ATTACHMENTS

Asbestos and LBP Investigation Reports

(Prepared by USC HAZMAT Personnel)

FM00413486 *FM00413486* USC Work Order

Description HAZMAT SURVEY DM12 819 BARNWELL EXTERIOR REPAIRS

Site	COLUMBIA	**Assigned To**	JPROVENCE
Building	034 819 BARNWELL STREET	**Crew**	HAZMAT
Floor	**Room:**	**Start Date**	**Priority** 3
Equipment		**Due date**	25-SEP-14
		Request Date	29-NOV-12 **by** CHAPMAS

Request # FM00413486 **Description** HAZMAT SURVEY DM12 819 BARNWELL EXTERIOR REPAIRS
Parent WO #

CP Number CP00366438 DM12 819 BARNWELL EXTERIOR REPAIRS

State/Internal Project Number H27-6100

Requestor	ABRAMS,JEFF	**Project Manager**	ABRAMS, JEFFREY R
Telephone	239-8074	**Telephone**	777-3594
Alternate Telephone		**Estimated Cost**	$ 0.00
		Billing	FIXED PRICE
Non-Available Time		53100-W797-57120	(DEFERRED MAINTENANCE 2012)

Task List

ERIC, THIS IS FOR HAZMAT SURVEY OF EXTERIOR, TO INCLUDE ALL PAINTED WOOD, WINDOW GLAZING MATERIAL, AND ANY EXTERIOR CAULKING. PLEASE CONTACT ME FOR A TIME TO GO OVER AND LOOK AT THE BUILDING PRIOR TO THE SURVEY. THANKS, JEFF ABRAMS, SEPT 11, 2014.

(CHECK ALL THAT APPLY AND PROVIDE ADDITIONAL INFORMATION AS NEEDED)

HAZMAT SURVEY(S) REQUESTED FOR THE FOLLOWING
_____ FLOOR TILE
_____ JOINT COMPOUND
_____ WALLS
_____ MASTIC
_____ CEILING TILE
_____ PIPE INSULATION
_____ VINYL SHEET FLOORING
_____ FIREPROOFING
_____ FUME HOODS/TABLE TOPS
_____ ROOFING MATERIALS
_____ FIRE DOORS
_____ GASKETS/VALVES
_____ BOILER INSULATION
_____ ACOUSTICAL POPCORN CEILING
_____ DUCT WORK
_____ OTHER (PLEASE DESCRIBE BELOW)

DATE WORK STARTED	CAUSE
DATE WORK COMPLETED	CONDITION

EQUIPMENT

CLOSING REMARKS

BENCHSTOCK MATERIALS

Qty	Description	Price Per Unit

Supervisor's Approval _____

Note Date	Title
23-SEP-14	HAZMAT SURVEY RESULTS

SURVEY DATES: 9/19/14

INSPECTOR #: DARRYL WASHINGTON (BI-00568)

STATUS: THE FOLLOWING MATERIALS HAVE BEEN TESTED FOR ASBESTOS AND RESULTS FOLLOW:

ASBESTOS SECTION:

WINDOW CAULKING- POSITIVE FOR ASBESTOS

WINDOW GLAZING- NEGATIVE FOR ASBESTOS

LEAD SECTION: LEAD RESULTS PREVIOUS TESTING WAS PERFORMED ON ANOTHER PROJECT ON 9/1/11

DOOR FRAME PAINT (WHITE)- POSITIVE FOR LEAD

WINDOW FRAME PAINT (WHITE)- POSITIVE FOR LEAD

COLUMN PAINT (WHITE)- POSITIVE FOR LEAD

IF YOU ENCOUNTER ANY OTHER MATERIALS IN PLACE AND DEEM THEM SUSPECT FOR ASBESTOS AND/OR LEAD, PLEASE STOP WORK AND CONTACT THE ASBESTOS PROGRAM MANAGER FOR FURTHER TESTING OR ABATEMENT. PLEASE NOTE THAT THE MATERIAL QUANTITY PROVIDED ON THE FIELD SHEET IS ONLY AN ESTIMATE FOR SAMPLING PURPOSES. THE QUANTITY SHOULD BE FIELD VERIFIED FOR ALL OTHER PURPOSES INCLUDING ABATEMENT.

REFER TO THE SURVEY RESULTS ATTACHED TO THE WORK ORDER FOR DETAILED INFORMATION.

02-APR-04 ASBESTOS MAY BE PRESENT IN THIS BUILDING

WARNING - ASBESTOS EXPOSURE ALERT - EXPOSURE TO ASBESTOS MAY BE HARMFUL TO YOUR HEALTH

AS OF 02/04/2004 THE FOLLOWING AREAS WITHIN THE BUILDING HAVE BEEN IDENTIFIED BY SURVEY TO CONTAIN ASBESTOS:

BLDG 034 GIBBS HOUSE 819 BARNWELL
BASEMENT --> FLUE OVER HOT WATER TANK [26 SQ. FT.]

THE FOLLOWING COMMON TYPES OF BUILDING COMPONENTS COULD CONTAIN MATERIALS THAT, WHEN DISTURBED, MIGHT EXPOSE YOU TO ASBESTOS:

1. FLOOR TILE
2. PIPE INSULATION
3. BLACK MASTIC

HVAC DUCT MASTIC
5. SPRAYED-ON FIREPROOFING
6. SPRAYED-ON CEILINGS
SHEETROCK JOINT COMPOUND

BEFORE DISTURBING THESE TYPES OF COMPONENTS, CONFIRM THAT THEY DO NOT CONTAIN ASBESTOS AND TAKE PROPER PRECAUTIONS AT ALL TIMES

EMSL Analytical, Inc.
706 Grailn Street, Kernersville, NC 27284
Phone/Fax: (336) 992-1025 / (336) 992-4175
http://www.EMSL.com greensborolab@emsl.com

EMSL Order:	021405303
CustomerID:	UNSC62
CustomerPO:	
ProjectID:	

Attn: **USC Hazmat**
University of South Carolina
743 Greene Street
Columbia, SC 29208

Phone:	(803) 777-7000
Fax:	(803) 777-3990
Received:	09/18/14 10:15 AM
Analysis Date:	9/18/2014
Collected:	

Project: **819 Barnell St.**

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	Description	Appearance	% Fibrous	% Non-Fibrous	% Type
1 *021405303-0001*	Window Caulking	Brown/Gray/White Non-Fibrous Heterogeneous	<1% Cellulose	100% Non-fibrous (other)	**None Detected**
2 *021405303-0002*	Window Caulking	Gray/Tan/White Non-Fibrous Heterogeneous	<1% Cellulose	100% Non-fibrous (other)	**None Detected**
3 *021405303-0003*	Window Caulking	Tan Fibrous Homogeneous		95% Non-fibrous (other)	5% **Chrysotile**
4 *021405303-0004*	Window Glazing	Gray/White/Beige Non-Fibrous Heterogeneous	<1% Cellulose	100% Non-fibrous (other)	**None Detected**
5 *021405303-0005*	Window Glazing	Gray/Tan/White Non-Fibrous Heterogeneous	<1% Cellulose <1% Fibrous (other)	100% Non-fibrous (other)	**None Detected**
6 *021405303-0006*	Window Glazing	Gray/Tan/White Non-Fibrous Homogeneous	<1% Fibrous (other)	100% Non-fibrous (other)	**None Detected**

Analyst(s)
Kristie Elliott (2)
Scott Combs (4)

Stephen Bennett, Laboratory Manager
or other approved signatory

Initial report from 09/19/2014 10:09:58

EMSL Analytical, Inc.
706 Gralin Street, Kernersville, NC 27284
Phone/Fax: (336) 992-1025 / (336) 992-4175
http://www.EMSL.com greensboroiab@emsl.com

EMSL Order:	021405303
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Attn: **USC Hazmat**
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Columbia, SC 29208

Phone:	(803) 777-7000
Fax:	(803) 777-3990
Received:	09/18/14 10:15 AM
Analysis Date:	9/19/2014
Collected:	

Project: **819 Barnell St.**

Test Report: Asbestos Analysis of Non-Friable Organically Bound Materials by TEM via EPA/600/R-93/116 Section 2.5.5.1

SAMPLE ID	DESCRIPTION	APPEARANCE	% MATRIX MATERIAL	% NON-ASBESTOS FIBERS	ASBESTOS TYPES
3 021405303-0006	Window Glazing	Gray/White Non-Fibrous Heterogeneous	100	<0.25 Fibrous (other)	No Asbestos Detected

Analyst(s)
Stephen Bennett (1)

Stephen Bennett, Laboratory Manager
or other approved signatory

This laboratory is not responsible for % asbestos in total sample when the residue only is submitted for analysis. The above report relates only to the items tested. This report may not be reproduced, except in full, without written approval by EMSL Analytical, Inc. Samples received in good condition unless otherwise noted. Unless requested by the client, building materials manufactured with multiple layers (i.e. linoleum, wallboard, etc.) are reported as a single sample.

Samples analyzed by EMSL Analytical, Inc. Kernersville, NC

Initial report from 09/19/2014 16:46:49

rderID: 021405303

EMSL ANALYTICAL, INC.
LABORATORY • PRODUCTS • TRAINING

Asbestos Bulk Building Material Chain of Custody

EMSL Order Number (*Lab Use Only*): 021405303

EMSL ANALYTICAL, INC
200 ROUTE 130 NORTH
CINNAMINSON, NJ 08077
PHONE (800) 220-3675
FAX (856) 786-5974

Company: University of South Carolina	**EMSL-Bill to:** ☒ Same ☐ Different If Bill to Is Different note instructions in Comments** *Third Party Billing requires written authorization from third party*
Street: 743 Greene Street	
City: Columbia **State/Province:** SC	**Zip/Postal Code:** 29208 **Country:** US
Report To (Name): USC Hazmat	**Telephone #:** 803-509-3376
Email Address: asbestos@mailbox.sc.edu	**Fax #:** **Purchase Order:**
Project Name/Number: [illegible]	**Please Provide Results:** ☐ Fax ☒ Email
U.S. State Samples Taken: SC	**CT Samples:** ☐ Commercial/Taxable ☐ Residential/Tax Exempt

Turnaround Time (TAT) Options* – Please Check

☐ 3 Hour ☐ 6 Hour ☒ 24 Hour ☐ 48 Hour ☐ 72 Hour ☐ 96 Hour ☐ 1 Week ☐ 2 Week

*For TEM Air 3 hr through 6 hr, please call ahead to schedule. *There is a premium charge for 3 Hour TEM AHERA or EPA Level II TAT. You will be asked to sign an authorization form for this service Analysis completed in accordance with EMSL's Terms and Conditions located in the Analytical Price Guide

PLM - Bulk (reporting limit)

- ☒ PLM EPA 600/R-93/116 (<1%)
- ☐ PLM EPA NOB (<1%)
- Point Count ☐ 400 (<0.25%) ☐ 1000 (<0.1%)
- Point Count w/Gravimetric ☐ 400 (<0.25%) ☐ 1000 (<0.1%)
- ☐ NIOSH 9002 (<1%)
- ☐ NY ELAP Method 198.1 (friable in NY)
- ☐ NY ELAP Method 198.6 NOB (non-friable-NY)
- ☐ OSHA ID-191 Modified
- ☐ Standard Addition Method

TEM – Bulk

- ☒ TEM EPA NOB – EPA 600/R-93/116 Section 2.5.5.1
- ☐ NY ELAP Method 198.4 (TEM)
- ☐ Chatfield Protocol (semi-quantitative)
- ☐ TEM % by Mass – EPA 600/R-93/116 Section 2.5.5.2
- ☐ TEM Qualitative via Filtration Prep Technique
- ☐ TEM Qualitative via Drop Mount Prep Technique

Other

- ☐

☒ **Check For Positive Stop – Clearly Identify Homogenous Group** **Date Sampled:**

Samplers Name: **Samplers Signature:**

Sample #	HA #	Sample Location	Material Description

Client Sample # (s): **Total # of Samples:** 6

Relinquished (Client): **Date:** **Time:**

Received (Lab): NS **Date:** 9/18/14 **Time:** 10:15

Comments/Special Instructions: FX 7900555178 20

021405303

UNIVERSITY OF SOUTH CAROLINA

Sample Analysis

Building # 034 819 BARNWELL ST

Type of Analysis: Lead / ~~Asbestos~~ Date: 9/10/14

Turn Around Time 24 HRS

Area	Sample ID	Material Sampled	Material Location	F/NF	Cond	Quantity	Pot to Disturb
A	1	WINDOW CAULKING	1ST LOWER WINDOW EAST SIDE	NF	FAIR	<400 SQ FT	LOW
A	2	WINDOW CAULKING	1ST LOWER WINDOW SOUTH SIDE	NF	FAIR	<400 SQ FT	LOW
A	3	WINDOW CAULKING	MIDDLE LOWER WINDOW NORTH SIDE	NF	FAIR	<400 SQ FT	LOW
B	4	WINDOW GLAZING	1ST LOWER WINDOW SOUTH SIDE	NF	FAIR	<500 SQ FT	LOW
B	5	WINDOW GLAZING	1ST LOWER WINDOW EAST SIDE	NF	FAIR	<500 SQ FT	LOW
B	6	WINDOW GLAZING	MIDDLE LOWER WINDOW NORTH SIDE	NF	FAIR	<500 SQ FT	LOW

License # BI-00568 FM# FM00413486 Signature [signature] Requestor JEFF ABRAMS

Send lab results in PDF and CSV format as soon as possible to: asbestos@mailbox.sc.edu

FM00413486 *FM00413486* USC Work Order

Description HAZMAT SURVEY DM12 819 BARNWELL EXTERIOR REPAIRS

Site	COLUMBIA	**Assigned To**	JPROVENCE
Building	034 819 BARNWELL STREET	**Crew**	HAZMAT
Floor	**Room:**	**Start Date**	**Priority** 3
Equipment		**Due date**	25-SEP-14
		Request Date	29-NOV-12 **by** CHAPMAS

Request # FM00413486 **Description** HAZMAT SURVEY DM12 819 BARNWELL EXTERIOR REPAIRS
Parent WO #

CP Number CP00366438 DM12 819 BARNWELL EXTERIOR REPAIRS

State/Internal Project Number H27-6100

Requestor	ABRAMS,JEFF	**Project Manager**	ABRAMS, JEFFREY R
Telephone	239-8074	**Telephone**	777-3594
Alternate		**Estimated Cost**	$ 0.00
Telephone		**Billing**	FIXED PRICE
Non-Available Time		53100-W797-57120	(DEFERRED MAINTENANCE 2012)

Task List

ERIC, THIS IS FOR HAZMAT SURVEY OF EXTERIOR, TO INCLUDE ALL PAINTED WOOD, WINDOW GLAZING MATERIAL, AND ANY EXTERIOR CAULKING. PLEASE CONTACT ME FOR A TIME TO GO OVER AND LOOK AT THE BUILDING PRIOR TO THE SURVEY. THANKS, JEFF ABRAMS, SEPT 11, 2014.

(CHECK ALL THAT APPLY AND PROVIDE ADDITIONAL INFORMATION AS NEEDED)

HAZMAT SURVEY(S) REQUESTED FOR THE FOLLOWING
_____ FLOOR TILE
_____ JOINT COMPOUND
_____ WALLS
_____ MASTIC
_____ CEILING TILE
_____ PIPE INSULATION
_____ VINYL SHEET FLOORING
_____ FIREPROOFING
_____ FUME HOODS/TABLE TOPS
_____ ROOFING MATERIALS
_____ FIRE DOORS
_____ GASKETS/VALVES
_____ BOILER INSULATION
_____ ACOUSTICAL POPCORN CEILING
_____ DUCT WORK
_____ OTHER (PLEASE DESCRIBE BELOW)

F M00413486 *FM00413486* **USC Work Order**

DATE WORK STARTED	CAUSE
ATE WORK COMPLETED	CONDITION

EQUIPMENT

OSING REMARKS

NCHSTOCK MATERIALS

Qty	Description	Price Per Unit

Supervisor's Approval _____

ote Date	Title
23-SEP-14	HAZMAT SURVEY RESULTS

URVEY DATES: 9/19/14

INSPECTOR #: DARRYL WASHINGTON (BI-00568)

ATUS: THE FOLLOWING MATERIALS HAVE BEEN TESTED FOR ASBESTOS AND RESULTS FOLLOW:

ASBESTOS SECTION:

NDOW CAULKING- POSITIVE FOR ASBESTOS

WINDOW GLAZING- NEGATIVE FOR ASBESTOS

AD SECTION: LEAD RESULTS PREVIOUS TESTING WAS PERFORMED ON ANOTHER PROJECT ON 9/1/11

DOOR FRAME PAINT (WHITE)- POSITIVE FOR LEAD

NDOW FRAME PAINT (WHITE)- POSITIVE FOR LEAD

COLUMN PAINT (WHITE)- POSITIVE FOR LEAD

-YOU ENCOUNTER ANY OTHER MATERIALS IN PLACE AND DEEM THEM SUSPECT FOR ASBESTOS AND/OR LEAD, PLEASE STOP WORK AND CONTACT THE ASBESTOS PROGRAM MANAGER FOR FURTHER TESTING OR ABATEMENT. PLEASE NOTE THAT THE MATERIAL QUANTITY ROVIDED ON THE FIELD SHEET IS ONLY AN ESTIMATE FOR SAMPLING PURPOSES. THE QUANTITY SHOULD BE FIELD VERIFIED FOR ALL OTHER URPOSES INCLUDING ABATEMENT.

EFER TO THE SURVEY RESULTS ATTACHED TO THE WORK ORDER FOR DETAILED INFORMATION.

11-DEC-14 HAZMAT SURVEY - 12/10/14

URVEY DATE: 12/10/14

NSPECTOR #: DARRYL WASHINGTON II (BI-00568)

ATUS: THE FOLLOWING MATERIALS HAVE BEEN TESTED FOR LEAD AND THE RESULTS FOLLOW:

INTERIOR WINDOW PAINT (WHITE)- (BOTH FLOORS)- POSITIVE FOR LEAD

YOU ENCOUNTER ANY OTHER MATERIALS IN PLACE AND DEEM THEM SUSPECT FOR ASBESTOS AND/OR LEAD, PLEASE STOP WORK AND CONTACT THE ASBESTOS PROGRAM MANAGER FOR FURTHER TESTING OR ABATEMENT.

EFER TO THE SURVEY RESULTS ATTACHED TO THE WORK ORDER FOR DETAILED INFORMATION.

02-JAN-15 HAZMAT SURVEY RESULTS - 1/2/15
SURVEY DATE: 1/2/15

INSPECTOR #: ERIC MELARO (BI-01296)

STATUS: THE FOLLOWING MATERIALS HAVE BEEN TESTED FOR LEAD AND THE RESULTS FOLLOW:

WHITE PAINT ON PLYWOOD SURROUNDING BACK PORCH – NEGATIVE FOR LEAD

WHITE PAINT ON BOARDS COVERING 3 WINDOWS NEAR BACK PORCH – NEGATIVE FOR LEAD

WHITE PAINT ON 2 DOORS AND DOOR FRAMES ON BACK PORCH – NEGATIVE FOR LEAD

IF YOU ENCOUNTER ANY OTHER MATERIALS IN PLACE AND DEEM THEM SUSPECT FOR ASBESTOS AND/OR LEAD, PLEASE STOP WORK AND CONTACT THE ASBESTOS PROGRAM MANAGER FOR FURTHER TESTING OR ABATEMENT.

PLEASE NOTE THAT THE MATERIAL QUANTITY PROVIDED ON THE FIELD SHEET IS ONLY AN ESTIMATE FOR SAMPLING PURPOSES. THE QUANTITY SHOULD BE FIELD VERIFIED FOR ALL OTHER PURPOSES INCLUDING ABATEMENT.

REFER TO THE SURVEY RESULTS ATTACHED TO THE WORK ORDER FOR DETAILED INFORMATION.

02-APR-04 ASBESTOS MAY BE PRESENT IN THIS BUILDING
WARNING - ASBESTOS EXPOSURE ALERT - EXPOSURE TO ASBESTOS MAY BE HARMFUL TO YOUR HEALTH

AS OF 02/04/2004 THE FOLLOWING AREAS WITHIN THE BUILDING HAVE BEEN IDENTIFIED BY SURVEY TO CONTAIN ASBESTOS:

BLDG 034 GIBBS HOUSE 819 BARNWELL
BASEMENT --> FLUE OVER HOT WATER TANK [26 SQ. FT.]

THE FOLLOWING COMMON TYPES OF BUILDING COMPONENTS COULD CONTAIN MATERIALS THAT, WHEN DISTURBED, MIGHT EXPOSE YOU TO ASBESTOS:

1. FLOOR TILE
2. PIPE INSULATION
3. BLACK MASTIC
4. HVAC DUCT MASTIC
5. SPRAYED-ON FIREPROOFING
6. SPRAYED-ON CEILINGS
7. SHEETROCK JOINT COMPOUND

BEFORE DISTURBING THESE TYPES OF COMPONENTS, CONFIRM THAT THEY DO NOT CONTAIN ASBESTOS AND TAKE PROPER PRECAUTIONS AT ALL TIMES

me	Component	Substrate	Side	Condition	Color	Site	Inspector	Floor	Room	Results	Action Level	POC
12/10/2014 10:07	WINDOW	WOOD		INTACT	WHITE	819 barnwell	wash	FIRST	100	Positive	0.7	< LOD
12/10/2014 10:07	WINDOW	WOOD		INTACT	WHITE	819 barnwell	wash	FIRST	100	Positive	0.7	< LOD
12/10/2014 10:08	WINDOW	WOOD		INTACT	WHITE	819 barnwell	wash	FIRST	100	Positive	0.7	10.6
12/10/2014 10:09	WINDOW	WOOD		INTACT	WHITE	819 barnwell	wash	SECOND	200	Positive	0.7	20.8
1/2/2015 10:21	calibrate				green	819 barnwell	melaro			Negative	0.7	< LOD
1/2/2015 10:23	wall	wood	around back porch	flaking	white	819 barnwell	melaro			Negative	0.7	0.27
1/2/2015 10:23	wall	wood	around back porch	flaking	white	819 barnwell	melaro			Negative	0.7	< LOD
1/2/2015 10:23	wall	wood	around back porch	flaking	white	819 barnwell	melaro			Null	0.7	< LOD
1/2/2015 10:24	wall	wood	around back porch	flaking	white	819 barnwell	melaro			Negative	0.7	< LOD
1/2/2015 10:25	boarded window	wood	west, back	flaking	white	819 barnwell	melaro			Negative	0.7	< LOD
1/2/2015 10:25	boarded window	wood	west, back	flaking	white	819 barnwell	melaro			Negative	0.7	< LOD
1/2/2015 10:25	boarded window	wood	west, back	flaking	white	819 barnwell	melaro			Negative	0.7	< LOD
1/2/2015 10:26	door	wood	back porch, lower	flaking	white	819 barnwell	melaro			Negative	0.7	< LOD
1/2/2015 10:26	door	wood	back porch, lower	flaking	white	819 barnwell	melaro			Negative	0.7	< LOD
1/2/2015 10:27	door	metal	back porch, upper	flaking	white	819 barnwell	melaro			Negative	0.7	< LOD
1/2/2015 10:27	door	metal	back porch, upper	flaking	white	819 barnwell	melaro			Negative	0.7	< LOD
1/2/2015 10:28	calibrate				green	819 barnwell	melaro			Negative	0.7	< LOD

USC LEAD MANAGEMENT PLAN

UNIVERSITY OF
SOUTH CAROLINA

University of South Carolina
Facility Services
Lead Management Program

Requirements for
Managing Projects That Involve
Lead-Containing Materials

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2.0	Purpose
3.0	Definitions
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6.0	Lead Exposure
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9.0	Notification to Building Occupants
10.0	Training
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APPENDIX B	Lead Work Area Warning Sign

1.0 INTRODUCTION

This document is the official Facility Services position on procedures and operations involving the disturbance of lead-containing materials by employees or outside contractors.

This document was developed from a template developed by USC Environmental Health and Safety 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.

The entity that is responsible for management of work affected by this program is also responsible for following the requirements herein.

2.0 PURPOSE

The purpose of this Lead Management Program is to prevent lead exposure of all employees, regardless of job title, as well as students, and to help prevent the potential for building contamination from lead during demolition, maintenance, and renovation activities in University of South Carolina owned structures.

The requirements in this Program set standards for work that disturbs lead-containing materials. Contractors engaged in such projects are expected to possess the managerial expertise, experience and to employ workers with skill, training, and experience so that the work is carried out in compliance with these requirements.

3.0 DEFINITIONS

Action Level (AL) – Employee exposure, without regard to the use of respirators, to an airborne concentration of lead of 30 micrograms per cubic meter of air ($30ug/m^3$) calculated as an 8-hour time-weighted average.

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.

Contractor Employer Program - In accordance with the Hazard Communication Standard, each outside contractor working on a USC 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 USC, and other employer(s) working on-site, with unrestricted, on-site access to material safety data sheets (MSDSs) 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.

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.

HEPA – A HEPA filter is one that is capable of filtering 99.97% of all airborne particles at 0.3 micrometers (μm) in diameter.

HEPA Vacuum Cleaner - An electrical device that cleans surfaces by suction and discharges exhaust air through a HEPA filter.

Lead-Containing Material – Any paint, material or coating containing any detectable quantity of lead.

Lead-Based Material – Any paint, material or coating containing >0.06% by weight (600 ppm) total lead OR containing >= 0.7 mg/cm^2 as measured with an XRF (X-ray diffraction) analyzer.

Permissible Exposure Limit (PEL) - Employee exposure, without regard to the use of respirators, to an airborne concentration of lead of 50 micrograms per cubic meter of air ($50ug/m^3$) calculated as an 8-hour time-weighted average.

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

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

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.

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 age 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.

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).

4.0 DUTIES AND RESPONSIBLITIES

The Office of Environmental Health and Safety (EHS) shall:

1) Provide technical guidance to University personnel concerning lead hazard evaluation and control.

2) Review results of area air monitoring and clearance dust wipe sampling and provide interpretation for departments managing work.

3) Direct the University Departments conducting the work to modify or stop lead related work practices if employees, students, or the public are being exposed to lead hazards.

4) Maintain records of all sampling data submitted to EHS.

5) Communicate requirements of Lead Management Program.

6) Periodically review the Lead Management Program and revise as necessary.

7) Provide Lead Training in accordance with 29 CFR 1926.62 (L)(2) for University employees anticipated to have occupational lead exposure.

Facility Services shall:

1) Disclose known information regarding the presence of lead in building and construction materials to any contractor retained to conduct demolition or renovation work at Facility Services

2) Contact EHS a minimum of 5 working days in advance of upcoming projects that may impact coated surfaces that may contain lead.

3) Ensure that the Contractor has read, understands, and will abide by the minimum performance standards required in this Program for controlling lead hazards.

4) Report any problems associated with implementation of the Lead Management Program to EHS.

5) Stop or modify lead related work practices if employees, students, or the public are being exposed to lead hazards.

6) Conduct area air monitoring and clearance sampling by qualified consultant as required by this program and provide EHS with all sample results.

7) Ensure all lead related work-sites 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 job-site until removed by approved hazardous waste contractor.

9) Provide specific contractor language regarding projects that may contain lead to outside contractors bidding on projects.

5.0 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, MSDS, or testing proves otherwise.

Presumed Lead 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 x-ray penetration protection

The OSHA Lead Standard applies to any detectable concentration of lead in a material. The presence of any lead in a material triggers the worker protection and work practice requirements of this program.

Facility Services may decide to conduct lead identification sampling to determine if a presumed lead containing material contains lead and requires lead management.

Sampling may only be conducted by a qualified USC employee or a qualified consulting firm. USC Facility Services has qualified personnel that are available conduct sampling for the identification of lead.

6.0 LEAD EXPOSURE

According to the Occupational Safety and Health Association (OSHA), any lead containing material has the potential to create an airborne exposure to lead. Contractors that disturb lead-containing material or presumed lead containing material must protect their employees from airborne lead exposure in compliance with the OSHA Lead Standard 29 CFR 1926.62. In accordance with OSHA, Contractors must protect their own employees with personal protective equipment, training, and medical surveillance.

Contractors conducting lead work on multi-contractor sites must also inform all site workers of potential exposure to lead.

USC employees must also be protected, regardless of job title, from lead exposures according to the OSHA General Industry Standard 29 CFR 1910.1025. Protecting these individuals from lead exposure will be accomplished by making sure the Contractor contains all airborne lead to the work site by using appropriate work practice controls and meeting the minimum performance criteria listed below.

7.0 WORK CATEGORIES

Projects involving lead are categorized according to the tasks performed, depending on the risk level. In order to ensure the appropriate measure will be taken to protect all individuals at USC, all projects will be categorized by Facility Services prior to initiation. Use the following tasks described below to categorize the work being conducted. Recommended minimum work practice controls can be found in Section 14.0.

Level 0

Level 0 tasks have been documented through personal air monitoring not to result in exposures above the OSHA Action Limit, and do not generate dust/debris or other waste requiring special waste management practices.

- Tasks conducted with lead-containing or lead-based materials that are not anticipated to create dust or debris and are not listed as Level 1, 2 or 3 Tasks. (example: use of manual (i.e. hammer, screwdriver) or power (i.e. pneumatic nail gun/electric drill) tools to insert nails or screws into surfaces through intact paint or coating which remains intact during work)
- Power drilling holes into materials or coatings <=0.06% by weight, or <0.7 mg/cm^2 as measured with XRF)
- Manual demolition of materials or coatings containing <=0.06% by weight, or <0.7 mg/cm^2 as measured with XRF)
- Manual scraping or sanding of materials or coatings containing <=0.06% by weight, or <0.7 mg/cm^2 as measured with XRF) using wet methods
- Chemical stripping of materials or coatings containing <=0.06% by weight, or <0.7 mg/cm^2 as measured with XRF)

Level 1

Level 1 tasks have been documented via personal air monitoring to result in exposures consistently below the OSHA Action Limit, but require more extensive work practices to minimize dust generation, contain lead contamination, and properly manage waste material resulting from work.

Example tasks may include, but are not limited to:

- Manual demolition of lead-based materials or coatings (contains >0.06% by weight, or >=0.7 mg/cm^2 as measured with XRF)
- Manual scraping or sanding of lead-based materials or coatings (contains >0.06% by weight, or >=0.7 mg/cm^2 as measured with XRF) using wet methods
- Power tool disturbance of lead based materials or coatings (contains >=0.06% by weight, or >0.7 mg/cm^2 as measured with XRF) with a dust collection system
- Power tool disturbance of materials or coatings containing <0.06% by weight, or <=0.7 mg/cm^2 as measured with XRF) with a dust collection system
- Chemical stripping of lead-based materials or coatings (contains >0.06% by weight, or >=0.7 mg/cm^2 as measured with XRF)

Level 2

Level 2 tasks either have been documented via personal air monitoring to result in exposures above the OSHA Action Limit, or may result in an unknown exposure due to lack of personal air monitoring data. Example tasks may include, but are not limited to:

- Using lead-containing mortar
- Lead burning
- Rivet busting on lead containing materials or coatings
- Power tool disturbance of lead containing materials or coatings without a dust collection system
- Clean-up of dry expendable abrasives used to remove a lead containing coating
- Spray painting with lead-based paint
- Use of a heat gun on lead containing materials or coatings

Level 3

Level 3 tasks are anticipated to generate high levels of airborne dust and pose a high risk of exposure above the OSHA PEL. Example tasks may include, but are not limited to:

- Abrasive blasting on lead containing materials or coatings
- Welding on lead containing materials or coatings
- Cutting on lead containing materials or coatings
- Torch burning on lead containing materials or coatings

8.0 PROJECT NOTIFICATION

Prior to the initiation of any interior or exterior work involving lead containing or presumed lead containing material by an outside contractor, Facility Services must provide EHS 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.

Facility Services must complete and submit the form 15 days prior to the start of the project. This form can be found in Appendix 1.

9.0 NOTIFICATION TO BUILDING OCCUPANTS

Prior to the initiation of any interior or exterior work involving lead containing or presumed lead containing material, Facility Services will forward an informational memo to all appropriate persons on the building contact directory list located in the building 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.

10.0 TRAINING

All maintenance and custodial staff must attend Lead Awareness training annually. This training requirement is satisfied through the comprehensive safety training program conducted by EHS.

All USC employees conduct, or that are anticipated to enter a lead work site other than Level 0 must receive Occupational Exposure to Lead Training in accordance with 29 CFR 1926.62(L)(2). Lead training shall be conducted annually by EHS and will consist of the following:

- The specific nature of the operations which could result in exposure to lead above the action level
- Procedures and work practices required to minimize lead exposure and properly manage resulting waste material
- 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

11.0 PERFORMANCE CRITERIA FOR CONTRACTORS

Minimum Performance Criteria have been established for outside contractors conducting lead related work to ensure that no University employee or student is exposed above the OSHA Action Level of 30 ug/m^3 of airborne lead or has the potential to come into contact with lead dust as a result of contractor's activities. At a minimum, a Contractor disturbing lead related materials must meet the following requirements.

- Possess, at a minimum, 2 years of experience with lead related work.
- Limit access to worksites in which Level 1, 2 and 3 tasks are taking place to trained and authorized personnel only.
- Adequately limit all migration of lead containing dust and debris to any areas outside the worksite.
- Ensure that USC employees and students not associated with the worksite are not exposed to lead levels above the OSHA Action Level.
- Prevent the contamination of USC property (i.e., computers, chairs, desks, carpet, floors, walls, etc.) from lead dust and debris.
- Collect and manage hazardous wastes produced in accordance with RCRA hazardous waste requirements.
- Ensure that workers contaminated with lead containing dust and debris do not transfer that material outside the worksite

Facility Services will ensure airborne lead and dust is contained to the worksite by conducting or contracting for approved third party Area Air Monitoring and Clearance Dust

Wipe Sampling (information on Area Air Monitoring and Clearance Dust Wipe Sampling can be found in Sections 15 and 16) when required by this program.

Note: USC employees designated to conduct lead related work will be protected in accordance with the OSHA Lead in Construction Standard 29 CFR 1926.62.

12.0 LEAD COMPLIANCE PLAN

OSHA requires contractors that employ workers occupationally exposed to lead establish and implement a Lead Compliance Plan. The Lead Compliance Plan shall be prepared by the Contractor, as required by the OSHA Standard (29 CFR 1926.62) and submitted to Facility Services and EHS. When Facility Services conducts any Level 1 tasks or above, a Lead Compliance Plan will also be developed. The document must include the following:

- Description of each activity in which lead containing, or presumed lead containing material is disturbed (i.e., equipment used, material involved and % Pb, controls in place, operating procedures, crew size and corresponding employee job responsibilities).
- Work Practice Controls to be used to prevent lead contamination from occurring outside the work-site.
- Regular inspections of the work-site and equipment by a competent person named by the Contractor.
- A description of arrangements made among Contractors on multi-contractor sites to inform workers of potential exposure to lead and their responsibility to comply with the OSHA Lead in Construction Standard 29 CFR 1926.62.
- Proof of appropriate Lead Training for each employee on-site.
- Proof of appropriate written respirator program and compliance under 29 CFR 1910.134.
- Certification that the Contractor has read understands and will abide by the minimum performance standards required in this Program for controlling lead hazards.

13.0 SIGNAGE

The Contractor conducting lead work shall post warning signs outside any entrance to the worksite in accordance with the OSHA standard below:

1926.62(m)(2)(i) The employer shall post the following warning signs in each work area where employee exposure to lead is above the PEL.

WARNING:
LEAD WORK AREA
POISON
NO SMOKING OR EATING

1926.62(m)(2)(ii) The employer shall assure that signs required by this paragraph are illuminated and cleaned as necessary so that the legend is readily visible.

Additionally all work areas (other than Category 0), regardless of airborne lead concentrations, shall be posted with the following sign. An example of this sign can be found in Appendix 2.

WARNING
LEAD WORK AREA
NO EMPLOYEE PERMITTED ENTRANCE
WITHOUT PROOF OF LEAD TRAINING
for further information, please contact:
(Project Manger) at (Phone #)

Facility Services will ensure that signs are posted and maintained appropriately.

14.0 RECOMMENDED MINIMUM WORK PRACTICE CONTROLS

Recommended work practices have been developed for lead related work conducted at USC. Work involving lead-containing material must be well planned out to avoid worker and occupant exposure. The following work practices are recommended for meeting the performance criteria listed in the Requirements of Contractors Section of this Program.

Level 0 Tasks

Training - Employees engaged in Level 0 tasks must have received Lead Awareness training within the past year.

PPE - No PPE Required

Required Work Practices

- Establish "safe zone" around work using barrier tape. Do not allow public access to work area.
- Use care to minimize the production of dust and debris.
- Visually inspect area for any debris/dust resulting from work conducted.

Level 1 Tasks

Training - Employees engaged in Level 1 tasks must have received Occupational Exposure to Lead training within the past year.

PPE – Tyvek suit or coveralls to prevent contamination of street clothing. A half-face , air purifying respirator with HEPA cartridges is optional. Note that any employee wearing a respirator must be enrolled in the Respiratory Protection Program and be qualified to wear a respirator.

Required Work Practices

- Barrier tape will be used to isolate the work area in such a way that staff, students, and the public cannot get within 10 ft of the work area.
- A warning sign should be posted outside any unsecured entry to the work site. Refer to the Signage Section of this Program (Section 13).
- Daily clean-up of the worksite will include removal of debris (with the exception of contaminated plastic sheeting) and disposal of protective clothing.
- Complete Lead Compliance Plan prior to beginning work.
- Identify and require the use of hand/face washing facility and change area.
- Personal air monitoring should be conducted periodically to confirm exposures remain below the OSHA Action Limit.
- For work occurring in occupied areas (i.e., office, cafeteria, gym, dormitory, apartments, study room, labs) the work area should be enclosed with, minimally, 6 mil plastic in a manner that prevents transfer of dust outside the work area.
- Remove all movable objects (desk, chairs, and books) within the enclosed work area. Non-movable objects should be securely covered with 6-mil plastic sheeting, as to prevent lead dust contamination. Facility Services employee entry to the work area will be limited to those individuals with documented Lead Awareness Training.
- For work occurring in unoccupied areas (i.e., hallway, stairwell, foyers, mechanical spaces, etc) prepare work area by placing 6mil plastic sheeting a minimum of six (6) feet horizontally out in all directions from the work area. Adequately secure plastic to ensure all debris and dust is collected on plastic.
- Cover all air vents within the work area.
- For exterior projects, capture all lead containing material and presumed lead containing material to prevent contamination of the surrounding environment (i.e. secure one layer of 6-mil plastic on the ground extending 10 feet beyond the perimeter of the worksite).
- Use care to minimize the production of dust from scraping or sanding. Use either wet sanding/scraping or HEPA filtration fitted equipment.
- After disturbance work is completed a HEPA vacuum should be used to remove any small debris and visible dust from interior/exterior surfaces and plastic sheeting.
- Visually inspect area for any debris resulting from work conducted. Remove any debris from area.
- Decontaminate Tyvek or coveralls with HEPA vacuum before leaving the regulated area.
- After work is completed, a HEPA vacuum should be used to remove any small debris and visible dust from all surfaces. After visible debris is removed from the plastic sheeting, it should be rolled inward and placed in a "hazardous" waste container, along with all disposable clothing. All "hazardous" waste shall be adequately labeled and stored in accordance with all Local, State, and Federal rules and in accordance with University Procedures.

Level 2 and 3 Tasks

Training - Employees engaged in Level 2 and 3 tasks must have received Occupational Exposure to Lead training within the past year.

PPE – Tyvek suit or coveralls to prevent contamination of street clothing. Depending upon the operation and expected exposure levels, all employees must wear, at a minimum, a powered air purifying respirator with tight-fitting face piece. Note that any employee wearing a respirator must be enrolled in the Respiratory Protection Program and be qualified to wear a respirator.

Required Work Practices

- Complete Lead Compliance Plan prior to beginning work.
- Lead dust/debris shall be contained to the work area by sealing all doors, windows, and air vents with 6-mil plastic sheeting. This may require turning off localized HVAC systems.
- The entrance to the work area should be equipped with an adequate air lock constructed of 6 mil plastic sheeting at a minimum. The air lock must control any dust migration or transfer out of the controlled work area.
- A three-stage decontamination unit, including equipment room, shower and clean room must be established at the entrance to the work area.
- Disposable coveralls must be donned prior to entering the work-site and contaminated coveralls must be doffed prior to exiting the work-site.
- Entry to the work area will be limited to workers with documented Occupational Exposure to Lead training.
- All furniture that cannot be removed from the work area should be covered in 6-mil plastic sheeting in a manner which provides protection from lead dust contamination.
- Place a minimum of 6-mil plastic sheeting on all finished floors in the work area, and tape all seams as necessary. The contractor must notify Facility Serice if plastic sheeting is not appropriate for floor application and provide an alternative floor protection control method.
- Mechanical ventilation may not be used, unless resulting exhaust outside the work area is equipped with HEPA filtration and the termination of the exhaust is monitored in accordance with Section 15 of this Program.
- Barrier tape will be used to isolate the work area in such a way that staff, students, and the public cannot get within 10 ft of the work area.
- A warning sign should be posted outside any unsecured entry to the work site. Refer to the Signage Section of this Program (Section 13).
- Daily clean-up of the worksite will include removal of debris (with the exception of contaminated plastic sheeting) and disposal of protective clothing.
- After lead project work is completed, a HEPA vacuum should be used to remove any small debris and visible dust from all surfaces. After visible debris is removed from the plastic sheeting, it should be rolled inward and placed in a

"hazardous" waste container, along with all disposable clothing. All "hazardous" waste shall be adequately labeled and stored in accordance with all Local, State, and Federal rules and in accordance with University Procedures.

- In situations where work is complete, but plastic sheeting was not used on the floor, a HEPA vacuum should be used to remove any small debris and visible dust, followed by a wet mopping with lead specific detergent of the entire floor. All liquid waste must be treated as "hazardous" until otherwise determined by analysis and characterization.
- The work area may not be released for general use or occupancy until clearance wipe samples are collected and results reviewed and approved by EHS. Information on Clearance Criteria and associated sampling can be found in Section 16 of this Program.

Required exterior work practices for Level 2 and 3 Tasks include:

- Building occupants shall be notified to close windows and doors within 20 feet of work area until work is complete.
- Controls shall be in place to eliminate contaminating HVAC systems and air intakes that have the potential to draw in air from the work-site. Control methods must be submitted to EHS for review and approval.
- Capture all lead containing material and presumed lead containing material to prevent contamination of the surrounding environment (i.e. secure one layer of 6-mil plastic on the ground extending 10 feet beyond the perimeter of the worksite).
- Erect temporary fencing or barrier tape at a 20 foot perimeter around work-site.
- Daily clean-up of the worksite will include removal of debris, plastic sheeting, and disposal of coveralls. All "hazardous" waste shall be adequately labeled and stored in accordance with all Local, State, and Federal rules and in accordance with University Procedures.
- Keep all hazardous waste in a secure indoor area until disposal.

15.0 SAMPLING

USC requires all lead sampling to be conducted by qualified individuals, consultants, and labs. Additionally, all laboratory analysis of bulk, air, and wipe samples must be conducted by an AIHA approved lead laboratory.

15.1 BULK SAMPLING FOR LEAD IDENTIFICATION

The department managing the work may decide to conduct lead identification sampling to determine if a presumed lead containing material contains lead and requires lead management. The only method currently recognized is bulk sampling for laboratory analysis. Sampling may only be conducted by a qualified USC employee or an approved consulting firm.

At a minimum, a qualified person conducting lead 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 need 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.

15.2 AREA AIR SAMPLING

Facility Services must provide area air sampling for all Level 2 and 3 tasks, or when HEPA equipped ventilation is exhausted outside the work-site. 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, Area Air Sampling must provide the following:

- 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 work-site 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 where 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.
- Area air sample results must be provided to EHS daily. EHS will review all air sample results and contact the department managing the work the next business day if results are at or above 30ug/m3. 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 30ug/m3, 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 was 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.

15.3 CLEARANCE DUST WIPE SAMPLING

Facility Services 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 a 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. In target housing (University Apartments) and child occupied facilities, the person conducting clearance sampling must possess EPA Lead Inspector or Risk Assessor certification.

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 work-site, 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 conduced 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

Area	Clearance Criteria
All interior surfaces (eg., floors, stair treads, window sills)	100 ug/ft^2
All exterior horizontal surfaces extending 20-feet from work-site up to a height of 6-feet (eg., stairs, pavement, concrete, window sills)	400 ug/ft^2

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. Failure to contact EHS before work is 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."

15.0 LEAD WASTE

There are comprehensive federal, state and local regulations for the management of hazardous waste. These rules apply to all 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.

The 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:

- 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.
- Debris – Any material with a surface are 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.
- Water – Waste water from processes involving the removal of lead based paint or lead contaminated debris, to include, but not limited to, mop water, rinse water, etc.
- 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.

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, and Debris, and for *large volumes of Dust on a case by case basis. Scrap Metal sent for recycling is not required to be tested.

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

EHS requires Facility Services use a qualified laboratory for sampling and analytical of the waste material. The lab provides a sampling service for a fee and all associated cost will be the responsibility of the department managing the work.

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 EHS prior to waste generation. By making a waste determination before work starts, the Contractor and the 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. Facility Services 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 a 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 Hazardous Waste Manager (see description below). Only then can the material sampled be treated as non-hazardous.

APPENDIX 1

University of South Carolina

Office of Environmental Health and Safety

Initial Lead Project Notification

USC Building_____/ #_____ Floor ____ Room_____

Building Contact_____ PH #_____

Project Representative _____ PH #_____

General
Contractor_____No._____

Scope of Work (Including Engineering Controls):

Start Date ___/___/___ End Date ___/___/___ Hours ___:___ to ___:___

Baseline Wipe Samples Requested yes___ no___

Presumed Lead Containing Material Tested? yes___ no___

If yes, who tested the material and what were the results:

Fax Completed Form to EHS at (803) 777/5275 at least 15 days before start

APPENDIX 2

LEAD WORK WARNING SIGN

SECTION 05 7300 - DECORATIVE METAL RAILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Steel and iron decorative railings.

1.3 DEFINITIONS

A. Railings: Guards, handrails, and similar devices used for protection of occupants at open-sided floor areas, pedestrian guidance and support, visual separation, or wall protection.

1.4 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design railings, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

B. General: In engineering railings to withstand structural loads indicated, determine allowable design working stresses of railing materials based on the following:

1. Steel: 72 percent of minimum yield strength.

1.5 ACTION SUBMITTALS

A. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

B. Samples for Initial Selection: For products involving selection of color, texture, or design.

C. Samples for Verification: For each type of exposed finish required.

1. Welded connections.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified professional engineer .

B. Welding certificates.

1.7 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of railing from single source from single manufacturer.

B. Product Options: Information on Drawings and in Specifications establishes requirements for system's aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including structural analysis, preconstruction testing, field testing, and in-service performance.

1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

C. Product Options: Drawings indicate size, profiles, and dimensional requirements of railings and are based on the specific system indicated. Refer to Section 01 6000 "Product Requirements."

1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

D. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.8 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of walls and other construction contiguous with railings by field measurements before fabrication and indicate measurements on Shop Drawings.

1.9 COORDINATION AND SCHEDULING

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

B. Coordinate installation of anchorages for railings. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor

bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

C. Schedule installation so wall attachments are made only to completed walls. Do not support railings temporarily by any means that do not suit structural performance requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Available manufacturers offering products subject to compliance with requirements listed.

2.2 METALS, GENERAL

A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.

B. Brackets, Flanges, and Anchors: Same metal and finish as supported rails unless otherwise indicated.
   1. Provide formed metal brackets ready for field welding or predrilled hole for exposed bolt anchorage.

2.3 STEEL AND IRON

A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

B. Tubing: ASTM A 513.

C. Bars: Hot-rolled, carbon steel complying with ASTM A 29/A 29M, Grade 1010.

2.4 FASTENERS

A. Fastener Materials: Unless otherwise indicated, provide the following:

   1. Uncoated Steel Components: Plated-steel fasteners complying with ASTM B 633, Class Fe/Zn 25 for electrodeposited zinc coating where concealed; Type 304 stainless-steel fasteners where exposed.
   2. Galvanized-Steel Components: Plated-steel fasteners complying with ASTM B 633, Class Fe/Zn 25 for electrodeposited zinc coating.
   3. Dissimilar Metals: Type 304 stainless-steel fasteners.

B. Fasteners for Anchoring to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction indicated.

C. Provide concealed fasteners for interconnecting railing components and for attaching railings to other work unless exposed fasteners are unavoidable.

1. Provide tamper-resistant flat-head machine screws for exposed fasteners unless otherwise indicated.

D. Anchors, General: Anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.

E. Post-Installed Anchors: Torque-controlled expansion anchors.
1. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 2 stainless-steel bolts, ASTM F 593, and nuts, ASTM F 594.

2.5 MISCELLANEOUS MATERIALS

A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

B. Brazing Rods: For copper-alloy railings, provide type and alloy as recommended by producer of metal to be brazed and as required for color match, strength, and compatibility in fabricated items.

2.6 FABRICATION

A. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage.

B. Assemble railings in the shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.

C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

D. Form work true to line and level with accurate angles and surfaces.

E. Fabricate connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate. Locate weep holes in inconspicuous locations.

F. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.

G. Connections: Fabricate railings with welded connections unless otherwise indicated.

H. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove flux immediately.
4. At exposed connections, finish exposed welds to comply with NOMMA's "Voluntary Joint Finish Standards" for Type 1 welds: no evidence of a welded joint.

I. Welded Connections for Aluminum Pipe: Fabricate railings to interconnect members with concealed internal welds that eliminate surface grinding, using manufacturer's standard system of sleeve and socket fittings.

J. Bend members in jigs to produce uniform curvature for each configuration required; maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.

K. Close exposed ends of hollow railing members with prefabricated end fittings.

L. Provide wall returns at ends of wall-mounted handrails unless otherwise indicated. Close ends of returns, unless clearance between end of rail and wall is 1/4 inch or less.

M. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work unless otherwise indicated.

1. At brackets and fittings fastened to plaster or gypsum board partitions, provide crush-resistant fillers, or other means to transfer loads through wall finishes to structural supports and prevent bracket or fitting rotation and crushing of substrate.

N. Provide inserts and other anchorage devices for connecting railings to concrete or masonry work. Fabricate anchorage devices capable of withstanding loads imposed by railings. Coordinate anchorage devices with supporting structure.

2.7 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Provide exposed fasteners with finish matching appearance, including color and texture, of railings.

2.8 STEEL AND IRON FINISHES

A. Preparing Nongalvanized Items for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with requirements indicated below:

1. Railings Indicated to Receive Primers Specified in Section 09 9600 "High-Performance Coatings": SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
2. Other Railings: SSPC-SP 7/NACE No. 4, "Brush-off Blast Cleaning."

B. Primer Application: Apply shop primer to prepared surfaces of railings unless otherwise indicated. Comply with requirements in SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting. Primer need not be applied to surfaces to be embedded in concrete or masonry.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine plaster and gypsum board assemblies, where reinforced to receive anchors, to verify that locations of concealed reinforcements have been clearly marked for Installer. Locate reinforcements and mark locations if not already done.

3.2 INSTALLATION, GENERAL

A. Fit exposed connections together to form tight, hairline joints.

B. Perform cutting, drilling, and fitting required for installing railings. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.

1. Do not weld, cut, or abrade surfaces of railing components that have been coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
2. Set posts plumb within a tolerance of 1/16 inch in 3 feet.
3. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet.

C. Adjust railings before anchoring to ensure matching alignment at abutting joints.

D. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.

3.3 RAILING CONNECTIONS

A. Welded Connections: Use fully welded joints for permanently connecting railing components. Comply with requirements for welded connections in "Fabrication" Article whether welding is performed in the shop or in the field.

3.4 ANCHORING POSTS

A. Cover anchorage joint with flange of same metal as post, welded to post after placing anchoring material .

3.5 ATTACHING RAILINGS

A. Attach handrails to walls with wall brackets except where end flanges are used. Provide brackets with 1-1/2-inch clearance from inside face of handrail and finished wall surface. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.

1. Use type of bracket with predrilled hole for exposed bolt anchorage.
2. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.

B. Secure wall brackets and railing end flanges to building construction as follows:

1. For wood stud partitions, use hanger or lag bolts set into wood backing between studs. Coordinate with carpentry work to locate backing members.

3.6 CLEANING

A. Clean wood rails by wiping with a damp cloth and then wiping dry.

B. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

1. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.

C. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Section 09 9113 "Exterior Painting" and Section 09 9123 "Interior Painting." and Section 09 9600 "High-Performance Coatings."

3.7 PROTECTION

A. Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at time of Substantial Completion.

B. Restore finishes damaged during installation and construction period so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units.

END OF SECTION 05 7300

SECTION 06910 - WOOD REPAIR

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Preservation and sealing of seams and joints.
2. Removal of decayed and contaminated wood.
3. Installation of borate wood preservatives.
4. Installation of flexible epoxy wood repair compound materials for non-structural repairs.

1.2 SUBMITTALS

A. Product Data: Provide Product Data, installation instructions and general recommendations from manufacturer for types of repair required including technical data sheets defining performance properties.

B. Qualification data for firms and persons specified in the "Quality Assurance" article to demonstrate their capabilities and experience. Include a list of completed projects with project name, address, names of architects and owners, and information specified.

1.3 QUALITY ASSURANCE

A. Only skilled workers who are thoroughly trained and experienced in wood repairs and restoration work, have the skills required for the work of this section, and are completely familiar wit the materials and methods specified shall be used for wood restoration work. At least one skilled worker shall be present at all times during the execution of the work and shall personally direct the wood repairs and restoration work. In acceptance or rejection of the wood restoration work, no allowance will be made for lack of skill on the part of the workers.

1.4 MOCK-UP

A. Wood restoration: Following the requirements of the Section, perform a mock-up of each type of wood repair system specified to demonstrate materials and methods intended to be used in the finished work.

B. Locate where directed.

C. Approved mock-up shall represent the minimum acceptable standard for each type and detail of the restoration work.

D. Mock-up, where acceptable, may remain as part of the Work.

1.5 DELIVERY, STORAGE, AND PROTECTION

A. Deliver all materials in original unopened containers labeled with the manufacturer's name, brand name, item name and installation instructions.

B. Store materials in compliance with the manufacturer's requirements for temperature, maximum and minimum, and other conditions. Keep all materials under cover and dry. Protect against exposure to the weather.

C. Discard and remove from the job site any materials damaged in handling or storage and any materials that have been subjected to conditions contrary to the manufacturer's recommendations or whose maximum shelf life has expired.

1.6 PROJECT CONDITIONS

A. Coordinate wood repair with paint stripping so that the effected surfaces are exposed for a minimal time to avoid further damage to bare wood. Coordinate with painting so that all restored surfaces are primed as soon as possible after repair.

1.7 ENVIRONMENTAL REQUIREMENTS

A. proceed with the Work of this section only when existing and foreseen weather conditions permit the work to be performed in accordance with the manufacturer's recommendations for temperature and humidity range, minimum and maximum.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Base Manufacturer: Abatron, Inc, Kenosha, WI; (800) 445-1754; www.abatron.com

B. Other Acceptable Manufacturers:
1. Wood Care Systems, Kirkland, WA; (800) 827-3480; www.ewoodcare.com
2. Conservepoxy; Newton, NJ; (973) 579-1112; www.conservepoxy.com
3. Preservation Resource Group; Rockville, MD; (301) 309-2222; www.prginc.com
4. Advanced Repair Technology; Cherry Valley, NY; (607) 264-9040; www.advancedrepair.com

2.2 MATERIALS

A. Obtain primary repair materials from a single manufacturer. Provide secondary materials as recommended by the manufacturer of the primary materials.

B. Compatibility: Provide products recommended by the manufacturers to be fully compatible with indicated substrate.

C. Epoxy Repair Products: Epoxy repair materials shall consist of 2 separate systems, a 2 part low viscosity epoxy primer/coupling agent and a 2 part thixotropic paste.

D. Other Repair Products: Injectable Borate gel and Borate rods.

E. Primers: 100 percent acrylic primer formulated to adhere to epoxy filler per Section 09900.

F. Paint Strippers: For use in limited areas.
1. Chemical Stripping Agent: Methylene chloride based, Thixotropic stripper; as manufactured by ProSoCo, or equal.
2. Palm sanders, no belt sanders are allowed for use on job.
3. Low temperature heat gun or heat plate, no open flame.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Locate isolated areas with decay, termite damage or other damage to wood substrate, where damage is confined to 12 inches or less in length and 3/8 inch or less in depth of the affected board.

B. In wood surfaces where decay is present, determine the methods and treatment of repair.

C. Areas that do not match existing profiles, determine the level of restoration and replication to be achieved.

D. Joints, Joinery and Edges: Check wood members at joints, seams and edges for:
1. Open seams or failed conditions;
2. Wood moisture content;
3. The presence of wood decay, by probing surfaces.

E. Sills and Trim: Inspect wood surfaces for natural defects (knots) cracks and checks; determine wood moisture content; probe for the presence for wood decay.

F. Where damage or decay is in excess of that specified, install new material at affected are per Section 06200. Verify replacement option prior to execution.

G. Review with Architect areas determined by field inspection to require wood repairs.

H. Substrate Conditions: Do not proceed with product applications until substrates have been inspected and are determined to be in satisfactory conditions. Substrate moisture content shall not be in excess of 18 percent during preparation and application.

3.2 PREPARATION

A. Remove all decayed wood to a clean, sound, bright unaffected substrate.

B. Remove all built up paints, and other debris to a clean sound substrate. See requirements for lead-based paint removal.

C. No soft wood, existing brittle compound, or other previous repair materials should remain.

D. Check moisture content and hardness of the wood in and around the repair area: Moisture content of wood to be 18 percent or less.

E. Sand bare wood to remove all loose fibers, paint, compounds. Remove all sawdust and dirt. See lead-based paint removal requirements.

F. Protect all adjacent building surfaces from damage, staining or deterioration resulting from wood restoration work.

G. Protect the restoration Work in progress to prevent further deterioration of exposed wood surfaces. Protect the completed Work until the time of acceptance by the Architect.

3.3 INSTALLATION

A. Install all products in accordance with manufacturer's instructions.

B. Install borate gel and rods in strict accordance with manufacturer's requirements. Gel should not come in contact with exposed wood surface.

C. Pre-treat bare and sanded wood thoroughly with low viscosity epoxy coupling/bonding agent. Apply in strict accordance with manufacturer's recommendations. Allow agent to penetrate wood surface for time as directed by manufacturer. Avoid application in direct sunlight. Remove excess bonding agent.

D. Apply epoxy repair compound over the uncured epoxy coupling agent; epoxy fill shall have optimal contact with wood; avoid inclusion of air pockets during applications; fill joints fill, even and smooth in one application.

E. Allow full cure time as specified by manufacturer before preparing for finishes.

F. After curing, sand surface even and smooth. Transitions and irregularities between wood and epoxy shall not be visible after sanding. In required, smooth any remaining irregularities with an additional application of epoxy repair compound. Always sand between coats.

END OF SECTION 06910

SECTION 07920 - JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes joint sealants for the following applications, including those specified by reference to this Section:
   1. Exterior joints in vertical surfaces and horizontal nontraffic surfaces.

1.2 PERFORMANCE REQUIREMENTS

A. Provide elastomeric joint sealants that establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.

B. Provide joint sealants for interior applications that establish and maintain airtight and water-resistant continuous joint seals without staining or deteriorating joint substrates.

1.3 SUBMITTALS

A. Product Data: For each joint-sealant product indicated.

B. Samples: For each type and color of joint sealant required, provide Samples with joint sealants in 1/2-inch- (13-mm-) wide joints formed between two 6-inch- (150-mm-) long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

1.4 QUALITY ASSURANCE

A. Mockups: Build mockups incorporating sealant joints, as follows, to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1.5 WARRANTY

A. Special Installer's Warranty: Installer's standard form in which Installer agrees to repair or replace elastomeric joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
   1. Warranty Period: Two years from date of Substantial Completion.

B. Special Manufacturer's Warranty: Manufacturer's standard form in which elastomeric sealant manufacturer agrees to furnish elastomeric joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.
   1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Products: Subject to compliance with requirements, provide one of the products listed :

Pecora Corporation

Sonneborn, Division of Chem-Rex

Tremco

2.2 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer, based on testing and field experience.

B. Colors of Exposed Joint Sealants: At building exterior: color as selected by Architect from manufacturer's full range.

2.3 ELASTOMERIC JOINT SEALANTS

A. Elastomeric Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.

B. Stain-Test-Response Characteristics: Where elastomeric sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.

C. General: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

D. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin) as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

2.4 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants:
   1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant.
      a. Clean porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air.
   2. Remove laitance and form-release agents from concrete.
      a. Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.

B. Joint Priming: Prime joint substrates, where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.2 INSTALLATION

A. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

B. Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
   1. Do not leave gaps between ends of sealant backings.
   2. Do not stretch, twist, puncture, or tear sealant backings.
   3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

C. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.
2. Completely fill recesses in each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

D. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
1. Remove excess sealant from surfaces adjacent to joints.
2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
3. Provide concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.

E. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.3 SCHEDULE

	LOCATION	TYPE	COLOR
A.	Exterior Door and Window Perimeter Wood to Masonry Joints	Polyurethane Multi-component, Non-sag	As selected by Architect

SECTION 07920

SECTION 099113 - EXTERIOR PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes surface preparation and the application of paint systems on the following exterior substrates

1. Galvanized metal.
2. Aluminum (not anodized or otherwise coated).
3. Wood.
4. Ferrous metal

1.3 DEFINITIONS

A. Gloss Level 1: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.

B. Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.

C. Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.

D. Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.

E. Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.

F. Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.

B. Samples for Initial Selection: For each type of topcoat product.

C. Samples for Verification: For each type of paint system and each color and gloss of topcoat.

1. Submit Samples on rigid backing, 8 inches square.
2. Step coats on Samples to show each coat required for system.
3. Label each coat of each Sample.
4. Label each Sample for location and application area.

1.5 QUALITY ASSURANCE

A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Architect will select one surface to represent surfaces and conditions for application of each paint system specified in Part 3.

    a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft..
    b. Other Items: Architect will designate items or areas required.

2. Final approval of color selections will be based on mockups.

    a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.

3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.7 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.

B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Benjamin Moore & Co.
2. Duron, Inc.
3. ICI Paints.
4. PPG Architectural Finishes, Inc.
5. Sherwin-Williams Company (The).
6. Rose Talbert Paints

2.2 PAINT, GENERAL

A. MPI Standards: Provide products that comply with MPI standards indicated and that are listed in its "MPI Approved Products List."

B. Material Compatibility:

1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

C. VOC Content: Provide materials that comply with VOC limits of authorities having jurisdiction.

D. Colors: As selected by Architect from manufacturer's full range.

2.3 PRIMERS/SEALERS

A. Primer, Alkali Resistant, Water Based:[MPI #3.]

B. Primer, Bonding, Solvent Based:[MPI #69.]

C. Wood-Knot Sealer: Sealer recommended in writing by topcoat manufacturer for exterior use in paint system indicated.

2.4 METAL PRIMERS

A. Primer, Galvanized, Water Based:[MPI #134.]

2.5 WOOD PRIMERS

A. Primer, Latex for Exterior Wood:[MPI #6.]

2.6 WATER-BASED PAINTS

A. Latex, Exterior Flat (Gloss Level 1):[MPI #10.]

B. Latex, Exterior Semi-Gloss (Gloss Level 5):[MPI #11.]

C. Light Industrial Coating, Exterior, Water Based (Gloss Level 3):[MPI #161.]

2.7 ALUMINUM PAINT

A. Aluminum Paint:[MPI #1.]

2.8 SOURCE QUALITY CONTROL

A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:

1. Owner will engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
2. Testing agency will perform tests for compliance with product requirements.
3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

1. Wood: 15 percent.

C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

D. Proceed with coating application only after unsatisfactory conditions have been corrected.

1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates and paint systems indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.

C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

D. Steel Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer[.] [but not less than the following:]

1. SSPC-SP 2, "Hand Tool Cleaning."
2. SSPC-SP 3, "Power Tool Cleaning."

E. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

F. Aluminum Substrates: Remove loose surface oxidation.

G. Wood Substrates:

1. Scrape and clean knots. Before applying primer, apply coat of knot sealer recommended in writing by topcoat manufacturer for exterior use in paint system indicated.
2. Sand surfaces that will be exposed to view, and dust off.
3. Prime edges, ends, faces, undersides, and backsides of wood.
4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Manual."

1. Use applicators and techniques suited for paint and substrate indicated.
2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.
3. Paint both sides and edges of exterior doors and entire exposed surface of exterior door frames.
4. Paint entire exposed surface of window frames and sashes.
5. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
6. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.

B. Tint undercoats same color as topcoat, but tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:

1. Paint the following work where exposed to view:

a. Equipment, including panelboards and switch gear.
b. Uninsulated metal piping.
c. Uninsulated plastic piping.
d. Pipe hangers and supports.
e. Metal conduit.
f. Plastic conduit.
g. Tanks that do not have factory-applied final finishes.

3.4 FIELD QUALITY CONTROL

A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.

1. Contractor shall touch up and restore painted surfaces damaged by testing.
2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing

and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 EXTERIOR PAINTING SCHEDULE

A. Concrete Substrates, Nontraffic Surfaces:

1. Latex System:

   a. Prime Coat: Latex, exterior, matching topcoat.
   b. Intermediate Coat: Latex, exterior, matching topcoat.
   c. Topcoat: Latex, exterior, low sheen (Gloss Level 3-4)[, MPI #15].

B. Steel Substrates:

1. Water-Based Light Industrial Coating System:

   a. Prime Coat: Primer, alkyd, anti-corrosive for metal[, MPI #79].
   b. Intermediate Coat: Light industrial coating, exterior, water based, matching topcoat.
   c. Topcoat: Light industrial coating, exterior, water based (Gloss Level 3)[, MPI #161].

C. Galvanized-Metal Substrates:

1. Water-Based Light Industrial Coating System:

   a. Prime Coat: Primer, galvanized metal, as recommended in writing by topcoat manufacturer for exterior use on galvanized-metal substrates with topcoat indicated.
   b. Intermediate Coat: Light industrial coating, exterior, water based, matching topcoat.

c. Topcoat: Light industrial coating, exterior, water based (Gloss Level 3)[, MPI #161].

D. Aluminum Substrates:

1. Latex System:

a. Prime Coat: Primer, quick dry, for aluminum[, MPI #95].
b. Intermediate Coat: Latex, exterior, matching topcoat.
c. Topcoat: Latex, exterior, low sheen (Gloss Level 3-4)[, MPI #15].

E. Wood Substrates: Including wood trim, architectural woodwork, doors, windows, wood-based panel products, exposed joists, exposed beams, wood shingles and shakes.

1. Latex System:

a. Prime Coat: Primer, latex for exterior wood[, MPI #6].
b. Intermediate Coat: Latex, exterior, matching topcoat.
c. Topcoat: Latex, exterior semi-gloss (Gloss Level 5)[, MPI #11].

END OF SECTION 099113