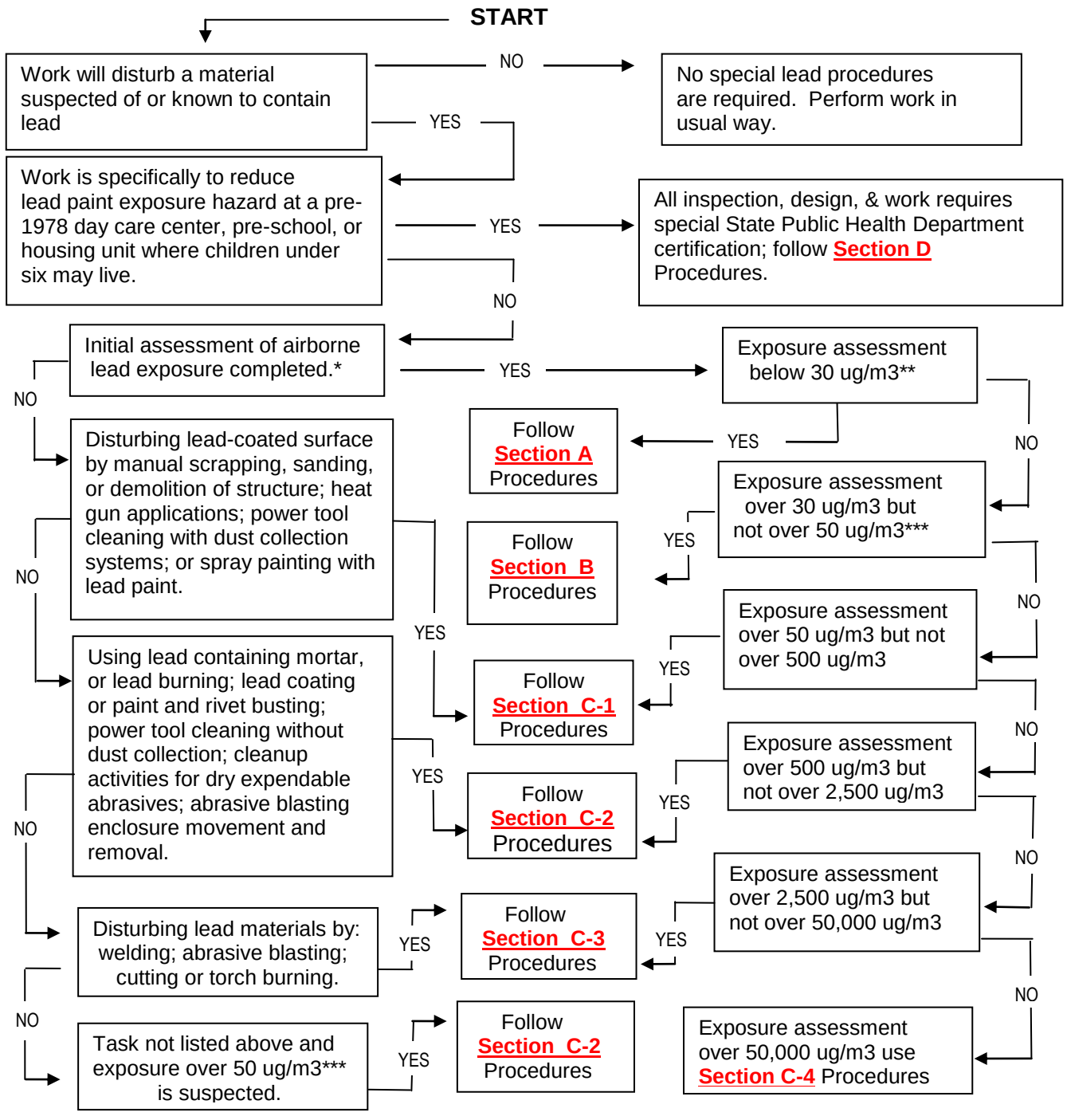
THE UNIVERSITY OF IOWA | EHS Environmental Health & Safety Office

Appendix A:
Logic Chart to Determine Procedures Applicable to Disturbing Lead Containing Materials



* Initial exposure assessment = Appropriate full shift air sampling. If none completed, follow procedures for operation/task listed in table (or EHS S.E.G. if one is available) during initial exposure assessment .

** 30 ug/m3 time-weighted average (TWA) airborne exposure for 8 hour day is OHSA Action Level.

*** 50 ug/m3 time-weighted average airborne exposure for 8 hour day is OSHA Permissible Exposure Limit (PEL)

Use these procedures when employee exposure assessment shows average airborne lead level will be below the 30 ug/m3 Action Level for the work day:

Exposure Assessment

All affected employees must be notified of air monitoring results within 5 days of receiving them.
Re-monitoring will be necessary if conditions change such that lead exposure levels may increase.

Methods of Compliance

None required

Respiratory Protection

None required. Recommend voluntary respirator program using half face masks/HEPA filters.

Protective Clothing and Equipment

None required. Recommend wearing coveralls or disposable tyvek suits.

Housekeeping

No special precautions are required. Recommend wet wiping any lead surface after disturbed.

Hygiene Facilities and Practices

No special precautions are required. Recommend washing hands after lead work completed.

Medical Surveillance

None required. It respirators used, need respirator physical.

Employee Information and Training

Communicate lead hazard as required per Hazard Communication Standard, including warning signs, labels, MSDS, and information and training.

Signs

None required

Record keeping

Written documentation of exposure assessment must be kept in department records.
Written documentation of any voluntary respirator program must be kept.

Observation of Monitoring

Provide affected employees or their representatives the opportunity to observe lead monitoring. Without interfering with monitoring observers can:

- Receive an explanation of measurement procedures;
- Observe all steps related to monitoring;
- Record or receive a copy of laboratory results.

Use these procedures when employee exposure assessment shows average airborne lead level will be above the 30 ug/m3 Action Level and below the 50 ug/m3 PEL for the work day.

Exposure Assessment

All affected employees must be notified of air monitoring results within 5 days of receiving them.
Re-monitoring is required every 6 months or if conditions change such that lead exposure levels may increase.
May discontinue monitoring if 2 consecutive tests 7 or more days apart are below 30 ug/m3.
Must re-monitor after discontinuing if changes may result in higher employee exposure levels.

Methods of Compliance

None required.

Respiratory Protection

None required. Recommend voluntary respirator program using half face masks/HEPA filters.

Protective Clothing and Equipment

None required. Recommend wearing coveralls or disposable tyvek suits.

Housekeeping

Keep all surfaces as free of lead as possible using methods that minimize airborne lead.

Hygiene Facilities and Practices

No special precautions are required.

Medical Surveillance

Initial medical surveillance required for employees with lead exposures at or above 30 ug/m3 for 30 or more days a year.
If respirators used, need respirator physical.

Employee Information and Training

Communicate lead hazard as required per Hazard Communication Standard, including warning signs, labels, MSDS, and information and training. Also provide the following information in training:

- Content of lead standard and appendices.
- Specific nature of operations that can cause lead exposure above action level.
- Purpose, selection, fitting, use, and limits of respirators.
- Medical surveillance and removal program and health effects of excessive lead exposure.
- Relative engineering and work practice controls including good work practices of Appendix B.
- Contents of any compliance plan in effect.
- Instruction that chelating agents should not be used routinely and only under doctor direction.

Employee access to records

Make copy of standard and appendices available to affected employees.
Provide all information and training materials requested to affected employees, representatives, and OSHA.

Signs

None required

Recordkeeping

Written documentation of exposure assessment must be kept in department records.
Maintain medical surveillance records and any medical removal records.
Written documentation of any voluntary respirator program must be kept.

Observation of Monitoring

- Provide affected employees or their representatives the opportunity to observe lead monitoring.
- Without interfering with monitoring observer can:
  - Receive explanation of measurement procedures.
  - Observe all steps related to monitoring.
  - Record or receive a copy of laboratory results.

Use these procedures when employee exposure assessment shows average airborne lead level exceeds the PEL, with levels between 50 ug/m3 and 500 ug/m3 for the work day, and for the following operations when an initial exposure assessment has not been performed: disturbing a lead-coated surface by manual scrapping, sanding, or demolition of the structure; heat gun applications; power tool cleaning with dust collection systems; or spray painting with lead paint.

Exposure Assessment

All affected employees must be notified of air monitoring results within 5 days of receiving them.
Include a statement that exposure was above 50 ug/m3 (PEL) and describe corrective action to reduce exposure to below that level.
Re-monitor every 3 months or if conditions change such that lead exposure levels may increase.
May discontinue monitoring if 2 consecutive tests 7 or more days apart are below 30 ug/m3
Must re-monitor after discontinuing if changes may result in higher employee exposure levels.

Methods of Compliance

Implement all feasible engineering and work practice controls to reduce and maintain exposure at or below 50 ug/m3.
If exposure not below 50 ug/m3 with controls, supplement with respirators.
Establish a written program that is revised and updated every 6 months and includes necessary elements per OSHA regulations.
Maintain mechanical ventilation as necessary.
If used, establish and implement administrative controls including assessing their reliability.
Ensure good work practices from OSHA 29 CFR1926.62 Appendix B are followed.

Respiratory Protection

Provide, at a minimum, a NIOSH approved half-face air purifying respirator with HEPA cartridges at no cost to employee. Provide PAPR when employee chooses it and it provides adequate protection.
Perform medical surveillance on each respirator user.
Ensure respirator fits properly and has minimum leakage.
Perform initial and then annual fit test for tight fitting respirators following 29 CFR 1926.62 Appendix D.
Have respirator program per 29 CFR 1910.134.

Protective Clothing and Equipment

When lead exposure causing skin or eye irritation, provide at no cost and require use of:
- Appropriate full-face respirator.
- Coveralls or similar fully-body work clothing.
- Gloves, hats, and shoes or disposable shoe coverlets.
- Face shields, vented goggles, and other appropriate equipment per 1910.133.
- Provide clean protective clothing at least weekly, daily if exposure over 200 ug/m3.
- Provide for cleaning, laundering, or disposal of PPE.
- Repair or replace PPE to maintain effectiveness.
- Employees remove work clothing at end of shift in change areas provided.
- Contaminated clothing into closed container for cleaning, or disposal.
- Inform laundry of potential harmful effects of lead exposure.
- Containers of contaminated clothing and equipment are properly labeled.
- Prohibit lead removal from PPE by blowing, shaking, or any method that disperses it into the air.

Housekeeping

Keep all surfaces as free of lead as possible using methods that minimize airborne lead.
Shoveling, dry or wet sweeping, and brushing ARE ONLY used if vacuuming and other effective methods were tried and found not effective.
Use vacuums with HEPA filters; use and empty in a manner to minimize reentry of lead.

No compressed air to remove lead except with an adequate ventilation system to collect the dust.

Hygiene Facilities and Practices

No food, beverage, tobacco, or cosmetics allowed or used in areas above 50 ug/m3.
Clean change areas with separate storage of work and street clothes to prevent contamination is required for employees.
Ensure employees do not leave workplace wearing clothing or equipment required during the Work shift.
Provide showers where feasible when exceed 50 ug/m3. Have workers shower at end of work shift, provide towels and cleaners.

Eating facilities

Provide readily accessible lunchroom or eating areas as free of lead contamination as feasible.
Make sure workers wash hands and face prior to eating, drinking, smoking, or applying cosmetics.
Workers do not enter lunchroom or eating areas wearing PPE unless surface lead dust was removed.

Hand washing facilities

Provide adequate hand washing facilities for exposed employees.
Where no showers are present, ensure employees wash hands and face at end of shift.

Medical surveillance

Make initial medical surveillance available to exposed employees.
Provide employee results of biological monitoring within 5 days of receipt.
Notify employee with a blood lead exceeding 40 ug/m3 of temporary medical removal.
Other issues to be determined with medical provider include medical exams and consultations, possible use of chelating agents, and medical removal protection.
Medical evaluation for respirator use.

Employee information and training

Communicate lead hazard information and training to employees per Hazard Communication Standard, including warning signs, labels, MSDS, and information and training. Also provide initial and annual training on the following:
Content of lead standard and appendices.
Specific nature of operations that can cause exposure to lead above action level.
Elements of respirator program and purpose, proper selection, fitting, use, and limits of respirators.
Medical surveillance program, medical removal protection program including adverse health effects of excessive lead exposure (reproductive effects, fetus hazards, and pregnancy precautions)
Engineering and work practice controls associated with job assignment including relevant good work practices in OSHA 29 CFR 1926.62 Appendix B.
Contents of any compliance plan in effect.
Instruction that chelating agents should not be used routinely and only under doctor direction.
Employee right to access records.

Access to information and training materials

Make copy of standard and appendices available to affected employees.
Provide all Communicate lead hazard information and training to employees per Hazard Communication Standard.

Signs

Post the following clear legible warning sign where lead exposure exceeds 50 ug/m3:

Warning
Lead Work Area
Poison
No Smoking or Eating

Illuminate and clean signs as necessary so readily visible.

Recordkeeping

Maintain the following records as required by OSHA:
Exposure assessments.
Exposure assessment monitoring.
Objective data for exemption from initial monitoring requirement.

Information demonstrating lead not released at or above 30 ug/m3 under any expected use.
Maintain records until no longer needed but at least 30 years.
Medical surveillance .

Medical removals

Written documentation of respirator program and fit tests must be kept.
Availability of records: make available to employees, former employees, employee representatives, and OSHA.
Transfer records to successor employers and to OSHA if no successor employer.
Notify OSHA 3 months before disposal of records.
Comply with requirements of 29 CFR 1910.20(h).

Observation of monitoring

Provide affected employees or designated representatives opportunity to observe lead monitoring.
Observer can enter regulated area if required provided he/she complies with safety and health procedures and uses appropriate PPE provided by employer.
Without interfering with monitoring observer can:
- Receive explanation of measurement procedures.
- Observe all steps related to monitoring.
- Record or receive copy of laboratory results.

Use these procedures when employee exposure assessment shows average airborne lead level exceeds the PEL, with levels between 500 ug/m3 and 2,500 ug/m3 for the work day, and for the following operations when an initial exposure assessment has not been performed: using lead containing mortar, lead burning, lead coating or paint and rivet bursting, power tool cleaning without dust collection, cleanup activities with dry expendable abrasives; and abrasive blasting enclosure movement and removal.

Exposure Assessment

All affected employees must be notified of air monitoring results within 5 days of receiving them.
Include a statement that exposure was above 50 ug/m3 (PEL) and describe corrective action to reduce exposure to below that level.
Re-monitor every 3 months or if conditions change such that lead exposure levels may increase.
May discontinue monitoring if 2 consecutive tests 7 or more days apart are below 30 ug/m3.
Must re-monitor after discontinuing if changes may result in higher employee exposure levels.

Methods of Compliance

Implement all feasible engineering and work practice controls to reduce and maintain exposure at or below 50 ug/m3. If exposure not below 50 ug/m3 with controls, supplement with respirators.
Establish a written program that is revised and updated every 6 months and includes necessary elements per OSHA regulations.
Maintain mechanical ventilation as necessary.
If used, establish and implement administrative controls including assessing their reliability.
Ensure good work practices from OSHA 29 CFR1926.62 Appendix B are followed.

Respiratory Protection

Provide all potentially exposed workers a NIOSH approved respirator effective against lead offering a respiratory protection factor of 50 or higher at no cost to the employee.
Perform medical surveillance on each respirator user.
Ensure respirator fits properly and has minimum leakage.
Perform initial and annual fit tests for tight fitting respirators following 29 CFR 1926.62 Appendix D.
Have respirator program per 29 CFR 1910.134.

Protective Clothing and Equipment

When lead exposure causing skin or eye irritation, provide at no cost and require use of:
Appropriate full-face respirator.
Coveralls or similar fully-body work clothing.
Gloves, hats, and shoes or disposable shoe coverlets.
Face shields, vented goggles, and other appropriate equipment per 1910.133.
Provide clean protective clothing at least weekly, daily if exposure over 200 ug/m3.
Provide for cleaning, laundering, or disposal of PPE.
Repair or replace PPE to maintain effectiveness.
Employees remove work clothing at end of shift in change areas provided.
Contaminated clothing into closed container for cleaning, or disposal.
Inform laundry of potential harmful effects of lead exposure.
Containers of contaminated clothing and equipment are properly labeled.
Prohibit lead removal from PPE by blowing, shaking, or any method that disperses it into the air.

Housekeeping

Keep all surfaces as free of lead as possible using methods that minimize airborne lead.
Shoveling, dry or wet sweeping, and brushing can only be used if vacuuming and other effective methods were tried and found not effective.
Use vacuums with HEPA filters, and use and empty in a manner to minimize reentry of lead.
No compressed air to remove lead except with an adequate ventilation system to collect the dust.

Hygiene Facilities and Practices

No food, beverage, tobacco, or cosmetics allowed or used in areas above 50 ug/m3.
Clean change areas with separate storage of work and street clothes to prevent contamination required for employees.
Assure employees do not leave workplace wearing clothing or equipment required during the work shift.
Provide showers where feasible when levels exceed 50 ug/m3. Have workers shower at end of work shift, provide towels and cleaners.

Eating facilities

Provide readily accessible lunchroom or eating areas as free of lead contamination as feasible.
Make sure workers wash hands and face prior to eating, drinking, smoking, or applying cosmetics.
Workers do not enter lunchroom or eating areas wearing PPE unless surface lead dust was removed.

Hand washing facilities

Provide adequate hand washing facilities for exposed employees.
Where no showers are present, ensure that employees wash hands and face at end of shift.

Medical surveillance

Make initial medical surveillance available to exposed employees.
Provide employee results of biological monitoring within 5 days of receipt.
Notify employee with a blood lead exceeding 40 ug/m3 of temporary medical removal.
Other issues to be determined with medical provider include medical exams and consultations, possible use of chelating agents, and medical removal protection.
Medical evaluation for respirator use.

Employee information and training

Communicate lead hazard information and training to employees per Hazard Communication Standard, including warning signs, labels, MSDS, and information and training. Also provide initial and annual training on the following:

- Content of lead standard and appendices.
- Specific nature of operations that can cause exposure to lead above action level.
- Elements of respirator program and purpose, proper selection, fitting, use, and limits of respirators.
- Medical surveillance program, medical removal protection program including adverse health effects of excessive lead exposure (reproductive effects, fetus hazards, and pregnancy precautions).
- Engineering and work practice controls associated with job assignment including relevant good work practices in OSHA 29 CFR 1926.62 Appendix B.
- Contents of any compliance plan in effect.
- Instruction that chelating agents should not be used routinely and only under doctor direction.
- Employee right to access records.

Access to information and training materials

Make copy of standard and appendices available to affected employees.
Provide all Communicate lead hazard information and training to employees per Hazard Communication Standard.

Signs

Post clear legible warning signs with the following information at entrances to areas where lead exposure exceeds 50 ug/m3.

Warning
Lead Work Area
Poison
No Smoking or Eating

Illuminate and clean signs as necessary so readily visible.

Recordkeeping

Maintain the following records as required by OSHA:
Exposure assessment.
Exposure assessment monitoring.
Objective data for exemption from initial monitoring requirement.
Information demonstrating lead not released at or above 30 ug/m3 under any expected use.

Maintain records until no longer needed but at least 30 years.
Written documentation of respirator program and fit tests must be kept.
Medical surveillance.
Medical removals.
Availability of records.
Make available to employees, former employees, employee representatives, and OSHA.
Transfer records to successor employers and to OSHA if no successor employer.
Notify OSHA 3 months before disposal of records.
Comply with requirements of 29 CFR 1910.20(h).

Observation of monitoring

Provide affected employees or designated representatives opportunity to observe lead monitoring.
Observer can enter regulated area if required provided he/she complies with safety and health procedures uses appropriate ppe provided by employer.
Without interfering with monitoring observer can:
- Receive explanation of measurement procedures.
- Observe all steps related to monitoring.
- Record or receive copy of laboratory results.

Use these procedures when employee exposure assessment shows average airborne lead level exceeds the PEL, with levels between 2,500 ug/m3 and 50,000 ug/m3 for the work day; or for the following operations when no initial exposure assessment has been performed: welding; abrasive blasting; cutting or torch burning.

Exposure Assessment

Notify all affected employees of air monitoring results within 5 days of receiving them.
Include a statement that exposure was above 50 ug/m3 (PEL) and describe corrective action to reduce exposure to below that level.
Re-monitoring is required every 3 months or if conditions change such that lead exposure levels may increase.
May discontinue monitoring if 2 consecutive tests 7 or more days apart are below 30 ug/m3.
Must re-monitor after discontinuing if changes may result in higher employee exposure levels.

Methods of Compliance

Implement all feasible engineering and work practice controls to reduce and maintain exposure at or below 50 ug/m3. If exposure not below 50 ug/m3 with controls, supplement with respirators.
Establish a written program that is revised and updated every 6 months and includes necessary elements per OSHA regulations.
Maintain mechanical ventilation as necessary.
If used, establish and implement administrative controls including assessing their reliability.
Ensure good work practices from OSHA 29 CFR1926.62 Appendix B are followed.

Respiratory Protection

Provide all potentially exposed workers a NIOSH approved respirator effective against lead offering a respiratory protection factor of 1,000 or higher at no cost to the employee.
Perform medical surveillance on each respirator user.
Ensure respirator fits properly and has minimum leakage.
Perform initial and annual fit tests for tight fitting respirators following 29 CFR 1926.62 Appendix D.
Have respirator program per 29 CFR 1910.134.

Protective Clothing and Equipment

Provide at no cost and require use of:
- Coveralls or similar fully-body work clothing.
- Gloves, hats, and shoes or disposable shoe coverlets.
- Face shields, vented goggles, and other appropriate equipment per 1910.133.
- Provide clean protective clothing daily.
- Provide for cleaning, laundering, or disposal of PPE.
- Repair or replace PPE to maintain effectiveness.
- Employees remove work clothing at end of shift in change areas provided.
- Contaminated clothing into closed container for cleaning, or disposal.
- Inform laundry of potential harmful effects of lead exposure.
- Containers of contaminated clothing and equipment are properly labeled.
- Prohibit lead removal from PPE by blowing, shaking, or any method that disperses it into the air.

Housekeeping

Keep all surfaces as free of lead as possible using methods that minimize airborne lead.
Shoveling, dry or wet sweeping, and brushing can only be used if vacuuming and other effective methods were tried and found not effective.
Use vacuums with HEPA filters, and use and empty in a manner to minimize reentry of lead.
No compressed air to remove lead except with an adequate ventilation system to collect the dust.

Hygiene Facilities and Practices

No food, beverage, tobacco, or cosmetics allowed or used in areas above 50 ug/m3.

Clean change areas with separate storage of work and street clothes to prevent contamination required for employees. Assure employees do not leave workplace wearing clothing or equipment required during the work shift.
Provide showers where feasible, have workers shower at end of work shift, provide towels and cleaners.

Eating facilities

Provide readily accessible lunchroom or eating areas as free of lead contamination as feasible.
Make sure workers wash hands and face prior to eating, drinking, smoking or applying cosmetics.
Workers do not enter lunchroom or eating areas wearing PPE unless surface lead dust was removed.

Hand washing facilities

Provide adequate hand washing facilities for exposed employees.
Where no showers are present, ensure employees wash hands and face at end of shift.

Medical surveillance

Make initial medical surveillance available to exposed employees.
Provide employee results of biological monitoring within 5 days of receipt.
Notify employee with a blood lead exceeding 40 ug/m3 of temporary medical removal.
Other issues to be determined with medical provider include medical exams and consultations, possible use of chelating agents, and medical removal protection.
Medical evaluation for respirator use.

Employee information and training

Communicate lead hazard information and training to employees per Hazard Communication Standard, including warning signs, labels, MSDS, and information and training. Also provide initial and annual training on the following:

- Content of lead standard and appendices.
- Specific nature of operations that can cause exposure to lead above action level.
- Elements of respirator program and purpose, proper selection, fitting, use, and limits of respirators.
- Medical surveillance program, medical removal protection program including adverse health effects of excessive lead exposure (reproductive effects, fetus hazards, and pregnancy precautions).
- Engineering and work practice controls associated with job assignment including relevant good work practices in OSHA 29 CFR 1926.62 Appendix B.
- Contents of any compliance plan in effect.
- Instruction that chelating agents should not be used routinely and only under doctor direction.
- Employee right to access records.

Access to information and training materials

Make copy of standard and appendices available to affected employees.
Provide all Communicate lead hazard information and training to employees per Hazard Communication Standard.

Signs

Post clear legible warning signs with the following information at entrances to areas where lead exposure exceeds 50 ug/m3.

Warning
Lead Work Area
Poison
No Smoking or Eating

Illuminate and clean signs as necessary so readily visible.

Recordkeeping

Maintain the following records as required by OSHA:

- Exposure assessment.
- Exposure assessment monitoring.
- Maintain records until no longer needed but at least 30 years.
- Written documentation of respirator program and fit tests must be kept.
- Medical surveillance.
- Medical removals.
- Availability of records.

Make available to employees, former employees, employee representatives, and OSHA.
Transfer records to successor employers and to OSHA if no successor employer.
Notify OSHA 3 months before disposal of records.
Comply with requirements of 29 CFR 1910.20(h).

Observation of Monitoring

Provide affected employees or designated representatives opportunity to observe lead monitoring.
Observer can enter regulated area if required provided he/she complies with safety and health procedures and uses the appropriate PPE provided by employer.
Without interfering with monitoring observer can:
- Receive explanation of measurement procedures.
- Observe all steps related to monitoring.
- Record or receive copy of laboratory results.

Use these procedures when employee exposure assessment shows average airborne lead level will be over 50,000 ug/m3 for the work day. All alternatives should be explored before working in exposure levels such as these!

Exposure Assessment

All affected employees must be notified of air monitoring results within 5 days of receiving them.
Include a statement that exposure was above 50 ug/m3 (PEL) and describe corrective action to reduce exposure to below that level.
Re-monitoring is required every 3 months or if conditions change such that lead exposure levels may increase.
May discontinue monitoring if 2 consecutive tests 7 or more days apart are below 30 ug/m3.
Must re-monitor after discontinuing if changes may result in higher employee exposure levels.

Methods of Compliance

Implement all feasible engineering and work practice controls to reduce and maintain exposure at or below 50 ug/m3. If exposure not below 50 ug/m3 with controls, supplement with respirators.
Establish a written program that is revised and updated every 6 months and includes necessary elements per OSHA regulations.
Maintain mechanical ventilation as necessary.
If used, establish and implement administrative controls including assessing their reliability.
Ensure good work practices from OSHA 29 CFR1926.62 Appendix B are followed.

Respiratory Protection

Provide all potentially exposed workers a NIOSH approved pressure-demand SCBA respirator at no cost to the employee.
Perform medical surveillance on each respirator user.
Assure respirator fits properly and has minimum leakage.
Perform initial and annual fit tests for tight fitting respirators following 29 CFR 1926.62 Appendix D.
Have respirator program per 29 CFR 1910.134.

Protective Clothing and Equipment

Provide at no cost and require use of:
- Coveralls or similar fully-body work clothing.
- Gloves, hats, and shoes or disposable shoe coverlets.
- Face shields, vented goggles, and other appropriate equipment per 1910.133.
- Provide clean protective clothing daily.
- Provide for cleaning, laundering, or disposal of PPE.
- Repair or replace PPE to maintain effectiveness.
- Employees remove work clothing at end of shift in change areas provided.
- Contaminated clothing into closed container for cleaning, or disposal.
  - Inform laundry of potential harmful effects of lead exposure.
  - Containers of contaminated clothing and equipment are properly labeled.
  - Prohibit lead removal from PPE by blowing, shaking, or any method that disperses it into the air.

Housekeeping

Keep all surfaces as free of lead as possible using methods that minimize airborne lead.
Shoveling, dry or wet sweeping, and brushing can only be used if vacuuming and other effective methods were tried and found not effective.
Use vacuums with HEPA filters, and use and empty in a manner to minimize reentry of lead.
No compressed air to remove lead except with an adequate ventilation system to collect the dust.

Hygiene Facilities and Practices

No food, beverage, tobacco, or cosmetics allowed or used in areas above 50 ug/m3.
Clean change areas with separate storage of work and street clothes to prevent contamination required for employees.

Ensure employees do not leave workplace wearing clothing or equipment required during the work shift.
Provide showers where feasible, have workers shower at end of work shift, provide towels and cleaners.

Eating facilities

Provide readily accessible lunchroom or eating areas as free of lead contamination as feasible.
Make sure workers wash hands and face prior to eating, drinking, smoking or applying cosmetics.
Workers do not enter lunchroom or eating areas wearing PPE unless surface lead dust was removed.

Hand washing facilities

Provide adequate hand washing facilities for exposed employees.
Where no showers are present, ensure employees wash hands and face at end of shift.

Medical surveillance

Make initial medical surveillance available to exposed employees.
Provide employee results of biological monitoring within 5 days of receipt.
Notify employee with a blood lead exceeding 40 ug/m3 of temporary medical removal.
Other issues to be determined with medical provider include medical exams and consultations, possible use of chelating agents, and medical removal protection.
Medical evaluation of respirator use.

Employee information and training

Communicate lead hazard information and training to employees per Hazard Communication Standard, including warning signs, labels, MSDS, and information and training.
Also provide initial and annual training on the following:

- Content of lead standard and appendices.
- Specific nature of operations that can cause exposure to lead above action level.
- Elements of respirator program and purpose, proper selection, fitting, use, and limits of respirators.
- Medical surveillance program, medical removal protection program including adverse health effects of excessive lead exposure (reproductive effects, fetus hazards, and pregnancy precautions).
- Engineering and work practice controls associated with job assignment including relevant good work practices in OSHA 29 CFR 1926.62 Appendix B.
- Contents of any compliance plan in effect.
- Instruction that chelating agents should not be used routinely and only under doctor direction.
- Employee right to access records.

Access to information and training materials

Make copy of standard and appendices available to affected employees.
Provide all lead hazard information and training to employees per Hazard Communication Standard.

Signs

Post clear legible warning signs with the following information at entrances to areas where lead exposure exceeds 50 ug/m3.

Warning
Lead Work Area
Poison
No Smoking or Eating

Illuminate and clean signs as necessary so readily visible.

Recordkeeping

Maintain the following records as required by OSHA:

- Exposure assessment.
- Exposure assessment monitoring.
- Maintain records until no longer needed but at least 30 years.
- Written documentation of respirator program and fit tests must be kept.
- Medical surveillance
- Medical removals.
- Availability of records.
- Make available to employees, former employees, employee representatives, and OSHA.
- Transfer records to successor employers and to OSHA if no successor employer.
- Notify OSHA 3 months before disposal of records.

Comply with requirements of 29 CFR 1910.20(h).

Observation of monitoring

Provide affected employees or designated representatives opportunity to observe lead monitoring.
Observer can enter regulated area if required provided he/she complies with safety and health procedures uses appropriate PPE provided by employer.
Without interfering with monitoring observer can:
- Receive explanation of measurement procedures.
- Observe all steps related to monitoring.
- Record or receive copy of laboratory results.

Use these procedures when work is done specifically for the purpose of reducing lead paint exposure at a pre-1978 day care center, pre-school, or housing units where children under six may live.

All lead based paint activities described as a lead inspection, elevated blood lead inspection, lead hazard screen, risk assessment, visual risk assessment, lead abatement, or clearance testing after lead abatement, must be performed by an individual certified by the State Department of Public Health to conduct that activity.

All lead based paint removal activities will be overseen and performed by personnel with the appropriate certification and licenses. These activities include:

Elevated blood lead inspections - certified elevated blood lead inspector/risk assessor.

Lead inspections - certified lead inspector/risk assessor, or certified elevated blood lead inspector/risk assessor.

Lead hazard screen - certified lead inspector/risk assessor, or certified elevated blood lead inspector/risk assessor.

Risk assessment - certified lead inspector/risk assessor, or certified elevated blood lead inspector/risk assessor.

Lead abatement - certified lead abatement contractor, or certified lead abatement worker.

Visual Risk assessment - certified lead inspector/risk assessor, certified elevated blood lead inspector/risk assessor, or certified visual risk assessor.

Lead abatement clearance testing - certified lead inspector/risk assessor, certified elevated blood lead inspector/risk assessor, or certified visual risk assessor (limited).

Elevated blood lead inspection records - certified elevated blood lead inspection agency.

Occupant Protection Plan - certified lead abatement contractor, certified project designer.

Appendix B: Educational Information on Lead

Procedures for Lead-Containing Materials

Date Revised: 5/7/07

What is Lead?

Materials Suspected of Containing Lead

How does Exposure Occur?

Health Effects

Exposure Limits

Guidelines for Minimizing Exposures

Tasks that Do Not Produce Excessive Exposures

Tasks that May Produce Excessive Exposures

Tasks that Do Produce Excessive Exposures

Medical Considerations

Waste Disposal Guidelines

Information Web Sites

Introduction

Poisoning as a result of overexposure to lead is the oldest recorded occupational disease. The significant health risk posed by too much lead entering the human body has been known and documented for thousands of years. Most lead exposure problems in adults occur from occupational exposures in the construction or manufacturing industries. An especially high health risk from excessive lead exposure exists for pregnant women and young children. Most recently, concerns about lead exposure have focused on the potential danger to young children from lead in and around homes, day care centers, and pre-schools.

What is Lead?

Lead is a soft, dense, inorganic heavy metal that oxidizes in air and is commonly found in the environment in a number of ores. Lead is often combined with other metals to form alloys and other substances to create a variety of compounds. Lead-based paint is paint that contains at least 1 mg/cm2 or 5000ug/g (0.5%) lead by weight.

Items and Materials Containing Lead

Items and materials that are commonly known to contain lead include:

- Any painted surface on the interior or exterior of a building or structure constructed prior to 1978.
- Debris, paint chips, or dusts inside or near the exterior of pre-1978 painted buildings and structures.
- Soil from or next to the exterior of pre-1978 painted buildings and structures.
- Lead pipes, lead based solder or plumbing fixtures in older buildings, and lead lined water coolers.
- Soil near heavily used streets and roads.
- Window glazing.
- Drinking water delivered through piping in older buildings.
- Old toys, imported toys.
- Lead-glazed and/or lead-painted pottery.
- Leaded crystal.
- Sinkers, ammunition, stain glass work.
- Storage batteries.
- Roof flashing.
- Inks.
- In resins as a stabilizer.
- As radioactive protective shielding.
- Telephone and television cable sheathing.

How does Exposure Occur?

Inhalation

Inhalation is the most common source of occupational lead exposure. Lead can become airborne when it is burned or melted to a temperature high enough to release a fume into the air. It is also released into the air when dust from lead painted surfaces is disturbed, or created by abrasion of the paint. Lead dust can also be released from contaminated clothing worn by a worker. Airborne lead dusts or fumes can be inhaled into the lungs and upper respiratory tract, where it is readily absorbed and distributed throughout the body.

Ingestion

Ingestion is the most common source of lead exposure in children. Small children may eat lead paint chips or play in contaminated soil. While adults do not typically eat paint chips, they may handle cigarettes, food, chewing tobacco, or apply make-up that has been contaminated by lead, or use these products with lead-contaminated hands. Lead can also be ingested from water that has been contaminated by lead in water pipes or containers.

Skin absorption

Skin absorption is not normally a lead hazard because inorganic lead is not absorbed through the skin. Skin absorption was a hazard when skin absorbable organic leads (tetraethyl and tetramethyl lead) were used as gasoline additives; their use has been banned by the EPA since 1/1/1996.

Health Effects

The effects of lead normally accumulate over time from a series of exposures. Most lead is absorbed through the lungs or digestive tract and enters the blood stream. While some lead in the blood stream is excreted, the rest remains in the blood and is stored in other tissues. Extended exposure to lead, especially in high doses,

increases the amount stored in the body. When too much lead has entered the body, visible effects and symptoms begin to appear. Lead poisoning is normally treatable, though some of the effects can be permanent when exposure levels have been excessive for long periods of time. Children under the age of six and fetuses exposed through lead in the mother's blood are most susceptible to lead poisoning. Lead poisoning has been linked to anemia, central nervous system disorders, kidney and immune system damage, reproductive disorders, and learning disabilities.

In both adults and children, the signs and symptoms of lead poisoning are often confused with those of other common illnesses and misdiagnoses can easily occur. Because symptoms do not usually develop until the condition has become very serious, someone with lead poisoning may appear to be healthy.

Common signs and symptoms of lead poisoning include headaches, joint pain, fatigue, muscle ache, clumsiness, nervousness, a poor appetite, metallic taste in mouth, irritability, sleeplessness, abdominal pain, and constipation. Adults may also have impotency, decreased fertility or miscarriages. Children may also have behavioral problems and learning disabilities. Symptoms of severe poisoning may include nausea/vomiting, loss of balance, stupor, seizures, coma, and blue tints to gums and skin under fingernails.

Exposure Limit Information

Lead is a recognized health hazard. Consequently, exposure limits have been developed to protect people from excessive exposure. Lead exposure limits that are either regulated or recommended by government agencies include:

- OSHA (Occupational Safety and Health Administration) – sets regulatory limits for workplace daily airborne exposure to lead and the levels permissible in the bloodstream of workers with occupational contact with lead. The current lead exposure limits for workplace air are 50 mg/cm3, with an action level of 30 mg/m3. The current blood lead limits are 40ug/dl. The regulations are enforced by the Iowa Occupational Safety and Health (IOSH) Enforcement in the Labor Services Division of Iowa Workforce Development.

- EPA (Environmental Protection Agency) – sets regulatory limits for the amount of lead contained in paint, dust, and soil in and on the grounds of pre-1978 housing and child occupied facilities. The current exposure limits are: 40 ug/ft2 for floor dust; 250 ug/ft2 for interior windowsill dust; 400 ug/ft2 for bare soil in play areas; and 1,200 ug/ft2 for bare soil in non-play areas. These regulations are enforced by the Iowa Department of Public Health.

- EPA – has a regulatory limit for lead levels in ambient air to remain at or below 1.5 ug/m3 as averaged over a 3 month sample period. This regulation is enforced by the Iowa Department of Natural Resources.

- EPA – recommends a maximum concentration of lead in drinking water of 15 ug/L of water. This regulation is enforced by the Iowa Department of Natural Resources.

- CDC (The Centers for Disease Control and Prevention) - recommend all children be screened for blood lead levels once per year, especially between the ages of 6 months and 6 years. Children with blood levels at or in excess of 10 ug/l should be included in a childhood lead prevention program. These recommendations are supported through the Iowa Department of Public Health.

Guidelines for Minimizing Lead Exposure

- Employers need to be aware of materials in their workspaces that contain, or are suspected of containing, lead

- Employers must assume that all materials suspected of containing lead do contain lead unless proper testing proves otherwise. Determining the concentration of lead in materials is done by analysis of samples taken by trained professionals using appropriate and approved sampling methods. Lead swab testing (sodium rhodonzonate) is not an approved method to test for either the presence or concentration of lead in materials.

- Employees who perform activities that could potentially disturb materials containing or suspected of containing lead, must receive specialized training. Employers are responsible for training their employees on the health effects of lead exposure, and the types and locations of lead-containing materials in their workplace.

- Employees must be trained to not disturb materials containing or suspected of containing lead, or be made aware of tasks that do and do not create significant lead exposure. Employers must also provide their employees with equipment necessary to perform the tasks safely and comply with federal and state regulations pertaining to lead.

- Employers not familiar with regulatory requirements should obtain guidance when planning renovation, remodeling, or demolition work that could involve disturbing materials suspected of containing lead. Requirements include specific procedures, training, and licenses.

Tasks that Do Not Produce Excessive Exposures

These tasks are normally considered as not producing excessive exposure to lead. This is not a complete list of tasks that do not produce excessive exposure to lead. It does not exclude the possibility that a task on the list could be performed in a way that could produce excessive exposure to lead.

Tasks generally not requiring precautions and/or protective measures for lead exposure include:

- Removal of nails, screws, picture hangers, or other fasteners, etc., from a painted wall surface.
- Removal of cover plates, switch covers, etc., from a painted surface.
- Removal of hinge pins or painted door hinges.
- Removal of lock hardware, closers, or other hardware accessories from a painted door.
- Wet sanding drywall compound or spackle using a sponge.
- Separating and removing anything attached to a painted baseboard.
- Planing painted wood with manual tools.
- Drilling or preparing a painted door from installation of new door hardware (lock set, closers, kicker plate etc.).
- Re-nailing or refastening loose building trims, moldings or panels.
- Re-glazing of window glass.
- Removal of painted phone line or electrical wire.
- Freeing an inoperable window.
- Housekeeping, including emptying trash, vacuuming carpets, dust mopping hallways, cleaning water fountains, buffing floors, and disinfecting bathrooms.
- Maintenance, including replacing air filters, replacing toilet flush valve, replacing light bulbs, checking and repairing shower valves, unclogging a shower drain using a “snake,” mechanical repair of an air-conditioning unit, and repairing a shower leak.
- Carpentry activities, including removing wooden windows to measure to make screens, sweeping out the carpentry shop, planing the edge of a door and re-installing the hinges, re-hanging the door, removing outside entrance door, removing the kick plate, and removing the screws.
- Carpentry activities, including removing door hinges and lockset and replacing.
- Carpentry activities, including sanding floor with “stand-behind” power disc sander, scraping floor near corner, cleanup of debris, and placing debris in container.
- Carpentry activities, including wet hand scraping and wet sanding a column.
- Carpentry activities, including removing painted baseboards, cutting and pulling up wall-to-wall carpeting, scraping walls near baseboard, scraping carpet adhesive residue from floor, and sweeping floor.
- Carpentry activities, including removing window casing and painted molding, removing the window sash, heating the glazing, scraping and removing the softened glazing, re-installing the sash, re-hanging the window, and installing the wooden molding.
- Removing old plaster and re-plastering, manually sanding new plaster.
- Maintenance activities, including wet scraping of window and door.
- Plumbing activities, including manually removing old lead and oakum from around shower drains, heating lead in an open ladle using a propane torch, pouring the molten lead from the ladle into the cavity surrounding the drain, rapidly cooling the unused hot lead using cooling water from a sink faucet.
- Chipping and sanding plaster.
- Painter activities, including spreading plastic material around the hot-water radiator and wet scraping old paint from hot-water radiator, folding up the plastic on the floor, broom sweeping the floor.

Tasks that May Produce Excessive Exposure

These tasks are normally considered as capable of producing excessive exposure to lead. This is not a complete list of all tasks capable of producing excessive exposure to lead. It is possible that a task on the list could be performed in a way that would not produce excessive exposure to lead.

Tasks that may require precautions and/or protective measures for lead exposure include:

- Cleaning damaged or deteriorated lead based paint surfaces.
- Removing lead based paint chips and debris.
- Removing small areas of lead based paint.
- Wet sanding of lead based paint.
- Penetrating lead based paint.
- Removing components from lead based paint surfaces.
- Attaching to a lead based paint surface.
- Applying coatings to lead based paint surfaces.
- Installing materials over lead based paint surfaces.
- Enclosing a lead based paint surface.
- Exposing Lead Based Paint contaminated cavities.
- Lead based paint door and window maintenance.
- Changing filters and waste bags in lead based paint contaminated HEPA vacuums.
- Cleaning lead dust contaminated carpet.
- Landscaping in soil containing elevated levels of lead based paint.

Tasks that Do Produce Excessive Exposure

These tasks normally produce excessive exposure to lead. This is not a complete list of all tasks producing excessive exposure to lead.

Tasks that require precautions and/or protective measures for lead exposure include:

- Welding, cutting, or torch burning and related activities on lead containing materials.
- Abrasive blasting and related activities on lead containing materials.
- Dry sanding, scraping, or demolition and related activities on lead containing materials.
- Heat gun or burning removal of lead based paint from surfaces.
- Spray painting with lead based paint.

Medical Considerations

Surveillance

In accordance with OSHA standards, any employee who performs construction work and is occupationally exposed on any day to an average airborne lead level of 30 ug/m3 or higher, shall have initial medical surveillance. Employees occupationally exposed to an average daily airborne lead level at or above 30 ug/m3 for more than 30 days in any consecutive 12 months, will be offered scheduled lead medical surveillance per OSHA regulations. Also, initial medical surveillance will be done on any employee if the attending physician has reason to suspect may have been exposed to high levels of lead. The University Employee Health Clinic provides medical surveillance.

Medical Consultation

A medical examination shall be provided annually for any employee who has had a blood-lead level of 40 ug/dl or greater, or has been medically removed in the past 12 months. A medical exam shall also be provided to any employee in a lead medical surveillance program, for any of the following circumstances:

Employee experiences symptoms consistent with lead intoxication.
Employee needs consultation concerning the potential effects of past lead exposure or on the ability to procreate or carry a healthy child.
Employee has difficulty breathing during fit-testing or use of a respirator.

Chelation

Prophylactic chelation may only be performed by a licensed physician and conducted in a clinical setting with thorough and appropriate medical monitoring. The employee must be notified in writing by the UIHC Workers Health Clinic prior to performing chelation. (External physicians planning on performing chelation must first notify the employee and the Workers Health Clinic).

Medical Removal Protection

Any employee who has a blood lead level of 50 ug/dl or more shall be excluded from work that has potential

for lead exposure until the employee has had two (2) consecutive blood samples at or below 40 ug/dl.

Any employee may also be excluded from lead-related work when results of a medical consultation determine that the employee's health may be at risk of impairment from exposure to lead. The medically removed employee may return to former duties upon receipt of a written opinion from the consulting physician that the conditions placing the employee at increased risk are no longer present or of material concern.

Waste Disposal Guidelines

EPA standards determine whether the waste must be managed and disposed of as hazardous or nonhazardous waste. Waste containing lead must be managed and disposed of as hazardous waste unless the laboratory EPA TCLP test characterized the waste as containing less than 5 mg/l of lead.

Information Web Sites

Additional information about lead hazards is available from the following web sites:

Department of Housing and Urban Development (http://www.hud.gov/offices/lead.html)
Environmental Health Center (http://www.nsc.org/resources/issues/lead.aspx)
Environmental Protection Agency (http://www.epa.gov/opptintr/lead/index.html)