SECTION 02 83 33 - REMOVAL AND DISPOSAL OF MATERIALS CONTAINING LEAD

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PART 1 GENERAL

1.01 SUMMARY AND SCOPE

A. Applicable provisions of Division 1 – General Requirements shall govern work under this section.

B. Perform all operations in connection with lead abatement, removal, clean-up and related work as shown on drawings, specific scopes of work, and/or specified herein.

C. Description of Work – This project involves removal of building materials with lead coatings; this specification is for removal of the following materials:

Building Component	Paint Color	Lead Conc.	Comments
Red-Asphalt-Floor Decal, Parking lot South of Portable 43	Red	1.6 mg/cm2 (by XRF Testing)	Section of asphalt containing lead-based paint should be handled by lead trained workers. The waste shall be profiled using TTLC, STLC and/or TTLC. Dispose of the waste properly per current local, state and federal regulations

C. Special Precautions: Coordinate with the Owner Representative for the shutdown and isolation of all electrical circuits and air movement systems within the regulated area. Refer to Subpart entitled "3.02 LBP/Lead-containing Surface Coating Impacts and 3.03 Surface Preparation-LBP Stabilizstion", of this section, relative to shutdown of mechanical and electrical systems. The provision of temporary facilities and/or utilities must be arranged prior to each project as necessary and will be the responsibility of the Contractor.

D. Special Circumstances: Emergency response may be necessary during non-working hours requiring Contractor personnel to be on-site within 3 hours of notification (e.g., due to weather, vandalism, burglary, etc.).

E. Restoration: Not Applicable.

F. Related work specified elsewhere (enclosed):

Section Title — Section Number
Not applicable

1.02 REFERENCES

A. General Reference:

All work under this contract shall be done in accordance with all applicable Federal, State, and local regulations, standards and codes governing asbestos abatement and any other trade work done in conjunction with the abatement. The most recent edition of any relevant regulation in force at the time of bid opening shall be in effect. Where conflict among the laws, rules, regulations, or with these specifications exists, the most stringent requirements shall be utilized.

B. Specific References:

Occupational Safety and Health Administration (OSHA) Title 29 Code of Federal Regulations (CFR):

1910.134 – Respiratory Protection.
1926.59 - Hazard Communication Standard; Construction Industry
1926.62 – Lead; Construction Industry

Environmental Protection Agency (EPA) Title 40 Code of Federal Regulations (CFR) Part 745 -- Lead-Based Paint Poisoning Prevention in Certain Residential Structures.

California Division of Occupational Safety and Health (Cal/DOSH):

8 CCR 5144 – Respiratory Protection Standard
8 CCR 1532.1 – Lead
22 CCR Division 4.5, Environmental Health Standards for the Management of Hazardous Waste

Housing and Urban Development (HUD) Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing.

1.03 QUALIFICATIONS

A. The prospective Contractor shall submit to the Owner Representative the data hereinafter requested within ten (10) calendar days after Bid Opening.

B. The Contractor shall, if requested:

1. Demonstrate prior experience on lead abatement projects of similar nature and scope of that being bid, through the submission of letters of reference from building owners including the name, address, and telephone numbers of the contact persons who are specifically familiar with the referenced projects. At least three previous users of this service shall be submitted. Include descriptions of projects and records of all air monitoring data that was generated during the projects.

2. Submit a description of all major Lead Abatement Equipment owned by the prospective Contractor which is available for use on this project such as respiratory protection equipment, HEPA vacuum equipment dedicated to lead abatement, negative air pressure equipment dedicated to lead abatement, spray equipment for amended water and other coatings, equipment used for shower facilities in decontamination enclosure system.

C. Submit a list of names, work responsibilities and evidence of certification for all employees that will be assigned to this project including:

1. All removal and disturbance of LBPs and lead-containing materials shall be performed by a state-licensed contractor, using California Department of Public Health (CDPH) certified workers with at least one CDPH-certified Supervisor. All removal and disturbance of lead-containing materials (not meeting the definition of lead-based) as defined in 8 CCR 1532.1, shall be performed by a state-licensed contractor, using lead-trained workers with certification of training meeting the requirements of 8 CCR 1532.1. Abatement contractor's workforce shall be supervised by experienced persons trained, knowledgeable and qualified in the techniques of lead abatement, handling and disposal

D. The Contractor must be licensed by the California State Contractors License Board for activities necessary to complete the projects described in this specification.

1.04 DEFINITIONS

ACGIH: American Conference of Governmental Industrial Hygienists

AIHA: American Industrial Hygiene Association

Air Monitoring:
The process of measuring lead concentration of a known volume of air collected during a specific period of time shall conform to the requirements of OSHA Standard 29 CFR 1926.62 or 8 CCR 1532.1.

Air Sampling Professional:
The Professional contracted or employed by Owner Representative to supervise and conduct air monitoring and analysis schemes. This individual shall not be affiliated in any way other than through this contact with the Contractor performing the abatement work.

ANSI: American National Standards Institute

ASTM: American Society for Testing and Materials (now ASTM International)

Authorized Visitor:
The Building Owner (and designated representatives) and any representative of a regulatory agency having jurisdiction over the project.

California Department of Public Health (CDPH):
Certification agency for lead abatement workers, supervisors, inspector/assessors, project monitors and sampling technicians. Lead workers and supervisors must hold current certifications with this agency. CDPH is also the enforcement agency for lead abatement in child-occupied structures.

California Division of Occupational Safety and Health (Cal/DOSH):
The Occupational Safety and Health Enforcement Section aka Cal DOSH or Cal/OSHA which is a part of the California Division of Industrial Relations.

Certified Industrial Hygienist (CIH):
An industrial hygienist certified in Comprehensive Practice by the American Board of Industrial Hygiene.

Competent Person:

Means one who is capable of identifying existing lead hazards in the workplace and who has the authority to take prompt corrective measures to eliminate them.

Consultant:

Means the person, persons, and/or company contracted by the Owner to provide third party oversight of the project described in these specifications. The Consultant shall have no business relationship with the Contractor.

Contractor:

Means the person, persons, and/or company contracted by the Owner to provide the services specified herein.

Decontamination Enclosure:

A decontamination system consisting of a clean room, a shower room, and an equipment room separated from each other and from the regulated area by airlocks. This system is used for all workers to enter and exit the regulated area and may also serve as equipment and waste pass out on small jobs.

Encapsulation:

The application of a bridging or penetrating liquid material to asbestos containing materials to control the release of lead dust into the air. The bridging liquid material creates a membrane over the surface and the penetrating liquid material seeps through the surface and binds all components together.

Enclosure:

The construction of an airtight, impermeable, permanent barrier around asbestos containing material to control the release of lead dust into the air.

EPA: U. S. Environmental Protection Agency

HEPA Filter:

A high efficiency particulate air filter capable of removing particles 0.3 microns in diameter with 99.97% efficiency.

HEPA Vacuum:

A vacuum system equipped with HEPA filtration.

Lead-Based Paint:

Paint or other surface coatings that contain lead equal to or in excess of 1.0 milligrams per square centimeter or more than 5,000 parts per million.

Lead Containing Material (LCM):

Material containing lead of any type and in an amount greater than the detection limit of the analytical method.

Lead Containing Waste Material:

Lead containing material or lead contaminated materials requiring disposal in an EPA approved landfill.

OSHA:

The Occupational Safety and Health Administration; may also be referenced instead of Cal/DOSH or Cal/OSHA equivalent regulations.

Owner:

Means the owner of the properties in which the activities described in these specifications are to be performed for. The Owner will also be the employer of the personnel working in the affected building.

(designated) Owner Representative:

Means the person, persons, or company who monitors the work specified in this document with the Owner's interests as a priority. Compliance with these specifications will be monitored by the Owner's Representative. The Consultant and the Owner's Representative will be the same unless otherwise specified.

Permissible Exposure Limits (PELs):

No personnel associated with lead abatement work shall be exposed to an airborne concentration of lead in excess of the following limits, as determined by the method prescribed in OSHA 29 CFR 1926.62, and 8 CCR 1532.1 or by an equivalent method:

PEL is 50 micrograms per cubic meter ($\mu g/M^3$) of air as an eight (8) hour time-weighted average (TWA).

Action Level is 30 $\mu g/M^3$ as an eight (8) - hour TWA.

Regulated Area:

An area identified by specific boundaries where airborne concentrations of asbestos exceed, or can reasonably be expected to exceed, the PEL and/or Excursion Limit. The regulated area may take the form of a temporary negative-pressure enclosure, or an area specifically identified and segregated in any manner that minimizes the number of employees exposed to lead dust.

Soluble Threshold Limit Concentration (STLC):

Laboratory test to be conducted on waste to determine if it meets the definition of hazardous waste.

South Coast Air Quality Management District (SCAQMD):

The SCAQMD is the local enforcement and notification agency within Orange, and populated portions of Los Angeles, San Bernardino and Riverside Counties in the State of California.

Surfactant: A chemical wetting agent added to water to improve penetration.

Toxicity Characteristic Leaching Procedure (TCLP):

Laboratory test to be conducted on waste to determine if it meets the definition of hazardous waste.

Total Threshold Limit Concentration (TTLC):

Laboratory test to be conducted on waste to determine if it meets the definition of hazardous waste.

Visible Emissions:

Any emissions containing particulate material that is visually detectable without the aid of instruments. This does not include condensed uncombined water vapor.

Wet Cleaning:

The process of eliminating asbestos contamination from building surfaces and objects by using cloths, mops, or other cleaning utensils which have been dampened with water and afterwards thoroughly decontaminated or disposed of as lead contaminated waste.

1.05 SUBMITTALS AND NOTICES

A. No later than 14 calendar days prior to commencement of work, Contractor shall submit in electronic format or PDF files to the Owner Representative and/or Consultant documentation that includes, without limitation, the following:

1. Current Copies of licenses and registrations required by Article 1.03, Qualifications (include copies of subcontractor's licenses).

2. Notify the Cal/DOSH at least 24 hours prior to commencement of any lead-related work, per the requirements of 8 CCR 1532.1.

3. Current proof of insurance coverage required by Article 1.10 Insurance Requirements (include proof of insurance for subcontractors).

4. Current proof that required permits, site location and arrangements for transport and disposal of asbestos materials have been made.

5. Current proof of legal right to use patented equipment or processes.

6. Current Manufacturer's certification that HEPA vacuums, differential pressure air filtration devices and other local exhaust ventilation equipment conform to ANSI Z9.2-79 and have been permitted by the SCAQMD.

7. Current documentation showing that Contractor's employees, including foreman, supervisor, and any other company personnel or agents who may be exposed to lead or who may be responsible for any aspects of lead abatement activities, have received training as required by 29 CFR 1926.1101 and 8 CCR 1529.

8. Current documentation from Physician (signed by an M.D.) showing that all employees or agents who may be exposed to lead dust in excess of background levels have received medical monitoring to determine whether they are physically capable of working while wearing the respirator required without suffering adverse health effects. The Contractor must be aware of and provide information to the examining physician about unusual conditions in the workplace environment (e.g. high temperatures, humidity, chemical contaminants) that may impact on the employee's ability to perform work activities.

   Evidence of blood lead level testing of workers assigned to the project as well as medical clearance for the work to be performed and clearance to don respirators including fit testing records.

9. Current documentation of respirator fit-testing for all Contractor employees and agents who must enter the work area. This fit-testing shall be conducted annually and in accordance with procedures as required by 29 CFR 1910.134 and 8 CCR 5144.

10. An emergency preparedness plan as required by Article 1.07 - Emergency Planning.

11. Master schedule, showing phasing, number of shifts, time for air clearances, tear down and manpower loading to be utilized for the duration of the project.

12. A site-specific work plan based on scope of work. Include a diagram showing containment set-up, decontamination unit(s), locations of negative air machines and exhaust placement.

13. The name, address and telephone number of the transporter and disposal facility must be provided to the Owner.

B. During abatement activities, Contractor shall submit to the Owner Representative and/or Consultant documentation that includes, without limitation, the following:

1. Copies of the work area entry/exit log book. Log book must record name, affiliation, time in, and time out for each entry into the work area.

2. Copies of logs documenting filter changes on respirators, HEPA vacuums, differential pressure air filtration devices, water filtration device, and other engineering controls.

3. Copies of Safety Data Sheets (SDS) for solvents, encapsulants, wetting agents, replacement materials, and other substances brought by Contractor to the Project Site. SDSs shall be available the first day that subject materials/substances are present on the project site.

4. Results of all required Cal/DOSH compliance air monitoring. Results shall be available prior to the start of the following shift and within 24 hours of completion of the last shift.

5. Copies of all accident/incident reports where injury or damage has occurred on or to the Owner's property.

6. Copies of daily work logs indicating location(s) worked, type of materials removed, quantity of materials removed and number of personnel conducting the aforementioned activities.

7. Contractor shall provide unit costs for the preparation of regulated work areas, abatement, waste storage and disposal for lead encountered during abatement and or renovation of the buildings located at the property. Rates for labor of appropriately trained workers, supervisors and management shall be included in the listing of unit rates.

8. Copies of all transport manifests, trip tickets and disposal receipts for all lead waste materials removed from the work area shall be provided. Copies shall be emailed to the Owner’s Representative.

9. A Close out Report will be generated by the Environmental Consultant at the conclusion of the abatement activities. Documents referenced in the section shall be provided to the Environmental Consultant for inclusion in the Close out Report.

C. For any new lead abatement employee hired, who has not been previously reported, complete data must be submitted, consisting of: experience, certification, assigned job responsibilities, respirator test fitting, physicians determination of employee's ability to work while wearing respirator and evidence of medical monitoring (blood lead).

1.06 SITE SECURITY

A. Contractor shall be responsible for the security of the regulated area(s) during abatement operations in order to protect work efforts and Owner equipment. Contractor will also be responsible for the security of all their equipment and materials on the job site.

B. The regulated area shall be restricted to only authorized, trained, and protected personnel. These may include the Contractor's employees, employees of subcontractors, State representatives, and any other designated individuals. A list of authorized personnel shall be established prior to job start and posted in the clean room of the decontamination facility. A log book shall be maintained in the clean room area of the decontamination system. Anyone who enters the regulated area must record name, affiliation, time in, and time out for each entry.

C. Contractor shall assure any unauthorized individual entering the regulated area is decontaminated (if required), evict them, and notify the Owner Representative of the actions taken and the identity of the unauthorized individual.

D. Access to the regulated area shall be through a single decontamination system. All other means of access (doors, windows, hallways, etc.) shall be blocked or locked so as to prevent entry to or exit from the regulated area. The only exceptions to this rule are the waste pass-out air lock which shall be sealed except during the removal of containerized asbestos waste from the regulated area, and emergency exits in case of fire or accident. Emergency exits shall not be locked from the inside. However, they shall be sealed with polyethylene sheeting and tape until needed.

1.07 EMERGENCY PLANNING

A. Emergency procedures shall be in written form and prominently posted in the clean change area and equipment room of the worker decontamination area. Everyone prior to entering the regulated area must read and sign these procedures to acknowledge receipt and understanding of work site layout, location of emergency exits and emergency procedures.

B. Contractor employees shall be trained in evacuation procedures in the event of workplace emergencies under the following conditions:

1. For non-life-threatening situations, employees injured or otherwise incapacitated shall decontaminate following normal procedures with assistance from fellow workers, if necessary, before exiting the workplace to obtain proper medical treatment.

2. For life-threatening injury or illness, worker decontamination shall take least priority; after measures to stabilize the injured worker, remove the worker from the workplace and secure proper medical treatment.

C. Telephone numbers of all emergency response personnel shall be prominently posted in the clean change area and equipment room along with the location of the nearest telephone.

D. Exit routes should be clearly identified in the containment.

E. Procedures to prevent and treat heat stress must be posted in the clean room area. Workers shall be provided easy access to drinking water outside of the regulated area(s) and encouraged to drink frequently.

PART 2 PRODUCTS

2.01 MATERIALS

A. Polyethylene sheeting for all uses shall be a minimum of six (6) mil thickness. Widths will be selected to minimize the frequency of joints. All plastic, spray-on strippable coatings and structural materials shall be UL-certified as fire-retardant or non-combustible.

B. Deliver all materials in the original packages, containers, or bundles bearing the name of the manufacturer and brand name (where applicable).

C. Polyethylene sheeting utilized for decontamination enclosure shall be opaque white or black in color and 6-mil in thickness.

D. Disposal bags shall be of six (6) mil polyethylene, clear bags.

E. Metal disposal bins shall be used for the storage of asbestos-containing waste materials. Bins shall be lined in plastic sheeting affixed with spray glue and tape at walls, floor and ceiling of the bin. As an alternate, disposal drums for transporting disposal bags may be used. Drums shall be metal, 55-gallon DOT A1A (DOT 17H) with locking ring tops and will meet the requirements of 49 CFR 172 – 178. Stick-on labels as per EPA and 8 CCR 1529 (k) (8) requirements shall be provided for the disposal drums.

B. Surfactant (Wetting Agent) for Amended Water:

1. For wetting all materials containing lead, it shall consist of soapy water mixed in a proportion of two (2) fluid ounces of liquid sap to five (5) gallons of water.

2. Where regulated area temperature may cause freezing of the amended water solution, the addition of ethylene glycol in amounts sufficient to prevent freezing is permitted.

G. Encapsulating Material: Bridging type encapsulant (for sealing masonry and concrete walls, barrier surfaces during cleanup phase and lead containing surfaces to remain in place) shall be capable of being applied with airless spray equipment, able to withstand light impact or abrasion without releasing fibers, and be water insoluble when cured, and must retain sufficient integrity after six (6) years to allow recoating.

G. Durable exterior coating over stabilized LBP: The coating to be used will be designated by Owner Representative.

H. All caustics shall be properly labeled and containerized in lead-tight containers.

J. Chemical Stripping Removers (**Alternative**) - Chemical removers shall contain no methylene chloride products. Chemical removers shall be compatible with and not harmful to the substrate to which they are applied. Chemical removers used on masonry surfaces shall contain anti-stain formulation that inhibits discoloration of stone, granite, brick and other masonry construction. Chemical removers used on interior surfaces shall not raise or discolor the surface being abated.

K. Chemical Stripping Agent Neutralizer (**Alternative**) - Chemical stripping agent neutralizers may be used on exterior surfaces only. Neutralizers shall be compatible with and not harmful to the substrate that they are applied to. Neutralizers shall be compatible with the stripping agent that has been applied to the surface substrate.

L. Paint Blasting Materials (**Alternative**) – Blasting materials shall not create respirable crystalline silica dust. The blasting debris will be considered hazardous waste for lead. The building must be encased/enclosed in a manner that does not allow visible dust from the building exterior during blasting.

M. Component removal (**Alternative**) – Building Components coated with LBP (or lead containing glaze) can be removed from the regulated area, wrapped in 6-mil plastic sheeting, or placed in 6-mil plastic bags. Provision must be made with Owner Representative and Consultant for replacement of the component, as necessary.

2.02 EQUIPMENT

A. Negative Pressure Ventilation Units (Use as applicable):

1. A sufficient quantity of negative pressure ventilation units equipped with HEPA filtration and operated in accordance with ANSI and EPA guidance documents. They shall be utilized so as to provide one workplace air change every 15 minutes.

   To calculate total air flow requirement:

$$\text{Total } Ft^3/\text{Min.} = \frac{\text{Volume of Regulated area (in } Ft^3)}{15 \text{ Min.}}$$

   To calculate the number of units needed for the abatement:

$$\text{Number of Units Needed} = \frac{\text{Total } Ft^3/\text{Min.}}{0.75(\text{Capacity of Unit in } Ft^3/\text{Min.})}$$

2. The air filtering equipment shall be capable of filtering lead particles at 99.97 percent efficiency. Pre-filters, which protect the final filter by removing the larger particles, are required to prolong the operating life of the HEPA filter. Two stages of pre-filtration are required. The first-stage pre-filter shall be a low efficiency type (e.g., for particles 10 um and larger). The second-stage (or intermediate) filter shall have a medium efficiency (e.g., effective for particles down to 5 um). Pre-filters and intermediate filters shall be installed either on or in the intake grid of the unit and held in place with special housings or clamps.

3. The exhaust air for the air filtering devices used to maintain negative pressure in the contained regulated area(s) shall be directed outdoors to an area where unprotected personnel are not present.

4. The regulated area shall be maintained at a negative pressure of 0.02 inches of water (head). The ventilation shall operate on a 24-hour basis throughout the abatement process until final clearance has been approved.

B. Air Purifying Respirators: Respirator bodies shall be of half face or full-face type with removable cartridges. Single use, disposable or quarter face respirators shall not be used. Full face respirators shall be equipped with a nose cup or other anti-fogging devices as would be appropriate for use in air temperatures less than 32 degrees F. Filter cartridges shall, at a minimum, be HEPA type filters certified by NIOSH under 30 CFR Part 11 or with filters certified for particulates under 42 CFR Part 84 (e.g., P100).

C. Full body disposable protective clothing, including head, body and foot coverings consisting of material impenetrable by asbestos fibers (Tyvek® or equivalent) shall be provided to all workers and authorized visitors in sizes adequate to accommodate movement without tearing.

1. Full body disposable protective clothing as described above shall be provided to authorized visitors in sizes adequate to accommodate movement without tearing on request.

D. Additional safety equipment (as necessary), such as hard hats, eye protection, safety shoes, disposable gloves meeting the requirements of current ANSI Standards shall be provided to all workers and authorized visitors. Nonskid footwear shall be provided to all abatement workers. Disposable clothing shall be adequately sealed to the footwear and gloves to prevent body contamination.

E. Provide sufficient supply of disposable mops, rags and sponges for work area decontamination. Rubber dust pans and rubber squeegees shall be provided for cleanup.

F. Provide scaffolds, ladders, lifts and hand tools such as scrapers, wire cutters, brushes, utility knives, and wire saws, as the work requires. Brushes utilized for removing loose asbestos containing material shall have nylon or fiber bristles, not metal.

1. Contractor must have in place a valid Fall Protection Plan, in compliance with Cal/DOSH requirements, to be reviewed and approved by the Owner Representative.

G. Sprayers shall have pumps capable of providing 14-15 pounds per square inch (psi) at the nozzle tip at a flow rate of 2 gallons per minute for spraying amended water.

H. A sufficient supply of HEPA filtered vacuum systems shall be available during cleanup.

I. Airless spray equipment with an adjustable low-pressure nozzle shall be provided for spraying encapsulants. Nozzle tip size and pressure adjustment shall conform to encapsulant manufacturer’s written recommendations.

J. Machine Sanding Equipment - Sanders shall be of the dual action, rotary action, orbital or straight-line system type, fitted with a high efficiency particulate air (HEPA) dust pick-up system. Air compressors utilized to operate this equipment shall be designed to continuously provide 90 to 110 p.s.i. or as recommended by the manufacturer.

K. Heat Blower Gun Equipment - Electrically operated, heat- blower gun shall be a flameless electrical paint softener type. Heat blower shall have electronically controlled temperature settings to allow usage below a temperature of 1,100 degrees Fahrenheit. Heat blower shall be DI type (non-grounded) 120 V, AC application. Heat blower shall be equipped with various nozzles to cover all common applications (cone, fan, glass protector, spoon reflector, etc.).

L. Heavy duty power cables for temporary electrical service and a portable electric generator for maintaining negative pressure in the work area in case of power failure.

M. Warning Signs and Labels: As required OSHA Regulation 29 CFR 1926.629(m) and 8 CCR 1532.1.

N. Other equipment the Contractor deems necessary for lead work shall be submitted to the Owner Representative and/or Consultant for approval prior to their use.

PART 3 EXECUTION

3.01 GENERAL COMPLIANCE MEASURES

A. Mandatory Protection Conditions: Contractor's employees shall wear appropriate respiratory protection and protective clothing under the following conditions:

1. During installation or implementation of engineering work practices and control measures.

2. During maintenance and repair activities for which control measures, hereinafter described, are not feasible.

3. Whenever the control measures are not yet sufficient to reduce exposure below the Permissible Exposure Limits (TWA and/or Excursion Limits).

4. Whenever emergency conditions exist.

B. Control Measures: The Contractor shall use one or any combination of the following control methods to achieve compliance with the "Permissible Exposure Limits" defined herein:

1. Local exhaust ventilation equipped with HEPA filter dust collection systems (ref. 2.02).

2. General dilution ventilation equipped with HEPA filtration systems on both exhaust and return air (ref. 2.02).

3. Vacuum cleaners equipped with HEPA filters (ref. 2.02).

4. Enclosure or isolation of processes producing airborne lead dust.

5. Use of wet methods, wetting agents or removal encapsulants to control employee exposures during their performance of asbestos abatement activities.

6. Prompt clean up and disposal of wastes contaminated with lead in leak-tight containers.

C. Supplement to Control Measures: Whenever the control measures described above are not sufficient to reduce the employee exposure to or below the "Permissible Exposure Limits" (TWA and/or Excursion Limit), the Contractor shall continue to use the control measures to maintain the employee exposure to the lowest levels attainable and supplement them with the use of appropriate respiratory protection and protective clothing.

C. Negative-Pressure Enclosure: A negative-pressure enclosure shall be employed whenever feasible, prior to commencing removal, demolition and renovation operations involving lead containing materials. The negative air machines (ref. 2.02) should be ducted outdoors, especially if the space outside the containment is occupied. This will prevent the indoor spread of contamination if the negative air machine malfunctions or other chemicals are used in the containment (not recommended) which would not be filtered by the machines. If the area of work outside is dusty, then a square hole may be cut in the containment and fitted with a pleated residential air filter (Minimum Efficiency Reporting Value [MERV] 11 or better) to filter the make-up air. The entry to the containment should be well sealed to prevent the entry of unfiltered outside air.

E. Types of Respiratory Protection: The following Table represents the minimum respiratory protection required for given airborne concentrations of lead:

Airborne Concentration of Lead milligrams per cubic meter (mg/M^3)	**Required Respirator**
Not in excess of 0.50 mg/M^3 (10x PEL)	Half-mask air purifying respirator equipped with high-efficiency filters.
Not in excess of 2.50 mg/M^3 (50x PEL)	Full faceplate air purifying respirator equipped with high-efficiency filters.
Not in excess of 5.00 mg/M^3 (100x PEL)	1. Any powered air purifying respirator equipped with high efficiency filters. 2. Any supplied air respirator operated in continuous flow mode.
Not in excess of 50.0 mg/M^3 (1000x PEL)	Full face piece supplied air respirator operated in pressure demand mode.
Greater than 50.0 mg/M^3 (1,000x PEL) or unknown concentration	Full face piece supplied air respirator operated in pressure demand mode equipped with an auxiliary positive pressure self-contained breathing apparatus.

NOTE: Respirators assigned for higher environmental concentrations may be used at lower concentrations. A high-efficiency filter means a filter that is at least 99.97 percent efficient against mono-dispersed particles of 0.3 micrometers in diameter or larger.

D. Respirator use during initial air monitoring must be selected per the requirements outlined in 29 CFR 1926.62(d)(2) or State equivalent.

3.02 LEAD-CONTAINING MATERIALS AND SURFACE COATING IMPACTS

This section applies to the removal of LBPs or lead-containing paints and/or the demolition of components coated with lead coatings.

A. Post warning signs meeting the specifications of 8 CCR 1532.1 and 29 CFR 1926.62 at any location and approaches to a location where airborne concentrations of lead dust may exceed ambient background levels. Signs shall be posted at a distance sufficiently far enough away from a work area to permit a person to read the sign and take necessary protective measures to avoid exposure. Barrier tape shall be utilized in conjunction with signs for exterior removal activities, to delineate the extent of regulated work areas.

B. Prepare appropriate fall protection systems in accordance with the requirements of Title 8 California Code of Regulations, Sections 1669, 1670, 1724 and anchoring guidance from Title 8 California Code of Regulations, Section 3283 (where applicable).

C. Install worker decontamination unit described in Article 3.03 or as agreed upon with Project Environmental Consultant.

D. Lead-containing material handlers involved in removal procedures shall wear disposable Tyvek suits, including gloves, hood, and footwear. Minimum respiratory protective equipment shall be half-face air-purifying respirators equipped with P100 filters.

1. For exterior lead work, it is recommended that workers wear two (2) disposable Tyvek suits. Upon exiting the work area, the handlers shall HEPA vacuum all visible debris from the outer suit, dispose of it as lead-contaminated waste, and proceed through the decontamination unit for full decontamination.

E. Isolate work area by installing critical barriers or curtained doorways across all openings where airborne lead dust migration may cause secondary lead contamination (for work where components will be removed relatively intact, such as doors, downspouts, and wood trim, drop cloths will suffice). Establish regulated areas with delineators, barrier tape and lead signage for exterior work areas.

F. Cover floors in each work area with fire retardant polyethylene sheeting (do not cover floors where flooring finishes, such as ceramic flooring, for example, are to be removed).

1. A single layer of six-mil (minimum) sheeting.

2. Containment plastic shall be sized to minimize seams.

3. Where multiple layers of floor poly are utilized, sheeting shall be installed in a fashion so as to prevent slippage between successive layers of material.

G. Cover all immovable items and/or construct walls in the Work Area with fire retardant polyethylene sheeting. Walls that will be demolished do not necessarily need protection (check with Project Environmental Consultant).

1. Walls shall be covered with six-mil fire-retardant polyethylene sheeting (sealed airtight with duct tape).

2. Plastic shall be sized to minimize seams.

3. Wall sheeting shall overlap floor sheeting by at least 12 inches beyond the wall/floor joint to provide a better seal for negative pressure.

4. Wall sheeting shall be secured adequately to prevent it from falling away from the walls. This may require additional support/attachment when Negative Pressure Ventilation Systems area utilized.

5. Fire exits shall be clearly labeled with red tape or equivalent.

H. Where manual demolition is employed for lead removal, such as ceramic tile demolition (for example), periodically mist the work area and materials to be impacted to maintain a wet condition and avoid the creation of airborne dust, which may carry lead.

I. The Contractor shall carry out all impacts to lead-based surface coatings in a manner that will minimize pulverizing, breaking, abrading, or in any other way impacting lead-containing paints and generating airborne lead-containing dust.

J. Once all removal activities have been completed, clean-up of the work areas shall be conducted in accordance with Article 3.11 - Clean-Up.

K. Dispose of all lead-containing/contaminated waste in accordance with Article 3.13 - Disposal Procedures.

3.03 DECONTAMINATION ENCLOSURE SYSTEM

A. Worker decontamination enclosure systems shall be provided at all locations where workers will enter or exit the work area. At a minimum, one, three-stage system at a single location is preferred. Each work area where negative pressure enclosure is the selected method of engineering controls shall have a worker decontamination unit.

In the event that a three-stage decontamination unit includes a shower, the shower must be connected to a water source and have a water filtration unit attached and functioning. As an alternate, a cleansing station may be used. See Item E below.

B. Worker decontamination enclosure systems constructed at the Project site shall utilize six-mil, fire-retardant polyethylene sheeting, or other approved materials for privacy.

C. Personnel Decontamination Units shall not be located inside the work area(s) unless specifically authorized by the Environmental Consultant.

D. Alternate methods of providing Decontamination facilities may be submitted to the Environmental Consultant for approval. Do not proceed with any such method(s) without the written authorization from Owner Representative and/or Consultant.

E. The worker decontamination enclosure system shall consist of at least a cleansing station in accordance with the requirements of 8 CCR 1527 and 8 CCR 1529, equipped with adequate water, towels and cleansing agents to accommodate the entire crew and visitors.

F. All polyethylene barriers and decontamination enclosure systems shall be inspected at least twice daily by the Contractor's competent person prior to the start of each day's abatement activities and following the completion of the day's abatement activities.

G. Damage and defects in the enclosure system are to be repaired immediately upon discovery.

3.04 WORKPLACE ENTRY AND EXIT PROCEDURES

A. All workers and authorized personnel shall enter the regulated area through the decontamination enclosure system.

B. All personnel shall proceed first to the clean room, remove all street clothes, and appropriately don respiratory protection (as approved for the job conditions) and disposable coveralls, head covering and foot covering. Hard hats, eye protection and gloves shall also be utilized, if required. Clean respirators and protective clothing shall be provided and utilized by each person for each separate entry into the regulated area.

C. Personnel wearing designated personal protective equipment shall proceed from the clean room through the decontamination enclosure system to the regulated area.

D. Before leaving the regulated area, all personnel shall remove gross contamination from the outside of respirators and protective clothing by brushing or wet wiping procedures. Small HEPA vacuums with brush attachments may be utilized for this purpose. Each person shall clean bottoms of protective footwear in the walk-off pan just prior to entering the equipment room/pre-shower chamber.

E. Personnel shall proceed to equipment room where they remove all protective equipment except respirators. Deposit disposable clothing into appropriately labeled containers for disposal.

F. Reusable, contaminated footwear shall be stored in the equipment room when not in use in the regulated area. Upon completion of abatement, it shall be disposed of as asbestos contaminated waste. Rubber boots may be decontaminated at the completion of the abatement for reuse.

G. Workers will decontaminate all respirators and non-porous items with wet towels, rags provided in the equipment room. Workers will remove filter cartridges and dispose of them in the bag or receptacle provided in the equipment room. Workers will also wet wipe and decontaminate themselves in this location. Contaminated towels and suits shall be placed in bags/receptacles before proceeding to the clean room.

H. Workers shall not eat, drink, smoke, and chew gum or tobacco in the regulated area. To eat, drink or smoke, workers shall follow the procedure described above, and then dress in street clothes before entering the non-regulated areas of the building.

I. Emergency exits shall be established and clearly marked with duct tape arrows or other effective designations to permit easy location from anywhere within the regulated area. They shall be secured to prevent access from uncontaminated areas, but still permit emergency exiting. These exits shall be properly sealed with polyethylene sheeting which can be cut to permit egress, if needed. These exits may be through the decontamination enclosure, the waste pass-out airlock, and/or other alternative exits that are satisfactory to fire officials.

3.05 WASTE CONTAINER PASS-OUT PROCEDURE

A. Lead contaminated waste that has been containerized shall be transported out of the regulated area through the waste container pass-out airlock (or through the decontamination enclosure if a separate airlock has not been constructed). Wherever possible, this shall be located where there is direct access from the regulated area to the outside of the building and the waste storage/disposal container. The waste container pass-out airlock shall be constructed in similar fashion to the worker decontamination enclosure system using similar materials and airlock and curtain doorway designs. This airlock system shall not be used to enter or exit the regulated area. The airlock system shall be tightly sealed when not in use.

B. The inside team wearing protective clothing and respirators appropriate for the contaminated regulated area shall clean the entire surface, including bottoms, of properly labeled bags, using HEPA vacuums and wet wiping techniques and transport them into the waste container pass-out airlock where they will be placed into another properly labeled bag. No worker from the inside team shall further exit the regulated area through this airlock.

C. Workers from outside the regulated area wearing appropriately assigned respirators shall enter the airlock from outside the regulated area solely for waste removal from the work area. No worker from the outside team shall further enter the regulated area through this airlock.

D. The exit from this airlock shall be secured to prevent unauthorized entry when not in use.

3.06 WATER COLLECTION AND DISPOSAL

A. All water resulting from the pre-cleaning operation, excess from the floor of regulated area, decontamination water, and the final cleaning operation shall be collected and placed in a sealed container(s) for disposal as hazardous waste or for waste characterization to determine if it is hazardous waste. No water shall be disposed of in sanitary sewers or storm drains.

3.07 WET REMOVAL PROCEDURE

A. Wet all lead containing material with an amended water solution using equipment capable of providing a fine spray mist, in order to reduce airborne fiber concentrations when the material is disturbed. Saturate the material to the substrate. Keep all removed material wet to prevent dust release until it can be containerized for disposal.

B. Saturated lead waste shall be removed in manageable sections, but as large as practical. Removed material should be containerized before moving to a new location for continuance of work. Surrounding areas shall be periodically sprayed and maintained in a wet condition until visible material is cleaned up.

C. Bags shall be considered full when half their capacity has been filled. They should be securely sealed to prevent accidental opening and leakage by tying tops of bags in an overhand knot or by taping in gooseneck fashion. Do not seal bags with wire or cord.

D. Large components removed intact may be wrapped in two (2) layers of six (6) mil polyethylene sheeting secured with tape for transport to the approved disposal site.

E. Lead containing waste with sharp edged components (e.g., nails, screws, metal lathe, tin sheeting) shall be placed into drums for disposal in lieu of polyethylene bags. Drums shall be marked to differentiate contents from those drums containing bagged material.

F. After completion of all stripping work, surfaces from which lead has been removed such as plaster base coat or metal deck, etc., the surfaces shall be wet brushed and sponged to remove all visible residues.

3.08 ENCAPSULATION/STABILIZATION PROCEDURES

A. Clean and isolate the regulated area as specified in Subpart entitled "3.02 LBP/Lead-Containing Surface Coating Impacts", hereinbefore.

B. Repair damaged and missing areas of existing materials with non-lead-containing substitutes. Material must adhere adequately to existing surfaces and provide an adequate base for application of encapsulating agents. Filler material shall be applied in accordance with manufacturer's recommended specifications.

C. Feather back rough edges of paint by carefully sanding with HEPA equipped sanders.

D. Spray apply with airless equipment with low nozzle pressure to all surfaces where lead is removed or surfaces containing lead that are to remain in place. Spray must completely encapsulate any remaining lead, permanently locking it in place.

E. Apply a minimum of one (1) coat with coverage in strict accordance with manufacturer's recommendations. Surfaces must be dry and free of dirt, oil and dust.

3.09 AIR MONITORING

A. All sample collection procedures and evaluation to determine employee exposure levels (Contractor responsibility) shall conform to the requirements of OSHA Standard 29 CFR 1926.62 or 8 CCR 1532.1. For exterior lead abatement areas, a minimum of two upwind and two downwind ambient air samples (one at each of four sides of the area is acceptable) shall be collected during the disturbance of lead containing materials (e.g., stabilization and coating). For interior lead abatement areas air samples shall be collected outside the perimeter of the regulated area(s), outside the decontamination unit, and outside the waste load-out unit. The samples shall be placed as close as practical to the affected area.

B. All samples collected shall be analyzed on a 24-hour turnaround basis by a laboratory accredited by the California Environmental Laboratory Accreditation Program (CA ELAP) and the American Industrial Hygiene Association Laboratory Accreditation Programs, LLC (AIHA-LAP) under their Environmental Lead Laboratory Accreditation Program (ELLAP). The results of each analysis shall be submitted to the Owner’s Representative within two hours of receipt from the lab. Copies of the analysis results shall also be made available to Owner Representative and the Contractor upon request and posted in the clean room or break area on the day of receipt from the lab.

C. Documentation requirements must include the following, as a minimum:

Air Sampling Procedures: Sampling times, sampling locations (with appropriate diagrams), evidence of periodic inspection of sampling equipment, documentation of pre and post calibration of equipment, detailed description of work conditions, description of worker protective devices, and a description of any atypical environmental conditions.

D. Minimum testing required for the project shall consist of the following:

1. Exterior Testing During Exterior Paint Disturbance: Area air samples will be collected at the perimeters of the regulated area.

2. Personal Sampling for OSHA - PEL and Action Level - As required by 29CFR 1926.62 samples shall be within the breathing zone of each worker category (i.e., wetter, receiver, bagger, etc.) 25% of the crew, or one per job category (Contractor responsibility).

E. Daily Personal Air Monitoring (OSHA Compliance):

1. Daily determination of employee exposure during LBP disturbance (e.g., exterior paint stabilization and coating disturbance) shall be made by collecting one or more breathing zone samples that are representative of the 8-hour TWA, full-shift exposure for each employee in each regulated area.

2. Daily testing may be dispensed with if employees are equipped with supplied-air respirators operated in a positive-pressure mode while performing abatement work or sampling indicates that exposures do not exceed the OSHA Action Level.

3. Daily testing may also be dispensed with if the contractor is in possession of a negative exposure assessment performed in accordance with 8 CCR 1532.1 on the same workers for like tasks within the last 12 months.

3.10 WORK STOPPAGE

A. The Owner's Representative has the authority to stop the abatement work under the provisions of the General Conditions of this contract at any time he/she determines either personally or through the services of the air sampling professional that conditions are not in compliance with the specifications and applicable regulations. The stoppage of work shall continue until conditions have been corrected and corrective steps have been taken to the satisfaction of the Owner's Representative. Standby time required to resolve violations shall be at the Contractor's expense.

B. When exterior paint is being stabilized or removed any visible debris or dust must not migrate beyond the work area. If wind conditions cause this to occur, then work shall stop until the wind decreases to allow for no further dust/debris migration. Wind speed of over 10 mph may cause this. As such wind conditions expected for the days of work must be considered when planning these activities.

3.11 CLEANUP PROCEDURE

A. Remove and containerize all visible accumulations of lead and lead contaminated debris utilizing rubber dust pans and rubber squeegees to move material around. Do not use metal shovels to pick up or move accumulated waste. Special care shall be taken to minimize damage to floor containment sheeting, when present.

B. Wet clean all surfaces in the regulated area using rags, mops and sponges as appropriate. (Note: Some HEPA vacuums might not be wet-dry vacuums.)

C. Prior to removing the inner layer of plastic sheeting, the sheeting shall be sprayed with an encapsulant so that any residue remaining will be adhered to the plastic sheeting.

D. Remove the cleaned inner layer of plastic sheeting from walls and floors. Windows, doors, HVAC system vents and all other openings shall remain sealed. The negative pressure ventilation units shall remain in continuous operation. Decontamination enclosure systems shall remain in place and be utilized.

E. Remove all containerized waste from the regulated area and waste container pass-out airlock. Decontaminate all tools and equipment and remove at the appropriate time in the cleaning sequence.

F. The Owner's Representative and the Contractor shall inspect the regulated area for visible residue. If any accumulation of residue is observed, it will be assumed to be asbestos and the cleaning cycle shall be repeated.

3.12 CLEARANCE TESTING

A. Not required for this project

3.13 DISPOSAL PROCEDURES

A. Contractor is responsible for characterization of lead waste prior to waste being transported off site. All waste characterization samples must be taken under the supervision of the Project Environmental Consultant. Characterization sample results must be submitted to the Owner and/or Project Environmental Consultant for review prior to waste being transported off site.

B. All lead wastes shall be either disposed of as construction debris (if STLC/TCLP results allow) or lead-containing waste (with attendant RCRA codes, if STLC/TCLP results so require).

C. All hazardous wastes must be disposed of by a certified waste hauler approved by the Owner.

D. Obtain the EPA Hazardous Waste Generator Identification Number and State of California Hazardous Waste Tax Identification Number from the Owner.

E. All hazardous waste manifests, non-hazardous material data forms and bills of lading shall be delivered to the Project Environmental Consultant. Record keeping format shall utilize a chain of custody form which includes the names and addresses of the Generator (Owner), Contractor, Waste Hauler, pickup site, disposal site, the estimated quantity of the asbestos waste and the type of containers used. The form shall be signed by the Generator, Contractor, Waste Hauler and the Disposal Site Operator, as the responsibility for the material changes hands.

3.14 ALTERNATIVE PROCEDURES

A. If specified procedures cannot be utilized, a request shall be made in writing to the Owner Representative and Consultant providing details of the problem encountered and recommended alternatives.

B. Alternative procedures shall provide equivalent or greater protection than procedures that are replaced.

C Any alternative procedure must be approved in writing by the Environmental Consultant and the Owner Representative prior to the implementation of the procedure.

END OF SECTION