

<b>Lead Abatement</b>	S.O.P. 8C		Page 1 of 21
	11/02	Rev. 3	
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STANDARD OPERATING PROCEDURE			

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### **I. SCOPE AND PURPOSE**

- A. All employees involved in Lead Abatement regardless of exposure levels must receive initial and periodic annual training that includes:
  - 1. The content of 29 CFR 1926.62 and its appendices, including health effects of lead exposure, as well as 29 CFR 1926.59 Hazard Communications and 29 CFR 1926.21 Recognition and Avoidance of Unsafe Acts or Unsafe Conditions applicable to the Work Environment.
  - 2. The nature of operations that result in lead exposure, including job specific task that may result in exposure to lead.
  - 3. Employer’s Respiratory Protection Program, Personal Protective Equipment, and Decontamination requirements, including hands on training.
  - 4. Employer’s Medical Surveillance including responsibilities.
  - 5. Engineering controls to limit personnel exposure, including work practices.
  - 6. Employer’s compliance program for Lead Abatement Work.
  - 7. Instructions to employees that chelating agents should not routinely be used to remove lead from their bodies and should not be used at all except under the direction of a licensed physician.
  - 8. Employees right to access of records per 29 CFR 1910.20.
- B. Currently there exists no approval/recognition of training courses for Lead Abatement, worker or supervisor. The Environmental Protection Agency is preparing a “Model Accreditation Plan” that will create the curriculum and approval mechanism for such courses. During the interim individuals experienced in similar industrial skill training will administer the above training in-house.

## **II. RELATED PROCEDURES AND RESOURCES**

- A. S.O.P. 2C, Project Hazard Control Procedures
- B. S.O.P. 3G, Personal Protective Equipment
- C. S.O.P. 5F, Respiratory Protection
- D. S.O.P. 5G, Hazard Communication
- E. S.O.P. 7A, Abrasive Blasting
- F. S.O.P. 8A, Asbestos Abatement
- G. Environmental Policy Statement
- H. CFR 1910.134, Respiratory Protection
- I. CFR 1910.1200, Hazard Communication
- J. CFR 1926.62, Lead
- K. CFR 1926.1101, Asbestos
- L. Respiratory protection Field Training Module
- M. Hazard Communication Field Training Module
- N. Personal Protective Equipment Field Training Module
- O. Asbestos and Lead Awareness Field Training Module

## **III. DEFINITIONS**

- A. **Action Level** - means employee exposure, without regard to the use of respirators, to an airborne concentration of lead of 30 micrograms per cubic meter of air ( $30\mu\text{g}/\text{m}^3$ ) calculated as an 8-hour time-weighted average (TWA).
- B. **Authorized Person** - means any person authorized by the employer and required by work duties to be present in regulated areas.
- C. **Competent person** - means one who is capable of identifying existing and predictable lead hazards in the surroundings or working conditions and who has the authority to take prompt corrective measures to eliminate them. The duties of the competent person include at least the following:
  - 1. Establishing a regulated area.
  - 2. Ensuring the regulated area's integrity.
  - 3. Controlling entry to and exit from the regulated area.
  - 4. Supervising any employee exposure monitoring required by the standard.
  - 5. Ensuring that all employees working within such regulated area wear the proper personal protective equipment.
  - 6. Ensuring that all employees are trained in the use of appropriate methods of exposure control.
  - 7. Ensuring that all employees are trained in the use of hygiene facilities and decontamination procedures specified in the standard.
  - 8. Ensuring that engineering controls in use are in proper operating condition and are functioning properly.
- D. **High-efficiency particulate air (HEPA) filter** - means a filter capable of trapping and retaining at least 99.97 percent of all mono-dispersed particles of 0.3 micrometers in diameter.

- E. **Lead** - means metallic lead, all inorganic lead compounds and organic lead soaps.
- F. **LCM (Lead Containing Material)** - means
  1. Any surfacing material found through testing to contain more than .5 percent by weight or 5000 PPM lead.
  2. Any materials used or waste generated through the removal process that has been contaminated with lead.
- G. **Permissible Exposure Limit (PEL)** - means:
  1. The employer shall assure that no employee is exposed to lead at concentrations greater than fifty micrograms per cubic meter of air ( $50\mu\text{g}/\text{m}^3$ ) averaged over an 8-hour period.
  2. If an employee is exposed to lead for more than 8 hours in any work day, the employee's allowable exposure, as a time weighted average (TWA) for that day, shall be reduced according to the following formula:
    - a. Allowable employee exposure in  $\mu\text{g}/\text{m}^3 = 400$  divided by hours worked in the day.
    - b. For example, 400 divided by 12 hours worked, equals  $33.33\mu\text{g}/\text{m}^3$  allowable employee exposure for that day.
- H. **Regulated area** - is established to demarcate an area where Lead work is conducted, and any adjoining area where debris and waste from such work is accumulated. OSHA approved danger signs will demarcate a regulated area. Only authorized personnel wearing proper protective equipment will be allowed access to this area.

#### IV. **PERSONNEL RESPONSIBILITY**

- A. **Supervisor**
  1. It is the responsibility of the supervisor to know the requirements of this procedure.
  2. No employee shall enter or be directed to enter a regulated area where lead abatement is actively taking place unless:
    - a. A written plan has been established, medical monitoring instituted, specific training of personnel has been conducted and successfully completed by all effected employees.
- B. **Employee**
  1. It is the responsibility of the employee to report to their supervisor any suspected exposure to lead in the workplace.
  2. It is the responsibility of the employee to follow the requirements of this procedure.

#### V. **ABATEMENT PROCEDURES**

- A. **Protective Clothing**
  1. All lead abatement employees will be provided with and required to wear

full-length disposable coveralls, or full-length washable coveralls and foot-coverings or boots. As much as possible, wrists, ankles, and other openings of the protective clothing, shall be taped to prevent the intrusion of lead contaminated materials. NIOSH/MSHA approved respirators are provided and required to be worn. As a minimum, half-face dual cartridge respirators equipped with HEPA filters must be worn. Safety glasses or goggles, work gloves and hard hats are required during all phases of lead abatement work.

2. Under special circumstances where the use of disposable coveralls is not practical, washable coveralls may be worn instead. Employees will use the same as disposable coveralls. Washable coveralls will be put on in the clean room, before going to work, and taken off in the dirty room of the decon at breaks and end of shift. Contaminated suits will be collected in an impermeable bag and laundered at regular intervals. The company will provide proper laundering service and replacement of these coveralls at no cost to the employee.
3. The company will provide protective clothing at no cost to the employee.

**B. Lead Abatement Containment Area and/or Enclosure**

1. During all lead removal projects larger than “small scale, short duration”, it is the policy of the Company to build enclosures whenever feasible. When determining the feasibility of enclosures the company will consult with the client’s Industrial Hygiene and/or Safety official, because of their familiarity with plant process. Factors that will also affect the decision to construct an enclosure include, proximity to other people, the nature of the abatement, materials to be abated, methods used, and the engineering to prevent any possible bystander exposure at or above OSHA’s Action Level of  $30\mu\text{g}/\text{m}^3$ .
2. Procedures and provisions for water run-off and collection, with appropriate TCLP testing prior to discharge to sewer, must be submitted for approval by owner.
3. It will be the supervisor’s responsibility to maintain the integrity of the regulated work area throughout the duration of the removal and decontamination work.
4. A designated fire extinguisher will be available at the containment area as approved by the owner.
5. Procedures will be developed for evacuation of injured workers and approved by owner prior to start of work.
6. All entrances to the containment area will be posted with an OSHA approved caution signs describing the nature of the lead hazard.

**C. Controlled Access of Lead Work Area**

1. With the exception of the contractor, his employees and the owner’s designated representatives, no one may enter a controlled lead work area without written authority from the owner. No one is permitted in the controlled lead work area without proper protective clothing

and respiratory protection, which is supplied by their employers. All

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personnel must follow procedures.

2. The competent person of all individuals entering the controlled lead work area will keep personnel logs, Attachment Form 8A.1f, Regulated Area Entry/Exit Log. This log will be kept for the duration of the job. At the completion of the job the logs shall be submitted to the Project Manager along with all monitoring results for the thirty-year retention period.

**D. Methods of Lead Removal**

1. The number of possible lead containing materials (LCM) that could be the object of the Company's abatement activities is too numerous to list. However, we anticipate a majority of our abatement operations will involve the removal of lead based paint or other coating materials from piping and equipment found in a typical industrial setting.
2. Various factors will dictate the Company's decisions surrounding crew size and crew member responsibilities, abatement techniques, work area preparation, confinement, and engineering controls used to keep employee exposures below OSHA's PEL. Typically, piping and equipment operating schedules or temperatures, plant operations, maintenance activity and volatile or hazardous environments impact work conducted in an industrial environment. These types of situations will force us to conduct abatement procedures differently in similar situations.

**E. Abatement Method Options**

1. Based on the aforementioned variables, the Project Manager and/or supervisors will choose from the following abatement methods (listed in order of preference)
  - a. Removal of piping/equipment with LCM intact and undisturbed with disposal as a unit.
  - b. Heat gun "bubbling" and scraping.
  - c. HEPA vacuum controlled needle-gun removal.
  - d. Manual scraping/sanding.
  - e. Mechanical scraping/sanding.
  - f. Wet and/or Dry blasting.

**F. Engineering, Control Methods**

1. In conjunction with the abatement methods listed above, engineering control options that can be used to control employee exposure to below the OSHA PEL include (listed in order of preference):
  - a. Full enclosure with HEPA filtration
  - b. Local ventilation with HEPA filtration.
  - c. Localized containment (mini-enclosure, etc.)
  - d. Wet method removal.

**G. Administrative Control Methods**

1. When the scope of work allows, lead abatement workers will be rotated to minimize potential exposure times. The competent person for the job will

effectively minimize exposures. Specific tasks should be defined before the project begins to aid in exposure monitoring of worst-case scenario tasks. Employees shall therefore, be rotated accordingly.

2. These engineering and administrative controls and abatement methods will be used to reduce employee exposure to as low a level as possible. Respiratory protection will be used at all times during the LCM abatement process. Air monitoring (both initial and periodic) will be conducted to insure the respiratory protection provided employee's is sufficient to prevent exposure above the PEL.
3. Once removal has begun in a regulated area, the area will continue to be regulated until completion.
4. Removal will be done using approved procedures. Lead containing materials must be handled carefully to avoid creating dust unnecessarily.
5. All debris must be cleaned up periodically and loaded in designated containers. Workers removing bagged or drummed waste from containment area will wear the full protective clothing.

**H. Personnel Decontamination/Hygiene Facilities**

1. All company employees involved in lead abatement are required to completely decontaminate after each work period (before breaks, lunch, and quitting time).
2. OSHA mandated decontamination facilities shall be centrally located. Employees leaving lead regulated areas will proceed as follows:
  - a. One of the following scenarios will apply:
    - i. Employees will wear two disposable coveralls while working.
    - ii. Employees will wear one disposable coverall while working and use the second coverall while traveling to the decontamination facility.
  - b. Before leaving the regulated area, employees' will HEPA vacuum or otherwise remove as much visible gross contamination as possible.
  - c. Before leaving the restricted areas, employees will:
    - i. Remove and bag outer suit (if double suited).
    - ii. Don second suit (if single suited).
  - d. Depending on the distance from the decontamination facilities, workers will proceed through the equipment room where they will remove protective clothing, except for their respirator. From here, they will enter the shower room of the decontamination unit. Once inside the shower, they will completely rinse themselves and the respirator prior to removing it. (If the respirator is a dual cartridge type, they will soak the HEPA filter cartridges.) From here they will enter the clean room, change, and then dry and clean the respirator. All clothing, towels, etc., will be treated as lead waste.

- e. In lieu of full-decontamination as specified above, remote-partial decontamination may be conducted **only** when exposure levels can be maintained below the Action Level of  $30\mu\text{g}/\text{m}^3$ . Two disposable coveralls will be worn. The outer protective clothing will be HEPA vacuumed before leaving the regulated area then removed and treated as lead waste. Employees' will then proceed to the wash area to wash hands, face, etc., prior to removal of respiratory protection. Respirators will then be removed; their filters removed and discarded as lead waste.

**I. Lead Waste Disposal**

- 1. All lead removed will be collected in appropriate containers. Disposal of the lead containing waste will be the customer's responsibility, unless other contractual arrangements have been made.

**J. Housekeeping/Work Area Cleaning**

- 1. Housekeeping will be an ongoing integral part of lead abatement activities. Areas will be cleaned as lead is removed so that debris does not accumulate.
- 2. After all abatement and gross cleaning has been completed, final cleaning will begin. Clean cloths, mops, etc., will be used in conjunction with a high-phosphate solution in water to wipe/mop all surfaces in the work area. This will be repeated until all visible dust has been cleaned.
- 3. After final cleaning is complete, wipe samples representing (1) one square foot of surface area will be collected and analyzed by a third party laboratory. A clearance level of  $500\mu\text{g}$  per square foot of irregular surfaces will be the final clearance criteria for the surfaces where lead-containing coating is removed. Where Lead Abatement is conducted on a solid surface floor, an additional wipe sample will be collected from the floor to determine a clearance level of  $200\mu\text{g}$  per square foot or less. As directed by local, state, federal or client specific requirements other wipe and/or air testing may be conducted to determine successful project cleaning before the work area is returned for re-occupancy. Final clearance and other monitoring requirements are outlined in the Environmental/Air Monitoring section.

**K. Emergency Procedures**

- 1. Injuries
  - a. In the event of an injury occurring within a regulated area, immediate top-priority attention shall be given to the injured individual(s).
  - b. Lead regulated areas, enclosures, decontamination units, etc., will be altered or dismantled to whatever extent necessary to provide prompt, safe first aid attention for the injured individual(s).
  - c. Altered or dismantled abatement structures will be re-constructed and necessary decontamination of people and equipment will be conducted as soon as the situation has stabilized and the injured person/s have been tended to by the first aid provider or designated

- plant emergency response personnel.
- d. All plant emergency personnel should be briefed by the Customer Industrial Hygienist or Safety Department on the appropriate procedures to be used when responding to an emergency within a regulated area including: Health Effects, PPE, Decontamination, etc. Persons required to enter the lead regulated area should remain in the area no longer than, necessary. After leaving the area clothing should be removed and bagged for disposal or laundering. All persons should, if possible, shower completely with special attention given to cleaning their hair and exposed skin areas.
2. Fire
    - a. In the event of a fire, the Company's employees are instructed to react as required by plant policy. If a fire breaks-out while employees are inside abatement-regulated areas, precedence will be given to following plant policy.
    - b. Abatement enclosures, decontamination units, etc., will be altered or dismantled to whatever extent necessary to allow immediate escape to safety. Altered or dismantled abatement structures will be re-constructed and necessary decontamination of people and equipment will be conducted as soon as the fire has been extinguished and the Supervisor has received the all-clear signal.

## **VI. ENVIRONMENTAL/AIR MONITORING PROCEDURES**

**NOTE: Unless otherwise specified, the Company will utilize a third party Industrial Hygienist for all environmental monitoring. The following are general environmental monitoring guidelines.**

- A. Frequency
  1. Initial Air Monitoring
    - a. Personal air monitoring will be conducted at the initiation of each lead abatement project to determine employee exposures.

Additional monitoring will be required any time a significant change in the abatement process (e.g., personnel, abatement method, engineering controls, work area environment, type of material abated, etc.) occurs.
  2. Periodic Monitoring
    - a. Personal air monitoring may be repeated daily or weekly to document that prevailing lead concentrations are consistent with levels established during initial monitoring. If periodic monitoring reveals exposure levels that exceed the permissible levels for the protection factor (PF) provided by the respirator in use, necessary adjustments in respiratory protection shall be made immediately.

B. Air Monitoring Procedures

1. Purpose

- a. The Occupational Safety and Health Administration (OSHA) has established as its Lead Permissible Exposure Level (PEL) at  $50\mu\text{g}/\text{m}^3$ . Air monitoring is required by OSHA in accordance with 29 CFR 1926.62 so as to continually insure that worker exposure to lead does not exceed the PEL.
- b. Initial and periodic monitoring is conducted on each lead work area to insure that the work practices and engineering control methods and personal protective equipment are proper and adequate to comply with the Standard's requirements and to protect the Company's workers from the harmful effects of lead.
- c. Will protect workers as if the exposures for the respective job tasks, listed below, are present until actual exposure measurements can be obtained.
- d. For lead containing coatings (either application or removal) exposure should be anticipated at greater than the  $50\mu\text{g}/\text{m}^3$  but less than  $500\mu\text{g}/\text{m}^3$  (10 times the PEL) if the following operations are conducted:
  - i. Manual demolition of structures (e.g. drywall).
  - ii. Manual scraping or sanding.
  - iii. Heat gun applications.
  - iv. Power-tool cleaning with dust collection.
- e. For the use of lead containing mortar or the burning of lead, or if lead containing coatings or paint are disturbed as follows, exposure should be anticipated at greater than  $500\mu\text{g}/\text{m}^3$  if the following operations are conducted:
  - i. Rivet busting.
  - ii. Power tool cleaning without dust collection.
  - iii. Clean-up using dry expendable abrasive.
  - iv. Abrasive blasting enclosure movement and removal.
- f. For lead containing coating or paint disturbed as follows, exposure should be anticipated at greater than 50 times the  $50\mu\text{g}/\text{m}^3$  ( $2,500\mu\text{g}/\text{m}^3$ ):
  - i. Abrasive blasting
  - ii. Welding
  - iii. Cutting
  - iv. Torch burning
- g. Other respirators with superior protection factors that could be used in any of the interim periods listed include:
  - i. Full face supplied air in pressure demand (PF = 2,000)
  - ii. CE abrasive blasting respirators in positive pressure mode (PF = 2,000)
  - iii. Full-face self-contained breathing apparatus in positive or pressure demand mode (PF = Greater than 2,000)

2. Definitions
  - a. **Air Monitoring** - The process of collecting samples of air and analyzing them to determine the amount of lead present. The goal of air monitoring is to determine the average amount of lead present per cubic meter of air.
  - b. **Personal Samples** - Air samples collected from the breathing zone of a person; used to determine actual worker exposure.
  - c. **Area Samples** - Air samples collected outside the lead work area to document those areas beyond the work area are not contaminated by lead.
  - d. **Air Monitoring Cassette** - Air is drawn through the cassette and dust particles are trapped on a filter within the cassette.
3. The Equipment Used For Air Monitoring
  - a. **Low-volume, battery powered, portable personnel pumps** with a calibrated flow of at least 2.0 liters per minute and a self containing power pack capable of sustaining this calibrated flow for at least 75% of full shift exposure. This pump unit will also be equipped with an automatic flow control unit, which will maintain a 2.0-liter per minute flow even as filter resistance increases due to trapped debris.
  - b. **High-volume, portable, battery powered pumps** will be used for area samples.
  - c. **Portable flow calibrator.** (Rot meter or Gilibrator calibrators)
  - d. **Air monitoring cassette.** (27 mm, 0.8. micron mixed cellulose ester filter membrane).
4. Type of Air Sampling
  - a. **Personnel Samples** - For the purpose of determining employee exposure, protection needs and for compliance determinations, samples must be collected outside respirators, including abrasive blasting hoods. The cassette is pinned, clamped, or taped to the forward part of the shoulder in the breathing zone of the worker. The pump's airflow is calibrated between 0.5 liters per minute and 2.5 liters per minute. Sampling will represent full shift exposure for workers in each lead work area.
  - b. **Area Samples** - Either high-volume or low-volume pumps may be used. The pump will remain stationary for the duration of the sample. Sample duration can be for any length, however longer durations are preferable. Sampling volume can be up to 10 liters per minute.
5. Sampling and Analytical Procedure
  - a. Cassettes for personal samples must be 37 mm in diameter. Area and dust sample cassettes can be of any size, shape or composition. All cassettes must contain 0.8 micron mixed cellulose ester filter membrane designed as suitable for lead.

- b. Pumps are to be calibrated before and after each sample to accurately calculate the total volume of air sampled. Calibrations are to be recorded on the calibration form and submitted to the Project Manager with other documentation for archives and kept for thirty-years. Samples must be voided if the pre- and post-calibrations differ by more than ten (10%) percent.
  - c. Personal samples are to be collected on a minimum of twenty-five (25 %) of the workers in each work area using the worst case scenario and will be collected at all times that removal is being conducted.
  - d. At least one area sample will be collected outside the lead work area whenever removal is being conducted.
  - e. All sample cassettes are to be capped and labeled to identify the sample number, date of collection, duration, and person or area sampled. An air sample transmittal form will be used to serve as a chain of custody for the Samples. Samples will be submitted on a daily basis for analysis.
6. Record Keeping-Records will be maintained on all air monitoring and analysis. The third party Hygienist will provide these data sheets. Sampling data sheets will be used to document the following information:
- a. Job Number
  - b. Sample Number
  - c. Date collected
  - d. Sampling device (pump type)
  - e. Collection Medium (cassette type)
  - f. Name and Social Security Number, if personal
  - g. Area in which the sample was collected
  - h. Sampling flow rate
  - i. Sample duration
  - j. Total volume of air sampled (Flow x Duration in minutes)
  - k. Total shift length (work day length)
7. Employee Notification
- a. A record of the laboratory analysis showing the results of the samples will be attached to the sample data sheet and posted in the worker break room or in the clean room for worker review within five days of receipt. A roster will be made available for workers to confirm that they have been notified and understand the results of the exposure assessment performed. The roster along with the results will be retained in the job file and forwarded to the Record Keeping department for permanent storage. All air monitoring results will be kept in the main office for thirty-years.
8. Samples and a copy of the data sheet(s) are packaged with sufficient non-electrostatic packing to keep the samples from being jarred.
9. The package is sent to a qualified laboratory, (ELPAT Certified lab, or participant in AIHA sponsored ELPAT rounds), for analysis. The

laboratory analyzes the samples and returns a report of the results.

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C. Environmental Monitoring.

1. Pre- and post-abatement sampling of surfaces inside the work area will be required on each Lead Abatement project. Soil, water or other samples may be collected depending on the location of the Lead Abatement work area and its surroundings. An accredited independent third party firm will collect these samples.
2. Sample Types
  - a. **Bulk Samples** are taken to determine the presence of lead in the material. Generally, a paint chip is collected in a container. The container is labeled and a chain of custody filled out before it is sent to an accredited laboratory. Laboratory results are reported in mg/kg which is equivalent to parts per, million.
  - b. **Wipe Samples** are a type of dust sample used for baseline determination and final clearance. One square foot of surface area is measured off. With a damp cloth a “5” shaped motion is made with the cloth inside the marked area. The cloth is folded and the motion repeated. Three wipes in this manner are normally used to sample all dust inside the marked, area. The Cloth is placed in a label container; a chain of custody filled out and sent to an accredited laboratory for analysis. Wipe sample results are reported in  $\mu\text{g}/\text{sq. ft.}$
  - c. **Soil Samples** are taken to determine the presence of lead in soil. A qualified third party when applicable should collect soil sample.
  - d. **Water Samples** are taken to determine the presence of lead in water. A qualified third party when applicable should take water samples.
3. Sample Frequency
  - a. **Bulk Samples** - unless the material is assumed to be lead containing, a bulk sample should be taken any time it is required to disturb coatings. Samples should be collected that are representative of the full application of the coating, from the topcoat to the substrate. Samples should be containerized, labeled and sent to an approved laboratory with a chain of custody for analysis.
  - b. **Wipe Samples**
    - i. Baseline - After the work area has been pre-cleaned and before any poly is laid on the flooring of the work area, a wipe sample should be taken to determine baseline cleanliness.
    - ii. Final Clearance - A final clearance wipe sample will be collected after the work area has been final cleaned. Generally two samples will be collected. The first sample will be collected off of the substrate from which the lead containing coating was removed. Clearance level for these surfaces will be  $500\mu\text{g}/\text{sq. ft.}$  A second sample will be

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clearance level for floors will be 200µg/sq. ft.

- c. **Soil Samples** - The owners, Industrial Hygienist or Environmental Department should be consulted before any soil samples are collected. Soil samples will be collected anytime soil is part of the flooring for the lead abatement work area. These soil samples will serve as a baseline determination. Similarly at the completion of final cleaning a second soil sample should be collected to assure contamination has not occurred.
- d. **Water Samples** - The owners, Industrial Hygienist or Environmental Department should be consulted before any water samples are collected. Water samples maybe collected whenever bodies of water are immediately adjacent to the lead work area. A water sample will be collected before abatement begins to determine a baseline, and after final cleaning to assure no contamination has occurred.

## **VII. RESPIRATORY PROTECTION**

- A. This written protection plan for employees is required by OSHA as per Federal Register 29 CFR 1910.134. The written program, S.O.P. 5F, shall be approved and periodically revised as necessary by the Safety Director.
  - 1. The responsibility for implementation and adherence to this program falls on the company. However, Project Managers, supervisors and foremen have the direct responsibility for enforcement of the procedures at the jobsite.
  - 2. Employees violating this program will be disciplined. Documentation of such actions concerning this policy will be maintained in project and individual employee files (i.e., written reprimands, suspension and/or dismissal of individuals not complying with the program).
- B. Respirator Selection and Use
  - 1. An improperly fitted respirator or one that has a defective part offers little protection to its user. Before beginning lead removal work, employees should be instructed about the atmosphere in which they will be working, the need for respiratory protection and approved procedures for fitting, adjusting, maintenance, cleaning and storage of respirators. It is important that all employees follow these procedures.
  - 2. The company's selection of respirators as listed elsewhere in this section, has been chosen from respirators approved by the Mine Safety and Health Administration (MSHA) and/or the National Institute for Occupational Safety and Health (NIOSH) for use in atmospheres containing lead.
- C. Protective Factors
  - 1. Respirators offer varying degrees of protection against lead. The key to understanding the difference between types of respirators (air-purifying, powered-air purifying, air supplied, etc) is the amount of protection afforded the wearer. To compare these, one must understand the concept

of protection factor (PF).

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2. A protection factor is a number obtained when the concentration of a contaminant outside the mask is divided by the concentration found inside the mask. This simple formula is illustrated below.
  3. The protection factor depends greatly on the fit of the mask to the wearer's face. Accordingly, the protection offered by any one respirator will be different for each individual person. Further, the protection constantly changes depending upon the worker's activity and even shaving habits. When a worker laughs or coughs inside a respirator, the protection factor will decrease since the mask will not "fit" as well during the laughing or coughing. Similarly, a worker who forgot to shave one morning will not receive as much protection that day since the mask will not fit as well to the face. The importance of properly fitting the mask should now be obvious.
  4. It is virtually impossible to measure the concentration inside the mask (where the worker is breathing) for each worker, all the time, during all the various activities he or she may be conducting. Accordingly, protection factors, based on extensive research, have been developed for different categories of respirators. Using these protection factors, it is easy to determine what type of respirator is appropriate to maintain the concentration of a contaminant inside the mask below a certain level. For example, if 1.0 fiber per cubic centimeter (1 f/cc) is the current permissible exposure level listed in the Federal Register for a particular contaminant, then workers should never be exposed above this level inside the respirator.
  5. Appendix Attachment Form, 5F.1c is a list of Respiratory Protection Factors used in the general industry, based on the wearer successfully passing a fit test.
- D. Respirator Assignment and Maintenance
1. The Company field supervisors will implement a system of record keeping to document and record respiratory protection equipment assignment, as well as periodic cleaning and maintenance of equipment on a per job basis.
  2. Assigned respirators shall be regularly cleaned and disinfected as described by the listed procedures and the supervisor's control.
  3. Record keeping forms are available from the Safety department.
- E. Facial Hair
- A. Recent studies have proven that any facial hair inside the respirator, other than neatly trimmed mustaches (that do not extend beyond the edges of the mouth), eye lashes and eye brows, significantly reduce the protection factor of the respirator.
  - B. In response to these tests, OSHA now forbids such facial hair. No employees that are required to wear a respirator or visitors into our regulated areas will be allowed to have any facial hair (other than the aforementioned cases) that interferes with the seal of the respirator, or that

is within the respirator.

- C. Employees and/or visitors who have more than one-days growth of facial hair will be required to shave prior to wearing respirators and entering a regulated area.
  - 1. Supervisors shall have available disposable razors for such use.
  - 2. Employees who consistently report to work at projects requiring respiratory protection with more than one-day growth of facial hair will be subject to disciplinary measures up to and including termination.

F. Respirator Care

- 1. Before leaving the work area, each user must shower with the respirator on, to remove any lead containing material, which may have settled on the equipment.
- 2. Respiratory equipment shall be washed using a brush with detergent and warm water. Detergents containing a bactericide are to be used. If this is not available, disinfectants may be made by:
  - a. Using two (2) tablespoons of chlorine bleach to one (1) gallon of water, or
  - b. Adding one (1) tablespoon tincture of iodine to one gallon of water.
  - c. A two-minute immersion of the respirator into either solution is sufficient for disinfections.
- 3. The respiratory equipment should be thoroughly rinsed in warm clean water to remove all traces of detergent, cleaners and sanitizer.
- 4. Respiratory equipment will be allowed to air dry on a clean surface or hung from a horizontal wire.
- 5. When not in use, respiratory equipment should be sealed in plastic bags and stored so as not to distort the respirator valves or face-piece.
- 6. Qualified personnel, who have been designated by management, must do repair or replacement of component parts. A respirator becomes invalid if parts are substituted from a different brand or type of respirator. Inspection for defects in the respiratory equipment must be done before and after each use and during the cleaning process. Areas to be inspected for defects and overall inspection should be as follows:
  - a. ***Air Purifying Respirators (quarter-mask, half-mask)***
    - i. **Rubber face-mask** - check for the following:
      - aa. *Excessive dirt* - clean all dirt from face-piece.
      - bb. *Cracks, tears, or holes* - obtain new face-piece.
      - cc. *Distortion* - allow face-piece to “sit” free from any constraints and see if distortion disappears. If so, obtain new face-piece.
      - dd. *Cracked, scratched or loose fitting lenses* - replace parts or obtain new face-piece.

- ii. **Head-straps** - check for the following:
  - aa. *Breaks or tears* - replace head-strap.
  - bb. *Loss of elasticity* - replace head-strap.
  - cc. *Broken or malfunctioning buckles or attachments* - obtain new buckles.
  - dd. *Face-piece slips* - replace head-strap.
- iii. **Inhalation Valves/Exhalation Valves** - check for the following:
  - aa. *Detergent residue, dust particles, or dirt on valve or valve seat* - remove residue with soap and water.
  - bb. *Cracks, tears, or distortion in valve material or valve seat* - obtain new respirator.
  - cc. *Missing or defective valve cover* - obtain valve cover from manufacturer.
- iv. **Filter Element(s)** - check for the following:
  - aa. *Proper filter for the hazard* – if not replace with the proper filter for the hazard.
  - bb. *Missing or worn gaskets* - replace gaskets.
  - cc. *An approval designation number or code.*
  - dd. *Worn threads, both filter threads and face-piece threads* - replace either filter or face-piece as required.
  - ee. *Cracks or dents in filter housing* - replace filter.
  - ff. *Missing or loose hose clamps* - obtain new clamps.
- b. **TYPE “C” - Supply Air Respirators**
  - i. **Check face-mask, head-straps, valves, and breathing tube as for the air purifying respirators.**
  - ii. **Hood, helmet, blouse, or full suit, if applicable, check for the following:**
    - aa. *Headgear suspension* - adjust per individual.
    - bb. *Cracks or breaks in face-shield* - replace face shield.
    - cc. *Protective screen to see that it is intact and fits correctly over the face-shield, abrasive blasting hoods and blouses* - obtain new screen.
  - iii. **Air supplying system** - check for the following:
    - aa. *Breathing air quality*
    - bb. *Breaks or kinks in air supply hoses and end fitting attachments* - replace hose and/or fittings.
    - cc. *Tightness of connections.*
    - dd. *Proper setting of regulators and valves* - see Manufacturer’s Recommendations.
    - ee. *Correct operation of air purifying elements and carbon monoxide or high-temperature alarms.*

- G. Employee Respirator Training Program
1. Each employee required to wear a respirator will receive sufficient respiratory training. The training sessions, initial and periodic re-training, will be conducted by qualified personnel (Safety personnel, qualified supervisors/foremen) to ensure that the employees understand the limitations, use and maintenance of the respiratory equipment. Acknowledgement that each employee has received and understands this training will be documented and retained in the company and employee records.

## **VIII. MEDICAL SURVEILLANCE**

- A. Work Condition Surveillance
1. Personnel air sampling will be conducted during each company lead abatement project (refer to Air Monitoring Procedures in this document). This will be performed by a qualified subcontractor (hygienist service) or by a qualified employee trained in the proper use of the equipment and in the documentation of the monitoring techniques. The data collected will be used to determine proper respiratory protection for the hazard encountered as indicated by employee exposure levels for the airborne lead in the work area. Typically, half face, dual cartridge, air purifying, and negative pressure respirators with HEPA filter will be used during work area preparation. Powered air purifying respirators equipped with HEPA filters will usually be worn once abatement begins, and may be downgraded to half mask, if air-monitoring results warrant.
  2. All employees will receive instructions regarding emergency procedures. These will include:
    - a. Leaving the work area immediately should they (the employee) experience difficulty in breathing or dizziness.
    - b. No employee wearing a respirator should be allowed to work alone.
    - c. Emergency procedures in case of a “Hazardous Situation” inside the work area.
- B. Medical Tracking
1. All Lead Medical Surveillance documentation will be reviewed upon receipt and maintained in the employee’s personnel file and entered into the computer system for tracking purposes. Before lead abatement projects begin, the employees medical record will be investigated and the latest blood lead levels determined. No employee is to remove lead based paint until medical exams and blood lead levels are reviewed. In the event an employee’s blood lead level is found to be elevated, the project manager for the site is to be notified and prompt action taken, if necessary [see Medical Removal, section (VIII)(I)].
- C. Initial and Subsequent Exams

1. The content of medical exams for Lead Abatement employees will be determined by an examining physician and, if requested by an employee, will include pregnancy testing or laboratory evaluation of male fertility.

D. Mandatory

1. Detailed work history, medical history, past lead exposure, personal habit (smoking), and past gastrointestinal, hematological, rehab, cardiovascular, reproductive and neurological problems.
2. A thorough physical exam, paying particular attention to teeth, gums, hematological, gastrointestinal, renal, cardiovascular, and neurological systems.
3. Pulmonary function tests (FVC, FEV 1)
4. Blood Pressure measurement
5. Blood sample analysis including
  - a. Blood lead level
  - b. Hemoglobin and hematocrit determination, red cell indices, and examination of peripheral smear morphology.
  - c. Zinc protoporphyrin
  - d. Blood urea nitrogen
  - e. Serum creatinine
6. Routine urinalysis with microscopic examination.
7. Any other test relevant to lead exposure as deemed necessary by the examining physician.
8. The Company will provide a physician and/or medical clinic to the employee for the medical examination.
9. **Biological Monitoring-** Biological monitoring that includes blood lead and ZPP level determination will be conducted as follows:
  - a. Before initial assignment (entry physical).
  - b. At termination of employment (exit physical).

E. Frequency

1. **Medical Exams-** Initial exams are provided before an employee is assigned to a work area where lead exposure is anticipated. Subsequent medical exams are provided as follows:
  - a. The employee has developed symptoms commonly associated with lead-related disease.
  - b. The employee desires advice concerning the effects of current or past lead exposure on his/her reproductive ability and/or the ability to procreate healthy offspring.
  - c. Every two months for the first six months of exposure above the action level of  $30\mu\text{g}/\text{m}^3$ .
  - d. Every six months after the first six months of exposure above the action level.
  - e. Every two months if the blood lead level is greater than or equal to  $40\mu\text{g}/\text{dl}$ . This frequency will continue until two consecutive samples drop below  $40\mu\text{g}/\text{dl}$ .

- F. Information Provided to Physician
  - 1. Copy of 29 CFR 1926.62 (Lead Standard) with all appendices.
  - 2. Employee's duties related to lead exposure.
  - 3. Anticipated employee exposure to lead (as well as any other toxic substance).
  - 4. Description of personal protective equipment.
  - 5. Any prior blood leads determinations.
  - 6. Any prior written opinions.
- G. Information Received From Physicians
  - 1. The physician's opinion as to whether the employee has any detected medical conditions that would place the employee at increased risk of impaired health due to lead exposure.
  - 2. Any recommended special protective measures to be provided to the employee or limitations to be placed upon the employees' exposure to lead.
  - 3. Any restrictions on the use of negative pressure respirators including a determination if a powered air-purifying respirator can be used if the physician determines the employee should not use a negative pressure respirator.
  - 4. Results of any blood lead determinations.
- H. Employer Instructions to Physicians
  - 1. Non-release to employer of any information discovered that are unrelated to employees occupational exposure to lead.
  - 2. Physician must advise employee, of **any** medical conditions that dictate further medical examination or treatment.
  - 3. No prophylactic chelation is allowed.
  - 4. Physician should provide employer with a medical emergency alert informing the employer if any employee blood lead levels reach or exceed 40 micro-grams of lead per deciliter of blood.
- I. Medical Removal
  - 1. If during any periodic blood-level test a result of 50µg/dl is achieved the employee will be removed from work or task having providing the exposure to lead at or above the action level. A follow-up test within two weeks is then required. If the second blood test result is also above 50µg/dl, the employee will remain removed from the work area. Results cannot be averaged to determine eligibility for medical removal.
  - 2. An employee must be removed from a work area with airborne levels of lead at or above 30µg/m<sup>3</sup> (Action Level) in the following situations:
    - a. Any periodic or follow-up blood lead tests reveal blood lead levels at or above 50µg/dl.
    - b. If, any medical exam reveals a medical condition which, places the employee at an increased risk from lead exposure.

3. Employees removed for medical reasons will not be returned to a work area with airborne lead levels at or above the Action Level ( $30\mu\text{g}/\text{m}^3$ ) until two consecutive blood lead tests reveal levels at or below  $40\mu\text{g}/\text{dl}$ , and/or until a subsequent medical exam reveals that whatever medical condition existed, that caused the medical removal, no longer exists. Blood test to determine an employee's readiness to return to work should be administered monthly.
  4. While removed for medical reasons, the following stipulations apply:
    - a. The employee must receive his/her total normal earnings, seniority and other benefits for up to 18 months or until medically capable of returning or his former job position ceases to exist.
    - b. Workers compensation, other benefits, or any other earnings from another employer shall reduce the contribution necessary.
  5. If after 18 months the employee's bloods' lead levels or a physician's determination of medical condition do not warrant the employees return to work the employer must:
    - a. Provide employee with a medical exam to obtain a final determination if employee may return.
    - b. Provide any necessary personal protection, work schedule, etc., that would allow the employee to return.
    - c. Continue to provide medical removal protection benefits until the employee is returned to former job status, until a medical determination is made that the employee will never be able to return, or until the job the employee was removed from has concluded.
- J. Records of Medical Removals
1. The employer will maintain the records of all medical removals. Each record shall include:
    - a. Employee name and social security number
    - b. Dates removed and returned.
    - c. Description of how each removal is accomplished.
    - d. Description of the reason for removal (voluntary, blood lead level, medical conditions, etc.).
  2. Medical removal records will be maintained for employee's duration of employment.
- K. Recordable Medical Removal (OSHA 300 Logs)
1. Each medical removal will be addressed on a case-by-case basis as to its recordability.
- L. Employee Access to Medical Records
1. The employee, their designated representatives, the Assistant Secretary, and the Director have ready access and will be provided copies upon request of 29 CFR 1926.62, its appendices, and all medical records for that employee by signed employee consent or with a medical access order.

M. General Record Retention

1. Medical records must be maintained for the duration of employment plus thirty years.