

LEAD/HEAVY METAL MANAGEMENT PLAN

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Environmental Health & Safety
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PURPOSE

The purpose of the Lead/Heavy Metal Management Program is to prevent lead, cadmium, and chromium exposure of all workers, regardless of job title and to help prevent the potential for building contamination from lead during demolition, maintenance, and renovation activities in Michigan State University owned structures. The requirements in this program set standards for work that disturbs potential lead/heavy metal-containing materials. Contractors engaged in such projects are expected to possess managerial expertise, experience and to employ workers with skill, training, and experience so that the work is carried out in compliance with these requirements.

This document is the official MSU position on procedures and operations involving the disturbance of lead/ heavy metal-containing materials at MSU by employees or outside contractors. This document was developed to ensure University compliance with Occupational Safety and Health Administration (OSHA), Environmental Protection Agency (EPA) and the office of Housing and Urban Development (HUD) Standards. Many of these standards are enforced in the State of Michigan by authorized agencies such as the Department of Labor and Economic Opportunity (DLEO) Michigan Occupational Health and Safety Administration (MIOSHA), the Michigan Department of Community Health (MDCH) and the Michigan Department of Environment, Great Lakes and Energy (MDEGLE).

INTRODUCTION

Lead is a soft bluish-gray metal in its elemental state that is commonly found as an additive in many construction materials. Such materials include but are not limited to; paint, welding wire, solders used for soldering tinplate and copper pipe joints, tank linings and electrical conduit. The Consumer Product Safety Commission has banned the use of lead-based paint in residences. However, because lead-based paint inhibits the rusting and corrosion of iron and steel, lead continues to be used on bridges, railways, ships, lighthouses and other steel structures. Employee exposures to lead can occur during the demolition, or salvage of structures, during the removal or encapsulation of lead-containing materials, and during new construction, alteration, repair, or renovation of structures that contain lead or lead-containing materials.

Overexposure to lead are commonly found in the construction industry and are a significant cause of illness in the workplace. Exposure to lead can occur through inhalation (breathing), ingestion (eating), and

in the case of certain organic lead compounds, absorption through the skin. Employee exposure to lead can result in both acute (short term) and chronic (long term) health effects. Such health effects include insomnia, constipation, nausea, encephalopathy or damage to the central nervous system, anemia, and kidney disease. Exposure can also result in damage to both the male and female reproductive systems (e.g., decreased fertility, sterility, impotence, miscarriage, and still birth). If an employee does not receive proper medical treatment for these conditions, and the exposures to lead continue unchecked, these health effects can become permanent, and may even result in death.

Cadmium (Cd) is a soft, malleable, bluish white metal found in zinc ores, and to a much lesser extent, in the cadmium mineral greenockite. Most of the cadmium produced today is obtained from zinc byproducts and recovered from spent nickel-cadmium batteries. Common industrial uses for cadmium today are in batteries, alloys, coatings (electroplating), solar cells, plastic stabilizers, and pigments.

Cadmium and its compounds are highly toxic and exposure to this metal is known to cause cancer and targets the body's cardiovascular, renal, gastrointestinal, neurological, reproductive, and respiratory systems. Requirements to protect workers from cadmium exposure are addressed in specific OSHA cadmium standards covering general industry ([1910.1027](#)), shipyards ([1915.1027](#)), construction ([1926.1127](#)) and agriculture ([1928.1027](#)).

Workers can be exposed to cadmium by breathing in dust, fumes, or mist containing cadmium. Cadmium or cadmium compounds can also get on the skin, contaminate clothing or food, and be ingested (which is also one of the [routes of exposure](#)). The most effective way to prevent exposure to a hazardous metal such as cadmium is through elimination or substitution.

Chromium is a hard steel-gray metal that is highly resistant to oxidation, even at high temperatures. It is the sixth most abundant element in the earth's crust, where it is combined with iron and oxygen in the form of chromite ore.

Occupational exposures often include mixed exposure to both Cr(III) and Cr(VI) [EPA 1998]. Human occupational experience clearly indicates that, when inhaled, chromium compounds are respiratory tract irritants, resulting in airway irritation, airway obstruction, and lung, nasal, or sinus cancer. Dose, exposure duration, and the specific compound involved can determine chromium's adverse health effects. Pulmonary irritant effects following inhalation of chromium dust can include asthma, chronic bronchitis, chronic irritation, chronic pharyngitis, chronic rhinitis, congestion and hyperemia, polyps of the upper respiratory tract, tracheobronchitis, and ulceration of the nasal mucosa with possible septal perforation.

DEFINITIONS

Many definitions regarding lead exist in different statutes, regulations, and guidelines. The list below is included for clarification of terms used within this management plan and is in no way exhaustive or complete. Definitions marked with an asterisk (*) are incomplete. For additional definitions or clarification please refer to specific regulations or contact the Lead Program Manager.

Abatement* means any measure or set of measures designed to permanently eliminate lead-based paint hazards. Abatement includes, but is not limited to:

(1) The removal of paint and dust, the permanent enclosure or encapsulation of lead-based paint, the replacement of painted surfaces or fixtures, or the removal or permanent covering of soil, when lead-based paint hazards are present in such paint, dust or soil; and

(2) All preparation, cleanup, disposal, and post-abatement clearance testing activities associated with such measures.

(3) Abatement does not include renovation, remodeling, landscaping, or other activities, when such activities are not designed to permanently eliminate lead-based paint hazards, but, instead, are designed

to repair, restore, or remodel a given structure or dwelling, even though these activities may incidentally result in a reduction or elimination of lead-based paint hazards. Furthermore, abatement does not include interim controls, operations and maintenance activities, or other measures and activities designed to temporarily, but not permanently, reduce lead-based paint hazards. (MCL 333.5453(1), MCL 333.5453(2))

Action Level (AL) Lead

Employee exposure, without regard to the use of respirators, to an airborne concentration of lead of 30 micrograms per cubic meter of air (30µg/m³) calculated as an 8-hour time-weighted average. (1926.62(b)).

Action Level (AL)-Cadmium - Employee exposure, without regard to the use of respirators, to an airborne concentration of cadmium of 2.5 micrograms per cubic meter of air (2.5µg/m³) calculated as an 8-hour time-weighted average. (R 325.51853).

Action Level (AL)-Chromium (VI) - Employee exposure, without regard to the use of respirators, to an airborne concentration of chromium (VI) of 2.5 micrograms per cubic meter of air (2.5µg/m³) calculated as an 8-hour time-weighted average. (1926.1126(c)).

Certified firm means a company, partnership, corporation, sole proprietorship, association, or other business entity that performs lead-based paint activities to which EPA has issued a certificate of approval pursuant to §745.226(f). (MCL 333.5454(3))

Certified Inspector means an individual who has been trained by an accredited training program and certified by the MDCH to conduct inspections and take samples for the presence of lead in paint, dust, and soil for the purpose of abatement clearance testing. (MCL 333.5454(4))

Certified Renovator means an individual who has successfully completed an eight-hour renovator course accredited by an EPA certified trainer.

Certified Risk Assessor means an individual who has been trained by an accredited training program and certified by the MDCH to conduct inspections and risk assessments and to take samples for the presence of lead in paint, dust, and soil for the purpose of abatement clearance testing. (MCL 333.5454(6))

Certified Supervisor means an individual who has been trained by an accredited training program and certified by the MDCH to supervise and conduct abatements and to prepare occupant protection plans and abatement reports. (MCL 333.5454(7))

Child Occupied Facility – a building or portion of a building constructed before 1978 that is visited regularly by a child who is 6 years of age or less, on at least 2 different days within a given week, if each day's visit is at least 3 hours and the combined weekly visit is at least 6 hours in length, and the combined annual visits are at least 60 hours in length. Child occupied facility includes but is not limited to a day-care center, a preschool, and a kindergarten classroom. (MCL 333.5454(8))

Cleaning Verification Card means a card developed and distributed, or otherwise approved, by EPA for the purpose of determining, through comparison of wet and dry disposable cleaning cloths with the card, whether post-renovation cleaning has been properly completed in RRP settings. (40 CFR 745.85(5))

Common Area means a portion of the building that is generally accessible to all occupants of the building. Common areas include, but is not limited to, a hallway, a stairway, a laundry and recreational room, a playground, a community center, a garage, and a boundary fence. (MCL333.5455(3), 40 CFR 745.63 Subpart D)

Construction* means work for construction, alteration and/or repair, including painting and decorating. It includes but is not limited to the following:

1. Demolition or salvage of structures where lead or materials containing lead are present.
2. Removal or encapsulation of materials containing lead.

3. New construction, alteration, repair, or renovation of structures, substrates, or portions thereof, that contain lead, or materials containing lead.
4. Maintenance operations associated with the construction activities described in this paragraph. (29 CFR 1926.62(a) (a)(1)-(a)(7))

Contractor Employer Program - In accordance with the Hazard Communication Standard, each outside contractor working on an MSU owned property (on-site) is responsible for developing, implementing, and informing other on-site employers of all hazard communication related information. Under the Program, each outside employer must provide MSU, and other employer(s) working on-site, with unrestricted, on-site access to safety data sheets (SDSs) for all hazardous materials used, handled or stored on-site to which an employee may potentially be exposed to during their normal course of work.

Distinct Painting History means the application history, as indicated by its visual appearance or a record of application, over time, of paint or other surface coatings to a component or room. (MCL 333.5456(4))

Dormitory Apartment – An apartment located within a dormitory building which contains more than one room.

Dormitory Room – A zero-bedroom unit for housing students. (24 CFR 35.110)

EBL Investigator means a certified risk assessor who has been endorsed by the MDCH to conduct EBL environmental investigations.

Elevated Blood Level or EBL means for purposes of lead abatement, an excessive absorption of lead that is confirmed concentration of lead in whole blood of 20µg/dL (micrograms of lead per deciliter of whole blood), for a single venous test or of 15-19 µg/dL in two consecutive tests taken 3 to 4 months apart. For purposes of case management of children 6 years of age or less, elevated blood level means an excessive absorption of lead that is a confirmed concentration of lead in whole blood of 10 µg/dL. (MCL 333.5456(7))

Hazardous Waste – Generation and disposal of hazardous waste is regulated under the Resource Conservation and Recovery Act (RCRA). If a waste exhibits toxicity, corrosivity, ignitability, or reactivity characteristics it is considered hazardous. (40 CFR 261.3 Subpart A)

HEPA – A high-efficiency particulate air (HEPA) filter is one that is capable of filtering 99.97% of all airborne particles at 0.3 micrometers (µm) in diameter. (40 CFR 745.83)

HEPA Vacuum Cleaner means a vacuum cleaner which has been designed with a HEPA filter as the last filtration stage. The vacuum cleaner must be designed so that all the air drawn into the machine is expelled through the HEPA filter with none of the air leaking past it. (40 CFR 745.83)

Inspection means a surface-by-surface investigation to determine the presence of lead-based paint in target housing or child occupied facility, and the provision of a report explaining the results of the investigation. (MCL 333.5457(5))

Lead means metallic lead, all inorganic lead compounds, and all organic lead soaps. Excluded from this definition are all other organic lead compounds. (29 CFR 1926.63(b))

Lead-Based Paint means paint or other surface coatings that contain lead equal to or more than 1.0 milligrams per square centimeter (mg/cm²), 0.5 percent by weight, or 5,000 micrograms per gram (µg/g). (MCL 333.5458(1))

Lead-Based Paint Activities means, in the case of target housing and child-occupied facilities, inspection, risk assessment, and abatement, as defined in 40 CFR §745.223 (MCL 333.5458(2))

Lead Containing Material (LCM) – Any material that has been confirmed, through laboratory analysis to contain any detectable quantity of lead.

Permissible Exposure Limit (PEL) Lead - No employee shall be exposed to lead at concentrations greater than fifty micrograms per cubic meter of air (50 µg/m³) averaged over an 8-hour period or for a total of 400 µg/m³ in any workday. (40 CFR 1926.62(c)(1), (c)(2))

Permissible Exposure Limit (PEL) Cadmium - An employer shall ensure that an employee is not exposed to an airborne concentration of cadmium more than 5 micrograms per cubic meter of air (5 µg/m³), calculated as an eight-hour, time weighted average (TWA) exposure. Part 309 R325.51853.

Permissible Exposure Limit (PEL) Chromium - An employer shall ensure that an employee is not exposed to an airborne concentration of chromium more than 5 micrograms per cubic meter of air (5 µg/m³), calculated as an eight-hour, time weighted average (TWA) exposure. Part 309 R325.51853.

Presumed Lead Containing Material (PLCM) – Any material that is presumed to contain any quantity of lead.

Renovation* means the modification of any existing structure, or portion thereof, that results in the disturbance of painted surfaces, unless that activity is performed as part of an abatement as defined by 40 CFR 745.223. The term renovation includes (but is not limited to): The removal, modification or repair of painted surfaces or painted components (e.g., modification of painted doors, surface restoration, window repair, surface preparation activity (such as sanding, scraping, or other such activities that may generate paint dust)); the removal of building components (e.g., walls, ceilings, plumbing, windows); weatherization projects (e.g., cutting holes in painted surfaces to install blown-in insulation or to gain access to attics, planning thresholds to install weather-stripping), and interim controls that disturb painted surfaces. (40 CFR 745.83)

Representative Sample – Sample that accurately captures a particular material or area based on the typical characteristic of that material or area.

Risk Assessment means an on-site investigation in target housing or a child occupied facility to determine the existence, nature, severity, and location of a lead-based paint hazard AND the provision of a report by the person conducting the risk assessment explaining the results of the investigation and options for reducing the lead-based paint hazard. (MCL 333.5459(9)(a),(b))

Substrate – The underlying material a building component is made from, over which is often applied a surface finish such as paint. Common substrates include plaster, concrete, wood, metal, and gypsum. (24 CFR 35.110)

Target Housing* – Any housing constructed before 1978, except any of the following:

- (a) Housing for the elderly or persons with disabilities, unless any 1 or more children aged 6 years or less resides or is expected to reside in that housing.
- (b) A 0-bedroom dwelling.
- (c) An unoccupied dwelling unit pending demolition provided the dwelling unit remains unoccupied until demolition. (MCL 333.5460(1) (a-c))

Time Weighted Average (TWA) (8hr) - an average value of exposure over the course of an 8-hour work shift

Toxicity Characteristic Leachate Procedure (TCLP) - Test conducted to determine if a substance is a hazardous waste. The hazardous waste limit for lead is 5 parts per million (ppm). This limit applies only to waste determination. (40 CFR 261.24)

Wet Disposable Cleaning Cloth means a commercially available, pre-moistened white disposable cloth designed to be used for cleaning hard surfaces such as uncarpeted floors or counter tops. (40 CFR 745.83)

Wet Mopping System means a device with the following characteristics: A long handle, a mop head designed to be used with disposable absorbent cleaning pads, a reservoir for cleaning solution, and a

built-in mechanism for distributing or spraying the cleaning solution onto a floor, or a method of equivalent efficacy. (40 CFR 745.83)

Work Area means the area that the certified renovator establishes to contain the dust and debris generated by a renovation. (40 CFR 745.83)

X-Ray Fluorescence (XRF) XRF is a non-destructive analytical technique used to determine the presence of lead in paint.

Zero-Bedroom Dwelling means any residential dwelling in which the living area is not separated from the sleeping area. The term includes efficiencies, studio apartments, dormitory housing, military barracks, and rentals of individual rooms in residential dwellings. (24 CFR 35.110)

APPLICABLE REGULATIONS

The MSU Lead/Heavy Metal Management Plan has been established to comply with the following regulations:

- ❖ Cadmium-[LEO Part 309](#)
- ❖ Chromium-[LEO Part 604](#)
- ❖ Lead for General Industry: [LEO Part 310 and 29 CFR 1910.1025](#)
- ❖ Lead Exposure in Construction: [LEO Part 603 and 29 CFR 1926.62](#)
- ❖ Lead-based Paint Poisoning Prevention in Certain Residential Structures, including:
 - EPA Renovation, Repair, and Painting (RRP) Rules: [40 CFR 745, Subpart E](#)
 - Disclosure of Known Lead-Based Paint and/or Lead-Based Paint Hazards upon Sale or Lease of Residential Property: [40 CFR 745 Subpart F](#)
 - Lead-Based Paint Activities: [40 CFR 745 Subpart L](#)
- ❖ National Primary Drinking Water Regulations: [40 CFR Part 141](#)
- ❖ Identification and Listing of Hazardous Waste: [40 CFR Part 261](#)
- ❖ Lead Abatement Act: [Michigan Part 54A](#)
- ❖ Lead Hazard Control Rules: [MDHHS Rule 325](#).

The plan also includes information from the following reference materials:

- ❖ EPA Lead Information Pamphlet for Pre-Renovation Education and RRP Compliance: [Renovate Right: Important Lead Hazard Information for Families, Child Care Providers, and Schools](#)
- ❖ EPA [Small Entity Compliance Guide to Renovate Right](#)
- ❖ MIOSHA [Lead Exposure in Construction Fact Sheet](#)
- ❖ OSHA Lead in Construction: [OSHA 3142-09R](#)
- ❖ OSHA Appendix A - Substance Data Sheet for Occupational Exposure to Lead: [General Industry Construction Industry](#)
- ❖ OSHA Appendix B - Employee Standard Summary: [General Industry Construction Industry](#)
- ❖ OSHA Compliance Directive: Lead Exposure In Construction: [CPL 02-02-058](#)
- ❖ EPA Guidance: ["Regulatory Status of Waste Generated by Contractors and Residents from Lead-Based Paint Activities Conducted in Households" \(August 2000\)](#)
- ❖ FDA - Ornamental and decorative ceramicware: [21 CFR 109.16](#)
- ❖ FDA - Pottery (Ceramics); Import and Domestic - Lead Contamination: [CPG Sec. 545.450](#)

These materials are available at the links above or from the Lead Program Manager.

RESPONSIBILITIES

All campus members, including faculty, staff, students, visitors, and external contractors and consultants are expected to follow the requirements outlined in the General Lead Compliance section. In addition, to increase the effectiveness of this lead management program, the following responsibilities are specifically designated:

University Employees

1. Treat all coated surfaces as if they are lead/heavy metal-containing unless specifically tested and documented by EHS.
2. Contact your supervisor to have a suspect lead/heavy metal-containing material tested, if necessary.
3. Attending appropriate initial and refresher awareness training as directed by your supervisor and the LPM.
4. Comply with all provisions of the Metals Management Plan.

Supervisors, Deans, Directors, Chairs

1. Assume all coated surfaces are lead/heavy metal-containing unless specifically tested and documented by EHS.
2. Assure that information and procedures contained within this Lead/Heavy Metal Management Plan are strictly followed by all personnel.
3. Notify the LPM when new employees are hired so they may be properly trained, if necessary.
4. Contact the LPM for testing of suspect materials encountered during routine operations.
5. Ensure that authorized employees are following proper work procedures while handling lead/heavy metal-containing materials and if an NEA is relied upon that it is listed as “current” by the LPM.
6. Coordinate annual air sampling with the LPM to keep Negative Exposure Assessments (NEA’s) current.
7. Contact the LPM for waste characterization via TCLP sampling.
8. Waste will remain segregated until TCLP analysis is received by the LPM.
9. Contact the LPM 15 business days prior to any renovation activities taking place in target housing or child occupied facilities to ensure RRP compliance.
10. Report any problems associated with the Lead/Heavy Metal Management Program to EHS.

Planning Design and Construction (PDC) Design Representatives

1. Assume all coated surfaces are lead/heavy metal-containing unless specifically tested and documented by EHS.
2. Coordinate with the Lead Program Manager when renovations and demolitions are planned to obtain existing lead surveys and to determine what level of project design and specification documents may be required.
3. Provide the LPM with a copy of any lead survey and/or project specification information for metal related activities as they are obtained.
4. Ensure the standard lead notification is included in any project specification or contract.
5. Contact the LPM if any renovation activities are to take place in target housing or child occupied facilities for RRP compliance assistance.

PDC Construction Representatives

1. Assume all coated surfaces are lead/heavy metal-containing unless specifically tested and documented by EHS.
2. Notify EHS in writing a minimum of 15 working days in advance of upcoming projects that may impact coated surfaces that may contain lead/heavy metal. Work with LPM to determine if RRP rules apply to project.
3. Disclose known information regarding the presence of metals in building and/or construction materials to any contractor retained to conduct work at MSU.
4. Utilize only EPA licensed RRP contractors for disturbances of lead containing materials in target housing or child occupied facilities.
5. Ensure that the Contractor has read, understands, and will abide by the minimum performance standards required in this Program for controlling metal hazards.
6. Stop or modify metal related work practices if employees, students, or the public are being exposed to metal hazards.
7. Ensure all metal related worksites and all areas that have been contaminated resulting from the work conducted are properly cleaned and meet the clearance criteria required by this Program.
8. Ensure all hazardous waste is properly identified, labeled, segregated, and stored at the jobsite until removed by EHS or approved contractor.
9. Provide specific language regarding projects that may contain metals to all contractors bidding on projects.
10. Submit a variance request to the EHS office in writing for work practices, notification times, or other deviations from the metals management plan. Variance approval is at the discretion of EHS.
11. Notify the Lead Program Manager of any metal related incidents at MSU construction sites.
12. Report any problems associated with the Lead Management Program to EHS.

External Project Managers, General Contractors, Sub-Contractors, and Lead Specific Contractors:

1. Assume all coated surfaces are lead/heavy metal-containing unless specifically tested and documented by EHS.
2. The Contractor will, at no cost to the University, be responsible for maintaining a company specific Lead/Heavy Metal Management Plan (1926.62(e) and comply with all applicable regulations.
 - a. Written programs shall be submitted upon request to any affected employee or employee representatives, to the project Planner/Inspector/Analyst, and shall be available at the worksite for examination and copying by the University LPM
3. Conduct initial assessments, at no cost to the University, of employee's potential for lead exposure as required by DLEO Part 603.
4. Ensure, prior to work, that all impacted employees have received lead awareness training including information required by DLEO Part 603. Proof of current training shall be provided to the LPM upon request.
5. Do not disturb any lead/heavy metal-containing material unless specifically trained and authorized to do so. Assume all coated surfaces are lead/heavy metal-containing as defined by DLEO Part: 309, 603 and 604.
6. Communicate hazards related to lead/heavy metal work to all other trades on a project site and to LPM.
7. Ensure that MSU employees are not exposed to levels above the OSHA action level, including but not limited to, implementing all applicable administrative and engineering controls as described in DLEO Part: 309, 603 and 604.

8. Contact the LPM through MSU Project Manager, no less than 15 business days prior to any renovation activities are to take place in target housing or child occupied facilities for RRP compliance assistance.
9. Limit access to worksites in which Level 1, 2 and 3 tasks are taking place to trained and authorized personnel only.
10. Adequately limit all migration of metal containing dust and debris to any areas outside the worksite.
11. Prevent the contamination of MSU property (i.e., computers, chairs, desks, carpet, floors, walls, etc.) from metal dust and debris.
12. Collect and manage metal wastes produced in accordance with EHS hazardous waste requirements.
13. Do not discard waste until a TCLP sample has been collected, submitted and laboratory analysis received by the LPM, TCLP analysis cost shall be borne by the University.
14. Ensure that workers contaminated with lead/heavy metal containing dust and debris do not transfer that material outside the worksite.
15. For Lead Abatement Activities, Possess required MDCH licenses and certifications as well as a minimum of 2 years of experience with lead abatement.

Facility for Rare Isotope Beam (FRIB) Staff

1. Attend appropriate initial and refresher awareness trainings as directed by your supervisor and the LPM.
2. Comply with all provisions of the Lead/Heavy Metal Management Plan.

Childcare Facilities (Pre 1978)

1. Notify EHS in writing a minimum of 15 working days in advance of upcoming projects or maintenance that may impact coated surfaces that may contain lead to comply with RRP.
2. Utilize only EPA licensed RRP contractors for disturbances of lead containing materials.
3. Not less than 10 business days prior to start of renovation activities, distribute the *Renovate Right* pamphlet to an adult representative of Childcare Facility and document representative received said pamphlet. In accordance with 40 CFR 745.

Residential Hospitality Services/Land Management Office

1. Disclose the presumed presence of lead in paint to all tenants in all leasing contracts for target housing built before 1978.
2. Provide a copy of the EPA pamphlet titled "Protect Your Family from Lead in Your Home" to tenants at lease signing for target housing built before 1978.
3. Keep record of signatures obtained from tenant acknowledging receipt of lead disclosure and EPA pamphlet.
4. Notify EHS in writing a minimum of 15 working days in advance of upcoming projects or maintenance that may impact coated surfaces that may contain lead. Work with LPM to determine if RRP rules apply.
5. Not less than 10 business days prior to start of renovations activities, distribute the *Renovate Right* pamphlet and document occupant received said pamphlet. In accordance with 40 CFR 745.
6. Contact EHS prior to the sale of any property built before 1978 for assistance with *Disclosure of Known Lead-Based Paint* requirements found at 40 CFR 745 Subpart F.

University Physician's Office

1. Coordinate and direct all required or recommended medical surveillance for employees as required by applicable regulations.
2. Provide medical consultations and/or examinations for workers who have been exposed, believe they have been exposed, or may be exposed to heavy metals.
3. Maintain medical records relating to heavy metal as required by any applicable regulations.

EHS Lead Program Manager (LPM)

1. Maintain the Lead/Heavy Metal Management Program and revise as necessary.
2. Provide technical guidance to university personnel concerning lead/ heavy metal hazard evaluation and control.
3. Investigate lead/heavy metal concerns of students, faculty, staff, contractors, building occupants, and visitors.
4. Authorize modified clearance limits based on elevated baseline sampling, if necessary and allowable.
5. Review results of area air monitoring and clearance dust wipe sampling and provide interpretation for departments managing work.
6. Periodically monitor activities at work sites for compliance with applicable metal regulations.
7. Direct the University departments conducting or contracting work to modify or stop metal related work practices if employees, students, or the public are being exposed to potential heavy metal hazards.
8. Maintain records of all sampling data conducted by and submitted to EHS.
9. Review for approval Statement of Qualifications for outside Lead Abatement contractors or consultants.
10. Provide Lead Training in accordance with 29 CFR 1926.62 (L) (2) for university employees anticipated to have occupational lead exposure.
11. Develop and maintain a database of known lead/heavy metal containing materials in campus buildings, based on information provided by Departments conducting lead/heavy metal sampling.
12. Evaluate and approve acceptable lead/heavy metals management plan variance requests.
13. Meet with all regulatory agencies as needed for inspections and lead/heavy metal related inquiries.

LEAD COMPLIANCE AND OPERATIONS

The regulation of lead is unique in that several different agencies regulate activities that occur at the University through an even greater number of rules. For example, DLEO regulates worker exposure to metals in general industry and construction settings, the EPA regulates any activity that impacts lead-based paint in target housing or child occupied facilities, and the MDCH enforces the EPA regulated Lead Based Paint Activities such as inspection, abatement, and control of lead.

At any time, any, some, or all of these sets of overlapping regulations may apply to work at any Michigan State University owned property and are incorporated by reference into this program. It is the responsibility of the contractor or the University unit to understand where and when what regulations must be followed. For further detail please see the online version of these regulations posted under "Applicable Regulations" or contact the Lead Program Manager.

Lead Identification

Because of its physical properties, lead has been widely used as an additive to many building materials. Although lead has been banned from use on potable water supplies and residential paint, it may still be

present in older buildings. Some lead containing building materials continue to be used to this day. The following materials should be presumed to contain lead unless manufacturer information, SDS, or testing proves otherwise.

Presumed Lead/Metal Containing Materials (PLCM):

- Interior and exterior paint
- Steel and iron primer
- Industrial paint
- Industrial electrical jacketing
- Roof flashing
- Tank linings
- Soft solder
- Glazed Ceramics
- Sheeting, blocks, and bricks in floors and walls for radiation penetration protection

The OSHA Lead Standard applies to **any** detectable concentration of lead/heavy metals in a material. The presence of any lead/heavy metals in a material triggers the worker protection and work practice requirements of this program. Due to the fact that no limit exists for lead/heavy metals in paint and the average age of construction on campus, ***all coated surfaces at the university are assumed to contain some amount of lead/heavy metals.***

The department managing the work may decide to conduct lead/heavy metal identification sampling to determine if a material contains lead. Currently, OSHA only recognizes the bulk paint sample method to determine lead/heavy metal content.

Sampling may only be conducted by a qualified University employee or a qualified consulting firm.

At a minimum, a qualified person conducting lead/heavy metal identification sampling will:

- Have previous bulk sampling for lab analysis experience.
- Have a working understanding of the National Institutes for Occupational Safety and Health (NIOSH) sampling methodologies.
- Capable of determining appropriate sampling methodologies documenting and submitting a “representative” sampling plan.

At a minimum, Lead Identification Sampling must provide the following:

- Sampling must be representative of the material selected. One sample is needed for each homogenous (same color and substrate) component and each individual component must be sampled separately. For example, if a door is painted 2 different colors, a sample is needed for each color, or if a wall is half plaster and half drywall, a sample is needed for each substrate.
- A collection of all paint layers from the substrate and minimize the collection of actual substrate.
- A record of the component, substrate, color, and location for each sample taken.
- Sampling results must be provided to the department managing the work and EHS.

Training

OSHA

All MSU employees that are anticipated to impact potential lead-containing materials or enter a lead worksite which may result in an occupational lead exposure must receive two-hour ***lead awareness*** training in accordance with 29 CFR 1926.62(L)(2) and MI Part 603(L)(2). Lead awareness training shall be conducted annually by EHS and will include the following:

- The specific nature of the operations which could result in exposure to lead above the action level.
- The purpose, proper selection, fitting, use and limitations of respirators.
- The purpose and description of the medical surveillance and medical removal programs, including health effects of lead exposure and potential reproductive consequences.
- The contents of this compliance plan.
- Instruction that chelating agents should not be used unless under the direction of a licensed physician.
- Explanation of engineering controls and work practices for lead-related work
- The employee's right of access to records

Non-University employees that will impact potential lead-containing materials are required to maintain the same level training of university employees at a minimum.

EPA RRP

Any MSU employee supervising and/or performing work under the EPA Renovation, Repair, and Painting Rules must receive eight-hour **Certified Renovator** training. Certified Renovator training must be provided by an EPA licensed RRP training provider. The certified renovator training is valid for 3 years from the date of the initial or most recent refresher training.

An employee performing work under the EPA Renovation, Repair, and Painting Rules **and** who is supervised by a certified renovator may conduct the work with on-site hands-on training called **Tailgate Training**.

MDCH Lead Abatement

Any MSU employee supervising and/or performing any lead abatement must be a MDHHS certified a lead abatement supervisor. Certified lead abatement supervisors oversee lead abatement projects by supervising lead abatement workers conducting abatement work, preparing occupant protection plans and abatement reports. Supervisors can also perform lead abatement work. Certified lead abatement supervisor training must be provided by an EPA licensed MDHHS training provider. The certified lead abatement supervisor training is valid for 3 years from the date of the initial or most recent refresher training.

Medical Surveillance

The University maintains a medical surveillance program for all employees who are exposed at or above the action level. This medical surveillance consists of a review of medical and work history, a physical exam and biological monitoring. This exam is offered annually at no charge to affected employees. For employees otherwise required to wear a respirator, a physician will determine that the employees are able to perform the work and use the equipment. For further information on medical surveillance, contact your supervisor or the Office of the University Physician at (517) 353-9137.

Respiratory Protection

All University employees must be provided with proper protective clothing and respirators when assigned to work that may result in exposure above the Action Level. The university maintains a respiratory protection program for its employees in accordance with DLEO Respiratory Protection Standard Part 451 (OSHA 29 CFR 1910.134). Contact the Department of Environmental Health and Safety's Occupational Safety Team for information on the MSU respirator program.

Work Practice Standards and Procedures

LEO - [Labor and Economic Opportunity](#)

EPA RRP - [EPA Lead Renovation, Repair and Painting Program](#)

MDHHS - [Michigan Department of Health & Human Services](#)

Exposure Assessments and Monitoring

Air Monitoring for Lead

The department managing the work must provide air sampling for all tasks involving lead containing materials or presumed lead containing materials, in which abrasive blasting is conducted, large scale demolition takes place, or HEPA equipped ventilation is exhausted outside the worksite. Sampling may only be conducted by a qualified individual(s).

At a minimum, a qualified person conducting air sampling will:

- Have previous air sampling experience and work under the supervision of an Industrial Hygiene Professional.
- Possess the ability to calibrate and maintain all air sampling equipment.
- Have an understanding of the National Institutes for Occupational Safety and Health (NIOSH) sampling methodologies.
- Have the ability to answer questions on sampling procedures, laboratory results, and or, instrument readings.

At a minimum, Air Sampling must provide the following:

- A personal breathing zone sample of a worker performing the lead removal operations.
- One air sample which represents an area outside the worksite, no more than 3 feet from the entrance.
- One air sample at the termination of any mechanical ventilation device used in the worksite which is exhausted outside of the worksite.
- One sample that represents the closest occupied area, or adjacent public space.
- Area air sampling must be conducted for every shift HEPA equipped ventilation is used or abrasive blasting is conducted.
- Analytical results of air samples must be provided by an American Industrial Hygiene Association accredited lab within 24 hours of sample collection.
- Air sample results must be provided to EHS daily. EHS will review all air sample results and contact the department managing the work as soon as possible and no later than the next business day if results are at or above $30 \mu\text{g}/\text{m}^3$. The results must contain the date, time, duration, associated room number, and a floor plan drawing that identifies sample location.

An area air sample result at, or above $30 \mu\text{g}/\text{m}^3$, for any shift, will be considered a breach in dust containment. All surfaces represented in the area sample are considered to be contaminated with lead dust and represent an exposure potential for future or existing building occupants. Work must be stopped immediately, and the following must occur:

- The affected area must be HEPA vacuumed, removing all visible dust from all affected surfaces.

- Clearance Dust Sampling must be conducted to ensure lead dust is removed. A re-clean of the area will be required until the University Clearance Criteria is met. Information on Clearance Dust Sampling is provided below.

Final Clearance Sampling

The University department conducting the work must provide Clearance Dust Wipe Sampling at the completion of the Level 2 and 3 tasks in which more than 2 square feet of a lead containing material is impacted. Results of the sampling will determine if the worksite is free of lead dust contamination and if the worksite can be opened for unrestricted access. Sampling will also provide confirmation that an area that was accidentally contaminated was sufficiently cleaned. Sampling may only be conducted by qualified individual(s). At a minimum, a qualified person conducting clearance sampling will:

- Have previous sampling experience and work under the supervision of an Industrial Hygiene Professional.
- Have the ability to answer questions on sampling procedures and laboratory results.
- Be completely independent of the contractor conducting the lead work.

For EPA RRP work, clearance samples may only be collected by a MDCH licensed inspector or risk assessor. For MDCH abatement activities, only a MDCH licensed inspector or risk assessor may collect clearance samples.

At a minimum, Clearance Dust Wipe Sampling must provide the following:

- One representative floor dust wipe sample per room, or per every 1000 square foot of floor space for rooms over 1000 square foot in size. Sample locations will represent the areas that have the highest potential for contamination within the worksite, or areas that have been identified as contaminated.
- One dust wipe sample for every hand contact surface located in the work site, or hand contact surfaces that have been identified as contaminated.
- Clearance dust wipe samples shall be collected no sooner than one hour from the completion of work. Samples collected within an hour of the completion of work will not be considered accurate representations of actual conditions in the work area.
- Clearance dust wipe sampling shall be conducted after the worksite is HEPA vacuumed by the Contractor and all visible dust is removed and prior to use or occupancy.
- Analytical results of dust wipe samples must be provided by an American Industrial Hygiene Association accredited lab.
- Clearance dust wipe sample results must be provided to EHS for review. EHS will notify The University department managing the work the next business day if area testing results meets the Clearance Criteria, and or, the space can be released for unrestricted access. University Clearance Criteria is listed below.

Dust Wipe Clearance Criteria

Surface	Clearance Criteria
All interior non-carpeted floors.	10 µg/ft ²
All interior surfaces except floors(e.g., stair treads, windowsills, widow troughs)	100 µg/ft ²

<p>All exterior horizontal surfaces extending 20-feet from worksite up to a height of 6-feet (e.g., stairs, pavement, concrete, windowsills)</p>	<p>400 µg/ft²</p>
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The University department or contractor conducting lead work on campus shall be responsible for returning the work area to below the appropriate clearance level. In settings where baseline samples show existing lead concentrations above the clearance level, the contractor must clean the work area to the baseline level or below. If baseline data is used as clearance criteria, the department or contractor must contact EHS BEFORE work is conducted to request baseline wipe sampling and for authorization from EHS. Failure to contact EHS before work has started will require use of the listed clearance limits.

Clearance dust wipe sample results above the Clearance Criteria represent surface lead contamination. Any areas that contain surface contamination must remain a restricted lead worksite, until a re-clean is completed and clearance dust wipes are collected by a third-party Sampling Technician and results reviewed for approval by EHS.

Note: Clearance Criteria for lead contamination in “Target Housing” or Child-Occupied Facilities must meet requirements listed in the US Department of Housing and Urban Development (HUD), “Guidelines for the Control of Lead-Based Paint Hazards in Housing.”

Housekeeping

The following basic housekeeping standards apply to all lead related activities:

1. All surfaces shall be maintained as free as practicable of accumulations of lead.
2. Clean-up of floors and other surfaces where lead accumulates shall, wherever possible, be cleaned by vacuuming or other methods that minimize the likelihood of lead becoming airborne.
3. Shoveling, dry or wet sweeping, and brushing may be used only where vacuuming or other equally effective methods have been tried and found not to be effective.
4. Where vacuuming methods are selected, the vacuums shall be equipped with HEPA filters and used and emptied in a manner which minimizes the reentry of lead into the workplace.
5. Compressed air shall not be used to remove lead from any surface unless the compressed air is used in conjunction with a ventilation system designed to capture the airborne dust created by the compressed air.

Lead Waste

There are comprehensive federal, state and local regulations for the management of hazardous waste. These rules apply to all contractors, sub-contractors, university personnel; from those who initially generate the hazardous waste to those who arrange for waste disposal. The University is regulated as a hazardous waste generator. Strict regulatory requirements apply to labeling, handling, storing and disposing of hazardous wastes.

In order to remain compliant with the Resource Conservation and Recovery Act (RCRA) solid waste must be reviewed to determine if it is a regulated waste. In the case of construction debris, there is a potential for lead contamination from lead-based paint. Any waste which leaches lead at a rate of 5 parts per million or greater is considered to be a hazardous waste.

University has determined that there are four types of lead contaminated waste which may be created as a result of maintenance and construction operations. These four types are:

1. Dust – Any material with a surface area of less than 2 square inches, to include, but not limited to, paint scrapings, small bits of construction debris, and dust from drilling, sanding, cutting, etc.
2. Debris – Any material with a surface area greater than or equal to 2 square inches in size, to include, but not limited to, Personal Protective Equipment (PPE), rags, wood, construction debris, paper, plastic, Scrap Metal, which is not sent for recycling, etc.
3. Water – Wastewater from processes involving the removal of lead-based paint or lead contaminated debris, to include, but not limited to, mop water, rinse water, etc.
4. Scrap Metal – Any painted metal which is being discarded as a waste, and can be sent to a metal recycling facility, to include, but not limited to, railings, stairs, shutters, doors, etc.

Two exemptions exist to the lead disposal requirements of RCRA:

1. Scrap Metal sent for recycling is not required to be tested due to the university's use of the *Scrap Metal Exemption* presented under 6NYCRR Part 371.1(c)(7).
2. Building parts, such as doors, window frames, painted woodwork, and paint chips from residential dwellings like single family homes, apartment buildings, row houses, military barracks, or college dormitories may be disposed of as household waste.

Waste Sampling

Many wastes which are or have the potential to be contaminated with lead must be sampled by an approved Third-Party Sampling Technician or by a qualified University employee and be submitted for testing to an EPA accredited lab for Toxicity Characteristic Leaching Procedure (TCLP) analysis. For the purposes of this program, the university will require testing and analytical for all water, debris, and large volumes of dust on a case-by-case basis*.

*Due to the cost of analytical testing, it does not make sense to analyze insignificant amounts of material. Any small quantities (less than 5 pounds) of dust should be automatically managed as hazardous waste and disposed of accordingly.

EHS requires that the contractor and/or department managing the work use an approved laboratory for sampling and analytical testing of the waste material. Contact the LPM for testing options.

- A proper sample must be representative of the waste. Proper sampling protocol will be ensured if employing the approved laboratory to sample and analyze the material. If the department managing the work chooses not to employ an approved laboratory, a sampling protocol must be submitted to the EHS for approval, five business days in advance of sampling.

EHS recommends that a representative waste sample be taken, and results submitted to the LPM prior to waste generation. By making a waste determination before work starts, the contractor and/or department managing the work can make the appropriate arrangements for storage and disposal of the waste in advance.

Waste Determination

Once the analytical results are received, a hazardous waste determination must be made by the contractor. The department managing the work must submit a copy of sample results for review by EHS. Waste may only be removed from the worksite after EHS has made a waste determination, based on the analytical results.

Once materials are deemed to be hazardous waste they must be managed as such.

If the material is determined by EHS to be non-hazardous it may be treated as a Municipal Solid Waste, Construction Debris, or Scrap Metal and can be managed and removed by the contractor. The material cannot be determined to be non-hazardous until the EHS receives and reviews a copy of the analytical for

review and notification of determination is given to the Waste Coordinator (see description below). Only then can the material sampled be treated as non-hazardous.

Recordkeeping

Specific records must be kept regarding asbestos related activities, including but not limited to:

1. Training records, including employee name, employee ID number, job title, name of training, date(s) of training, and instructor name shall be maintained by the EHS LPM for 3 years.
2. Exposure monitoring records including employee name, employee ID number, job title, and task, results of monitoring, testing protocol, and date of testing shall be maintained by the EHS LPM for 30 years.
3. Medical records are kept on file by the University Physician's office in accordance with 29 CFR 1910.20.
4. Acknowledgement of lead disclosure by leases of pre-1978 target housing at the university will be maintained by RHS for 3 years.
5. Acknowledgement of receipt of EPA pamphlet titled "Protect Your Family from Lead in Your Home" by tenants at lease signing for target housing built before 1978 will be maintained by RHS for 3 years.
6. Signed manifests returned from the lead disposal facilities shall be maintained by the EHS LPM if the waste is categorized as hazardous.
7. Other records or information as required by this management plan or existing regulations shall be maintained by the EHS LPM as necessary.

NOTIFICATIONS AND COMMUNICATION

Lead Notification to University Housing Residents

Occupants of target housing must be provided the following:

1. Disclosure of the assumed presence of lead in all paint in housing built before 1978.
2. EPA pamphlet titled "[Renovate Right: Important Lead Hazard Information for Families, Child Care Providers, and Schools](#)"
3. If any work is conducted under RRP or MDHHS rules in occupied housing, tenants/owners must be provided a copy of the EPA pamphlet referenced above within 60 days *prior* to the renovation.

Lead Work Notification to Building Occupants

Prior to the initiation of any interior or exterior work involving lead containing or presumed lead containing material, the Physical Plant will forward an informational memo to all appropriate persons on the building contact directory list that lead work is conducted. This memo will contain the general scope of work to be done, dates for the start and proposed completion of the work, and the precautions which will be employed to protect building occupants.

Lead Notification in Contract Documents

The following language shall be included in all project specifications, contracts, or other means of contracting work:

1. If the Contractor suspects a material, preexisting or newly discovered, within the scope of this project to be a hazardous material such as, asbestos, lead, polychlorinated biphenyl or any other potentially hazardous material, that has not already been identified and/or in the scope of work for

the Contractor to abate, notify the Project Representative immediately. Do not impact or disturb the material in question until it has been determined to either be non-hazardous, included in the original scope of work, or until other arrangements can be made with the project representative and the MSU Department of Environmental Health and Safety (EHS).

2. Due to the age of buildings on the Michigan State University campus, all coated surfaces shall be assumed to contain lead-based paint. This includes but is not limited to any type of paint, primer, coating, lacquer, or varnish on any building component. Proper precautions must be taken to ensure that workers and building occupants are not exposed to airborne lead concentrations at or above the OSHA Action Level (AL) of 30 µg/m³.
3. If work will be conducted on any coated surface at MSU, the contractor must submit to the Department of Environmental Health and Safety (EHS) and Physical Plant Project Representative current proof of appropriate detailed written lead work plan in accordance with 29 CFR § 1926.62 (Michigan Part 603). This submittal will include proof of training, written respirator program, and negative exposure assessments from projects with similar conditions at a minimum.
4. Any work that impacts Lead shall comply with the provisions of the MSU EHS Lead Management Plan.

The LPM is available to take samples of suspect LCM when necessary.

Notifications by Contractors or MSU Departments Conducting Lead Operations

Any contractor or MSU department conducting lead work under OSHA regulations shall post warning signs outside any entrance to the worksite in accordance with 1926.62(m)(2)(i).

The contractor or MSU department shall post the following warning signs in each work area where an employee's exposure to lead is above the PEL.



Additionally, all lead work areas, regardless of airborne lead concentrations, shall post the following information on a sign.



A sign is also required when conducting RRP work. Both signs posted above satisfy the RRP requirements when correctly used for compliance with OSHA standards. The contractor and/or department managing lead work shall ensure that signs are posted and maintained appropriately.

Notifications to the State of Michigan

If work is conducted that falls under the Lead Hazard Control protocols, the MDCH must be notified.

The contractor submitting a notification form to MDCH must send a copy to the Lead Program Manager. Notifications can be physically mailed, e-mailed, or faxed to:

4000 Collins Rd
East Lansing, MI 48910
boshgary@msu.edu
(517) 353-8956

In situations where a variance of work methods must be requested of either agency, prior approval must be provided to the contractor in writing from the Lead Program Manager.

Notifications and Communication to the Lead Program Manager (LPM)

Notification shall be made to the LPM of the following occurrences:

1. Project meetings with lead abatement contractors and environmental consultants.
2. Pre-bid, pre-construction, kickoff and project progress meetings for projects with lead abatement, RRP, or other Type-3 lead work components.
3. Notifications to State agencies as detailed above. Copies of subsequent revisions to a notification must also be submitted to the LPM.
4. Lead abatement activity information to include location, material to be abated, dates and times of work, abatement contractor, environmental consultant, and university project manager/coordinator.
5. Any analytical results collected for lead compliance, including TCLP, Dust, XRF, Chip, and Air samples.
6. Inspections from state or federal agencies regulating lead such as DLEO, MDEGLE, MDCH, OSHA, and EPA.
7. Prior to the initiation of any interior or exterior work involving lead containing or presumed lead containing material the contractor and/or department managing the work must provide the LPM with an initial lead project notification. The initial notification must contain the general scope of

work to be done, dates for the start and proposed completion of the work, and the precautions which will be employed to protect building occupants.

APPENDIX A: REGULATORY CRITERIA

Matrix	Concentration	Agency	Application	Basis
Paint: XRF	> 1.0 mg/cm ²	EPA	Dried Film – LBP (Abatement)	Technology
Paint: paint chip (lab analysis)	> 5000 ppm (µg/g) (> 0.5% by weight)	HUD EPA	Dried Film – LBP (Abatement)	Technology
Paint: Non-LBP (except OSHA)	< 90ppm (µg/g) (< 0.09% by weight)	CPSC	Liquid Form – “Lead Free” (For residential application)	Impurity Level
Dust	< 40 µg/ft ²	EPA	Uncarpeted Floor – Risk Assessment and Clearance	Health
Dust	< 250 µg/ft ²	EPA	Window Stool (Sill) – Risk Assessment and Clearance	Health
Dust	< 400 µg/ft ²	EPA	Window Trough (Well) – Risk Assessment and Clearance	Health
Bare Residential Soil	400 ppm (where there is child contact such as play area)	EPA HUD	Public Notice. Interim controls Action: Take measures to eliminate contact – change use patterns and provide barriers for children	Health
Bare Residential Soil	1,200 ppm (with minimal or no child contact such as drip line)	EPA HUD	Action: Interim control measures to cover soil or eliminate contact	Health
Bare Residential Soil	5,000 ppm	HUD	Action: Mandatory Soil Removal	Health
RCRA Waste	≥ 5 ppm Leachable lead (TCLP)	DHEC HUD	Hazardous Waste Characterization	Environment
Blood	10 µg/dl	CDC	Level of concern for children	Health
Blood	20 µg/dl	CDC	Level of concern for 2 tests	Health
Blood	40 µg/dl	OSHA	Worker return to work level	Health
Blood	50 µg/dl	OSHA	Worker medical removal level	Health
Water	0 ppb (µg/l)	EPA	Maximum Containment Level Goal (MCLG)	Health
Water	15 ppb (µg/l)	EPA	Public Notice	Health
Potable Water	0.2%	EPA	Solder	Health
	8.0%	EPA	Pipes and Fixtures	Technology
Air	1.5 µg/m ³	EPA	Quarterly TWA	Air Quality
Air	30 µg/m ³	OSHA	Action Level (8hr TWA)	Health
Air	50 µg/m ³	OSHA	PEL (8hr TWA)	Health
Air	400 µg/m ³	OSHA	Total Allowable Shift (PEL)	Health
Ceramic/Pottery Glasses	3ppm	FDA	Flatware	Health
Ceramic/Pottery Glasses	2ppm	FDA	Small Hollowware	Health
Ceramic/Pottery Glasses	1ppm	FDA	Large Hollowware	Health
Ceramic/Pottery Glasses	0.5 ppm	FDA	Cups, Mugs, and Pitchers	Health