1 Status

1.1 Update of existing policy, effective 06/03/11.

2 Purpose

2.1 To recognize and manage health hazards associated with lead and other heavy metal exposure in the workplace. The precautions for lead will also protect against the other heavy metals that may be present. Air sampling will identify additional actions that may have to be taken.

3 Applicability

3.1 This policy applies to all subsidiary companies and departments of the Cianbro Companies.

3.2 All organizations are required to comply with the provisions of this policy and procedure. Any deviation, unless spelled out specifically in the policy, requires the permission of the Safety Director or designee.

4 Definitions

4.1 Competent Person: A person who has the knowledge to identify hazards associated with the work, has the knowledge to correct those hazards, and has the authority to take the necessary corrective actions.

4.2 Competent Person on jobs that require SSPC QP-2: The same as above and has taken the SSPC C-3 thirty-two hour Competent Person for Deleading of Industrial Structures training and is current with the required annual refresher training.

4.3 QP1 and QP2: These are painting contractor certification programs administered by The Society for Protective Coatings. QP1 evaluates contractors who perform surface preparation and industrial coating application on steel structures in the field in the areas of management procedures, quality control, safety and environmental compliance, and technical capabilities. QP2 is a supplement to QP 1 that evaluates the contractor's ability to perform industrial hazardous paint removal in a field operation. QP 2 Certification requires demonstrated competence in four key areas: Management of Hazardous Paint Removal Projects, Technical Capabilities Related to Hazardous Paint Removal, Personnel Qualifications and Training, and Safety and Environmental Compliance Programs. Holding these certifications allows us to do work for clients that require the certifications in their specifications.

4.4 Society for Protective Coatings (SSPC): SSPC is a non-profit association that is focused on the protection and preservation of concrete, steel and other industrial and marine structures and surfaces through the use of high-performance industrial coatings. It provides information on surface preparation, coating selection, coating application, environmental regulations, and health and safety issues that affect the protective coatings industry. It administers the contractor certification programs of QP1 and QP2.
5 Policy

5.1 Prior to any work, the presence of lead or other heavy metals will be identified and a job or task specific activity plan developed that meets the requirements contained within this policy.

6 Responsibilities

6.1 The top Cianbro manager of the job site is responsible for the implementation of this policy on the job site. S/He must also insure that this program and the project specific program are available for review at all times by any affected team member.

6.2 Corporate Safety is responsible for maintaining this document and for reviewing and updating it at least annually.

6.3 The Project Manager (top Cianbro manager on the job) is responsible for notifying The Society for Protective Coatings (SSPC) prior to the start of any job where the specifications require QP-2 certification.
7.1 Cianbro may be exposing its team members to lead and other heavy metal hazards when work involves activities like cutting, burning, grinding, removal, scraping coated materials and housekeeping (sweeping). BEFORE any activity begins, projects must take measures to identify the presence of LEAD in the areas where our team members will work.

- Use existing test documentation from the owner to see if lead or other heavy metals are present on the painted surface or in the boiler ash.
- Lead Check swabs can be used to check for the presence of lead in coatings but are not very accurate. If a positive result is obtained, then lead is present. However, if a negative result is obtained, then a paint chip sample must be done to verify.
- Take a representative sample of the coated material and test for LEAD, PCB's, CHROMIUM, and CADMIUM. Contact the Safety Department with any questions about sampling.
- Take a representative sample of boiler ash and test for heavy metals (the 8 RCRA metals plus vanadium). Confirm with client fuel type used.
- Test soil and sediment samples around the work area as required or necessary to establish a base line to verify a known or suspected presence of lead and/or other contamination.
- Additional potential sources of lead exposure include lead in solders, pipes, batteries, circuit boards, cathode ray tubes, leaded glass, and construction/demolition debris.
7.2 Planning for Lead Exposure Protection

Managing a lead and other heavy metals hazard means the project must plan for the potential team member’s health and environmental impacts before the work begins. Each lead and other heavy metal activity must be addressed in a job-specific activity plan with a primary focus on eliminating/minimizing the lead exposure. Each activity plan must address team member medical surveillance, personal protection, safe hygiene practices/controls, environmental controls, engineering controls, work practice controls, training, emergency procedures, waste disposal and the identification of a competent person. Please refer to the Heavy Metals Protection Program Planning Checklist SD1065 or to Appendix G (Boiler Work Guidelines) for guidance.

7.3 Other Heavy Metals Exposures

7.3.1 OSHA has specific health standards for hexavalent chromium, cadmium and arsenic. These standards include requirements for air monitoring, PPE, personal hygiene facilities, medical surveillance, emergency procedures, and other requirements. If chromium, cadmium or arsenic is found on your project (in paint, boiler ash or other), following the requirements of this Safety Policy and Procedure is expected to protect team members from chromium, cadmium and/or arsenic exposure. If arsenic, chromium, or cadmium is found to be present, air sampling will be done for these along with the lead. If exposures exceed the action level (2.5 ug/m$^3$ for cadmium and chromium or 5 ug/m$^3$ for arsenic), additional medical surveillance may be required. Contact the corporate manager of health and environmental hazards. In addition, all potentially exposed team members shall be trained in the hazards of chromium, cadmium or arsenic.

7.3.2 Other heavy metals (silver, barium, vanadium, mercury, and selenium) do not have specific health standards but do have permissible exposure limits. If these metals are found to be present at your site, then HAZCOM training and air monitoring shall be done. See Appendix H (Table of Permissible Exposure Limits and Action Levels).

7.4 Competent Person

Each activity involving lead or other heavy metals requires a competent person to be onsite. A competent person by definition has the knowledge to identify hazards associated with the work, has the knowledge to correct those hazards, and has the authority to take the necessary corrective actions. If the person does not have the authority to make changes, then that person cannot be the competent person. The competent person must be identified on the specific activity plan. A back up shall be identified when the competent person is not present at the site. The duties include at a minimum ensuring appropriate training is provided, inspecting the work daily (see SD#1058), and reviewing the specific activity plans. In addition, for sites where The Society for Protective Coatings (SSPC) QP-2 certification is required in the job specifications, the competent person must have had SSPC C-3 thirty-two hour Competent Person for Deleading of Industrial Structures Training or equivalent and 8 hours of annual refresher training.

7.5 Establishing a Project Specific Written Lead/Heavy Metal Program

Establish and implement a job specific written protection program that incorporates this Safety Policy and Procedure. Complete the lead plan section of the major activity plan to include:

7.5.1 A description of each activity in which exposure to lead/heavy metals is expected; e.g. equipment used, material involved, controls in place, crew size, team member job responsibilities, operating procedures, maintenance practices and a competent person.

7.5.2 A description of the specific means that will be employed to achieve compliance and, where engineering and work practice controls are required to reduce exposure levels below the PEL, document plans and studies used to determine methods selected for controlling exposure to lead.
7.5.3 A description of the technology considered in attempting to reduce the exposure levels below the PEL when feasible (ventilation, filtering, respirators, containment). Document the reasons why some controls available are not feasible or possible to do.

7.5.4 Monitoring data that documents the source of lead/heavy metals emissions.

7.5.5 A detailed schedule for implementation of the program, including documentation such as copies of purchase orders for equipment, construction contracts, etc.

7.5.6 Provide written notification to vendors and subcontractors (i.e., salvage dealers) when materials containing lead/heavy metals in paint coatings are sold/given to them.

7.5.7 A work practice program that includes protective work clothing and equipment, housekeeping and hygiene facilities/practices and incorporates other relevant team member work practices.

7.5.8 Provide, when feasible and allowed, administrative controls schedule for team members minimizing the time spent working in lead/heavy metals area.

7.5.9 Hazard and solution identification documented in the activity plan(s) and conveyed to all team members working in the lead/heavy metals control area(s).

7.5.10 Regular and frequent inspections by the competent person.

7.5.11 Method of informing other contractors and subcontractors of potential heavy metals exposure if applicable.

7.6 Training

Prior to any activity having the potential for contamination and/or exposure to lead or other heavy metals, and annually there after, Cianbro team members must receive documented job-specific training in the following areas: (Normally, the Safety Specialist would conduct training). If other heavy metals are expected to be present, then they shall be included in the training listed below.

7.6.1 Review activity plan in regards to lead exposure/handling and hazards/solutions.

7.6.2 Specific activities that could result in exposure to lead and lead exposure levels (if known) for the work activities.

7.6.3 Team members must avoid exposure to lead and heavy metals by following all signs, labels, and assessment reports identifying the presence of heavy metals. Ensure appropriate work practices are identified in the activity plan to prevent disturbing of lead and other heavy metal containing materials not required by the scope of work.

7.6.4 Health hazards associated with lead exposure (reference and use this Safety Policy and Procedure and Cianbro’s Hazard Communication Program Safety Policy and Procedure).

7.6.5 Proper use, wear, care, and maintenance of protective clothing and equipment including respirators.

7.6.6 Engineering/administrative work practice controls needed to minimize hazards.

7.6.7 Purpose of medical surveillance and team member rights concerning this information. Include medical removal provisions and their rights.

7.6.8 Discuss requirements concerning warning signs for work areas.

7.6.10 Proper handling of contaminated materials and waste.

7.6.11 No chelating agents to be used except under direction of a licensed physician.

7.6.12 Team member rights to access exposure and medical records (CFR 1910.20).
   • Explain existence and location of records.
   • Person responsible to maintain and provide access to records.

7.7 Eliminating/Minimizing Exposure

7.7.1 The first step in lead or other heavy metal activity planning is determining whether the hazard can be eliminated or encapsulated. If feasible, can the coating be removed before working on the surface (blasting coating off-site, chemical stripping, etc.)?

7.7.2 If a hazard cannot be eliminated, the next step is to minimize it. This can be done through engineering, administrative and work practice controls such as work isolation, job rotation, mechanical ventilation, increased torch length, and alternative removal methods. If administrative controls are used, (i.e. job rotation), a log of the rotating team members (name, SS#, duration/exposure levels/activity, etc.) must be kept on site and with the activity plans.

7.7.3 REMEMBER, if the hazard cannot be eliminated and the levels exceed the PEL (50 ug/m3 for lead), the lead work area must be clearly marked and posted with signs. Use appropriate language for other metals if air monitoring shows levels at or above the PEL. Cianbro recommends posting signs for all lead work areas reading.

You also need signs for arsenic, hexavalent chromium or cadmium work areas if they are present above the PEL.

<table>
<thead>
<tr>
<th>WARNING</th>
<th>DANGER</th>
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</thead>
<tbody>
<tr>
<td>LEAD WORK AREA</td>
<td>HEXAVALENT CHROMIUM</td>
</tr>
<tr>
<td>POISON</td>
<td>CANCER HAZARD</td>
</tr>
<tr>
<td>NO SMOKING OR EATING</td>
<td>AUTHORIZED PERSONNEL</td>
</tr>
<tr>
<td>ONLY</td>
<td>NO SMOKING OR EATING</td>
</tr>
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</table>

<table>
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<tr>
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<tr>
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<td>ONLY</td>
</tr>
<tr>
<td>NO SMOKING OR EATING</td>
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<tr>
<td>CADMIUM</td>
</tr>
<tr>
<td>CANCER HAZARD</td>
</tr>
<tr>
<td>AVOID CREATING DUST</td>
</tr>
<tr>
<td>CAN CAUSE LUNG AND KIDNEY DISEASE</td>
</tr>
</tbody>
</table>

7.8 Exposure Assessment and Air Monitoring

7.8.1 Supervisors working with lead or other heavy metal containing coatings must plan and develop safeguards to protect against exposures resulting from outside elements (wind, temperature) and work location (indoors, outdoors, over water, over workers, near public areas, etc.). Containment plans, should they be needed, must be project-specific and meet the needs of the people in the work area. The Safety Department is available to help projects develop containment plans if deemed necessary by the competent person.
7.8.2 Each work activity (burning, welding, rivet busting, scraping, etc.) must be monitored to determine the levels of team member lead/heavy metals dust/fume exposure and the effectiveness of engineering controls, work practice controls, PPE, etc. Air monitoring must be done during a team member’s regular daily duties. Initial air sampling should be taken as soon as possible with the start of an activity (within 24 hours, if possible) and the results received from the lab as soon as possible (within 48 hours, if possible). Respiratory protection must be determined by the airborne lead level results and the specific work activity. (Refer to Appendix A for respiratory selection). Compare results to the PEL. (Remember to adjust action limit and PEL if working other than 8-hr shifts.)

7.8.3 Continue air monitoring until two consecutive tests are obtained below the action level. A historical sampling result may be used as one of the two tests at least 7 days apart if the following conditions are met: acceptable historical air monitoring results are current within the last 12 months and taken where workplace conditions closely resemble the current work (essentially the same types of materials, tools, engineering and work practices, and environmental conditions). Also see Appendix C.

7.8.4 In performing air monitoring (personal air sampling), documentation needs to be specific/detailed as to actual work activity tasks, time exposed to lead or non-lead work for the full shift, etc.

7.8.5 Any changes in the work activities or conditions that could possibly result in increased exposure require immediate further air monitoring.

7.8.6 Air monitoring needs to be done to represent each group of people who have similar exposures (for each task, location, work method, etc.).

7.8.7 Environmental Air Monitoring
   - Perform Total Suspended Particulate (TSP) monitoring when appropriate. (Usually on large outside jobs or jobs that vent outside.) Contact the Corporate Safety Department to coordinate any TSP monitoring that is required. Follow the environmental guidebook to establish and set up TSP monitoring.
   - Perform air monitoring prior to any lead abatement work.
   - Perform air monitoring during lead abatement activity.
   - Use trained individuals to perform this monitoring.
   - Document the sampling.

NOTE: Proper positioning of these instruments is important (Refer to Cianbro’s Environmental Guidebook). TSP monitoring data will help document that Cianbro is not polluting the environment or violating the state and/or federal Clean Air Act requirements.

The allowable limit is 0.15 ug/m^3 as a 90-day average. To adjust this limit to a daily average, use the following formula:

\[ DA = (90 + PD) \times 0.15 \text{ ug/m}^3 \]

\[ DA = \text{Daily Allowance for 24 hour period} \]
\[ PD = \text{Number of days lead work will be performed in 90 day period} \]

THEN

\[ ADA = DA \times \frac{24}{H} \]

\[ ADA = \text{Adjusted Daily Allowance (ug/m}^3\) \]
\[ DA = \text{Daily Allowance (ug/m}^3\) \]
\[ H = \text{Hours worked in 24 hours} \]
7.9 Personal Protective Equipment

After engineering and work practice controls are in place to minimize the lead or other heavy metal contamination hazard, protective clothing must be utilized. At a minimum, this shall include gloves, coveralls or Tyvek suits, boots, eye protection and hard hats. These items will be provided at no cost to team members. Clean protective coveralls or Tyvek suits must be provided daily, if the airborne lead level is above 200 ug/m³ and weekly if the airborne lead level is below 200ug/m³. However, Tyvek suits must be repaired or replaced immediately if ripped or torn. Respiratory protection should only be used as a last resort or under the following circumstances:

- When there is no reasonable way to eliminate the airborne contaminant.
- During periods necessary to implement feasible engineering and work practice controls.
- If initial air monitoring results show that the contaminant still exists at levels above the PEL despite our engineering and work practice controls.
- During emergency situations.

When necessary, respiratory protection will be determined/selected in accordance with Appendix A and used in accordance with 29 CFR 1910.134. PAPR’s must be made available to team members should they request them provided known exposure limits for PAPR use are not exceeded.

7.10 Hygiene Practices and Controls

Lead and other heavy metal exposure occurs through ingestion and inhalation (and also skin contact for hexavalent chromium). This usually results from ingesting lead or other heavy metal particles that come in contact with food, coffee, and cigarettes, or through inhaling paint dust/fumes (without the benefit of a respirator). Good hygiene practices are extremely important no matter which type of lead activity is performed. Adequate time must be allowed for good hygiene practices so as not to interfere with team member break, lunch and shift completion times. To avoid any team member or environmental contamination, the following hygiene practices will be used on all projects with lead or other heavy metal activity:

7.10.1 Running water (heated if possible), soap (pumpable preferred since it prevents contamination of soap), clean towels, and readily available trash container to ensure team members wash their hands and face prior to eating, drinking, smoking, and leaving the project. Showers are also required, where feasible, when team members are subject to the possibility of skin or eye irritation from inorganic arsenic or when airborne exposure to lead and/or cadmium is above the respective PEL as determined by the length of the work shift.

7.10.2 Any contact to potentially lead or other heavy metal contaminated materials requires hand and face wash as soon as possible to prevent ingestion.

7.10.3 Clean change room/area for removing necessary street clothes and putting on protective clothing. Instructional signs should be posted in change and wash areas to ensure proper steps are taken to prevent exposures. Separate change room/area, including closed disposal container, for team members to remove contaminated clothing. Contamination must not spread to street clothes, team member homes and children.

7.10.4 Establish check point(s) at access/egress point(s) to lead work area(s). Assign an individual at this check point(s) to monitor team member hygiene practices exiting work area(s).

7.10.5 All dirty coveralls must be placed into a separate container. This container must be marked:

CAUTION: “Clothing contaminated with lead (or hexavalent chromium if appropriate). Do not remove dust by blowing or shaking. Dispose of lead contaminated wash water in accordance with local, state and federal regulations.”
7.10.6 Laundry cleaning service must be notified in writing that clothing is contaminated with lead or hexavalent chromium.

7.10.7 Provide clean lunch/break room, separate from change area. Team members must HEPA vacuum themselves off at a checkpoint when leaving the regulated work area or remove contaminated clothing and in either case, wash hands and face before entering a clean area.

7.10.8 A written housekeeping and maintenance plan must be developed to insure that surfaces, work areas, and equipment are maintained and kept free of an accumulation of contamination. Whenever possible, cleaning should be done with a vacuum equipped with High Efficiency Particulate Air (HEPA) filter. The clean areas (change room/area, lunch room/area, etc.) must have less than 200 ug/ft2 of lead contamination (wipe test) (There is not yet a clean level for hexavalent chromium, just requirement to keep it clean). Wipe samples should be done approximately every two weeks, more often if there is reason to believe the areas are not staying clean.

7.10.9 Equipment being removed from a lead controlled area needs to be decontaminated by vacuum or water wash. (i.e. body harness/lanyards, grinders, cords, hoses, small tools, etc.).

CAUTION: Cleaning and maintenance methods must be utilized that minimize team member exposure. Do not use methods that introduce contaminated dust into the air (like dry sweeping, blow down, etc.).

NOTE: There will be no smoking, eating, or drinking in regulated work/change areas that contain heavy metals, only in properly designated areas. There will also be no smoking, eating, and drinking until contaminated outer clothing is removed or HEPA vacuumed and team members have washed up. Furthermore, smoking and eating/drinking materials are not allowed in the lead area. Failure to follow these guidelines has been the leading cause of high blood-lead levels!

7.11 Team Member Lead Medical Surveillance
For cadmium, hexavalent chromium or arsenic medical surveillance requirements, contact the corporate health and environmental manager. It will be based on air sampling results and length of work.

7.11.1 Team members who will be participating in activities constituting a potential exposure to lead will undergo blood lead/ZPP testing as follows:
- Blood lead/ZPP testing will be performed initially (one time) for new team members. Team members new to the lead medical surveillance program who are expected to be exposed to lead above the action level more than 30 days in a 12 month period will additionally be blood lead tested every two months for the first 6 months.
- Team members will be retested annually when expected to be exposed to low exposure lead activities (<30 ug/m3).
- If team members currently monitored under this medical surveillance program are exposed to documented high risk/high exposure activities (>30 ug/m3), the frequency of blood lead testing will increase to every 6 months for the period of exposure. Team member must be current with his/her blood lead test within 6 months or a new blood lead test must be offered to the team member.
- Cianbro requires increased frequency of biological monitoring if the PEL (50 ug/m3) is met or exceeded. Should exposure monitoring equal or exceed the PEL, contact Corporate Safety immediately for assistance in engineering/workplace controls to reduce the hazard and to establish frequency of blood lead/ZPP testing requirements.
7.11.2 Blood Lead/ZPP Testing

A. Review Cianbro's Blood Lead Historical Report and ensure that team members expected to work in the lead area are current within one year, have a blood lead <40 ug/dl or are current within six months for high risk/high exposure activities with expected or known air monitoring results >30 ug/m3 for the new lead work activities.

B. If team members are not current with blood lead/ZPP testing then schedule them for testing and notify Occupational Medical Consulting by faxing (207-524-2412) the Notice of Appointment Form immediately after making appointments with the clinic.

C. Notify Occupational Medical Consulting (207-524-2410 or 1-800-575-6537) if you are having problems getting the clinic to draw blood after clinic hours or on weekends.

D. Blood lead levels at or above 25 ug/dl (Cianbro’s administrative limit)
   • If blood lead level is at or above 25 ug/dl, a First Report of Incident must be completed and the cause investigated by the competent person and project management.

E. Blood lead levels at or above 40 ug/dl but below 50 ug/dl
   • If a blood lead level is at 40 ug/dl but below 50 ug/dl, blood lead testing must be done every month until two consecutive blood lead tests indicate levels below 40 ug/dl.
   • Removal from the lead environment until levels drop below 40 ug/dl and notify your regional safety superintendent/human resources manager.
   • Team members with blood lead level at or above 40 ug/dl but below 50 ug/dl must be offered a complete medical exam. If the team member declines, then the Medical Exam Decline Form SD1019, available on Cianbro.net must be completed by each team member declining such an exam.
   • Complete First Report of Incident and coach individual on personal hygiene and check respirator fit. Consider using a higher level of respiratory protection.

F. Blood Levels at or Above 50 ug/dl
   • If a blood lead level is at or above 50 ug/dl, another blood lead test must be done within 2 weeks of receiving the results from the first blood lead sampling with levels over 50 ug/dl and then monthly until two consecutive samples indicate levels below 40 ug/dl.
   • Removal from the lead environment until levels drop below 40 ug/dl and notify your regional safety superintendent/human resources manager.
   • A blood lead level at or above 50 ug/dl is an OSHA Recordable Illness.
   • Complete a First Report of Incident Form and coach individual on personal hygiene and check respirator fit. Consider using a higher level of respiratory protection when go back into the lead work area.
   • Record incident on the OSHA 300 log.
   • Team member will be required to have a complete medical exam. At this point the exam is mandatory (Can’t go back to a lead environment without it).

7.12 Medical Exams

The initial medical exam, when required, is done by a physician chosen by the employer. A second opinion, (see below), may be requested by the team member using a physician chosen by the team member. Notify Occupational Medical Consulting (OMC) immediately after exam appointment is scheduled.

Team members may request a medical exam if any one of the following holds true:

7.12.1 Team member has developed signs or symptoms commonly associated with lead intoxication.
7.12.2 Team member desires medical advice concerning the effects of current or past exposure to lead on his/her ability to have a healthy child. (Includes effects on pregnancy and male fertility.)

7.12.3 Team member has a blood lead level at or above 40 ug/dl at any time during the preceding 12 months.

7.12.4 Team member is pregnant and is or has worked in a lead environment within the last 12 months.

7.12.5 Team member has difficulty breathing with a respirator.

7.12.6 Team member is requesting a second opinion. See requirement 7.13.3 below.

7.13 Content of Medical Exam (see Appendix F)

7.13.1 Give two copies of this appendix to the team member before they go for their medical exam.

7.13.2 Instruct them to give a copy to the examining physician.

7.13.3 A team member has the right to request a second opinion after each occasion that an initial complete medical exam was given if the following is done by the team member:

- The team member notifies Cianbro of the desire for a second opinion within 15 days after receipt of the results of the initial medical exam.
- The team member initiates steps to make an appointment with a second physician.

7.14 Chelating Agents

7.14.1 Prophylactic chelation (used to keep blood lead levels from getting higher) even if physician prescribed is not allowed at any time.

7.14.2 Therapeutic or diagnostic chelation may be prescribed by a licensed physician and performed under the supervision of a licensed physician in a clinical setting with thorough and appropriate medical monitoring. Team members will be notified in writing prior to any chelation therapy.

7.14.3 This type of therapy is only prescribed when severely high levels of lead are in the body. This treatment is similar to chemotherapy for the treatment of cancer. It can be painful depending upon the individual’s tolerance to pain.

7.15 Recordkeeping

Cianbro shall maintain accurate records of all monitoring and other data used in conducting team member exposure assessments. Copies of all these records must be sent to the Corporate Safety Department. These records must be maintained for 30 years past the date of termination of the team member.

7.15.1 Exposure Monitoring Records

- The date(s), numbers, duration, location and results of each of the samples including a description of the sampling procedure used to determine representative team member exposure.
- A description of the sampling and analytical methods used and evidence of their accuracy.
- The type of respiratory protective devices worn.
- The name, social security number, and job classification of the team member(s) monitored.
- The environmental variables that could affect the measurement of team member exposure.
7.15.2 Medical Surveillance Records
- The name, social security number, and description of the duties of the team member.
- A copy of the physician’s written opinion.
- Results of any airborne exposure monitoring done on or for that team member and provided to the physician.
- Any team member medical complaints related to exposure to lead.

7.15.3 Medical Removal Records
- The name and social security number of the team member.
- The date of each occasion that the team member was removed from current exposure to lead as well as the corresponding date on which the team member was returned to his or her former job status.
- A statement with respect to each removal indicating whether or not the reason for the removal was an elevated blood lead level.

7.15.4 Availability of Records
A. Cianbro Corporation and Occupational Medical Consulting will make available upon written request from the affected team member(s), former team member(s), their designated representatives and the Assistant Secretary and Director all records listed above for examination and copying.
B. The following medical records shall be kept by Cianbro Corporation’s Medical Director at Occupational Medical Consulting:
   - A copy of the medical examination results including medical and work history.
   - A copy of the letter sent to the team member’s home with the results of the biological monitoring

7.15.5 Training Records
Copies of all training rosters must be documented on a training attendance form (PD621) and sent to the Cianbro Institute at TrainingAttendance@cianbro.com.

7.15.6 Activity Plans
Complete Cianbro Corporation’s specific Lead Activity Plan prior to performing any lead activity. This shall be done for any job involving lead work. Any other heavy metal requires a site/task specific activity plan as well. Can be combined in the same plan.

7.16 Waste Disposal
7.16.1 Treat all heavy metal contaminated waste as “hazardous waste”. Dispose of it through one of Cianbro’s approved hazardous waste disposal companies - Clean Harbors or Univar.
7.16.2 Store all heavy metal contaminated waste in UN or DOT approved containers (15, 30, or 55 gal.). Proper storage and handling, daily inspections, and shipping guidelines are listed in Cianbro’s Hazardous Materials and Waste Management Handbook (The Cookbook).
7.16.3 Clearly identify the generator (should be the Client) of the contaminated waste shipments in the project contract. Ensure that Cianbro Corporation’s name is not on any Hazardous Waste Manifest or other disposal documentation, AND ensure that a client representative, not a Cianbro team member, signs all disposal documentation/manifests.
7.16.4 Give all original paperwork to the Client representative and only keep photocopies at the job site. Send copies of paperwork to the Corporate Safety Department. Remember, if the client is the generator; DO NOT keep any original paperwork!
7.16.5 Any scrap steel painted with known lead base paint that is disposed of through a scrap metal dealer requires a letter be generated by project management, to the dealer. The letter must state that the steel is painted with lead based paint and could cause a health hazard to anyone working with the steel, such as burning or cutting directly on painted surfaces. The scrap dealer must be either shredding or melting down the steel. Otherwise, this is considered a hazardous waste.

7.17 Multi-employer Worksites

7.17.1 Subcontractors are required to follow the requirements of this policy and to notify Cianbro of any potential lead or other heavy metal exposure caused by their activities.

7.17.2 All potential exposure to lead and other heavy metals from work performed by our subcontractors, other contractors on site, or the client must be identified during the planning process. Team members who recognize potential exposures are required to leave the area and notify their supervisor. Work will continue once the hazard has been evaluated and proper controls implemented.

7.18 Safety at Home

Lead can be a serious risk for families and team members at home just as it can be on jobsites. It is critical not to bring contamination home with you. Follow the decon procedures thoroughly on your job site if lead is present. In addition, people at home can breathe in lead dust, put their hands or other objects covered with lead dust in their mouths, or eat paint chips or soil that contains lead. Remember lead is significantly more dangerous to children than it is to adults and at much lower levels. In most cases, intact lead paint is not a hazard. However, if you have to remove lead paint make sure to use a professional that understands the hazards. For more information, review the Environmental Protection Agency’s pamphlet at http://www.epa.gov/lead/pubs/leadpdf.pdf.

8 Budget / Approval Process

8.1 It is the responsibility of each jobsite to procure and provide all materials and PPE required and to provide necessary training.
9 Related Documents

9.1 List of Related Documents Attached:

- 9.1 Appendix A  Respiratory Selection Guide Chart
- 9.2 Appendix B  Medical Surveillance – Required Actions Based on Blood Lead Level Results
- 9.3 Appendix C  Required Actions Based on Airborne Lead Monitoring Results
- 9.4 Appendix D  Summary of Lead Standard for Workers
- 9.5 Appendix E  Health Effects and MSDS for Lead, Cadmium, Inorganic Arsenic, and Hexavalent Chromium
- 9.6 Appendix F  Content of Lead Medical Exam
- 9.7 Appendix G  Guidelines for Doing Boiler Work
- 9.8 Appendix H  Table of Permissible Exposure Limits and Action Levels

9.2 Documents available on Cianbro.net

<table>
<thead>
<tr>
<th>Document</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heavy Metals Protection Program Planning Checklist</td>
<td>SD1065</td>
</tr>
<tr>
<td>Lead and Other Heavy Metals Work Inspection Checklist for the Competent Person</td>
<td>SD1058</td>
</tr>
<tr>
<td>Lead Medical Exam Decline Form</td>
<td>SD1019</td>
</tr>
</tbody>
</table>

9.3 Please Note: Training manual for presenter and student is available on Cianbro.net>Standard Operating Procedures - on the SOP 2.0 February_Lead & 2.1 February_Lead.
RESPIRATORY SELECTION GUIDE CHART FOR LEAD

1. Typical lead activities listed below require appropriate respiratory protection be used during the airborne lead monitoring assessment period.
2. Airborne lead monitoring results could change respirator type required to complete lead work activity.
3. Air monitoring conducted which reflect lower results than what is required for respiratory protection listed below may allow a lower protective respirator type.

<table>
<thead>
<tr>
<th>RESPIRATOR</th>
<th>PROTECTION FACTORS</th>
<th>TYPICAL LEAD ACTIVITIES</th>
</tr>
</thead>
</table>
| HALF/FULL FACE, PAPR, SUPPLIED AIR, SCBA | UP TO 500 UG/M3 | -SPRAY PAINTING WITH LEAD PAINT 
                                           | ALLOWABLE LIMIT (10XPEL)       | -MANUAL DEMOLITION (DRY WALL)  
                                           |                               | -MANUAL SANDING AND SCRAPING  
                                           |                               | -POWER TOOL CLEANING WITH DUST COLLECTION SYSTEM  
                                           |                               | -HEAT GUN APPLICATION          |
| (HIGH EFFICIENCY FILTERS)   |                             |                                                                                |
| *FULL FACE, PAPR SUPPLIED AIR, SCBA | BETWEEN 500 TO 2500 UG/M3 | -RIVET BUSTING 
                                           | ALLOWABLE LIMIT (50XPEL)       | -LEAD BURNING, USING LEAD CONTAINING MORTAR  
                                           |                               | -POWER TOOL CLEANING WITHOUT DUST COLLECTION SYSTEM  
                                           |                               | -CLEANUP OF DRY EXPANDABLE ABRASIVES  
                                           |                               | -MOVEMENT/REMOVAL OF BLASTING ENCLOSURES          |
| (HIGH EFFICIENCY FILTERS)   |                             |                                                                                |
| SUPPLIED AIR, SCBA           | OVER 2500 UG/M3             | -ABRASIVE BLASTING 
                                           | ALLOWABLE LIMIT (>50XPEL)      | -WELDING  
                                           |                               | -TORCH BURNING  
                                           |                               | -OXY-FUEL GAS CUTTING           |
| SUPPLIED AIR, SCBA           | OVER 2500 UG/M3             | -ALL OTHER NON-TYPICAL LEAD ACTIVITIES INVOLVING AIRBORNE EXPOSURE  
                                           | ALLOWABLE LIMIT (>50XPEL)      |                                                                             |

*Full face allowed only if quantitatively fit tested.
MEDICAL SURVEILLANCE

Blood Lead Exposure Levels

**Blood Lead Results**

<25 ug/dl
- OMC to send written notification of results within 5 days to team member’s home.
- Project provides verbal results to team members on site.

>25 ug/dl <40 ug/dl
- OMC to send written notification of results within 5 days to team member’s home. Project provides verbal results to team member.
- Cianbro action level, project to counsel with team member looking into practices of hygiene and personal protection.
- Complete first report of incident.

>40 ug/dl <50 ug/dl
- OMC to send written notification of results within 5 days to team member’s home. Project provides verbal results to team member
- Remove from lead work areas.
- Conduct more frequent blood lead testing (monthly) until 2 test results show levels <40 ug/dl before returning team member to lead work areas.
- Evaluate/counsel with team member to determine source of higher than normal lead results. Coach on personal hygiene, check respirator fit, and consider higher level of respiratory protection.
- Complete first report of injury.
- Offer team member medical exam and/or consultation. Have medical exam decline form signed if team member declines.

>50 ug/dl
- OMC to send written notification of results within 5 days to team member’s home. Project provides verbal results to team member.
- Remove from lead work areas.
- Conduct more frequent blood lead testing (at least monthly) until 2 test results show levels <40 ug/dl before returning team member to lead work areas. Initial follow up must be within 2 weeks of receiving the results from the first blood sampling with level over 50 ug/dl.
- Evaluate/counsel with team member to determine source of higher than normal lead results. Coach on personal hygiene, check respirator fit, and consider higher level of respiratory protection.
- Complete first report of injury.
- Record on OSHA 200 log as a job recordable illness.
- Final medical determination (written medical opinion) on team member’s health status required by Cianbro.

**NOTE:** Removal from lead work areas may also be a physician order regardless of the blood lead level if the physician is concerned that either the patient has/or may develop a lead related illness or that aggravation of a pre-existing condition may/has occurred.
AIRBORNE LEAD MONITORING

I. Below Action Level: Results (Concentration):

- \(<30 \text{ ug/m}^3 - 8 \text{ hour shift (TWA)}\)
- \(<24 \text{ ug/m}^3 - 10 \text{ hour shift (TWA)}\)
- \(<20 \text{ ug/m}^3 - 12 \text{ hour shift (TWA)}\)

Minimum Action Required:

- Ensure affected team members are current with Cianbro’s medical surveillance monitoring (blood lead/ZPP testing). Refer to Appendix D of this Safety Policy and Procedure.
- Discontinue air monitoring unless activity conditions change, when two consecutive tests 7 days apart show \(<30 \text{ ug/m}^3\).
- Provide for wash facilities.
- Written notification to affected team members within 5 days of air monitoring and blood lead results.
- Provide for engineering, administrative, and work practice controls as feasible.
- Minimal respiratory protection required unless results show zero detectable limits, fit tests current within last 12 months.
- No tobacco, food, or drinks in lead areas.
- Conduct hazardous communications (RTK) and lead program training (activity planning).

II. Above the action level but below the PEL: Results (Conc.):

- \(>30 \text{ ug/m}^3 <50 \text{ ug/m}^3 - 8 \text{ hour shift (TWA)}\)
- \(>24 \text{ ug/m}^3 <40 \text{ ug/m}^3 - 10 \text{ hour shift (TWA)}\)
- \(>20 \text{ ug/m}^3 <33 \text{ ug/m}^3 - 12 \text{ hour shift (TWA)}\)

Minimum Action Required:

- Ensure affected team members are current with Cianbro’s medical surveillance monitoring (blood lead/ZPP testing). Refer to Appendix D of this Safety Policy and Procedure.
- Increase blood lead testing to every 6 months and every 6 months thereafter when team members are expected to be exposed \(> 30 \text{ days/year at levels} > \text{action level}\).
- Continue air monitoring every 6 months unless activity conditions change.
- Provide for wash facilities.
- Written notification to affected team members within 5 days of air monitoring and blood lead results.
- Provide for engineering, administrative, and work practice controls as needed.
- Require minimum respiratory protection (10xPEL), fit tests current within last 12 months.
- No tobacco, food, or drinks in lead area.
- Clearly establish controlled exit points from lead work areas and monitor team member hygiene practices.
- Conduct hazardous communications (RTK) and lead program training (activity planning).
- Review and update as required lead work activity plans every 6 months.
- Team members must be offered a medical exam and/or consultation if working in lead area for more than 30 days in any previous 12 month period and blood lead level result is \(>40 \text{ ug/dl}\).

III. Above the PEL: Results (Concentration):

- \(>50 \text{ ug/m}^3 (\text{PEL}) - 8 \text{ hour shift (TWA)}\)
- \(>40 \text{ ug/m}^3 (\text{PEL}) - 10 \text{ hour shift (TWA)}\)
- \(>33 \text{ ug/m}^3 (\text{PEL}) - 12 \text{ hour shift (TWA)}\)

Minimum Action Required:

- Ensure affected team members are current with Cianbro’s medical surveillance monitoring (blood lead/ZPP testing). Refer to Appendix D of this Safety Policy and Procedure.
- Contact Corporate Safety Department immediately to establish increased frequency for blood lead testing.
- Continue air monitoring every 3 months unless activity conditions change.
- Make available wash and shower facilities.
- Provide clean protective clothing (coveralls, gloves, hats, shoes, and shoe covers) weekly. (Daily if levels \(>200 \text{ ug/m}^3\).
- Ensure lead levels from surface contamination in change facilities and break areas does not exceed 200 ug/ft².
- Written notification to affected team members within 5 days of air monitoring and blood lead results.
- Provide for engineering, administrative, and work practice controls as needed.
- No tobacco, food, or drink in lead area.
- Clearly establish controlled exit points from lead work areas and monitor team member hygiene practices.
- Require minimum respiratory protection (50xPEL), fit tests current within last 12 months.
- Conduct hazardous communications (RTK) and lead program training (activity planning).
- Review and update as necessary lead activity plans every 6 months.
- Post lead work areas with signs “Warning Lead Work Area Poison No Smoking or Eating”.
- Team members must be offered a medical exam and/or consultation if working in lead area for more than 30 days in any previous 12 month period and blood lead level results is \(>40 \text{ ug/dl}\).
9.4 Appendix D

OSHA Federal Regulations
Appendix B to Sec. 1926.62 - Team Member Standard Summary

(EDITOR’S NOTE: The information contained in the appendices to this section is not intended by itself, to create any additional obligations not otherwise imposed by this standard nor detract from existing obligation.)

This appendix summarizes key provisions of the interim final standard for lead in construction that you as a worker should become familiar with.

I. Permissible Exposure Limit (PEL) - Paragraph (C)

The standard sets a permissible exposure limit (PEL) of 50 micrograms of lead per cubic meter of air (50 ug/m³), averaged over an 8-hour workday which is referred to as a time-weighted average (TWA). This is the highest level of lead in air to which you may be permissibly exposed over an 8-hour workday. However, since this is an 8-hour average, short exposures above PEL are permitted so long as for each 8-hour day your average exposure does not exceed this level. This interim final standard, however, takes into account the fact that your daily exposure to lead can extend beyond a typical 8-hour workday as the result of overtime or other alterations in your work schedule. To deal with this situation, the standard contains a formula that reduces your permissible exposure when you are exposed more than 8 hours. For example, if you are exposed to lead for 10 hours a day, the maximum permitted average exposure would be 40 ug/m³.

II. Exposure Assessment - Paragraph (D)

If lead is present in your workplace in any quantity, your employer is required to make an initial determination of whether any team member’s exposure to lead exceeds the action level (30 ug/m³ averaged over an 8-hour day). Team member exposure is that exposure which would occur if the team member were not using a respirator. This initial determination requires your employer to monitor workers’ exposures unless he or she has objective data that can demonstrate conclusively that no team member will be exposed to lead in excess of the action level. Where objective data is used in lieu of actual monitoring the employer must establish and maintain an accurate record, documenting its relevancy in assessing exposure levels for current job conditions. If such objective data is available, the employer need proceed no further on team member exposure assessment until such time that conditions have changed and the determination is no longer valid.

Objective data may be compiled from various sources, e.g., insurance companies and trade associations and information from suppliers or exposure data collected from similar operations. Objective data may also comprise previously collected sampling data including area monitoring. If it cannot be determined through using objective data that worker exposure is less than the action level, your employer must conduct monitoring or must rely on relevant previous personal sampling, if available. Where monitoring is required for the initial determination, it may be limited to a representative number of team members who are reasonably expected to have the highest exposure levels. If your employer has conducted appropriate air sampling for lead in the past 12 months, he or she may use these results, provided they are applicable to the same team member tasks and exposure conditions and meet the requirements for accuracy as specified in the standard. As with objective data, if such results are relied upon for the initial determination, your employer must establish and maintain a record as to the relevancy of such data to current job conditions.

If there have been any team member complaints of symptoms which may be attributed to exposure to lead or if there is any other information or observations which would indicate team member exposure to lead, this must also be considered as part of the initial determination.

If this initial determination shows that a reasonable possibility exists that any team member may be exposed, without regard to respirators, over the action level, your employer must set up an air-monitoring program to determine the exposure level representative of each team member exposed to lead at your workplace. In carrying out this air-monitoring program, your employer is not required to monitor the exposure of every team member, but he or she must monitor a representative number of team members and job types. Enough sampling must be done to enable each team member’s exposure level to reasonably represent full shift exposure. In addition, these air samples must be taken under conditions...
that represent each team member's regular, daily exposure to lead. Sampling performed in the past 12 months may be used to determine exposures above the action level if such sampling was conducted during work activities essentially similar to present work conditions.

The standard lists certain tasks which may likely result in exposures to lead in excess of the PEL and, in some cases, exposures in excess of 50 times the PEL. If you are performing any of these tasks, your employer must provide you with appropriate respiratory protection, protective clothing and equipment, change areas, hand washing facilities, biological monitoring, and training until such time that an exposure assessment is conducted which demonstrates that your exposure level is below the PEL.

If you are exposed to lead and air sampling is performed, your employer is required to notify you in writing within 5 working days of the air monitoring results that represent your exposure. If the results indicate that your exposure exceeds the PEL, (without regard to your use of a respirator), then your employer must also notify you of this in writing, and provide you with a description of the corrective action that has been taken or will be taken to reduce your exposure.

Your exposure must be rechecked by monitoring, at least every six months, if your exposure is at or over the action level but below the PEL. Your employer may discontinue monitoring for you if 2 consecutive measurements, taken at least 7 days apart, are at or below the action level. Air monitoring must be repeated every 3 months if you are exposed over the PEL. Your employer must continue monitoring for you at this frequency until 2 consecutive measurements, taken at least 7 days apart, are below the PEL but above the action level, at which time your employer must repeat monitoring of your exposure every six months and may discontinue monitoring only after your exposure drop to or below the action level. However, whenever there is a change of equipment, process, control, or personnel or a new type of job is added at your workplace that may result in new or additional exposure to lead, your employer must perform additional monitoring.

III. Methods of Compliance - Paragraph (E)

Your employer is required to assure that no team member is exposed to lead in excess of the PEL as an 8-hour TWA. The interim final standard for lead in construction requires employers to institute engineering and work practice controls including administrative controls to the extent feasible to reduce team member exposure to lead. Where such controls are feasible but not adequate to reduce exposures below the PEL they must be used nonetheless to reduce exposures to the lowest level that can be accomplished by these means and then supplemented with the appropriate respiratory protection.

Your employer is required to develop and implement a written compliance program prior to the commencement of any job where team member exposures may reach the PEL as an 8-hour TWA. The interim final standard identifies the various elements that must be included in the plan. For example, employers are required to include a description of operations in which lead is emitted, detailing other relevant information about the operation such as the type of equipment used, the type of material involved, team member job responsibilities, operating procedures and maintenance practices. In addition, your employer’s compliance plan must specify the means that will be used to achieve compliance and, where engineering controls are required, include any engineering plans or studies that have been used to select the control methods. If administrative controls involving job rotation are used to reduce team member exposure to lead, the job rotation schedule must be included in the compliance plan. The plan must also detail the type of protective clothing and equipment, including respirators, housekeeping and hygiene practices that will be used to protect you from the adverse effects of exposure to lead.

The written compliance program must be made available, upon request, to affected team members and their designated representatives, the Assistant Secretary and the Director.

Finally, the plan must be reviewed and updated at least every 6 months to assure it reflects the current status in exposure control.

IV. Respiratory Protection - Paragraph (F)

Your employer is required to provide and assure your use of respirators when your exposure to lead is not controlled below the PEL by other means. The employer must pay the cost of the respirator. Whenever you request one, your employer is also required to provide you a respirator even if your air exposure level is not above the PEL. You might desire a respirator when, for example, you have received
medical advice that your lead absorption should be decreased. Or, you may intend to have children in the near future, and want to reduce the level of lead in your body to minimize adverse reproductive effects. While respirators are the least satisfactory means of controlling your exposure, they are capable of providing significant protection if properly chosen, fitted, worn, cleaned, maintained, and replaced when they stop providing adequate protection.

Your employer is required to select respirators from the types listed in Table I of the Respiratory Protection section of the standard (1926.62(f)). Any respirator chosen must be approved by the National Institute for Occupational Safety and Health (NIOSH) under the provisions of 42 CFR part 84. This respirator selection table will enable your employer to choose a type of respirator that will give you a proper amount of protection based on your airborne lead exposure. Your employer may select a type of respirator that provides greater protection that that required by the standard; that is, one recommended for a higher concentration of lead than is present in your workplace. For example, a powered air-purifying respirator (PAPR) is much more protective than a typical negative pressure respirator, and may also be more comfortable to wear. A PAPR has a filter, cartridge, or canister to clean the air, and a power source that continuously blows filtered air into your breathing zone. Your employer might make a PAPR available to you to ease the burden of having to wear a respirator for long periods of time. The standard provides that you can obtain a PAPR upon request.

Your employer must also start a Respiratory Protection Program. This program must include written procedures for the proper selection, use, cleaning, storage, and maintenance of respirators.

Your employer must ensure that your respirator facepiece fits properly. Proper fit of a respirator facepiece is critical to your protection from airborne lead. Obtaining a proper fit on each team member may require your employer to make available several different types of respirator masks. To ensure that your respirator fits properly and that facepiece leakage is minimal, your employer must give you either a qualitative or quantitative fit test as specified in Appendix A of the Respiratory Protection standard located at 29 CFR 1910.134.

You must also receive from your employer proper training in the use of respirators. Your employer is required to teach you how to wear a respirator, to know why it is needed, and to understand its limitations.

Your employer must test the effectiveness of your negative pressure respirator initially and at least annually thereafter with a “qualitative fit test”. In this test, the fit of the facepiece is checked by seeing if you can smell a substance placed outside the respirator. If you can, there is appreciable leakage where the facepiece meets your face.

The standard provides that if your respirator uses filter elements, you must be given an opportunity to change the filter elements whenever an increase in breathing resistance is detected. You also must be permitted to periodically leave your work area to wash your face and respirator facepiece whenever necessary to prevent skin irritation. If you ever have difficulty in breathing during a fit test or while using a respirator, your employer must make a medical examination available to you to determine whether you can safely wear a respirator. The result of this examination may be to give you a positive pressure respirator (which reduces breathing resistance) or to provide alternate means of protection.

V. Protective Work Clothing and Equipment - Paragraph (G)

If you are exposed to lead above the PEL as an 8-hour TWA, without regard to your use of a respirator, or if you are exposed to lead compounds such as lead arsenate or lead azide which can cause skin and eye irritation, your team member must provide you with protective work clothing and equipment appropriate for the hazard. If work clothing is provided, it must be provided in a clean and dry condition at least weekly, and daily if your airborne exposure to lead is greater than 200 ug/m3. Appropriate protective work clothing and equipment can include coveralls or similar full-body work clothing, gloves, hats, shoes or disposable shoe coverlets, and face shields or vented goggles. Your employer is responsible for providing repairs and replacement as necessary, and also is responsible for cleaning, laundering or disposal of protective clothing and equipment.

The interim final standard requires that your employer assures that you follow good work practices when you are working in areas where your exposure to lead may exceed the PEL. With respect to protective clothing and equipment, where appropriate, the following procedures should be observed prior to beginning work:

1. Change into work clothing and shoe covers in a clean section of the designated changing areas
2. Use work garments and appropriate protective gear, including respirators before entering the work area.
3. Store any clothing not worn under protective clothing in the designated changing area.

Workers should follow these procedures upon leaving the work area:
1. HEPA vacuum heavily contaminated protective work clothing while it is still being worn. At no time may lead be removed from protective clothing by any means which may result in uncontrolled dispersal of lead into the air.
2. Remove shoe covers and leave them in the work area.
3. Remove protective clothing and gear in the dirty area of the designated changing area. Remove protective coveralls by carefully rolling down the garment to reduce exposure to dust.
4. Remove respirators last.
5. Wash hands and face.

Workers should follow these procedures upon finishing work for the day (in addition to procedures described above):
1. Where applicable, place disposal coveralls and shoe covers with the abatement waste.
2. Contaminated clothing that is to be cleaned, laundered or disposed of must be placed in closed containers in the change room.
3. Clean protective gear, including respirators, according to standard procedures.
4. Wash hands and face again. If showers are available, take a shower and wash hair. If shower facilities are not available at the work site, shower immediately at home and wash hair.

VI. Housekeeping - Paragraph (H)

Your employer must establish a housekeeping program sufficient to maintain all surfaces as free as practicable of accumulations of lead dust. Vacuuming is the preferred method of meeting this requirement, and the use of compressed air to clean floors and other surfaces is generally prohibited unless removal with compressed air is done in conjunction with ventilation systems designed to contain dispersal of the lead dust. Dry or wet sweeping, shoveling, or brushing may not be used except where vacuuming or other equally effective methods have been tried and do not work. Vacuums must be used equipped with a special filter called a high-efficiency particulate air (HEPA) filter and emptied in a manner that minimizes the reentry of lead into the workplace.

VII. Hygiene Facilities and Practices - Paragraph (I)

The standard requires that hand washing facilities be provided where occupational exposure to lead occurs. In addition, change areas, showers (where feasible), and lunchrooms or eating areas are to be made available to workers exposed to lead above the PEL. Your employer must assure that except in these facilities, food and beverage is not present or consumed, tobacco products are not present or used, and cosmetics are not applied, where airborne exposures are above the PEL. Change rooms provided by your employer must be equipped with separate storage facilities for your protective clothing and equipment and street clothes to avoid cross-contamination. After showering, no required protective clothing or equipment worn during the shift may be worn at home. It is important that contaminated clothing or equipment be removed in change areas and not to be worn home or you will extend your exposure to your family since lead from your clothing can accumulate in your house, car, etc. Lunchrooms or eating areas may not be entered with protective clothing or equipment unless surface dust has been removed by vacuuming, downdraft booth, or other cleaning method. Finally, workers exposed above the PEL must wash both their hands and faces prior to eating, drinking, smoking or applying cosmetics.

All of the facilities and hygiene practices just discussed are essential to minimize additional sources of lead absorption from inhalation or ingestion of lead that may accumulate on you, your clothes, or your possessions. Strict compliance with these provisions can virtually eliminate several sources of lead exposure that significantly contribute to lead absorption.
VIII.  Medical Surveillance - Paragraph (J)

The medical surveillance program is part of the standard’s comprehensive approach to the prevention of lead-related disease. Its purpose is to supplement the main thrust of the standard that is aimed at minimizing airborne concentrations of lead and sources of ingestion. Only medical surveillance can determine if the other provisions of the standard have effectively protected you as an individual. Compliance with the standard’s provision will protect most workers from the adverse effects of lead exposure, but may not be satisfactory to protect individual workers. (1) who have high body burdens of lead acquired over past years, (2) who have additional uncontrolled sources of non-occupational lead exposure, (3) who exhibit unusual variations in lead absorption rates, or (4) who have specific non-work related medical conditions which could be aggravated by lead exposure (e.g., renal disease, anemia). In addition, control systems may fail, or hygiene and respirator programs may be inadequate. Periodic medical surveillance of individual workers will help detect those failures. Medical surveillance will also be important to protect your reproductive ability-regardless of whether you are a man or a woman.

All medical surveillance required by interim final standards must be performed by or under the supervision of a licensed physician. The employer must provide required medical surveillance without cost to team members and at a reasonable time and place. The standard’s medical surveillance program has two parts - periodic biological monitoring and medical examinations. Your employer’s obligation to offer you medical surveillance is triggered by the results of the air monitoring program. Full medical surveillance must be made available to all team members who are or may be exposed to lead in excess of the action level for more than 30 days a year and whose blood lead level exceeds 40 ug/dl. Initial medical surveillance consisting of blood sampling and analysis for lead and zinc protoporphyrin must be made available to all team members exposed at any time (1 day) above the action level.

Biological monitoring under the standard must be provided at least every 2 months for the first 6 months and every 6 months thereafter until your blood lead level is below 40 ug/dl. A zinc protoporphyrin (ZPP) test is a very useful blood test that measures an adverse metabolic effect of lead on your body and is therefore an indicator of lead toxicity.

If your BLL exceeds 40 ug/dl the monitoring frequency must be increased from every 6 months to at least every 2 months and not reduced until two consecutive BLLs indicate a blood lead level below 40 ug/dl. Each time your BLL is determined to be over 40 ug/dl, your employer must notify you of this in writing within five working days of his or her receipt of the test results. The employer must also inform you that the standard requires temporary medical removal with economic protection when your BLL exceeds 50 ug/dl. (see discussion of Medical Removal Protection-Paragraph (K).) Anytime your BLL exceeds 50 ug/dl your employer must make available to you within two weeks of receipt of these test results a second follow-up BLL test to confirm your BLL. If the two tests both exceed 50 ug/dl, and you are temporarily removed, then your employer must make successive BLL tests available to you on a monthly basis during the period of your removal.

Medical examinations beyond the initial one must be made available on an annual basis if your blood lead level exceeds 40 ug/dl at any time during the preceding year and you are being exposed above the airborne action level of 30 ug/m3 for 30 or more days per year. The initial examination will provide information to establish a baseline to which subsequent data can be compared.

An initial medical examination to consist of blood sampling and analysis for lead and zinc protoporphyrin must also be made available (prior to assignment) for each team member being assigned for the first time to an area where airborne concentration of lead equals or exceeds the action level at any time. In addition, a medical examination or consultation must be made available as soon as possible if you notify your employer that you are experiencing signs or symptoms commonly associated with lead poisoning or that you have difficulty breathing while wearing a respirator or during a respirator fit test. You must also be provided a medical examination or consultation if you notify your employer that you desire medical advice concerning the effects of current or past exposure to lead on your ability to procreate a healthy child.

Finally, appropriate follow-up medical examinations or consultations may also be provided for team members who have been temporarily removed from exposure under the medical removal protection provisions of the standard. (See Part IX, below.)
The standard specifies the minimum content of pre-assignment and annual medical examinations. The content of other types of medical examinations and consultations is left up to the sound discretion of the examining physician. Pre-assignment and annual medical examinations must include (1) a detailed work history and medical history; (2) a thorough physical examination, including an evaluation of your pulmonary status if you will be required to use a respirator; (3) a blood pressure measurement; (4) a series of laboratory tests designed to check your blood chemistry and your kidney function. In addition, at any time upon your request, a laboratory evaluation of male fertility will be made (microscopic examination of a sperm sample), or a pregnancy test will be given.

The standard does not require that you participate in any of the medical procedures, tests, etc., which your employer is, required to make available to you. Medical surveillance can, however, play a very important role in protecting your health. You are strongly encouraged, therefore, to participate in a meaningful fashion. The standard contains a multiple physician review mechanism that will give you a chance to have a physician of your choice directly participate in the medical surveillance program. If you are dissatisfied with an examination by a physician chosen by your employer, you can select a second physician to conduct an independent analysis. The two doctors would attempt to resolve any differences of opinion, and select a third physician who conducts medical surveillance under the lead standard-unless you and your employer can agree on the choice of a physician or physicians. Some companies and unions have agreements in advance, for example, to use certain independent medical laboratories or panels of physicians. Any of these arrangements are acceptable so long as required medical surveillance is made available to workers.

The standard requires your employer to provide certain information to a physician to aid in his or her examination of you. This information includes (1) the standard and its appendices, (2) a description of your duties as they relate to occupational lead exposure, (3) your exposure level or anticipated exposure level, (4) a description of any personal protective equipment you wear, (5) prior blood lead level results, and (6) prior written medical opinions concerning you that the employer has. After a medical examination or consultation the physician must prepare a written report which must contain (1) the physician’s opinion as to whether you have any medical condition which places you at increased risk of material impairment to health from exposure to lead, (2) any recommended special protective measures to be provided to you, (3) any blood lead level determinations, and (4) any recommended limitation on your use of respirators. This last element must include a determination of whether you can wear a powered air-purifying respirator (PAPR) if you are found unable to wear a negative pressure respirator.

The medical surveillance program of the interim lead standard may at some point in time serve to notify certain workers that they have acquired a disease or other adverse medical condition as a result of occupational lead exposure. If this is true, these workers might have legal rights to compensation from public agencies, their employers, firms that supply hazardous products to their employers, or other persons. Some states have laws, including worker compensation laws, which disallow a worker who learns of a job-related health impairment to sue, unless the worker sues within a short period of time after learning of the impairment. (This period of time may be a matter of months or years.) An attorney can be consulted about these possibilities. It should be stressed that OSHA is in no way trying to either encourage or discourage claims or lawsuits. However, since results of the standard’s medical surveillance program can significantly affect the legal remedies of a worker who has acquired a job-related disease or impairment, it is proper for OSHA to make you aware of this.

The medical surveillance section of the standard also contains provisions dealing with chelation. Chelation is the use of certain drugs (administered in pill form or injected into the body) to reduce the amount of lead absorbed in body tissues. Experience accumulated by medical and scientific communities has largely confirmed the effectiveness of this type of therapy for the treatment of very severe lead poisoning. On the other hand, it has also been established that there can be a long list of extremely harmful side effects associated with the use of chelating agents. The medical community has balanced the advantages and disadvantages resulting from the use of chelating agents in various circumstances and has established when the use of these agents is acceptable. The standard includes these accepted limitations due to a history of abuse of chelation therapy by some lead companies. The most widely used chelating agents are calcium disodium EDTA, (CaNa2 EDTA), calcium disodium versenate (verenate), and d-penicillamine (pencillamine or cupramine).

The standard prohibits “prophylactic chelation” of any team member by any person the employer retains, supervises or controls. “Prophylactic chelation” is the routine use of chelating or similarly acting drugs to prevent elevated blood lead levels in workers who are occupationally exposed to lead, or the use of these...
drugs to routinely lower blood lead levels to predesignated concentrations believed to be “safe”. It should be emphasized that where an employer takes a worker who has no symptoms of lead poisoning and has chelation carried out by a physician (either inside or outside of a hospital) solely to reduce the worker’s blood lead level, that will generally be considered prophylactic chelation. The use of a hospital and a physician does not mean that prophylactic chelation is not being performed. Routine chelation to prevent increased or reduce current blood lead levels is unacceptable whatever the setting.

The standard allows the use of “therapeutic” or “diagnostic” chelation if administered under the supervision of a licensed physician in a clinical setting with thorough and appropriate medical monitoring. Therapeutic chelation responds to severe lead poisoning where there are marked symptoms. Diagnostic chelation involves giving a patient a dose of the drug then collecting all urine excreted for some period of time as aid to the diagnosis of lead poisoning.

In cases where the examining physician determines that chelation is appropriate, you must be notified in writing of this fact before such treatment. This will inform you of a potentially harmful treatment, and allow you to obtain a second opinion.

IX. Medical Removal Protection - Paragraph (K)

Excessive lead absorption subjects you to increased risk of disease. Medical removal protection (MRP) is a means of protecting you when, for whatever reasons, other methods, such as engineering controls, work practices, and respirators, have failed to provide the protection you need. MRP involves the temporary removal of a worker from his or her regular job to a place of significantly lower exposure without any loss of earnings, seniority, or other employment rights or benefits. The purpose of this program is to ease further lead absorption and allow your body to naturally excrete lead that has previously been absorbed. Temporary medical removal can result from an elevated blood lead level, or a medical opinion. For up to 18 months, or for as long as the job the team member was removed from lasts, protection is provided as a result of either form of removal. The vast majority of removed workers, however, will return to their former jobs long before this eighteen month period expires.

You may also be removed from exposure even if your blood lead level is below 50 ug/dl if a final medical determination indicates that you temporarily need reduced lead exposure for medical reasons. If the physician who is implementing your employers medical program makes a final written opinion recommending your removal or other special protective measures, your employer must implement the physician’s recommendation. If you are removed in this manner, you may only be returned when the doctor indicates that it is safe for you to do so.

The standard does not give specific instructions dealing with what an employer must do with a removed worker. Your job assignment upon removal is a matter for you, your employer and your union (if any) to work out consistent with existing procedures for job assignments. Each removal must be accomplished in a manner consistent with existing collective bargaining relationships. Your employer is given broad discretion to implement temporary removals so long as no attempt is made to override existing agreements. Similarly, a removed worker is provided no right to veto an employer’s choice that satisfies the standard.

In most cases, employers will likely transfer team members to other jobs with sufficiently low lead exposure. Alternately, a worker’s hours may be reduced so that the time weighted average exposure is reduced, or he or she may be temporarily laid off if no other alternative is feasible.

In all of these situations, MRP benefits must be provided during the period of removal - i.e., you continue to receive the same earnings, seniority, and other rights and benefits you would have had if you had not been removed. Earnings include more than just your base wage; it includes overtime, shift differentials, incentives, and other compensation you would have earned if you had not been removed. During the period of removal you must also be provided with appropriate follow-up medical surveillance. If you were removed because your blood lead level was too high, you must be provided with a monthly blood test. If a medical opinion caused your removal, you must be provided with medical tests or examinations that the doctor believes to be appropriate. If you do not participate in this follow up medical surveillance, you may lose your eligibility for MRP benefits.

When you are medically eligible to return to your former job, your employer must return you to your “former job status”. This means that you are entitled to the position, wages, benefits, etc., you would have
had if you had not been removed. If you would still be in your old job if no removal had occurred that is where you go back. If not, you are returned consistent with whatever job assignment discretion your employer would have had if no removal had occurred. MRP only seeks to maintain your rights, not expand them or diminish them. If you are removed under MRP and you are also eligible for worker compensation or other compensation for lost wages, your employer’s MRP benefits obligation is reduced by the amount that you actually receive from these other sources. This is also true if you obtain other employment during the time you are laid off with MRP benefits.

The standard also covers situations where an employer voluntarily removes a worker from exposure to lead due to the effects of lead on the team member’s medical condition, even though the standard does not require removal. In these situations MRP benefits must still be provided as though the standard required removal. Finally, it is important to note that in all cases where removal is required, respirators cannot be used as a substitute. Respirators may be used before removal becomes necessary, but not as an alternative to a transfer to a low exposure job, or to a lay-off with MRP benefits.

X. Team Member Information and Training - Paragraph (L)

Your employer is required to provide information and training program for all team members exposed to lead above the action level or who may suffer skin or eye irritation from lead compounds such as lead arsenate or lead azide. The program must train these team members regarding the specific hazards associated with their work environment, protective measures which can be taken, including the contents of any compliance plan in effect, the danger of lead to their bodies (including their reproductive systems), and their rights under the standard. All team members must be trained prior to initial assignment to areas where there is a possibility of exposure over the action level.

This training program must also be provided at least annually thereafter unless further exposure above the action level will not occur.

XI. Signs - Paragraph (M)

The standard requires that the following warning sign be posted in work areas where the exposure to lead exceeds the PEL:

WARNING LEAD WORK AREA POISON NO SMOKING OR EATING

These signs are to be posted and maintained in a manner that assures that the legend is readily visible.

XII. Recordkeeping - Paragraph (N)

Your employer is required to keep all records of exposure monitoring for airborne lead. These records must include the name and job classification of team members measured, details of the sampling and analytical techniques, the results of this sampling, and the type of respiratory protection being worn by the person sampled. Such records are to be retained for at least 30 years. Your employer is also required to keep all records of biological monitoring and medical examination results. These records must include the names of the team members, the physician’s written opinion, and a copy of the results of the examination. Medical records must be preserved and maintained for the duration of employment plus 30 years. However, if the team member’s duration of employment is less than one year, the employer need not retain that team member’s medical records beyond the period of employment if they are provided to the team member upon termination of employment.

Recordkeeping is also required if you are temporarily removed from your job under the medical removal protection program. This record must include your name and social security number, the date of your removal and return, how the removal was or is being accomplished, and whether or not the reason for the removal was an elevated blood lead level. Your employer is required to keep each medical removal record only for as long as the duration of a team member’s employment.

The standard requires that if you request to see or copy environmental monitoring, blood lead level monitoring, or medical removal records, they must be made available to you or to a representative that you authorize. Your union also has access to these records. Medical records other than BLLs must also be provided upon request to you, to your physician or to any other person whom you may specifically
designate. Your union does not have access to your personal medical records unless you authorize their access.

XIII. Observation of Monitoring - Paragraph (O)

When air monitoring for lead is performed at your workplace as required by this standard, your employer must allow you or someone you designate to act as an observer of the monitoring. Observers are entitled to an explanation of the measurement procedure, and to record the results obtained. Since results will not normally be available at the time of the monitoring, observers are entitled to record or receive the results of the monitoring when returned by the laboratory. Your employer is required to provide the observer with any personal protective devices required to be worn by team members working in the area that is being monitored. The employer must require the observer to wear all such equipment and to comply with all other applicable safety and health procedures.

XIV. Effective Date - Paragraph (P)

The standard's effective date is June 3, 1993. Employer obligation under the standard begin as of that date with full implementation of engineering controls as soon as possible but no later than within 4 months, and all other provisions completed as soon as possible, but no later than within 2 months from the effective date.

XV. For Additional Information

A. A copy of the interim standard for lead in construction can be obtained, free of charge by calling or writing OSHA Office of Publication, Room N-3101, United States Department of Labor, Washington, DC 20210: Telephone (202) 219-4667.

B. Additional information about the standard, its enforcement, and your employer's compliance can be obtained from the nearest OSHA Area Office listed in your telephone directory under United States Government/Department of Labor.
Health Effects and MSDS:

Lead

I. SUBSTANCE IDENTIFICATION
A. "Substance": Pure lead (Pb) is a heavy metal at room temperature and pressure and is a basic chemical element. It can combine with various other substances to form numerous lead compounds.
B. "Compounds Covered by the Standard": The word "lead" when used in this interim final standard means elemental lead, all inorganic lead compounds and a class of organic lead compounds called lead soaps. This standard does not apply to other organic lead compounds.
C. "Uses": Exposure to lead occurs in several different occupations in the construction industry, including demolition or salvage of structures where lead or lead-containing materials are present; removal or encapsulation of lead-containing materials, new construction, alteration, repair, or renovation of structures that contain lead or materials containing lead; installation of products containing lead. In addition, there are construction-related activities where exposure to lead may occur, including transportation, disposal, storage, or containment of lead or materials containing lead on construction sites, and maintenance operations associated with construction activities.
D. "Permissible Exposure": The permissible exposure limit (PEL) set by the standard is 50 micrograms of lead per cubic meter of air (50 ug/m(3)), averaged over an 8-hour workday.
E. "Action Level": The interim final standard establishes an action level of 30 micrograms of lead per cubic meter of air (30 ug/m(3)), averaged over an 8-hour workday. The action level triggers several ancillary provisions of the standard such as exposure monitoring, medical surveillance, and training.

II. HEALTH HAZARD DATA
A. "Ways in which lead enters your body": When absorbed into your body in certain doses, lead is a toxic substance. The object of the lead standard is to prevent absorption of harmful quantities of lead. The standard is intended to protect you not only from the immediate toxic effects of lead, but also from the serious toxic effects that may not become apparent until years of exposure have passed. Lead can be absorbed into your body by inhalation (breathing) and ingestion (eating). Lead (except for certain organic lead compounds not covered by the standard, such as tetraethyl lead) is not absorbed through your skin. When lead is scattered in the air as a dust, fume, or mist it can be inhaled and absorbed through your lungs and upper respiratory tract. Inhalation of airborne lead is generally the most important source of occupational lead absorption. You can also absorb lead through your digestive system if lead gets into your mouth and is swallowed. If you handle food, cigarettes, chewing tobacco, or make-up which have lead on them or handle them with hands contaminated with lead, this will contribute to ingestion. A significant portion of the lead that you inhale or ingest gets into your blood stream. Once in your blood stream, lead is circulated throughout your body and stored in various organs and body tissues. Some of this lead is quickly filtered out of your body and excreted, but some remains in the blood and other tissues. As exposure to lead continues, the amount stored in your body will increase if you are absorbing more lead than your body is excreting. Even though you may not be aware of any immediate symptoms of disease, this lead stored in your tissues can be slowly causing irreversible damage, first to individual cells, then to your organs and whole body systems.
B. "Effects of overexposure to lead" - (1) "Short term (acute) overexposure". Lead is a potent, systemic poison that serves no known useful function once absorbed by your body. Taken in large enough doses, lead can kill you in a matter of days. A condition affecting the brain called acute encephalopathy may arise which develops quickly to seizures, coma, and death from cardiorespiratory arrest. A short term dose of lead can lead to acute encephalopathy. Short term occupational exposures of this magnitude are highly unusual, but not impossible. Similar forms of encephalopathy may, however, arise from extended, chronic exposure to lower doses of lead. There is no sharp dividing line between rapidly developing acute effects of lead, and chronic effects which take longer to acquire. Lead adversely affects numerous body systems, and causes forms of health impairment and disease which arise after periods of exposure as short as days or as long as several years.
(2) "Long-term (chronic) overexposure". Chronic overexposure to lead may result in severe damage to your blood-forming, nervous, urinary and reproductive systems. Some common symptoms of chronic overexposure include loss of appetite, metallic taste in the mouth, anxiety, constipation, nausea, pallor, excessive tiredness, weakness, insomnia, headache, nervous irritability, muscle and joint pain or soreness, fine tremors, numbness, dizziness, hyperactivity and colic. In lead colic there may be severe abdominal pain. Damage to the central nervous system in general and the brain (encephalopathy) in particular is one of the most severe forms of lead poisoning. The most severe, often fatal, form of encephalopathy may be preceded by vomiting, a feeling of dullness progressing to drowsiness and stupor, poor memory, restlessness, irritability, tremor, and convulsions. It may arise suddenly with the onset of seizures, followed by coma, and death. There is a tendency for muscular weakness to develop at the same time. This weakness may progress to paralysis often observed as a characteristic "wrist drop"
or "foot drop" and is a manifestation of a disease to the nervous system called peripheral neuropathy. Chronic overexposure to lead also results in kidney disease with few, if any, symptoms appearing until extensive and most likely permanent kidney damage has occurred.

Routine laboratory tests reveal the presence of this kidney disease only after about two-thirds of kidney function is lost. When overt symptoms of urinary dysfunction arise, it is often too late to correct or prevent worsening conditions, and progression to kidney dialysis or death is possible. Chronic overexposure to lead impairs the reproductive systems of both men and women. Overexposure to lead may result in decreased sex drive, impotence and sterility in men. Lead can alter the structure of sperm cells raising the risk of birth defects. There is evidence of miscarriage and stillbirth in women whose husbands were exposed to lead or who were exposed to lead themselves. Lead exposure also may result in decreased fertility, and abnormal menstrual cycles in women. The course of pregnancy may be adversely affected by exposure to lead since lead crosses the placental barrier and poses risks to developing fetuses. Children born of parents either one of whom were exposed to excess lead levels are more likely to have birth defects, mental retardation, behavioral disorders or die during the first year of childhood. Overexposure to lead also disrupts the blood - forming system resulting in decreased hemoglobin (the substance in the blood that carries oxygen to the cells) and ultimately anemia. Anemia is characterized by weakness, pallor and fatigability as a result of decreased oxygen carrying capacity in the blood.

BLL measurements show the amount of lead circulating in your blood stream, but do not give any information about the amount of lead stored in your various tissues. BLL measurements merely show current absorption of lead, not the effect that lead is having on your body or the effects that past lead exposure may have already caused. Past research into lead - related diseases, however, has focused heavily on associations between BLLs and various diseases. As a result, your BLL is an important indicator of the likelihood that you will gradually acquire a lead - related health impairment or disease. Once your blood lead level climbs above 40 ug/dl, your risk of disease increases. There is a wide variability of individual response to lead, thus it is difficult to say that a particular BLL in a given person will cause a particular effect. Studies have associated fatal encephalopathy with BLLs as low as 150 ug/dl. Other studies have shown other forms of diseases in some workers with BLLs well below 80 ug/dl. Your BLL is a crucial indicator of the risks to your health, but one other factor is also extremely important. This factor is the length of time you have had elevated BLLs. The longer you have an elevated BLL, the greater the risk that large quantities of lead are being gradually stored in your organs and tissues (body burden). The greater your overall body burden, the greater the chances of substantial permanent damage. The best way to prevent all forms of lead - related impairments and diseases -- both short term and long term -- is to maintain your BLL below 40 ug/dl. The provisions of the standard are designed with this end in mind.

Your employer has prime responsibility to assure that the provisions of the standard are complied with by both the company and by individual workers. You, as a worker, however, also have a responsibility to assist your employer in complying with the standard. You can play a key role in protecting your own health by learning about the lead hazards and their control, learning what the standard requires, following the standard where it governs your own actions, and seeing that your employer complies with provisions governing his or her actions.

(4) "Reporting signs and symptoms of health problems". You should immediately notify your employer if you develop signs or symptoms associated with lead poisoning or if you desire medical advice concerning the effects of current or past exposure to lead or your ability to have a healthy child. You should also notify your employer if you have difficulty breathing during a respirator fit test or while wearing a respirator. In each of these cases, your employer must make available to you appropriate medical examinations or consultations. These must be provided at no cost to you and at a reasonable time and place. The standard contains a procedure whereby you can obtain a second opinion by a physician of your choice if your employer selected the initial physician.
9.5 Appendix E

General Health Effects of Lead Exposure

You get lead into your body by breathing it in or by swallowing it. Lead particles do not go through the skin, but if lead dust is on your hands it can be accidentally swallowed while eating, drinking, or smoking.

Lead is hazardous when it gets into the bloodstream where it can move around the body. High exposures over a short period of time or lower exposures spread out over longer time periods can cause lead poisoning. Lead can damage the brain and nervous system, kidneys, and reproductive systems. Lead also contributes to high blood pressure. Most of the absorbed lead is eventually stored in the bones where it may stay for decades. Under certain conditions, the lead stored in the bone may leach slowly into the bloodstream.

The early effects of lead poisoning are not specific and resemble the flu symptoms. Short term and long term effects of lead overexposure are listed below.

Lead poisoning is preventable. Many of the health problems caused by lead exposure are reversible if exposure is eliminated or reduced.

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<tr>
<th>SHORT TERM EFFECTS</th>
<th>LONG TERM EFFECTS</th>
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<td>Stomach cramps</td>
<td>High blood pressure</td>
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<td>Poor appetite</td>
<td>Nerve disorders</td>
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<td>Irritability/anxiety</td>
<td>Brain damage</td>
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<td>Fatigue</td>
<td>Kidney damage</td>
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<td>Constipation</td>
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<td>Sleep problems</td>
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<td>Impotence/loss of sex drive</td>
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From: www.blueprintproject.org
Guides for Managing Lead and Silica Control Programs in Construction
Cadmium

I. Substance Identification
A. Substance: Cadmium.
B. 8-Hour, Time-weighted-average, Permissible Exposure Limit (TWA PEL):
1. TWA PEL: Five micrograms of cadmium per cubic meter of air 5 ug/m(3), time-weighted average (TWA) for an 8-hour workday.
C. Appearance: Cadmium metal-soft, blue-white, malleable, lustrous metal or grayish-white powder. Some cadmium compounds may also appear as a brown, yellow, or red powdery substance.

II. Health Hazard Data
A. Routes of Exposure. Cadmium can cause local skin or eye irritation. Cadmium can affect your health if you inhale it or if you swallow it.
B. Effects of Overexposure.
1. Short-term (acute) exposure: Cadmium is much more dangerous by inhalation than by ingestion. High exposures to cadmium that may be immediately dangerous to life or health occur in jobs where workers handle large quantities of cadmium dust or fume; heat cadmium-containing compounds or cadmium-coated surfaces; weld with cadmium solders or cut cadmium-containing materials such as bolts.
2. Severe exposure may occur before symptoms appear. Early symptoms may include mild irritation of the upper respiratory tract, a sensation of constriction of the throat, a metallic taste and/or a cough. A period of 1-10 hours may precede the onset of rapidly progressing shortness of breath, chest pain, and flu-like symptoms with weakness, fever, headache, chills, sweating and muscular pain. Acute pulmonary edema usually develops within 24 hours and reaches a maximum by three days. If death from asphyxia does not occur, symptoms may resolve within a week.
3. Long-term (chronic) exposure. Repeated or long-term exposure to cadmium, even at relatively low concentrations, may result in kidney damage and an increased risk of cancer of the lung and of the prostate.
C. Emergency First Aid Procedures.
1. Eye exposure: Direct contact may cause redness or pain. Wash eyes immediately with large amounts of water, lifting the upper and lower eyelids. Get medical attention immediately.
2. Skin exposure: Direct contact may result in irritation. Remove contaminated clothing and shoes immediately. Wash affected area with soap or mild detergent and large amounts of water. Get medical attention immediately.
3. Ingestion: Ingestion may result in vomiting, abdominal pain, nausea, diarrhea, headache and sore throat. Treatment for symptoms must be administered by medical personnel. Under no circumstances should the employer allow any person whom he retains, employs, supervises or controls to engage in therapeutic chelation. Such treatment is likely to translocate cadmium from pulmonary or other tissue to renal tissue. Get medical attention immediately.
4. Inhalation: If large amounts of cadmium are inhaled, the exposed person must be moved to fresh air at once. If breathing has stopped, perform cardiopulmonary resuscitation. Administer oxygen if available. Keep the affected person warm and at rest. Get medical attention immediately.
5. Rescue: Move the affected person from the hazardous exposure. If the exposed person has been overcome, attempt rescue only after notifying at least one other person of the emergency and putting into effect established emergency procedures. Do not become a casualty yourself. Understand your emergency rescue procedures and know the location of the emergency equipment before the need arises.

III. Team member Information
A. Protective Clothing and Equipment.
1. Respirators: You may be required to wear a respirator for non-routine activities; in emergencies; while your employer is in the process of reducing cadmium exposures through engineering controls; and where engineering controls are not feasible. If respirators are worn in the future, they must have a joint Mine Safety and Health Administration (MSHA) and National Institute for Occupational Safety and Health (NIOSH) label of approval. Cadmium does not have a detectable odor except at levels well above the permissible exposure limits. If you can smell cadmium while wearing a respirator, proceed immediately to fresh air. If you experience difficulty breathing while wearing a respirator, tell your employer.
2. Protective Clothing: You may be required to wear impermeable clothing, gloves, foot gear, a face shield, or other appropriate protective clothing to prevent skin contact with cadmium. Where protective clothing is required, your employer must provide clean garments to you as necessary to assure that the clothing protects you adequately. The employer must replace or repair protective clothing that has become torn or otherwise damaged.
3. Eye Protection: You may be required to wear splash-proof or dust resistant goggles to prevent eye contact with cadmium.
B. Employer Requirements.
1. Medical: If you are exposed to cadmium at or above the action level, your employer is required to provide a medical examination, laboratory tests and a medical history according to the medical surveillance provisions under paragraph (I) of this standard. (See summary chart and tables in this Appendix A.) These tests shall be provided without cost to you. In addition, if you are accidentally exposed to cadmium under conditions known or suspected to constitute toxic exposure to cadmium, your employer is required to make special tests available to you.
2. Access to Records: All medical records are kept strictly confidential. You or your representative is entitled to see the records of measurements of your exposure to cadmium. Your medical examination records can be furnished to your personal physician or designated representative upon request by you to your employer.
3. Observation of Monitoring: Your employer is required to perform measurements that are representative of your exposure to cadmium and you or your designated representative is entitled to observe the monitoring procedure. You are entitled to observe the steps taken in the measurement procedure, and to record the results obtained. When the monitoring procedure is taking place in an area where respirators or personal protective clothing and equipment are required to be worn, you or your representative must also be provided with, and must wear the protective clothing and equipment.
C. Team member Requirements. You will not be able to smoke, eat, drink, chew gum or tobacco, or apply cosmetics while working with cadmium in regulated areas. You will also not be able to carry or store tobacco products, gum, food, drinks or cosmetics in regulated areas because these products easily become contaminated with cadmium from the workplace and can therefore create another source of unnecessary cadmium exposure.
Some workers will have to change out of work clothes and shower at the end of the day, as part of their workday, in order to wash cadmium from skin and hair. Hand washing and cadmium-free eating facilities shall be provided by the employer and proper hygiene should always be performed before eating. It is also recommended that you do not smoke or use tobacco products, because among other things, they naturally contain cadmium. For further information, read the labeling on such products.
Inorganic Arsenic

I. SUBSTANCE IDENTIFICATION
A. Substance. Inorganic Arsenic.
B. Definition. Copper acetoarsenite, arsenic and all inorganic compounds containing arsenic except arsenic, measured as arsenic (As).
C. Permissible Exposure Limit. 10 micrograms per cubic meter of air as determined as an average over an 8-hour period. No team member may be exposed to any skin or eye contact with arsenic trichloride or to skin or eye contact likely to cause skin or eye irritation.
D. Regulated Areas. Only team members authorized by your employer should enter a regulated area.

II. HEALTH HAZARD DATA
A. Comments. The health hazard of inorganic arsenic is high.
B. Ways in which the chemical affects your body. Exposure to airborne concentrations of inorganic arsenic may cause lung cancer, and can be a skin irritant. Inorganic arsenic may also affect your body if swallowed. One compound in particular, arsenic trichloride, is especially dangerous because it can be absorbed readily through the skin. Because inorganic arsenic is a poison, you should wash your hands thoroughly prior to eating or smoking.

III. PROTECTIVE CLOTHING AND EQUIPMENT
A. Respirators. Respirators will be provided by your employer at no cost to you for routine use if your employer is in the process of implementing engineering and work practice controls or where engineering and work practice controls are not feasible or insufficient. You must wear respirators for non-routine activities or in emergency situations where you are likely to be exposed to levels of inorganic arsenic in excess of the permissible exposure limit. Since how well your respirator fits your face is very important, your employer is required to conduct fit tests to make sure the respirator seals properly when you wear it. These tests are simple and rapid and will be explained to you during training sessions.
B. Protective clothing. If you work in a regulated area, your employer is required to provide at no cost to you, and you must wear, appropriate, clean, protective clothing and equipment. The purpose of this equipment is to prevent you from bringing to your home arsenic-contaminated dust and to protect your body from repeated skin contact with inorganic arsenic likely to cause skin irritation. This clothing should include such items as coveralls or similar full-body clothing, gloves, shoes or coverlets, and aprons. Protective equipment should include face shields or vented goggles, where eye irritation may occur.

IV. HYGIENE FACILITIES AND PRACTICES
You must not eat, drink, smoke, chew gum or tobacco, or apply cosmetics in the regulated area, except that drinking water is permitted. If you work in a regulated area your employer is required to provide lunchrooms and other areas for these purposes.
If you work in a regulated area, your employer is required to provide showers, washing facilities, and change rooms. You must wash your face and hands before eating and must shower at the end of the work shift. Do not take used protective clothing out of change rooms without your employer's permission. Your employer is required to provide for laundering or cleaning of your protective clothing.

V. SIGNS AND LABELS
Your employer is required to post warning signs and labels for your protection. Signs must be posted in regulated areas. The signs must warn that a cancer hazard is present, that only authorized team members may enter the area, and that no smoking or eating is allowed, and that respirators must be worn.

VI. MEDICAL EXAMINATIONS
If your exposure to arsenic is over the Action Level (5 mg/m3) -- (including all persons working in regulated areas) at least 30 days per year, or you have been exposed to arsenic for more than 10 years over the Action Level, your employer is required to provide you with a medical examination. The examination shall be every 6 months for team members over 45 years old or with more than 10 years exposure over the Action Level and annually for other covered team members. The medical examination must include a medical history; a chest x-ray; skin examination and a nasal examination. The examining physician will provide a written opinion to your employer containing the results of the medical exams. You should also receive a copy of this opinion. The physician must not tell your employer any conditions he detects unrelated to occupational exposure to arsenic but must tell you those conditions.

VII. OBSERVATION OF MONITORING
Your employer is required to monitor your exposure to arsenic and you or your representatives are entitled to observe the monitoring procedure. You are entitled to receive an explanation of the measurement procedure, and to record the results obtained. When the monitoring procedure is taking
place in an area where respirators or personal protective clothing and equipment are required to be worn, you must also be provided with and must wear the protective clothing and equipment.

VIII. ACCESS TO RECORDS
You or your representative is entitled to records of your exposure to inorganic arsenic and your medical examination records if you request your employer to provide them.

IX. TRAINING AND NOTIFICATION
Additional information on all of these items plus training as to hazards of exposure to inorganic arsenic and the engineering and work practice controls associated with your job will also be provided by your employer. If you are exposed over the permissible exposure limit, your employer must inform you of that fact and the actions he is taking to reduce your exposures.

I. SUBSTANCE IDENTIFICATION
A. Substance. Inorganic Arsenic.
B. Definition. Copper acetoarsenite, arsenic and all inorganic compounds containing arsenic except arsine, measured as arsenic (As).
C. Permissible Exposure Limit. 10 micrograms per cubic meter of air as determined as an average over an 8-hour period. No team member may be exposed to any skin or eye contact with arsenic trichloride or to skin or eye contact likely to cause skin or eye irritation.
D. Regulated Areas. Only team members authorized by your employer should enter a regulated area.

II. HEALTH HAZARD DATA
A. Comments. The health hazard of inorganic arsenic is high.
B. Ways in which the chemical affects your body. Exposure to airborne concentrations of inorganic arsenic may cause lung cancer, and can be a skin irritant. Inorganic arsenic may also affect your body if swallowed. One compound in particular, arsenic trichloride, is especially dangerous because it can be absorbed readily through the skin. Because inorganic arsenic is a poison, you should wash your hands thoroughly prior to eating or smoking.

III. PROTECTIVE CLOTHING AND EQUIPMENT
A. Respirators. Respirators will be provided by your employer at no cost to you for routine use if your employer is in the process of implementing engineering and work practice controls or where engineering and work practice controls are not feasible or insufficient. You must wear respirators for non-routine activities or in emergency situations where you are likely to be exposed to levels of inorganic arsenic in excess of the permissible exposure limit. Since how well your respirator fits your face is very important, your employer is required to conduct fit tests to make sure the respirator seals properly when you wear it. These tests are simple and rapid and will be explained to you during training sessions.
B. Protective clothing. If you work in a regulated area, your employer is required to provide at no cost to you, and you must wear, appropriate, clean, protective clothing and equipment. The purpose of this equipment is to prevent you from bringing to your home arsenic-contaminated dust and to protect your body from repeated skin contact with inorganic arsenic likely to cause skin irritation. This clothing should include such items as coveralls or similar full-body clothing, gloves, shoes or coverlets, and aprons. Protective equipment should include face shields or vented goggles, where eye irritation may occur.

IV. HYGIENE FACILITIES AND PRACTICES
You must not eat, drink, smoke, chew gum or tobacco, or apply cosmetics in the regulated area, except that drinking water is permitted. If you work in a regulated area your employer is required to provide lunchrooms and other areas for these purposes. If you work in a regulated area, your employer is required to provide showers, washing facilities, and change rooms. You must wash your face, and hands before eating and must shower at the end of the work shift. Do not take used protective clothing out of change rooms without your employer’s permission. Your employer is required to provide for laundering or cleaning of your protective clothing.

V. SIGNS AND LABELS
Your employer is required to post warning signs and labels for your protection. Signs must be posted in regulated areas. The signs must warn that a cancer hazard is present, that only authorized team members may enter the area, and that no smoking or eating is allowed, and that respirators must be worn.

VI. MEDICAL EXAMINATIONS
If your exposure to arsenic is over the Action Level (5 mg/m3) -- (including all persons working in regulated areas) at least 30 days per year, or you have been exposed to arsenic for more than 10 years over the Action Level, your employer is required to provide you with a medical examination. The examination shall be every 6 months for team members over 45 years old or with more than 10 years exposure over the Action Level and annually for other covered team members. The medical examination must include a medical history; a chest x-ray; skin examination and a nasal examination. The examining
physician will provide a written opinion to your employer containing the results of the medical exams. You should also receive a copy of this opinion. The physician must not tell your employer any conditions he detects unrelated to occupational exposure to arsenic but must tell you those conditions.

VII. OBSERVATION OF MONITORING
Your employer is required to monitor your exposure to arsenic and you or your representatives are entitled to observe the monitoring procedure. You are entitled to receive an explanation of the measurement procedure, and to record the results obtained. When the monitoring procedure is taking place in an area where respirators or personal protective clothing and equipment are required to be worn, you must also be provided with and must wear the protective clothing and equipment.

VIII. ACCESS TO RECORDS
You or your representative are entitled to records of your exposure to inorganic arsenic and your medical examination records if you request your employer to provide them.

IX. TRAINING AND NOTIFICATION
Additional information on all of these items plus training as to hazards of exposure to inorganic arsenic and the engineering and work practice controls associated with your job will also be provided by your employer. If you are exposed over the permissible exposure limit, your employer must inform you of that fact and the actions he is taking to reduce your exposures.
Hexavalent Chromium

NIOSH

Hexavalent chromium (Cr(VI)) compounds are a group of chemical substances that contain the metallic element chromium in its positive-6 valence (hexavalent) state. Occupational exposures to Cr(VI) occur during the production of stainless steel, chromate chemicals, and chromate pigments. Cr(VI) exposures also occur during other work activities such as stainless steel welding, thermal cutting, chrome plating, painting, and coating processes.

NIOSH considers all Cr(VI) compounds to be potential occupational carcinogens. An increased risk of lung cancer has been demonstrated in workers exposed to Cr(VI) compounds. Other adverse health effects associated with Cr(VI) exposure include dermal irritation, skin ulceration, allergic contact dermatitis, occupational asthma, nasal irritation and ulceration, perforated nasal septa, rhinitis, nosebleed, respiratory irritation, nasal cancer, sinus cancer, eye irritation and damage, perforated eardrums, kidney damage, liver damage, pulmonary congestion and edema, epigastric pain, and erosion and discoloration of the teeth.

Cr(VI) compounds vary in solubility from those that are readily soluble to those which are practically insoluble in water. In 1975 NIOSH documented the carcinogenic effects of water-insoluble Cr(VI) compounds. The NIOSH 1988 testimony to OSHA on the air contaminants standard recommended that all Cr(VI) compounds, regardless of their degree of solubility in water, be considered occupational carcinogens. NIOSH is currently reviewing and evaluating the available information on Cr(VI) compounds including the toxicology, health effects, industrial hygiene, and analytical chemistry literature in order to update its 1975 criteria document on Cr(VI).
9.6 Appendix F

CONTENT OF MEDICAL EXAM

The content of the medical exam shall be determined by an examining physician and must include at least the following:

1. Fertility test or pregnancy test if requested by the team member
2. Detailed work history and medical history
3. Thorough physical examination
4. Pulmonary status
5. Blood pressure measurement
6. Blood lead testing with ZPP
7. Hemoglobin and hematocrit determinations, red cell indices, and examination of peripheral smear morphology
8. Blood urea nitrogen
9. Serum creatinine
10. Routine urinalysis with microscopic examination (this is not a drug test)
11. Other relevant testing determined by the examining physician

Give two copies of this to team member before they go to their medical evaluation.

Note: For guidance on Cadmium, Hexavalent Chromium, or Arsenic medical exams/medical surveillance and when they are required, contact the Corporate Safety Department
BOILER WORK GUIDELINES

Since 1990 Cianbro has conducted air monitoring for lead exposure in boilers. Most recently, over the past two to three years, we have greatly improved our work practice controls and find that our exposure to the health hazards of lead in most boiler work is minimal, well below the current action levels established by OSHA. Over time, we have developed significant work history with medical surveillance and air monitoring results and have a good understanding of the lead and heavy metal issues in boiler work. Because of that, the following guidelines have been established in conjunction with our Lead and Other Heavy Metal Protection Safety Policy and Procedure and meeting what we believe is the intent and full compliance with the OSHA Lead Standard.

I. Planning Program Checklist for Boiler Work

☐ 1. A written site specific activity plan covering hazardous substances present in our work area must be done. Use the plan page included in the current Activity Plan format or equivalent to meet the OSHA and Cianbro requirements. Specific activities must be identified to determine what levels of respiratory, PPE, ventilation, hygiene, etc. will be required during the initial assessment periods of each activity. (Examples of activities are welding, cutting, burning, scraping, grinding, sweeping, vacuuming, needle gunning, etc.)

☐ 2. A competent person, capable of conducting training, identifying existing and predictable hazardous substance(s) in the work area and who has authority to take prompt corrective measures, must be identified and present during the work activities.

☐ 3. To reduce exposure to our team members, it is essential for the client to thoroughly clean the boiler before we enter. This can include explosive techniques, power wash, and vacuum. It is to our advantage to work with our clients to clean the boiler as effectively as possible and to help them understand why it will benefit them as well as Cianbro (productivity improvements during maintenance outages, reduced risk to their team members, etc.). If the boiler is not thoroughly cleaned, expect airborne levels above the PEL and plan accordingly.

☐ 4. Appropriate medical surveillance must be in place prior to the work. Team members selected to perform work in boilers must be current with Cianbro’s Medical Surveillance Lead Program (Reference section F of this Safety Policy and Procedure) at a minimum. Team members must have had a blood lead/ZPP test current within the last 12 months and a previous one with the results <40 ug/dl. Team members who have received a blood lead result >40 ug/dl must have been re-tested with results from two consecutive blood leads <40 ug/dl before available for work assignments in a lead work area. Also any team member who has received a blood lead level >50 ug/dl must have completed Cianbro’s final medical determination (written medical opinion) on their health status. (Reference Cianbro’s latest “Blood Lead Historical Report” for team member status.)

☐ 5. Boiler ash samples must be current and reflect the specific type(s) of fuel currently being used in the boiler process. Test the ash for the eight RCRA metals plus vanadium. Attach documentation to the activity plan. If a recent ash sample analysis (current within one year and boiler operating conditions have not changed) is available from the host it can be used.

☐ 6. Team member air monitoring results from lead sampling of specific work activities under similar work conditions, must be current within the past 12 months and show lead results below the action level.

☐ 7. Initial and ongoing air monitoring must be conducted, including all heavy metals known to be present, to confirm expected levels are less than the action level. If levels are greater than the action level, refer to Appendix C of this Safety Policy and Procedure and implement those minimum actions required if results are greater than the action level (to make sure we are using appropriate levels of PPE. Ongoing air monitoring can be discontinued if test(s) show levels less than the action level. If activity conditions change, then air monitoring must continue until two or more test results show levels less than the action level.
8. Wash facilities must be provided and located at a lead control point (as close as possible) coming from the lead work area. (Refer to Appendix C of this Safety Policy and Procedure and implement those minimum actions required based on the air monitoring results.)

9. Engineering and work practice controls must be implemented. (To reduce exposure to below the PEL when feasible.) Document in activity plan.

10. Minimum respiratory protection (half face, P100 (HEPA) cartridge) is required to start unless results from air monitoring show below the action level for lead and other potential airborne hazards (other heavy metals). For trash to energy boilers minimum respiratory protection must be based on the table in Appendix A of this Safety Policy and Procedure and must always start with at least half face with P100 cartridges.

CAUTION: There may be other hazards present like cadmium, hexavalent chromium, arsenic and/or vanadium that would require special PPE considerations and monitoring (competent person determination).

11. Good hygiene practices are essential for all work activities in and around boilers where unclean surfaces/areas exist and exposure is expected because of the specific activity.

Inhalation and ingestion are the two primary routes of entry into the body creating a health hazard. Skin contact of some substances like arsenic can cause dermatitis with burning, itching, swelling, and skin eruptions.

Minimum requirements include providing for: Running water, soap (pumpable preferred), clean wipes (towels) and trash containers for waste ensuring that team members wash hands and face prior to eating, drinking, smoking, chewing, and leaving the work area/project site.

12. It is strongly recommended that as a part of your work practice controls you establish at your lead (or other regulated metal) control area check point (around wash facilities) a HEPA vacuum so team members exiting the lead control area can vacuum off their PPE clothing. Otherwise team members must remove their protective clothing before entering eating/break areas or at the end of their shifts. Time must be allowed during regular work hours, including breaks, for team members to change and wash up going in and out of lead control work areas.

13. No tobacco, food, drinks or cosmetics allowed in the lead control work area(s).

14. Training must be conducted prior to starting work covering Cianbro’s activity plan, HAZCOM for lead (and any other heavy metal known to be present), activities that could result in exposures to hazardous substances above their assigned action levels, engineering controls, and the team member awareness standard summary from Appendix D of this Safety Policy and Procedure.

15. Post lead (and cadmium or arsenic if present) work signs.

16. A rigorous housekeeping effort is necessary. Regularly cleaning up ash dust and ash containing debris should be accomplished. NO DRY SWEEPING!

Wet sweep or HEPA vacuum only.

17. Any waste generated must be controlled, stored, labeled, and shipped in accordance with Cianbro's Hazardous Materials and Waste Management Program and any Federal, State or Local requirements.

A designated generator of hazardous waste must be identified. Our contract with the host/client to do the work should clearly state a representative party (i.e. DOT) acceptance of responsibility for hazardous waste collection, storage, shipping and disposal. Lead, cadmium, vanadium and arsenic (and other heavy metals) are all considered to be hazardous substances and depending on concentrations must be disposed of as a hazardous waste in accordance with EPA and Cianbro standards. Follow the requirements in the Cianbro Hazardous Materials/ Hazardous Waste Management Handbook (Cookbook).
NOTE: Adequate time must be allowed for good hygiene practices so as not to interfere with team member breaks, lunch and shift completion times.

II. **Boiler Work Minimum Requirements (excluding trash to energy boilers):**
(Starting boiler work with lead present at any level from ash sample analysis.)

1. **Trigger Tasks:** (See typical lead activities - Appendix A of this Safety Policy and Procedure)
2. Current team members must have had a blood lead/ZPP test current within the last 12 months for the duration of the planned work with previous results of <40 ug/dl. New team members must receive blood lead/ZPP tests every two months for the first six months then annually if expected to be exposed to lead above the action level for 30 days or more in a 12-month period.
3. Respiratory protection per Attachment B or based on historical date for the particular boiler current within 12 months.
4. Establish lead (and arsenic or cadmium if present) area controls checkpoint with wash facilities and HEPA vacuum. (Post instructional signs.)
5. Coveralls or Tyvek suits and gloves.
6. Provide for engineering, administrative and work practice controls as feasible.
7. No tobacco, food, drinks or cosmetics in lead work areas.
8. Conduct hazardous communication and lead program training.
9. Current with requirements of respiratory status (i.e.: medical approval, PFT, fit testing.
10. Conduct exposure assessment air monitoring for each trigger task until two consecutive tests at least 7 days apart show less than the action level and activity conditions do not change. One exposure assessment test conducted during work operations on any prior boiler work within the last year, under work place conditions closely resembling current work operations can be used as one of the two required. Documentation of air monitoring results must be reviewed by a competent person and on site.
11. Exposure assessment air monitoring results that show levels > the action level will require following Appendix C of this lead Safety Policy and Procedure.
12. Lead work activity plan.

III. **Minimum Requirements For Other Tasks:** (Lead work activities like inspections, erecting staging, etc. producing no airborne exposures, with no other trigger tasks going on simultaneously). Minimum requirements:

1. Establish lead area control checkpoint.
2. Coveralls or tyvek suits and gloves.
3. Respiratory protection per Attachment B.
4. No tobacco, food, drinks or cosmetics in lead work areas.
5. Conduct hazardous communications training.
6. Written lead and other heavy metal work activity plan.
7. Air monitoring.
## Table of Permissible Exposure Limits and Action Levels

<table>
<thead>
<tr>
<th>Substance</th>
<th>Permissible Exposure Limit (ug/m³)</th>
<th>Action Level (ug/m³)</th>
<th>TLV (ug/m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arsenic</td>
<td>10</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>Barium</td>
<td>500</td>
<td></td>
<td>500</td>
</tr>
<tr>
<td>Cadmium</td>
<td>5</td>
<td>2.5</td>
<td>10 (respirable fraction)</td>
</tr>
<tr>
<td>Chromium: Metal, II, III</td>
<td>1000 (metal)</td>
<td>500</td>
<td>500 (II or III)</td>
</tr>
<tr>
<td>Chromium IV (Hexavalent)</td>
<td>5.0</td>
<td>2.5</td>
<td>10 (insoluble compounds)</td>
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<tr>
<td>Lead</td>
<td>50</td>
<td>30</td>
<td>50</td>
</tr>
<tr>
<td>Mercury (metal and compounds excluding organo compounds)</td>
<td>C 100 (ceiling limit)</td>
<td></td>
<td>25 (elemental and inorganic forms)</td>
</tr>
<tr>
<td>Selenium</td>
<td>200</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Silver</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vanadium (as Pentoxide): Dust</td>
<td>C 500 (ceiling limit)</td>
<td></td>
<td>50</td>
</tr>
<tr>
<td>Fume</td>
<td>C 100 (ceiling limit)</td>
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