

**Chem Scope Lead Awareness Training for Maintenance and Construction**  
**Updated 02/17/05**

The duration of this course is a minimum of two hours.

Purpose: To Comply with the OSHA Lead Standard 1926.62 and to minimize hazards to workers and building occupants. Persons taking this course are experienced maintenance or construction personnel who need to become aware of the hazards of lead dust, how to protect themselves and occupants, and about the regulatory requirements for working with lead in construction.

The practical side of isolating the work area, avoiding building contamination and cleanup of the work site is explained for construction and maintenance activities that may disturb lead paint.

Persons who intend to do lead abatement, must take a longer, and more detailed course, usually 5 days.

Also available is the one-day Lead Safe Work Practices Course. Please see the separate syllabus.

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## **COURSE PROGRAM**

<u>TIME</u>	<u>TOPIC</u>
<b>8:00AM- 9:00AM</b>	<b>BACKGROUND INFORMATION AND HEALTH EFFECTS OF LEAD</b> REGULATORY OVERVIEW OSHA REGULATIONS EPA "PRE-RULE", RENOVATION NOTIFICATION MEASURING LEAD IN THE AIR MEASURING LEAD IN BLOOD HEALTH MONITORING OF WORKERS EMPLOYEE INFORMATION AND TRAINING: REQUIRED WRITTEN SAFETY AND HEALTH PLANS/PROGRAMS:
<b>9:00AM- 10:00</b>	<b>WORK PRACTICES</b>  SET-UP REQUIREMENTS FOR CLASS 1 TASKS: HEPA VACUUM CLEANING PROCEDURES ENTRY AND EXIT PROCEDURES WORK TECHNIQUES CLEAN UP DURING AND AFTER WORK MAINTENANCE ACTIVITIES, GENERAL: SPECIFIC IN-PLACE MAINTENANCE STRATEGIES: INTERIM CONTROL PLAN MANUAL DEMOLITION: WASTE DISPOSAL

***The Principal Instructors:***

*Ronald Arena has been hands-on in the field and actively participates in the training. Ron compiled all the training manuals in use at Chem Scope and is an expert on regulations and on the lead related procedures. He has been involved with the Connecticut lead program since it's beginning in the late 1980's and has been doing lead inspections, risk assessments and abatement plans for more than 10 years. He started conducting formal lead training at Chem Scope, Inc in 1989 and has been a lecturer on lead issues for CCDA, the New Haven Bar Association and other clients.*

*John Rowinski has 25 Years experience in environmental and safety chemistry and engineering. John is a PE and CSP. John's background is primarily in health and safety issues including asbestos, lead, air monitoring and inspection.*

*Time allocations may vary according to discussion.  
 Several short breaks will be given at appropriate stopping points.*

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- L. WASTE DISPOSAL

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PRE-COURSE QUIZ

Select and circle the answer that best answers the question.

1. Which of the following is a true statement?
  - a. Lead is only dangerous to children under 6.
  - b. Lead is not dangerous
  - c. Lead is dangerous to all but especially to young children and fetuses.
  - d. None of the above
  
2. How long has man known that lead is dangerous?
  - a. Since 1990
  - b. Since 1970
  - c. Since 1950
  - d. For thousands of years
  
3. What type of health effect is associated with lead?
  - a. Kidney damage
  - b. Reproductive effects
  - c. Brain-neurological damage
  - d. All of the above
  
4. Which of the following practices is recommended for lead abatement?
  - a. Make sure occupants remain in the work area so they can witness the work.
  - b. Make sure none of the occupants are aware of the type of work that is going to be done.
  - c. Make sure all the furniture remains in the work area during the lead removal work.
  - d. None of the above.
  
5. The agency which regulates employee safety in the construction industry is:
  - a. The U.S. EPA
  - b. OSHA
  - c. NIOSH

## Section 1

### Background Information and Health Effects of Lead

#### A. LEAD DUST

Lead dust comes from lead-based paint. The dust is so small that you may not even see it. Lead dust is easy to breathe when its gets into the air and to swallow when you get it on your hands. Lead-based paint turns into lead dust when:

1. It peels, chips, or flakes.
2. Surfaces covered with lead-based paint break or get disturbed. This happens during abatement renovation or maintenance. When you saw or drill a lead-based painted surface, you create lead dust.
3. Surfaces covered with lead-based paint rub against something. This is called friction. Windows and doors have friction surfaces. When you open a window, painted edges get rubbed and create dust. When you walk on lead painted floors, lead dust gets kicked up. The friction wears through the top layers of paint and exposes, the older lead-based paint. When you sand or scrape lead-based paint, you create friction and lead dust.
4. Surfaces covered with lead-based paint get hit with force. This is called impact. Impact surfaces include floors, stairs, parts of walls, and doors. When you bang into a lead-painted wall with the back of a chair, lead dust gets released. When you close a door, there is an impact. If the door hits surfaces with lead-based paint, lead dust can be released.

#### B. IDENTIFICATION OF LEAD

1. Assume that any building built before 1978 contains lead-based paint, or
2. Inspection by a qualified lead inspector
  - a. Field test: XRF (x-ray fluorescence)
  - b. Lab Tests For Paint Chips, Dust and Soil

#### C. WHY LEAD IS DANGEROUS

1. Can't see or feel the lead that makes you sick.
2. Most dangerous when in the form of dust or fumes
3. Lead dust particles can be very small.
  - a. You can't see them
  - b. You can breath them if they are in the air
  - c. You can swallow them if they are on anything you put in your mouth like food, cigarette or your fingers.

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d. Lead dust settles on flat surfaces: When you touch them you get lead on your hands. If you put your hands to your mouth, you will swallow lead dust.

**D. SOURCES OF ENVIRONMENTAL LEAD CONTAMINATION**

1. Dust From Paint

- a. Deterioration of paint
- b. Remodeling involving sanding or other abrasion or cutting
- c. Demolition and taking apart lead painted components.

2. Soil

3. Drinking water

4. Industrial air pollution

5. Food

6. Hobbies:

Home remodeling	Glazed pottery making
Target shooting	Electronics
Car and boat repair	Refinishing furniture
Lead fishing sinkers or lures	Stained glass work
Painting - some art paints	

7. On the job:

a. Construction trades

Lead abatement	Painters
Plumbers and pipe fitters	Cable splicers
Carpenters	Remodelers
Demolition workers	Welders and cutters
Other metal workers	Maintenance workers

b. Others

Lead mining, smelting and refining	Car mechanics
Lead crystal makers	Artists and Printers
Ceramic glaze manufacturers	Scrap yard workers
Plastic and electronics manufacturers	Firing ranges
Wire and cable manufacturers	Police officers
Recyclers	Radiator repair

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## **E. HISTORY OF LEAD USE**

### 1. Ancient World

Domestic implements in Roman times  
 Drinking ware, Tableware and Sculpture

### 2. Early 1900' S

Paint pigment	Solder joints of tin cans
Roofing sheet	Plumbing
Leaded glass & pottery glaze	Metal utensils
Medicine: Antiseptics, Plasters and Ointments	
Specialty dyes for hair and nails	

### 3. Current or Recent Industrial Uses

Tank linings	Radiation shielding
Piping for corrosive gases and liquids	Bearings
Gasoline antiknock compounds	Storage batteries
Plastics	Ceramics
Electronic devices	Metal cement
Ceramic tile finish glaze	Laboratory
Fusible alloys including solder	Ammunition

Specialty alloys for corrosion resistance  
 Corrosion resistant coating on steel cable  
 Glass flux for painting on porcelain and glass  
 Pigment in rubber or plastic such as vinyl siding and baseboards

## **F. POTENTIAL HEALTH EFFECTS RELATED TO LEAD EXPOSURE**

### 1. General

- a. Children are especially sensitive to lead and about 50% of the lead ingested is absorbed by the blood.
- b. Adults, too are at serious risk from overexposure although only about 10-15% of the lead ingested is absorbed by the blood.
- c. The body will hold more lead if there is a calcium or iron deficiency in the diet.
- d. Acute toxicity - immediate effects
- e. Chronic toxicity - long term effects
  - Can continue after lead been eliminated from the body.
  - Long term effects may be caused by repeated small doses or by one large dose.
- f. **Lead and lead compounds are reasonably anticipated to be human carcinogens. Lead exposure has been associated with increased risk of lung, stomach, and bladder cancer in diverse human populations. (Reports on Carcinogens - 01/31/05 - NTP).**

(See the LEADNTP01.pdf file in the handout CD).

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f. Some effects of lead poisoning can be reversed, for example, blood pressure can return to normal after the lead in the body decreases.

2. How Lead Gets Into the Body (Routes of Exposure)

a. Ingestion (eating)

Hand to mouth largely from dust contact

Drinking lead contaminated water.

Less commonly eating paint chips.

b. Inhalation of dust

Lead dust in air is generated from active work or forced air.

Some of the inhaled dust can be ingested.

Dust may be filtered by HEPA filters (High Efficiency Particulate Air). These are very fine filters that can catch lead dust.

c. Lead Vapors

Heating lead and its compounds > 700 deg. F

3. The Nature of Lead Related Diseases

- Central and Peripheral Nervous System
- Reproductive Effects
- Gastrointestinal Effects
- Renal (Kidney) Toxicity
- A cumulative poison:
- Dose-Response Relationship
- Symptoms usually don't develop until some damage is done
- Slow rate of discharge from the body

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#### 4. Signs and Symptoms of Lead Poisoning

(May come and go, Sometimes mistaken for the flu)

Tiredness (fatigue)	Sleep disturbances
Dizziness	Weakness
Irritability	Nervousness
Headache	Depression
Forgetfulness	Hyperactivity (children)
Numbness	Wrist or foot drop
Clumsiness, Falling	Joint and muscle pain
Vomiting & Nausea	Loss of appetite/Stomach aches
Constipation	Metal taste
Salivation	Anemia
Line on the gums	
Difficulty in concentrating, Learning disabilities	
Problems having healthy children	

#### 5. Blood Lead Testing and Standards

##### a. Blood Lead:

The only way to tell for sure that you are lead poisoned is to get a blood test. The amount of lead in your blood is called the blood lead level. The blood lead test is the most accurate measure.

##### b. ZPP:

Another test is the ZPP (zinc protoporphyrin). ZPP is a normal chemical in your body. When a lot of lead has entered your body over the last few months, the ZPP level becomes abnormal. (The normal ZPP range is 35-50- ug/dl). ZPP level may vary for other reasons such as diet.)

##### c. Workers, OSHA Lead Standards:

40 ug/dl or higher, testing every two months

50 ug/dl or higher, medical removal

Return at 40 or lower

Earnings and benefits paid during medical removal.

Employer pays the difference between normal pay and workmans compensation benefits.

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## **G. REGULATORY OVERVIEW**

There are Federal, State of Connecticut and local agencies with rules on working with lead. These rules are discussed throughout this course. When the manual uses the word "must", "shall", "required" or "require", "prohibited", "restricted"; this means that one regulation or another requires same. When we use the word "should", it is not yet covered by a regulation.

### 1. At the Federal Level:

#### b. EPA: US Environmental Protection Agency

This agency is in charge of protecting the air, water and land from pollution. EPA also has some responsibility for public health.

#### c. OSHA: US Occupational Safety and Health Administration

Covers worker safety and health and has standards about:

Lead	Asbestos
Ladders	Scaffolds
Respirators	Electrical Safety
Chemical Safety	Other Workplace hazards

In May 1993, OSHA published an interim final Lead in Construction Standard which went into effect in June 1993 and is being enforced actively by OSHA. We refer to this Standard and the OSHA Lead Construction Standard CFR 29 1926.62. CFR means Code of Federal Regulations.

d. HUD: US Department of Housing and Urban Development. 24CFR part 35 deals with any residential property receiving federal funding. Discussion of HUD regulated properties is not included in this course.

### 2. At the State and local level, the principal agencies are:

#### a. DPH: Connecticut Department of Public Health

The Lead Poisoning Prevention Program regulates:

Lead abatement related work in Housing and day care centers

Does not include renovation or demolition work.

#### b. DEP: Connecticut Department of Environmental Protection

The Hazardous Waste Section regulates disposal of lead wastes.

#### c. Local

Health Departments and code enforcement agencies have responsibility for local lead issues which are dictated by state law and local ordinances.

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**H. OSHA REGULATIONS:**

1. Construction Industry Lead Standard CFR 29 1926.62:

a. Scope:

Does not apply if lead is shown to be absent.

Applies to All construction work:

Alteration- Renovation	Repair
Painting	Removal
New construction	Encapsulation
Replacement	Installation
Demolition	Salvage
Emergency cleanup	Disposal
Transportation	Storage
Maintenance	or Decorating

**2. These requirements are triggered with lead work even if below the AL:**

Training  
 Personals  
 Maintain records

**3. These added requirements are triggered above the AL (but below the PEL) (30 - 50 ug/m<sup>3</sup>):**

Provide respirator  
 Personals every 6 months  
 Blood lead monitoring.

**4. These added requirements are triggered above the PEL (> 50 ug/m<sup>3</sup>):**

Compliance plan  
 Post signs/ Notify other employers  
 Enforce respirator and Personal Protective Equipment (PPE) use  
 Personals every 3 months  
 Enforce housekeeping  
 Provide hygiene facilities and enforce washing.

5. Other Key OSHA Regulations Affecting Lead in Construction:

a. 29CFR 1910.134 (Applies to Respirator Use)

b. 29 CFR 1926.59 (Hazard Communication Standard)

c. 29CFR 1910.120 (q) (Hazardous Waste Emergency Response) Covers sites where hazardous chemicals are present or Emergency response operations.

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**I. EPA “PRE-RULE” 40 CFR 745 Subpart E**  
**Pre-Renovation Notification Rule Effective 6/1/99**

1. Before Renovation of target housing (residential dwellings built before 1978 and “child occupied facilities”) , the contractor must provide the owner and / or tenants EPA Pamphlet: “Protect Your Family From Lead In Your Home” and prove he provided the pamphlet. In cases of renovation of common areas in multi-family units, pamphlets must be given to all the tenants.
2. Applies to renovation for compensation, including residential rental owners and managers.
3. Pamphlet or a complete copy must be given no more than 60 days before the renovation.
4. In essence a **child-occupied facility** includes any site constructed prior to 1978, visited regularly by the same child, 6 years of age or under, on at least two different days within any week (Sunday through Saturday period) provided that each days visit lasts at least 3 hours and the combined weekly visit lasts at least 6 hours and the combined annual visits last at least 60 hours. This will include pre-schools, day care facilities and elementary schools.
5. Renovation includes the modification of any existing structure or portion thereof that results in the disturbance of painted surfaces, painting, demolition, replastering and window replacement, electrical or plumbing work disturbing painted surfaces.
6. Proof includes:
  1. A written acknowledgement from the owner – occupant.
  2. A certificate of mailing at least 7 days before the renovation to the owner – occupant.
  3. If the owner does not occupy the dwelling provide an adult occupant the pamphlet, but if the pamphlet was not mailed and a written acknowledgement cannot be obtained:  
 Provide a certification that the pamphlet was delivered which includes the address of the unit, the date and method of delivery names of the persons delivering the pamphlet, reason for lack of acknowledgement and the date and signature of the renovator.

**7. Excluded are:**

- a. Renovations disturbing less than 2 sq ft of lead paint or when the surfaces involved in the renovation are proven to be not lead-based paint by a Certified Lead Inspector.
- b. Housing for the elderly or persons with disabilities (unless any one or more children age 6 years or under resides or is expected to reside in such housing for the elderly or persons with disabilities) or any 0-bedroom dwelling.
- c. Emergency renovations: renovations resulting from a sudden unexpected event that if not immediately attended to present a safety or public health hazard or threatens equipment or property with significant damage.

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**J. MEASURING LEAD IN THE AIR**

1. Airborne lead is measured in micrograms per cubic meter of air.

A cubic meter is a measure of volume. It is equal to about the size of a street corner US Post Office box. The abbreviation for cubic meter is m<sup>3</sup>.

A Microgram is a measure of weight. The abbreviation for microgram is ug. There are one million micrograms in a gram. A penny weighs about 2 grams.

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2. Why are these measurements important?

a. When lead is in the air, you can breath it. Your employer must determine how much lead is in the work air.

b. OSHA sets limits on the amount of lead you can breathe when you are working. There are two limits you need to know:

1) Action Level

The action level is like a yellow light. It means caution. The action level for lead is 30 ug/m<sup>3</sup>.

The Action Level is an average of the amount of lead in the air over an 8 hour period. If you are exposed to this much lead, your employer must measure the amount of lead in the air at least every 6 months or any time you change the activity or work environment. You must also be trained about the hazards of lead and visit a doctor for blood testing.

2) PEL (Permissible Exposure Limit)

The PEL is like a red light. It means stop. The PEL for lead is 50 ug/m<sup>3</sup>. The PEL is the maximum average amount for an 8 hour day you can breath. (8 hour TWA, time weighted average). This is a small amount of lead in a large amount of air, like a rain drop in a 3 story building. Even this amount of lead can damage your health.

When you work in an area where the amount of lead goes over the PEL, the OSHA Lead Standard requires you to stop until you have:

Respirator	Protective equipment
Protective clothing	Change areas
Washing facilities	Showers when feasible
Medical surveillance	Training

If you are exposed to lead above the PEL (averaged over 8 hours), your employer must monitor lead in the air every 3 months or any time you change the activity or the work environment.

OSHA says that the employer must make an employee exposure assessment to prove that a particular material containing lead or a specific operation cannot result in employee exposure to lead at or above the action level during processing, use or handling. Otherwise the employer has to start out with full personal protection and monitor the air.

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**K. MEASURING LEAD IN BLOOD**

1. The OSHA Lead Standard says you must have a blood test when you first work with lead. The level of lead in your blood is measured in micrograms of lead per deciliter of blood.
2. A deciliter (dl) is one tenth of a liter. (0.1 liter). A deciliter is about a half cup. A person who weighs 165 lbs has about 6 liters of blood or 60 deciliters.
3. The OSHA Lead Standard says that if you have a blood lead level above 50 ug/dl, you employer must give you work to do that does not expose you to lead.

**L. HEALTH MONITORING OF WORKERS**

OSHA LEAD STANDARD, 1926.62 Requires:

If you work 30 days per year above the action level:

1. Blood lead and EP tested.
2. Every 2 months for the first 6 months and every 6 months thereafter
3. 40 ug/dl or higher, testing every two months
4. Physical yearly
5. 50 ug/dl temporary removal

**M. EMPLOYEE INFORMATION AND TRAINING:**

OSHA Training Requirements under the Lead Standard: (CFR 29 1926.62)

a. Contents of:

- 1) OSHA Lead Standard CFR 29 1926.62
- 2) OSHA Hazard Communication Standard, CFR 29 1926.59:
- 3) OSHA Safety Training and Education, CFR 29 1926.21: (General training requirements for any job activity)
- 4) OSHA Resp. Protection Std: CFR 29 1910.134
- 5) OSHA Hazardous Waste (when Applicable) CFR 29 1910.120

b. Specific operations

Should include HANDS-ON training in the particular brands of equipment used by the company.

c. Medical surveillance

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- d. Engineering controls and work practices
- e. Instructions not to use chelating agents except as directed by doctor
- f. Access to employer records
- g. Medical removal protection program
- h. The content of any other health and safety or compliance plan.

**N. REQUIRED WRITTEN SAFETY AND HEALTH PLANS/PROGRAMS:**

Employees must have access to these plans as well as any monitoring data pertinent to their job. The plans can be incorporated into a single Safety and Health Plan which always must be kept on the job sites. Usually the employer makes a number of copies of this plan which each supervisor brings to the job site.

1. Lead compliance plan (Required by OSHA)
2. Written Respiratory protection program
3. Emergency response plan
4. Hazard Communication/Right to Know Program (OSHA 1926.59)
5. Medical Surveillance Program

## Section 2

### Personal Protection and Protective Equipment

#### A. "RIGHT TO KNOW" OSHA HAZARD COMMUNICATION STANDARD, CFR 29 1926.59:

##### 1. General:

- a. Deals with chemicals in the work place.
- b. You have a right to know if you are working with a dangerous material and you must be trained in how to work with it safely.

##### 2. Training:

##### 3. MSDS'S and how to read them:

- a. MSDS'S are the key to the hazard communication standard.
- b. Manufacturers must provide and your employer must obtain MSDS'S for all hazardous materials which are accessible to all exposed employees.
- c. You must be trained on how to use a MSDS
- d. Employers must have MSDS on the job site for each chemical:
- e. Employers on the job site must share MSDS's and other hazard communication with other employers and their employees; the GC (general contractor) is responsible for coordinating this effort for the entire project.
- f. MSDS'S must include:

#### **Section I**

Product identity and ingredients

Must be the same as on the container label

Must have the manufacturer's name, address and emergency phone number.

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## **Section II Hazardous Ingredients**

Must list hazardous ingredients greater than 1% including chemical name, synonyms and the CAS # (Chemical Abstracts Service). If carcinogens are present at more than 0.1% they must be identified as carcinogens.

In case of trade secrets, the manufacturer can withhold the name of the chemical but must give a more complete description of the hazards and the properties.

Legal exposure limits

PEL (OSHA)

TLV (ACGIH, AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS)

NIOSH LIMITS OR MANUFACTURER ESTABLISHED LIMITS

## **Section III**

Physical and chemical characteristics

Boiling point

Vapor Pressure

Vapor density

Appearance and odor

Specific gravity

Evaporation rate

Miscibility with water

## **Section IV**

Fire, Explosion and reactivity hazards

Flash point

< 100 deg F is flammable like gasoline, acetone, gases like methane and acetylene 100-200 deg F is combustible like lighter fluid, mineral spirits, fuel oil.

Extinguishing Media:

Class A for paper and wood

Class B for liquids or greases

Class C for electrical fires

Class D for metals such as magnesium or metal alloys

Firefighting procedures and unusual explosion hazards

Here you will see instructions like "do not use water" and any special manufacturer's instructions for handling fires with this chemical.

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**Section V Reactivity Data**

Incompatibility with other chemicals. For example if you mix chlorine bleach and ammonia, poisonous phosgene gas is released.

**Section VI Health Hazard Data**

Health hazards, risk of cancer

Acute (short term) effects

Chronic (long term) effects

Routes of entry (ingestion, inhalation, skin)

Target organs such as heart, liver, etc

Signs or symptoms of exposure

Medical conditions generally aggravated by exposure

What to do if someone is exposed

**Section VII Precautions for safe handling and use**

Spill and leak procedures

Waste disposal method

other special precautions for handling and storing

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**Section VIII Control measures**

How to eliminate or minimize the hazard including:

Ventilation and other engineering controls

Personal protective equipment requirements

Emergency and first aid measures

Spill and Leak procedures

Each MSDS may use different formats but all must contain the above information.

**B. PERSONAL PROTECTIVE CLOTHING**

1. The suit is needed to keep gross asbestos contamination off the body, thus making decontamination easier and minimizing the chance of tracking to other areas of the building or bringing asbestos contamination home.
2. Disposable coveralls usually with attached "feet" and hooded head covering.
3. Disposable suits are used which are made of Tyvek, or spun breathable fabrics.
4. Selection of sizes: Most popular Suit sizes: triple (xxx) and double (xx).
5. Storage in clean area for donning.
6. Clean changing area segregated from the work area by a physical barrier and which prevents additional employee lead exposure.
7. Remove protective clothing when leaving work area and before eating, drinking or smoking.
8. Dispose of in a plastic bag.

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### **C. ENGINEERING CONTROLS**

Employer must reduce and maintain dust below the PEL by engineering controls and if the controls are not adequate, then respirators are required. Following are commonly used methods.

1. Local Exhaust ventilation - Ventilated containments

Local exhaust ventilation is required for hazardous substances such as lead dusts.

The regulation requires constant operation of local ventilation during work and afterwards.

Local exhausts must be discharged outside.

2. HEPA Vacuum Shrouded hand tools

3. Removal of lead paint before demolition (requires specialized training, usually 4-5 days)

### **D. PERSONAL HYGIENE FACILITIES AND PRACTICES**

1. Protective clothing removed only in designated change areas

2. Change areas equipped with separate storage facilities for equipment and protective clothing and for street clothes

3. Enter the work area equipped with respirator and protective clothing.

4. Remove protective clothing and respirator on leaving work area

5. Employees may not leave job site wearing clothing or equipment worn during the work shift

6. Wash hands prior to eating, drinking, smoking, or applying cosmetics.

7. Contaminated protective clothing in a closed container in the designated change area.

8. Removal of lead from protective clothing or equipment by blowing, shaking or any other means which disperses lead into the air is prohibited.

9. No Food or beverage present or consumed, no smoking or chewing Tobacco and no cosmetics applied in the work area.

10. No contamination of non work areas permitted by any other means.

11. Shower when feasible

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**Section 3**

**Work Practices**

**A. SET-UP REQUIREMENTS FOR CLASS 1 TASKS:**

1. Work area separated from non work area & signs
2. Hygiene facilities (discussed above)
3. Set up a Clean Change Area and wash area
  - a. Set up at the entry to the work area.
  - b. A place to HEPA vacuum and take off dirty clothes
  - c. Labeled Container with a closeable lid for dirty protective clothing and used respirator cartridges
  - d. A Wash area which includes a shower if possible. Must have:
    - 1) an eye wash station
    - 2) running warm water
    - 3) clean towels
    - 4) soap
  - e. a toilet must also be provided at the site
  - f. A Clean area Must have:
    - 1) A place to change into street clothes:
    - 2) Clean place to store street clothes and respirators

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## **B. HEPA VACUUM CLEANING PROCEDURES**

### 1. What is a HEPA Vacuum

- a. A vacuum cleaner with a HEPA filter which is the same kind of filter as in the air purifying respirator. HEPA filters out particles of 0.3 microns or greater at 99.97% efficiency or greater.
- b. Air sucked into the cleaner first goes to a vacuum bag, then to a secondary filter and finally to the HEPA filter.
- c. Never use an ordinary vacuum cleaner since it will blow fine lead dust all over the area.

### 2. When to Use the HEPA Vacuum

- a. Cleaning surfaces before, during and after work
- b. Cleaning self before leaving work area
- c. As a dust control attachment for sanders and other abrasive equipment

### 3. How to Use the HEPA Vacuum Cleaner

- a. Follow the operating instructions provided by the manufacturer of the machine. Training sessions should be arranged with the manufacturer's representative.
- b. Use attachments appropriate for use on each type of surfaces including brushes of various sizes, crevice tools, and angular tools. For example:
  - 1) Brush tool for walls, fixtures and woodwork.
  - 2) Wheeled floor nozzle for bare floors
  - 3) Carpet beater for carpets
  - 4) Rubber cone where the floor meets the wall and other cracks.
  - 5) Slender and long plastic fitting for between radiator sections.
- c. Move the vacuum slowly since lead dust is heavy, sticks to surfaces and hard to pick up.

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4. Maintenance of the HEPA Vacuum:

a. Learn to disassemble the new unit before it is contaminated.

b. Filter change:

1) When machine flow gets restricted, you can feel and hear the difference.

2) If you wait too long, you are wasting your time vacuuming and the machine may get hot and burn out.

3) In a contained area.

4) Wear a full set of protective clothing and respirator.

5) Change bag and prefilter first and see if the flow is OK.

6) Check the hose for blockage and clean by reversing suction. Do not blow out the hose since this will contaminate the area.

7) Check gaskets, filters and vacuum bag for tears and replace as needed.

8) A second HEPA unit can be used to advantage to clean out the unit being serviced.

9) Use extreme caution to avoid release of lead dust into the environment.

10) Used HEPA filters and vacuumed debris are to be included with the hazardous waste.

11) Turn on the machine briefly and check the operation.

12) Clean up the area

c. Check daily for damage, especially power cords and switches.

d. At the end of the job if the dirty cleaner is to be taken out of the work area:

1) Clean each attachment by sucking through the vacuum while tapping and wet wipe each attachment. Place the cleaned parts in a sealable plastic bag.

2) Suck out and seal the end of the hose with duct tape to prevent dust from leaking all over your car or other clean areas.

3) Unplug and damp wipe the unit clean.

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**C. ENTRY AND EXIT PROCEDURES**

1. Entry

- a. Don protective clothing and respirator.
- b. Fit check respirator and adjust as needed
- c. Don personal air sampling pump at this time. Must be set up and calibrated by the supervisor or air monitor.

2. Exit

- a. Before leaving the Work Area, HEPA vacuum gross contamination from protective clothing and respirator.
- b. Take off protective suit and respirator cartridges and discard in the storage container for dirty suits.
- c. Proceed to the wash area and thoroughly wash hands and face. Wash any other areas of the body that may be contaminated with lead dust. Shower if one is available.
- d. In the Clean area, dress in street clothes. If no shower was taken, shower A.S.A.P.

**D. WORK TECHNIQUES**

1. Controlling Off-site Dispersal

- a. Limit Access:
- b. Limit Tracking of Dust and Debris:
- c. Do on-going cleanup.
- d. Isolate the work area.
- e. Use HEPA filtered ventilation units for large or dusty jobs
- f. Proper Waste Management:

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2. Removal and replacement of parts when areas are to be reoccupied.

a. Usually use protection and setup for Class 1 task

b. General

1) Mist the part to be removed with water

2) Sharp stiff putty knife

3) Screwdriver or prybar may next be used

4) Do not pry too far at one location to avoid splitting the piece

5) Work the piece gradually keeping it near parallel to the surface

6) Use a small piece of plywood as a guard to protect wall or other surface resting the fulcrum of the prybar on the plywood.

7) Pay prompt attention to nails

8) May generate lead dust

9) Too much water may warp components.

10) Wipe off the surfaces before storing the piece.

11) Label and preserve all the hardware before shipment.

c. Windows:

1) Often the highest source of lead.

2) Put up extra poly from under the sill to the floor and extend out at least 6 ft (for interior or exterior window work)

3) Remove molding

4) Remove parting bead

5) Disconnect the sash cord

6) Take out entire window sash

7) If off-site stripping is to be done:

a) Window panes may require re-sealing with new putty.

b) Putty may contain lead so if windows are to be re-used it may be wise to remove the putty, points and panes before dip-stripping.

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- c) Where cove molding and finishing nails hold in panes, they may be left intact for stripping
  - d. Doors:
    - 1) Tap out and take off the hinge pins.
    - 2) Unscrew the hardware
  - e. Cleanup:
    - 1) Wet clean and HEPA vacuum
    - 2) Be very thorough.
  - f. Waste disposal of parts.
  - g. Installing new components: Seal seams and gaps with caulking.
  - h. Clean up
  - i. Inspection and dust testing is recommended
3. Removal or Encapsulation of Lead-Based Paint:

Covered in 4-5 day Lead Abatement Classes

**E. CLEAN UP DURING AND AFTER WORK**

- 1. Ongoing Cleanup Daily:
  - a. Police debris and droppings constantly through the job. Wet sweeping or shovels may be used if HEPA vacuums cannot be used for a particular cleanup item such as wet sludge. Pick up remaining debris and HEPA vacuum at the end of each workday after active abatement has ceased.
  - b. Package wastes promptly and move them out of the area to the waste storage area.
  - c. Wet mop the floor. Bag and label small debris. Never dry sweep.
  - d. HEPA vacuum all surfaces in the work area including plastic coverings.
- 2. Final Clean-up of areas to be re-occupied:
  - a. HEPA vacuum the abatement area
  - b. Wash with TSP detergent
  - c. HEPA vacuum again.

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**H. MAINTENANCE ACTIVITIES, GENERAL:**

1. Sound Maintenance Program and Practices

The level of protection and controls should be keyed to the scale of the project and the potential for lead dust generation. At one extreme, a light switch or door handle can be replaced without great concern for lead dust generation. At another level, an area renovation or window replacement project may well create tremendous exposures, tantamount to a full-scale abatement project. In any event, surrounding surfaces should be protected to capture any dust or paint chips generated during any work. Workers engaged these activities should be subject to medical monitoring procedures... replacement medical examinations, periodic medical examinations and blood lead monitoring.

2. Worker Protection See Section 3:

3. Protection of Occupants:

a. Corrective Action (Larger Scale Work):

- 1) Occupants absent from vicinity of work
- 2) Protect occupant belongings
- 3) Daily complete cleanup if Occupants return at night

b. Preventative Maintenance and Repairs:

- 1) In most cases, Occupants may be in area but not in vicinity of work
- 2) Protect surfaces and occupant belongings
- 3) Daily complete cleanup

4. Preparation of Work Area:

For any corrective action, preventative maintenance or repair: plastic sheeting to protect ground, the area or the belongings.

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5. Cleanup Procedures:

a. Corrective Action:

- 1) Police up debris.
- 2) HEPA vacuum daily
- 3) At end of job:
  - a) HEPA vacuum
  - b) TSP wash
  - c) HEPA vacuum again

b. Preventative Maintenance and Repairs:

- 1) When dust is generated, use full cleanup as above, OR
- 2) At least wet wiping or wet mopping with TSP

**I. SPECIFIC IN-PLACE MAINTENANCE STRATEGIES:**

1. Deteriorating Exterior Paint

a. Recommended Action

Repair by wet scraping and repainting to obtain a smooth finish.

b. Sequence of Steps

1) Planning the corrective action:

Occupants are expected to have access to their areas during the period of exterior corrective work. Work activities that require more than one day for completion should be scheduled so that each day's work (including cleanup) can be accomplished within the work day.

2) Area Protection:

Cover all areas immediately adjacent to and below the work with a 6 mil polyethylene to protect the ground and shrubbery and to retain wet debris and dust that will be created during the surface treatment. This covering should extend out horizontally from the base of the wall for a distance that is equal to half the height of the wall surface being treated. Seal any joints or tears with duct tape. Avoid unnecessary traffic over the 6 mil film. Double the film if necessary to avoid punctures from rough ground surfaces. Repair any tears immediately.

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3) Surface Preparation:

Shut off electricity to exterior outlets and switches in the area.

Moisten surfaces to be corrected with a fine spray of water from a garden sprayer or an atomizer bottle.

4) Wet Scraping:

Wet scrape loose peeling, flaking material to obtain a smooth cleanable surface that can be repainted.

The scraping tool should have a soft pliable blade of plastic or rubber that will not damage or gouge the material. The blade should be rigid enough, however, to remove rough jagged edges of the broken paint surface. The resulting surface should be free of jagged, rough edges or snags that would interfere with the paint or coating's ability to bridge any remaining gaps. The rubber blade squeegee that is used for cleaning automobile windshields may be satisfactory. (One style has a foam or sponge on the back of the blade for wetting the surface.) Commercially available plastic scraping pads that are for use with liquid or chemical paint strippers may also be effective for wet scraping and the smoothing of roughened surface.

Collect debris during scraping with a wet/dry vacuum often as necessary to minimize its being carried away by the wind. At a minimum, this should be done at the end of each work day.

It may be necessary to spray or re-wet fallen debris to prevent its being blown off the protective covering.

Workers should be cautioned about the hazards of slipping on wet polyethylene, tracking of debris off the film and to clean or remove footwear when leaving the area.

5) Cleaning Surfaces:

Following wet scraping, the surfaces should be cleaned with a damp sponge to remove small particles and dust. It may be necessary to "degloss" the surface before resealing. Cleaning with TSP followed by a clean water wash will degloss as well as clean. The surface should be permitted to dry thoroughly in preparation for repainting or resealing.

6) Surface Sealing:

The "clean" dry surfaces are to be sealed with an enamel paint or coating material that results in a smooth cleanable surface. The paint or coating should be applied in accordance with manufacturer's instructions.

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7) Removal of Protective Covering:

At conclusion of the corrective work (or at the end of the work day on multi-day activities when the work area cannot be secured from access by Occupants), the protective polyethylene coverings should be carefully removed, retaining any remaining debris/dust. The coverings and debris should be disposed of in accordance with local disposal practices/regulations. Previously used plastic covering material should not be used again within the dwellings. Cleaning of the equipment, including ladders and scaffolding, while on the protective covering may simplify the collection of debris and liquid waste.

8) Disposal of Waste and Debris:

All retained liquid waste must be stored in a secure area pending disposal in accordance with EPA, DEP and local requirements.

2. Deteriorating Interior Lead-Based Paint

a. Recommended Action

Procedures are similar to exterior paint as above. Greater attention must be given to controlling, testing and cleaning up dust lead as well as protecting occupants belongings.

b. Sequence of Steps

(For areas greater than one square foot or when it is likely that lead dust will be created during the work)

1) Planning the corrective action:

Work activities that require more than one day for completion should be scheduled so that occupants can be relocated. For living and sleeping areas each room or space must be cleaned at the end of the day so that occupants can return for the night.

2) Protection of Occupants and Personal Belongings:

Occupants (and to the extent practicable, personal belongings) must be removed from rooms or space where work is done. Cover all floors and remaining belongings with 6 mil polyethylene and sealed with duct tape. Occupant's entry to the room/space/work area is to be prevented until cleanup has been completed at the conclusion of the work or at the end of the work day, whichever occurs sooner.

3) Area Protection:

Cover all areas immediately adjacent to the work with a 6 mil polyethylene to retain wet debris and dust that will be created during the corrective work. Seal any joints or tears with duct tape.

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4) Surface Preparation:

Moisten (do not flush) surfaces to be corrected with a fine spray of water from a sprayer or an atomizer bottle. Shut off electricity to outlets and switches in the area.

5) Wet Scrape as above.

6) Clean Surfaces as above

7) Surface Sealing as above

8) Removal of Protective Covering as above

9) Cleanup:

A final cleanup of the corrective surfaces and surrounding work area, room or space is to be conducted at the end of the work day with a HEPA vacuum, TSP, followed by a final HEPA vacuuming.

10) Dust Testing: Done as usual.

3. Excessive Lead Dust in Areas Without Deteriorating Paint:

a. Likely Sources

1) Chalking which was not previously detected.

2) Friction surfaces

3) Tracked in from contaminated interior soil

b. Corrective Action:

1) On a regular basis: wash down exterior walkways, stairs and landings where dust may accumulate.

2) Door mats used at entrances

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## **J. INTERIM CONTROL PLAN**

These actions are appropriate for areas with existing lead dust contamination. They will reduce the amount of lead dust in the area.

### 1. Setup:

- a. Set up signs and barrier tape.
- b. Keep non workers out of the area
- c. Wear protective clothing and a respirator until you are ready to repaint
- d. Clean and remove nearby objects. Send rugs out to be cleaned, after labeling.
- e. Clean and seal what remains in the area
- f. Seal air vents and other openings.
- g. Set up a decontamination area or area (dirty area, wash area and clean area.
- h. Lay layers of poly at least 6 ft in every direction from the area where you will be working.
- i. Bring in all work tools and equipment into the work area.

### 2. Do a special cleaning.

Vacuum the whole area with a HEPA vacuum. Then use TSP lead cleaner to wash the whole building. Pay special attention to the window wells.

### 3. Do small repairs to the windows to reduce lead dust.

Cut a small piece of sheet metal or plastic the same size as the window well. Back caulk the piece and nail it in place. This repair will enclose the well and create a cleanable surface. it will reduce the lead dust the window creates and make the window easier to clean.

### 4. Wet scrape edges and loose paint.

Wet scrape the leading edge of the window stools (inside window wells). Wet scrape any other loose, peeling paint.

### 5. Wash the whole area and HEPA vacuum again.

### 6. Repaint with a non lead paint.

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**K. MANUAL DEMOLITION:**

1. Set-Up Requirements:

- a. Regulated area perimeter with limited access
- b. Temporary enclosures and barricades clearly marked with signs
  - 1) 6-mil polyethylene sheeting to prevent release of lead into the environment.
  - 2) Full containment for abrasive blasting or other dusty operations.
- c. Clean change area/Decontamination unit
- d. Respirators and protective clothing.

2. Exterior Methods

- a. Abrasive Blasting: Sand, Track and Shot Blasting
  - 1) Only allowed on exterior work.
  - 2) Must be contained.
  - 3) Very dusty and creates a lot of waste
  - 4) Require the greatest attention to containment and worker protection
  - 5) Works best on brittle surfaces; not as well on gummy or elastic surfaces.
  - 6) No visible emissions outside are allowed.
  - 7) HEPA filters must be used on negative airs.
  - 8) The substrate may be worn down beyond the desired amount.

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b. Water Blasting or Power Washing:

1) Generates a large amount of liquid waste

2) A high power water or steam jet is directed usually downward along the surface and loosens and carries away the paint.

a) Must capture and evaluate the waste water

b) One technique used is to install a water trough at the bottom of each wall. A trough can be moved from wall to wall. Different arrangements can be made to lead the water to the trough. The best approach is to design the trough below the dripline of the foundation. Double thick reinforced 6-mil Poly attached under the dripline can be formed to make a trough from which water can be pumped into a 55-gal drum. Place boards under the poly to form the trough and place the pump at the lowest point. Raise the poly at the ends to prevent runoff. For firms doing this work frequently, it is best to fabricate a sheet metal trough.

c) Water is collected and pumped through a pressure filter into a drum. The pressure filter contents are almost always a hazardous waste. The water needs to be evaluated as a possible hazardous waste.

d) Even if the water is not a hazardous waste, then DEP and most local regulations will apply as to whether the water can be placed in the sewer. In most cases, the water cannot be discharged to the ground or sewer.

3. Steel Structures Techniques:

Special training is needed for this work and this is only for information.

a. Soil Testing Before and After Work

b. Blasting

1) Extra environmental monitoring:

2) Use supplied air type CE Respirator and a full decontamination unit; a shower if possible.

3) Types of abrasive

a) Sand

b) Black beauty (corn cob pieces)

c) Carbon dioxide pellets

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d) Recyclable Pellets

Steel grit

shot

aluminum oxide

plastic pellets

e) Water Blasting

Water is mixed with an abrasive material and blown at very high pressure, usually > 20,000 PSI.

f) Vacuum Blasting

Shroud or cover with abrasive sucks back the abrasive and catches the lead dust in a vacuum line.

c. Containment: (Needed for blasting and other dusty operations)

Special training is needed for this segment and not included in this course.

d. Cutting and Demolition Operations:

1) Torch Cutting

a) Cuts made after paint has been removed

b) Normal protection for welding is required including gloves, face shield/helmet and supplied air when needed for confined areas.

c) Any personnel doing cutting which may disturb lead paint should have the same personal protective measures specified above for lead abatement.

2) Hydraulic shears

a) Backhoe equipped with power shears.

b) Large units can cut a railroad car

c) Large tanks, bridges and other steel structures are best demolished with this device.

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e. Demolition with Heavy Equipment:

- 1) Personal monitor should be worn by the operator. In most cases, values will be below the action limit and respirators would not be required.
- 2) Disposable suits and a clean change area are always required.
- 3) Remove paint from areas before torch cutting

**L. WASTE DISPOSAL**

Special training is needed for this segment and not included in this course other than a brief summary.

1. Key terms:

DEP- CT DEPT OF ENVIRONMENTAL PROTECTION

RCRA- RESOURCE CONSERVATION AND RECOVERY ACT

EPA- US ENVIRONMENTAL PROTECTION AGENCY

TCLP (toxicity characteristic leaching procedure)- May be for 8 metals only or additionally for 40 other compounds.)

2. Waste Evaluation

- a. Evaluate the wastes to determine which types are hazardous under the RCRA and DEP regulations. This evaluation may be done by sampling and TCLP testing of materials as set forth in 40 CFR Part 261 as amended, or by "knowledge of process".
- b. EPA RCRA hazardous wastes which fail due to lead content have extractable lead of 5 mg/l according to the test specified in CFR 40 part 261. Other components may need to be included in the TCLP testing.

3. Packaging and Transportation:

- a. Prior arrangements must have been made for transportation through the TSD or a licensed transporter
- b. Package and label according to the TSD's instructions for the waste.
- c. For accidents or spills, report to the DEP, Oil and Chemical Spills Section at 566-3338 (24 hour hotline).

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**CHEM SCOPE**

**LEAD AWARENESS TRAINING**

**MAINTENANCE AND CONSTRUCTION STAFF**

**2 HOUR**

**STUDENT MANUAL**