FINAL CLEARANCE

9.1 Clearance Method

Final Clearance by wipe sampling shall be performed by an industrial hygienist who is not associated with the contractor. Sampling shall be by surface wipe sampling, using lead free commercial wipes moistened with distilled water. All surfaces sampled shall be at less than 200 micrograms per square foot. A blank for be provided and analyzed as control for every ten wipe samples.

All surfaces containing lead-based paint shall be completely removed or encapsulated so as to not pose a health risk to the occupants of the University building.

9.2 Contractor's Duty to Meet Final Clearance

The contractor shall repeat abatement and cleanup procedures until compliance with final clearance specifications is achieved.