

FOCUSED ASBESTOS AND HAZARDOUS MATERIALS SURVEY

**CLEAN WATER SERVICES
HEADWORKS BUILDING – ROCK CREEK FACILITY
3235 SW RIVER ROAD
HILLSBORO, OREGON 97123**

PREPARED FOR:

Clean Water Services, WWT Dept.
3235 SW River Road
Hillsboro, Oregon 97123
(503) 547-8038

PREPARED BY

CREEKSIDE ENVIRONMENTAL CONSULTING, LLC
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Creekside Project No. CWS-2019.1 / 351-19004-03

MARCH 2023

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ACRONYMS AND ABBREVIATIONS

ACM	asbestos-containing material
ACBM	asbestos-containing building material
Client	Clean Water Services
CMU	concrete masonry unit
Creekside	Creekside Environmental Consulting, LLC
CWS	Clean Water Services
EMSL	EMSL Analytical, Inc. (Laboratory)
EPA	U.S. Environmental Protection Agency
HUD	Department of Housing and Urban Development
HVAC	heating, ventilation, and air conditioning
LBP	lead-based paint
µg/g	micrograms per gram
mg/cm ²	milligrams per square centimeter
mg/Kg	milligrams per Kilogram
NESHAP	National Emission Standards for Hazardous Air Pollutants
ODEQ	Oregon Department of Environmental Quality
OSHA	Occupational Safety and Health Association
PACM	presumed asbestos-containing material
PCBs	polychlorinated biphenyls
PLM	Polarized Light Microscopy
ppm	parts per million
TCLP	Toxicity Characteristic Leaching Procedure

1.0 INTRODUCTION

Creekside Environmental Consulting, LLC (Creekside) was contracted by Clean Water Services (Client) to perform a focused asbestos, lead-based paint (LBP), and hazardous materials survey, which included assessing the Headworks Building for LBP, mercury, and polychlorinated biphenyl (PCB) liquids at the Rock Creek facility located at 3235 SW River Road, in Hillsboro, Oregon. Areas to be surveyed included floors, walls, ceilings, exteriors, and other miscellaneous construction materials for the above-mentioned hazardous materials. The purpose of this project was to visit and inspect the Headworks Building planned for demolition, and determine if hazardous materials were present, identify those locations and estimate the approximate surface areas (of asbestos), if possible.

This survey was limited to the interior and exterior of the Headworks Building, as directed by the Client. No other buildings located at this facility were assessed as part of this survey.

Creekside subcontracted EVREN Northwest, Inc. (ENW) to perform the above-mentioned survey, which was conducted in a manner that is consistent with appropriate Oregon Department of Environmental Quality (ODEQ) rules and regulations for asbestos assessment, and our findings are strictly confidential. This survey included onsite sampling, testing at a lab in Seattle, Washington, evaluation of laboratory test results, and comparison of the test results with appropriate regulatory standards and benchmarks. A detailed description of our project activities and assessment results are provided in the following sections.

2.0 BACKGROUND

Asbestos

Asbestos is a mineral fiber that has been used commonly in a variety of building construction materials for insulation and as a fire-retardant. The National Emission Standards for Hazardous Air Pollutants (NESHAP) has defined “asbestos-containing materials,” or ACMs, as products that contain more than one percent (1%) asbestos by weight. Since 1978, the U.S. Environmental Protection Agency (EPA) has banned the use of many asbestos products. Today, asbestos is most commonly found in older buildings, in pipe and furnace insulation materials, asbestos shingles, millboard, textured paints and other coating materials, and floor tiles.

Elevated concentrations of airborne asbestos can occur after asbestos-containing materials are disturbed by cutting, sanding or other remodeling activities. Improper attempts to remove these materials can release asbestos fibers into the air.

Lead Paint

“Lead-based paint” is defined by the EPA and the Department of Housing and Urban Development (HUD) as paint containing greater than one milligram of lead per square centimeter of paint (mg/cm^2). *If paint contains lead equal to or greater than 5000 micrograms per gram ($\mu\text{g}/\text{g}$), which is equivalent to 0.5 percent, 5000 milligrams per kilogram (mg/kg), or 5000 parts per million (ppm) by weight or 1.0 milligrams per square centimeter (mg/cm^2) by area, it is considered to be lead-based paint (LBP) under the Lead-Based Paint Poisoning Prevention Act.*

Oregon Occupational Safety and Health Administration (OSHA) adopted the federal OSHA lead-in-construction standard (29 CFR 1926.62) in November of 1993 under OAR 437 Division 3-001. The OR-OSHA standards outline worker exposure limits, personal protection requirements, and employer responsibility for exposure assessment, training, housekeeping and recordkeeping. OSHA's lead standard applies to all work where employees may be exposed to lead in construction, alteration, or repair. This includes renovation or demolition of structures where lead-containing materials are present.

Hazardous Materials Survey

Toxicity Characteristic Leaching Procedure (TCLP)

Disposal of building demolition waste coated with LBP will generally not require a hazardous waste determination (i.e., TCLP testing of debris) if the following criteria are met:

- The generator of such debris takes reasonable precautions, prior to demolition, to minimize contamination of the debris from other sources of lead contaminants. Such precautions will generally involve inspecting the structure and removing potentially hazardous materials such as mercury thermostats, lead piping, and containerized paints, solvents or other chemicals.
- And the demolition debris is disposed of at a solid waste landfill that is permitted by ODEQ and which meets the current design standards for municipal solid waste disposal facilities of 40 CFR Part 258.

See the attached fact sheet in Appendix B titled, ODEQ, Management of Building Demolition Waste, 97-002 for proper disposal of lead based painted demolition waste.

Mercury

Mercury is a persistent, bioaccumulative and toxic pollutant, and its prevalence in the environment has made it a high-priority pollutant at both the state and national level. Mercury may be released into the atmosphere and contaminates surface waters. It can build up in fish as methyl mercury, a neurotoxin that can affect the central nervous system in humans. Oregon currently has fish consumption advisories for mercury on thirteen (13) water bodies. Therefore, every attempt should be made to identify and separate out mercury containing equipment prior to demolition so that it can be sent to the appropriate recycling or disposal facility and not combined with the landfill debris.

Polychlorinated Biphenyls (PCBs)

PCBs belong to a broad family of man-made organic chemicals known as chlorinated hydrocarbons. PCBs were domestically manufactured from 1929 until their manufacture was banned in 1979. They have a range of toxicity and vary in consistency from thin, light-colored liquids to yellow or black waxy solids. Due to their non-flammability, chemical stability, high boiling point, and electrical insulating properties, PCBs were used in hundreds of industrial and commercial applications including electrical, heat transfer, and hydraulic equipment; as plasticizers in paints, plastics, and rubber products; in pigments, dyes, and carbonless copy paper; and many other industrial applications.

Prior to the 1979 ban, PCBs entered the environment during their manufacture and use in the United States. Today PCBs can still be released into the environment from poorly maintained hazardous waste sites that contain PCBs; illegal or improper dumping of PCB wastes; leaks or releases from electrical transformers containing PCBs; and disposal of PCB-containing consumer products into municipal or other landfills not designed to handle hazardous waste. PCBs may also be released into the environment by the burning of some wastes in municipal and industrial incinerators.

PCBs should be handled as a hazardous waste and disposed of at proper landfill sites. Every effort should be made to identify any equipment that contains PCBs and separate it from the rest of the debris prior to demolition and landfilling.

3.0 GENERAL BUILDING INFORMATION

Table 3-1. General Building Information

Year Built	Year(s) Remodeled	Total Area (feet²)	Floors	Current Use	Past Use
1995	None	8,000	2	Vacant	Wastewater Clarification

The subject property is located at the Clean Water Services Rock Creek Facility on the south side of SE River Road. Surrounding properties are industrial, residential, and commercial in use. The building has been used as a wastewater clarifier throughout its history.

4.0 SURVEY APPROACH

During the February 21, 2023, survey, a total of 19 samples of presumed asbestos containing materials (PACMs) were collected and analyzed for asbestos; they included:

- Acoustic sound board
- Caulking
- Concrete masonry unit (CMU)
- Concrete wall
- Gasket
- HVAC system duct
- Pipe sealant
- Pipe wrap
- Wall patching

Asbestos samples were sent to EMSL Analytical, Inc., (EMSL) in Seattle, Washington and analyzed using the EPA approved method, Polarized Light Microscopy (PLM). The test results are summarized in Table 1 and the complete laboratory report is included in Appendix A.

A total of four painted surfaces were analyzed on February 21, 2023, using an X-ray fluorescent analyzer (XRF). The complete XRF results are summarized in Table 2.

5.0 SURVEY RESULTS

5.1 Asbestos Results

Nineteen samples of PACM were collected from the site during the February 21, 2023 survey.

During laboratory analysis, some of the samples were determined to have multiple layers of material. According to laboratory analysis, none of the materials sampled contained asbestos above 1%. Thus, no materials sampled are considered to be asbestos-containing building materials (ACBMs).

Table 1 shows the complete results of the asbestos samples taken during the survey.

There were no other visible or accessible potential asbestos-containing materials identified during the survey; however, structures planned for demolition or remodeling, may contain previously

Hazardous Materials Survey

obscured or enclosed materials. If these are found, Creekside should be immediately contacted, and samples of the material collected.

5.2 Lead-Based Paint

Four readings of potential LBP were analyzed on-site. None of these readings had any concentrations of LBP, and none were determined to be LBP.

Table 2 shows the complete results of the LBP survey.

There were no other visible or accessible potential LBP-containing materials identified during the survey; however, structures planned for demolition may contain previously obscured or enclosed materials. If these are found, Creekside should be contacted immediately, and samples of the material collected. However, disposal of building demolition waste coated with lead-based paint will generally not require a hazardous waste determination (i.e., TCLP debris testing) if the generator of such debris disposes of the debris at a landfill that is permitted by ODEQ, and takes reasonable precautions prior to demolition to minimize contamination of the debris from other sources of lead contaminants; such as inspecting the structure and removing potentially hazardous materials such as mercury thermostats, lead piping, and containerized paints, solvents or other chemicals (See attached fact sheet in Appendix B: *Management of Building Demolition Waste*, 97-002. Oregon DEQ, 1997).

5.3 PCBs and Mercury

The subject area was inspected to determine if oil-cooled or other electrical equipment (e.g. transformers, old light ballasts) are present on site that could potentially contain PCBs.

- Cleaners and detergents were observed on the ground floor sink cabinet.
- Fluorescent lights and ballasts were observed throughout the building that may contain small amounts of mercury. Fluorescent bulbs are classified as universal waste in Oregon due to mercury, and waste lamps must be sent to a universal waste destination facility for recycling or disposal. Fluorescent bulbs can be sent to a hazardous waste facility, universal waste off-site collection site, or a universal waste destination facility.
- A leaking 55 gallon drum of unknown liquid was observed along the back wall of the ground floor.

Proper management of these materials is required to ensure that hazardous toxins are not released into the environment.

A summary of possible hazardous materials observed during the site inspection can be found in Table 3.

6.0 SUMMARY OF FINDINGS AND CONCLUSIONS

On February 21, 2023, Creekside conducted a hazardous material survey at the above-referenced property for potentially hazardous building materials, and made the following findings:

- None of the materials from the 19 total samples collected from the surveyed areas were identified as ACBM. See Table 1.
- None of the four total paint readings from the areas surveyed contained detectable levels of lead. See Table 2.
- Hazardous materials were present in the areas surveyed. See Table 3.

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Although Creekside has inspected and tested the reasonably accessible areas at the site, additional materials and/or equipment may have been obscured from view during our inspection and may be revealed during demolition or renovation.

7.0 RECOMMENDED RESPONSE ACTIONS

- If suspect asbestos or hazardous materials are discovered during demolition or renovation, or after an emergency or unexpected event, the owner or operator of the demolition or renovation activity or the owner or operator performing the emergency response must:
 - Stop work immediately;
 - Keep the exposed asbestos-containing materials and asbestos-containing waste material, adequately wet and cover with 6 mil plastic or equivalent at all times until a licensed asbestos abatement contractor begins removal activities; and
 - Have the licensed asbestos abatement contractor remove, handle and dispose of all friable asbestos-containing waste material and asbestos-containing waste material as friable asbestos-containing material in accordance with OAR 340-248-0270(5)(a-c).

8.0 DATA GAPS

No data gaps were encountered during the survey.

9.0 LIMITATIONS

The scope of Creekside's work presented herein was limited to assessing the site for asbestos, and limited hazardous materials such as lead-based paint, mercury, and PCB containing materials in observable areas of the property. Although Creekside made every attempt at identifying the above listed hazardous materials, we cannot eliminate all uncertainty regarding the potential for onsite building materials that may contain asbestos, lead-paint, PCBs or mercury in difficult-to-access or obscured areas. This work was performed in general accordance with professional standard environmental practices. Although this work was intended to be comprehensive, guarantees for complete removal cannot be made. Judgments leading to the enclosed general conclusions are based on available information, including information provided by subcontractors such as EMSL Analytical, Inc. While striving to present the most accurate scenario of the conditions of the property, this report may reflect inaccurate or incomplete information provided by others. Other information on the subject property may exist, and more extensive studies may reduce the uncertainties associated with this work. Creekside is not responsible for the accuracy of data obtained from the selected lab or for discrepancies between our conclusions and future activities at the site, which may result in conditions not present during this asbestos abatement project. Our conclusions are based upon the review of selected documents, lab data and observations of specific field conditions. It should also be recognized that Creekside's work was done in accordance with a reasonable understanding of the regulatory standards, which existed at the time the work was performed. The presence, nature, or extent of lead-paint and asbestos materials on the subject property can be evaluated through appropriate sampling and analysis, as was conducted in this project.

No warranties are expressed or implied concerning potential contaminants or environmental media not addressed through sampling and analysis. Creekside is not responsible for conditions or consequences arising from relevant information that was not fully disclosed at the time this investigation was conducted. Our findings and conclusions have been prepared in accordance

Hazardous Materials Survey

with generally accepted professional practice in the area at this time for the exclusive use of the Client and their authorized agents. No other warranty, either expressed or implied, is made.

Tables

Table 1. Results of Focused Asbestos Sampling

Sample	Date Sampled	Description	Appearance	Asbestos Detection
Loading Ramp				
East Entry				
ASB01	2/21/2023	Coating, large HVAC system duct	Clear, Non-Fibrous, Homogeneous	ND
ASB02	2/21/2023	Caulking, large HVAC system duct	Tan/Clear, Non-Fibrous, Homogeneous	ND
West Entry				
ASB17	2/21/2023	Concrete wall	Gray, Non-Fibrous, Homogeneous	ND
ASB18	2/21/2023	Concrete patching	Gray, Non-Fibrous, Homogeneous	ND
ASB19	2/21/2023	Caulking, along wall base	Gray, Non-Fibrous, Homogeneous	ND
Ground Floor				
ASB03	2/21/2023	Coating, large HVAC system duct, north	Tan/White, Non-Fibrous, Homogeneous	ND
ASB04	2/21/2023	Caulking, large HVAC system duct, north	Silver, Non-Fibrous, Homogeneous	ND
ASB05	2/21/2023	Sealant, large HVAC system duct, north	Black, Non-Fibrous, Homogeneous	ND
ASB06	2/21/2023	Sealant, pipe, central	Black, Fibrous, Homogeneous	ND
ASB07	2/21/2023	CMU, wall, bathroom	Gray, Non-Fibrous, Homogeneous	ND

Table 1. Results of Focused Asbestos Sampling

Sample	Date Sampled	Description	Appearance	Asbestos Detection
Basement				
Hallway				
ASB08-Wrap	2/21/2023	Pipe wrap, elbow, vertical	Tan/White/Silver, Fibrous, Homogeneous	ND
ASB08-Insulation	2/21/2023	Pipe wrap, elbow, vertical	Tan/Brown, Fibrous, Homogeneous	ND
ASB09-Insulation	2/21/2023	Pipe wrap, middle wide run, vertical	White/Silver, Fibrous, Homogeneous	ND
ASB09-Wrap	2/21/2023	Pipe wrap, middle wide run, vertical	Yellow, Fibrous, Homogeneous	ND
ASB10-Insulation	2/21/2023	Pipe wrap, top wide run, vertical	White/Silver, Fibrous, Homogeneous	ND
ASB10-Wrap	2/21/2023	Pipe wrap, top wide run, vertical	Tan, Fibrous, Homogeneous	ND
ASB11-Insulation	2/21/2023	Pipe wrap, elbow, horizontal	White, Non-Fibrous, Homogeneous	ND
ASB11-Wrap	2/21/2023	Pipe wrap, elbow, horizontal	Yellow, Fibrous, Homogeneous	ND
ASB12-Insulation	2/21/2023	Pipe wrap, middle wide run, horizontal	Beige/Silver, Fibrous, Homogeneous	ND
ASB12-Wrap	2/21/2023	Pipe wrap, middle wide run, horizontal	Brown, Fibrous, Homogeneous	ND
ASB13-Insulation	2/21/2023	Pipe wrap, run, horizontal	White/Silver, Fibrous, Homogeneous	ND
ASB13-Wrap	2/21/2023	Pipe wrap, run, horizontal	Yellow, Fibrous, Homogeneous	ND
ASB14-Coating	2/21/2023	Pipe gasket	Gray, Non-Fibrous, Homogeneous	ND
ASB14-Rubber	2/21/2023	Pipe gasket	Black, Non-Fibrous, Homogeneous	ND
East Room				
ASB15	2/21/2023	Acoustic sound board	Black, Non-Fibrous, Homogeneous	ND
ASB16	2/21/2023	Pipe gasket	Black, Non-Fibrous, Homogeneous	ND

ND = not detected

Table 2. Results of Focused Lead-Based Paint Screening

Sample #	Date Sampled	Material	XRF Reading (mg/cm ²)	Margin of Error (+/-)	Final Result (mg/cm ²)
Ground Floor					
LBP01	2/21/2023	Tan, metal, pipe, large, northeast	ND	<0.001	<0.001
LBP02	2/21/2023	Blue, metal, pipe, small, northeast	ND	<0.001	<0.001
LBP03	2/21/2023	Blue, wood, sink cabinet	ND	<0.001	<0.001
Basement					
LBP04	2/21/2023	Green, metal pipe, east room	ND	<0.001	<0.001

ND = non-detect

Table 3. Summary of Potentially Hazardous Materials

Location	Material
Sink cabinet, ground floor	General cleaning chemicals
Back wall, ground floor	Leaking 55 gallon drum of unknown liquid
Throughout Building	Florescent lights and ballasts

Table 4. XRF Calibration

Date	Source	XRF Reading (mg/cm ²)	Resolution
2/21/2023	Pre Survey Calibration - Non-Painted Surface (known non-LBP)	ND	<0.001
2/21/2023	Pre Survey Calibration - Painted Surface (known LBP)	1.07	0.10
2/21/2023	Post Survey Calibration - Non-Painted Surface (known non-LBP)	ND	<0.001
2/21/2023	Post Survey Calibration - Painted Surface (known LBP)	1.094	0.098

Appendix A

Laboratory Analytical Reports



EMSL Analytical, Inc.

5900 4th Avenue S, Suite 100, 1st Floor Seattle, WA 98108

Tel/Fax: (206) 269-6310 / (206) 900-8789

<http://www.emsl.com> / seattlelab@emsl.com

EMSL Order: 512300479

Customer ID: EVNE99

Customer PO: 351-19004

Project ID:

Attention: Heather Caporaso
EVREN Northwest, Inc.
PO Box 14488
Portland, OR 97293

Phone: (503) 452-5561

Fax: (503) 452-7669

Received Date: 02/22/2023 9:45 AM

Analysis Date: 02/22/2023

Collected Date: 02/21/2023

Project: 351-19004-03

Test Report: Asbestos Analysis of Bulk Materials via AHERA Method 40CFR 763 Subpart E Appendix E supplemented with EPA 600/R-93/116 using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos		Asbestos % Type
			% Fibrous	% Non-Fibrous	
ASB01 512300479-0001	Coating, large HVAC system duct, loading ramp, east	Clear Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
ASB02 512300479-0002	Caulking, large HVAC system duct, loading ramp, east	Tan/Clear Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
ASB03 512300479-0003	Coating, large HVAC system duct, ground floor, north	Tan/White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
ASB04 512300479-0004	Caulking, large HVAC system duct, ground floor, north	Silver Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
ASB05 512300479-0005	Sealant, large HVAC system duct, ground floor north	Black Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
ASB06 512300479-0006	Sealant, Pipe, ground floor, central	Black Fibrous Homogeneous	20% Cellulose	80% Non-fibrous (Other)	None Detected
ASB07 512300479-0007	CMU, wall, bathroom, ground floor	Gray Non-Fibrous Homogeneous		20% Quartz 80% Non-fibrous (Other)	None Detected
ASB08-Wrap 512300479-0008	Pipe wrap, elbow, vertical, basement	Tan/White/Silver Fibrous Homogeneous	70% Cellulose 20% Glass	10% Non-fibrous (Other)	None Detected
ASB08-Insulation 512300479-0008A	Pipe wrap, elbow, vertical, basement	Brown/Tan Fibrous Homogeneous	90% Glass	10% Non-fibrous (Other)	None Detected
ASB09-Wrap 512300479-0009	Pipe wrap, middle wide run, vertical, basement	White/Silver Fibrous Homogeneous	70% Cellulose 15% Glass	15% Non-fibrous (Other)	None Detected
ASB09-Insulation 512300479-0009A	Pipe wrap, middle wide run, vertical, basement	Yellow Fibrous Homogeneous	90% Glass	10% Non-fibrous (Other)	None Detected
ASB10-Wrap 512300479-0010	Pipe wrap, top run, vertical, basement	White/Silver Fibrous Homogeneous	50% Cellulose 15% Glass	35% Non-fibrous (Other)	None Detected
ASB10-Insulation 512300479-0010A	Pipe wrap, top run, vertical, basement	Tan Fibrous Homogeneous	95% Glass	5% Non-fibrous (Other)	None Detected
ASB11-Wrap 512300479-0011 Plastic	Pipe wrap, elbow, horizontal, basement	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
ASB11-Insulation 512300479-0011A	Pipe wrap, elbow, horizontal, basement	Yellow Fibrous Homogeneous	98% Glass	2% Non-fibrous (Other)	None Detected
ASB12-Wrap 512300479-0012	Pipe wrap, middle wide run, horizontal, basement	Silver/Beige Fibrous Homogeneous	55% Cellulose 15% Glass	30% Non-fibrous (Other)	None Detected

Initial report from: 02/23/2023 11:28:22



EMSL Analytical, Inc.

5900 4th Avenue S, Suite 100, 1st Floor Seattle, WA 98108

Tel/Fax: (206) 269-6310 / (206) 900-8789

<http://www.emsl.com> / seattlelab@emsl.com

EMSL Order: 512300479

Customer ID: EVNE99

Customer PO: 351-19004

Project ID:

Test Report: Asbestos Analysis of Bulk Materials via AHERA Method 40CFR 763 Subpart E Appendix E supplemented with EPA 600/R-93/116 using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
ASB12-Insulation 512300479-0012A	Pipe wrap, middle wide run, horizontal, basement	Brown Fibrous Homogeneous	95% Glass	5% Non-fibrous (Other)	None Detected
ASB13-Wrap 512300479-0013	Pipe wrap, run, horizontal, basement	White/Silver Fibrous Homogeneous	70% Cellulose 15% Glass	15% Non-fibrous (Other)	None Detected
ASB13-Insulation 512300479-0013A	Pipe wrap, run, horizontal, basement	Yellow Fibrous Homogeneous	90% Glass	10% Non-fibrous (Other)	None Detected
ASB14-Coating 512300479-0014	Pipe gasket, hallway, basement	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
ASB14-Rubber 512300479-0014A	Pipe gasket, hallway, basement	Black Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
ASB15 512300479-0015	Acoustic sound board, east room, basement	Black Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
ASB16 512300479-0016	Pipe gasket, east room, basement	Black Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
ASB17 512300479-0017	Concrete wall, loading ramp, west	Gray Non-Fibrous Homogeneous		15% Quartz 85% Non-fibrous (Other)	None Detected
ASB18 512300479-0018	Concrete patching, loading ramp, west	Gray Non-Fibrous Homogeneous		20% Quartz 80% Non-fibrous (Other)	None Detected
ASB19 512300479-0019	Caulking, along wall base, loading ramp, west	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected

Analyst(s)

Claudiu Nistor (22)

Carolyn Yeo (4)

Ehrin Stephens, Laboratory Manager
or Other Approved Signatory

EMSL maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. This report relates only to the samples reported above, and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. The report reflects the samples as received. Results are generated from the field sampling data (sampling volumes and areas, locations, etc.) provided by the client on the Chain of Custody. Samples are within quality control criteria and met method specifications unless otherwise noted. The above analyses were performed in general compliance with Appendix E to Subpart E of 40 CFR (previously EPA 600/M4-82-020 "Interim Method") but augmented with procedures outlined in the 1993 ("final") version of the method. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the federal government. Non-friable organically bound materials present a problem matrix and therefore EMSL recommends gravimetric reduction prior to analysis. Unless requested by the client, building materials manufactured with multiple layers (i.e. linoleum, wallboard, etc.) are reported as a single sample. Estimation of uncertainty is available on request.

Samples analyzed by EMSL Analytical, Inc. Seattle, WA NVLAP Lab Code 200613, CA 2733, WA C1025

Initial report from: 02/23/2023 11:28:22

EMSL ANALYTICAL, INC.
LABORATORY • PRODUCTS • TRAINING

Asbestos Chain of Custody

EMSL Order Number (Lab Use Only):

#512300479

PHONE:

FAX:

Company Name : EVREN Northwest, Inc.		EMSL Customer ID:	
Street: PO Box 14488		City: Portland	State/Province: OR
Zip/Postal Code: 97293	Country: USA	Telephone #: 503-452-5561	Fax #: 503-452-7669
Report To (Name): Heather Caporaso		Please Provide Results: <input type="checkbox"/> Fax <input checked="" type="checkbox"/> Email	
Email Address: heatherc@evren-nw.com, torib@evren-nw.com		Purchase Order: 351-19004	
Project Name/Number: 351-19004-03		EMSL Project ID (Internal Use Only):	
U.S. State Samples Taken: Oregon		CT Samples: <input type="checkbox"/> Commercial/Taxable <input type="checkbox"/> Residential/Tax Exempt	
EMSL-Bill to: <input checked="" type="checkbox"/> Same <input type="checkbox"/> Different - If Bill to is Different note instructions in Comments** Third Party Billing requires written authorization from third party			
Turnaround Time (TAT) Options* - Please Check			
<input type="checkbox"/> 3 Hour <input type="checkbox"/> 6 Hour <input checked="" type="checkbox"/> 24 Hour <input type="checkbox"/> 48 Hour <input type="checkbox"/> 72 Hour <input type="checkbox"/> 96 Hour <input type="checkbox"/> 1 Week <input type="checkbox"/> 2 Week			
<small>*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.</small>			
PCM - Air <input type="checkbox"/> Check if samples are from NY <input type="checkbox"/> NIOSH 7400 <input type="checkbox"/> w/ OSHA 8hr. TWA PLM - Bulk (reporting limit) <input checked="" type="checkbox"/> PLM EPA 600/R-93/116 (<1%) <input type="checkbox"/> PLM EPA NOB (<1%) Point Count <input type="checkbox"/> 400 (<0.25%) <input type="checkbox"/> 1000 (<0.1%) Point Count w/Gravimetric <input type="checkbox"/> 400 (<0.25%) <input type="checkbox"/> 1000 (<0.1%) <input type="checkbox"/> NYS 198.1 (friable in NY) <input type="checkbox"/> NYS 198.6 NOB (non-friable-NY) <input type="checkbox"/> NYS 198.8 SOF-V <input type="checkbox"/> NIOSH 9002 (<1%)		TEM - Air <input type="checkbox"/> 4-4.5hr TAT (AHERA only) <input type="checkbox"/> AHERA 40 CFR, Part 763 <input type="checkbox"/> NIOSH 7402 <input type="checkbox"/> EPA Level II <input type="checkbox"/> ISO 10312 TEM - Bulk <input type="checkbox"/> TEM EPA NOB <input type="checkbox"/> NYS NOB 198.4 (non-friable-NY) <input type="checkbox"/> Chatfield SOP <input type="checkbox"/> TEM Mass Analysis-EPA 600 sec. 2.5 TEM - Water: EPA 100.2 Fibers >10µm <input type="checkbox"/> Waste <input type="checkbox"/> Drinking All Fiber Sizes <input type="checkbox"/> Waste <input type="checkbox"/> Drinking	
TEM - Dust <input type="checkbox"/> Microvac - ASTM D 5755 <input type="checkbox"/> Wipe - ASTM D6480 <input type="checkbox"/> Carpet Sonication (EPA 600/J-93/167) Soil/Rock/Vermiculite* <input type="checkbox"/> PLM CARB 435 - A (0.25% sensitivity) <input type="checkbox"/> PLM CARB 435 - B (0.1% sensitivity) <input type="checkbox"/> TEM CARB 435 - B (0.1% sensitivity) <input type="checkbox"/> TEM CARB 435 - C (0.01% sensitivity) <input type="checkbox"/> TEM Qual via Filtration Technique <input type="checkbox"/> TEM Qual. via Drop-Mount Technique <small>*Can not accept New York State Loose Fill Vermiculite Samples</small> Other: <input type="checkbox"/>			
<input type="checkbox"/> Check For Positive Stop - Clearly Identify Homogenous Group		Filter Pore Size (Air Samples): <input type="checkbox"/> 0.8µm <input type="checkbox"/> 0.45µm	
Samplers Name: Heather Caporaso		Samplers Signature:	
Sample #	Sample Description	Volume/Area (Air) HA # (Bulk)	Date/Time Sampled
ASB01	Coating, large HVAC system duct, loading ramp, east		02/21/2023
ASB02	Caulking, large HVAC system duct, loading ramp, east		02/21/2023
ASB03	Coating, large HVAC system duct, ground floor, north		02/21/2023
ASB04	Caulking, large HVAC system duct, ground floor, north		02/21/2023
ASB05	Sealant, large HVAC system duct, ground floor, north		02/21/2023
ASB06	Sealant, pipe, ground floor, central		02/21/2023
ASB07	CMU, wall, bathroom, ground floor		02/21/2023
Client Sample # (s): ASB01 - ASB19		Total # of Samples: 19	
Relinquished (Client):		Date:	Time:
Received (Lab):		Date: 2/22/23	Time: 9:45 AM
Comments/Special Instructions:		7965 8218 5078 1 order	

#5 1 2 3 0 0 4 7 9

Page 2 Of 2

Appendix B

Photographic Log



View of the entrance to the Headworks Building.



View of the loading ramp east entry.



View of the loading ramp west entry.



View of basement entry and florescent lights and ballasts.

CREEKSIDE ENVIRONMENTAL CONSULTING, LLC	Headworks Building – Rock Creek Facility 3235 SW River Road Hillsboro, Oregon	Site Photographs	Project No. 351-19004-03
			Appendix B



General cleaning chemicals noted in the sink cabinet of the ground floor.



Leaking of an unknown liquid from 55-gallon drum located on the back wall of the ground floor.

CREEKSIDE ENVIRONMENTAL CONSULTING, LLC	Headworks Building – Rock Creek Facility 3235 SW River Road Hillsboro, Oregon	Site Photographs	Project No. 351-19004-03
			Appendix B

Appendix C

DEQ Guidance Fact Sheets

Asbestos Information You Need Before Demolishing a Building

DEQ and Lane Regional Air Protection Agency, known as LRAPA, have specific rules regarding the handling, removal and disposal of asbestos-containing materials, commonly referred to as ACM. DEQ and LRAPA regulate ACM abatement to prevent asbestos fiber release and exposure.

Asbestos fibers are a respiratory hazard proven to cause lung cancer, mesothelioma, and asbestosis. Asbestos is a danger to public health and a hazardous air pollutant for which there is no known safe level of exposure.

Before any public or private facility is demolished, including residential buildings, all ACM must be properly abated. Abatement includes handling, removing, disposing, repairing, salvaging, enclosing or encapsulating any ACM.

DEQ's asbestos survey rule requires a thorough inspection by an accredited inspector to determine the presence of ACM in or on a structure prior to any demolition activities. A copy of the asbestos survey is required to be onsite during all demolition activities and DEQ can request a copy of the asbestos survey. Asbestos consultants and many of the asbestos abatement contractors can provide this service. Factsheets are available regarding the asbestos survey requirements.

In general, there are two types of ACMs:

- **Friable** ACM will easily release asbestos fibers when crushed. Only [DEQ licensed asbestos abatement contractors](#) and certified asbestos workers can handle, remove and dispose of friable ACM. DEQ has specific training courses available that meet these certification needs.

Examples of **friable** ACM include, but are not limited to: sheet vinyl flooring, insulation on pipes, ductwork and boilers, fireproofing, ceiling texture and panel products, and soundproofing.

- **Nonfriable** ACM has a binder that holds the asbestos fibers within a solid matrix so asbestos fibers will not easily release unless mishandled, damaged, or in badly worn or weathered condition. You do not need to be a DEQ licensed asbestos abatement

contractor or a certified asbestos worker to perform nonfriable asbestos abatement.

However, the nonfriable materials must remain in nonfriable condition and predominantly whole pieces during the removal and disposal process.

Examples of **nonfriable** ACM include, but are not limited to: vinyl floor tile, asbestos-containing water pipe, and cement siding, roofing or paneling, also known as transite.

If you remove nonfriable ACM, follow the instructions in the DEQ nonfriable guidance documents. In addition, an ASN 6 nonfriable project notification and fee are required to be submitted to DEQ's Business Office five days prior to the start date of the project.

Nonfriable asbestos-containing waste material, referred to as nonfriable ACWM, must be kept adequately wet during abatement. DEQ recommends packaging the nonfriable ACWM in leak-tight containers. The ACWM must be disposed of at a landfill permitted to accept asbestos waste and should be accompanied by an ASN 4 waste shipment report at the time of disposal.

Contact the landfill prior to delivering the nonfriable ACWM. Landfills can be more stringent than DEQ and may only accept ACWM by appointment.

If you disturb or mishandle ACM and cause the public or the environment to be potentially exposed to asbestos fibers, you may be subject to a DEQ order with civil penalties in violation of rule or statute.

Alternative Formats

Alternative formats of this document can be made available. For more information call 503-229-5696, Portland, or call toll-free in Oregon at 1-800-452-4011, ext. 5696. Hearing-impaired persons may call 711.



State of Oregon
Department of
Environmental
Quality

Asbestos Program
www.oregon.gov

Contact Information:

Clackamas, Clatsop, Columbia, Multnomah, Tillamook and Washington Counties, call the **Northwest Region – Portland Office** at 503-229-5982, 503-229-5364 or 800-452-4011.

Benton, Lincoln, Linn, Marion, Polk and Yamhill Counties, call the **Western Region – Salem Office** at 503-378-5086 or 800-349-7677.

Jackson, Josephine and Eastern Douglas Counties, call the **Western Region – Medford Office** at 541-776-6107 or 877-823-3216.

Coos, Curry and Western Douglas Counties, call the **Western Region – Coos Bay Office** at 541-269-2721, ext. 222.

Crook, Deschutes, Harney, Hood River, Jefferson, Klamath, Lake, Sherman and Wasco Counties, call the **Eastern Region – Bend Office** at 541-633-2019 or 866-863-6668.

Baker, Gilliam, Grant, Malheur, Morrow, Umatilla, Union, Wallowa and Wheeler Counties, call the **Eastern Region – Pendleton Office** at 541-278-4626 or 800-304-3513.

Lane County, call the **Lane Regional Air Protection Agency** at 541-736-1056.

Fact Sheet

Oregon's Updated Asbestos Rules

Fall 2018

The Oregon Department of Environmental Quality regulates the handling, removal and disposal of asbestos-containing material to protect public health and the environment.

What's asbestos?

Asbestos is a natural occurring mineral that has been used extensively in a variety of construction materials in the U.S. When asbestos-containing material is disturbed, tiny hazardous fibers are released into the air and may cause lung cancer and other illnesses. There's no known safe level of exposure.

Asbestos requirements

In fall 2018, Oregon adopted additional requirements for handling asbestos-containing material.

DEQ requires property owners and contractors to identify asbestos-containing material and to properly handle, package and dispose of asbestos waste from demolition and renovation projects.

New requirement 1: Residential renovation asbestos survey

All houses and other residential buildings constructed prior to 2004 must now have an asbestos survey conducted by an accredited inspector prior to demolition and renovation activities, with one exception. Owner-occupants doing their own home renovation work are exempt from this rule. This exemption does not apply when the residence is going to be demolished.

Previous rules exempted residential renovation projects from the asbestos survey requirement that applied to commercial projects and residential demolition projects. However, residential property owners and contractors were still required to follow asbestos abatement requirements for licensing, certification, notification, handling, packaging and disposing of asbestos.

Requiring an asbestos survey for residential renovation projects ensures property owners and contractors know whether or not materials planned for renovation contain asbestos. This requirement reduces the risk that homeowners, contractors, neighbors and disposal site workers could be inadvertently exposed or sites contaminated with asbestos.



New requirement 2: Updated disposal requirements for nonfriable materials

Nonfriable asbestos waste must now be packaged the same as friable waste. Friable materials are those that can be easily crumbled and release asbestos fibers.

Nonfriable materials can become friable if improperly handled, increasing the risk of exposure to asbestos fibers. Applying the same packaging standard for nonfriable and friable materials streamlines the packaging requirements for all asbestos waste and ensures a safer work environment for employees, residents, neighbors and disposal facility workers.

New requirement 3: Accredited laboratories for asbestos testing

Laboratories analyzing bulk asbestos samples must participate in a nationally recognized accreditation or testing program by January 1, 2021.

This new requirement establishes a common level of competency and reliability in analysis to properly identify asbestos content. DEQ will maintain a public list of accredited laboratories on its website.

New requirement 4: Asbestos survey reports

Asbestos survey reports submitted to DEQ must now meet standard requirements. This requirement ensures survey reports include all required information. Learn more about asbestos survey requirements at:

<https://www.oregon.gov/deq/Hazards-and-Cleanup/Pages/Asbestos-Information.aspx>



State of Oregon
Department of
Environmental
Quality

Asbestos Program

Contact Information:

Clackamas, Clatsop, Columbia, Multnomah, Tillamook and Washington Counties, call the **Northwest Region – Portland Office** at 503-229-5982, 503-229-5364 or 800-452-4011.

Benton, Lincoln, Linn, Marion, Polk and Yamhill Counties, call the **Western Region – Salem Office** at 503-378-5086 or 800-349-7677.

Jackson, Josephine and Eastern Douglas Counties, call the **Western Region – Medford Office** at 541-776-6107 or 877-823-3216.

Coos, Curry and Western Douglas Counties, call the **Western Region – Coos Bay Office** at 541-269-2721, ext. 222.

Crook, Deschutes, Harney, Hood River, Jefferson, Klamath, Lake, Sherman and Wasco Counties, call the **Eastern Region – Bend Office** at 541-633-2019 or 866-863-6668.

Baker, Gilliam, Grant, Malheur, Morrow, Umatilla, Union, Wallowa and Wheeler Counties, call the **Eastern Region – Pendleton Office** at 541-278-4626 or 800-304-3513.

Lane County, call the **Lane Regional Air Protection Agency** at 541-736-1056.

Overview of Oregon's asbestos rules

Asbestos survey:

DEQ requires an accredited inspector conduct an asbestos survey prior to demolition and renovation activities on:

- Residential renovation and demolition projects on buildings constructed before 2004.
- All commercial renovation and demolition projects regardless of construction date.

Asbestos abatement project notification:

Contractors conducting asbestos abatement must submit notifications to DEQ prior to beginning work. Require notifications include:

- ASN-1 Project Notification for abatement of friable asbestos-containing material.
- ASN-6 Project Notification for nonfriable asbestos removal.

Owner-occupants performing renovation projects on their homes are exempt from the notification requirement. Find information about required notification forms at:

<https://www.oregon.gov/deq/Hazards-and-Cleanup/Pages/Asbestos-Forms.aspx>

Friable asbestos abatement (materials that easily crumble):

Only DEQ-licensed asbestos abatement contractors and owner-occupants of residential homes may perform friable abatement projects.

An owner-occupant is a person who owns the residence and resides as their primary residence. The owner-occupant is required to properly package the asbestos waste before transferring the material outside and must dispose of the asbestos at a landfill permitted by DEQ to accept asbestos waste.

Work practice requirements for contractors removing friable materials:

- Friable asbestos abatement must occur within a negative-pressure enclosure through a HEPA filtration system. The enclosure must have a two foot by two foot viewing window installed per 5,000 square-feet of enclosure space.
- Wet-method must be applied during asbestos removal and packaging.

Nonfriable asbestos abatement (materials that don't easily crumble):

Nonfriable asbestos abatement projects can be conducted by licensed asbestos abatement contractors, Construction Contractors Board (CCB) licensed contractors, homeowners, business owners, and property owners, provided the nonfriable material is not rendered friable during removal and packaging.

Waste handling and disposal:

Accumulation and storage of friable asbestos containing material is prohibited. Asbestos-containing material must be packaged in a minimum of two 6-mil thick plastic bags or similar leak-tight packaging with an asbestos hazard warning label, and must be disposed of at a landfill permitted by DEQ to accept asbestos waste.

Prior to transport, asbestos waste containers must have a label attached with the name of the generator (person doing the removal) and the address from where the waste was removed. A completed Asbestos Waste Shipment Report Form (ASN 4) must be provided to the landfill at the time of disposal.

Contact the landfill prior to delivering asbestos. Landfills may have additional requirements and may only accept asbestos by appointment.

More information

Visit www.oregon.gov/deq/Hazards-and-Cleanup/Pages/Asbestos-Information.aspx

Asbestos requirements are detailed in Oregon Administrative Rules 340, Division 248.

If you have questions or need technical assistance, contact asbestos program staff.

Alternative formats

Documents can be provided upon request in an alternate format for individuals with disabilities or in a language other than English for people with limited English skills. To request a document in another format or language, call DEQ in Portland at 503-229-5696, or toll-free in Oregon at 1-800-452-4011, ext. 5696; or email deqinfo@deq.state.or.us.



State of Oregon Department of Environmental Quality **Licensed Asbestos Abatement Contractors**

This is a list of asbestos abatement contractors that have obtained a license from the Oregon Department of Environmental Quality. This list does not constitute an endorsement by the Department. Services provided and costs are solely determined between the abatement contractors and their customer.

3 Kings Environmental, Inc.

15001 NE 10th Avenue
Vancouver, WA 98685
253-750-4143

Abate Right, Inc.

2275 Judson St SE
Salem, OR 97302
503-409-9089

Abatement Pro, Inc.

4149 S Cubola Avenue
Meridian, ID 83642
208-853-1789

Abatement Services, Inc.

PO Box 747
Beavercreek, OR 97004
503-765-5257

**Accelerated Construction LLC
DBA One Call Abatement**

2302 Cove Avenue
LaGrande, OR 98850
541-786-4596

All Aspects

PO Box 611
Sutherlin, OR 97479
541-515-7600

Alpine Abatement Associates, Inc.

PO Box 1557
Bend, OR 97709
541-388-2672

Alpha Environmental Inc

11080 SW Allen Boulevard, Suite 100
Beaverton, OR 97005
503-292-5346

Arcadia Environmental Inc.

PO Box 1290
Coos Bay, OR 97420
541-404-9919

Asbestos Abatement, Inc.

PO Box 2593
Boise, ID 93714
208-345-3574

Asbestos Control Group, Inc.

19386 SW 55th Ct
Tualatin, OR 97062
503-780-3363

ATEZ, Inc.

PO Box 126
Harrisburg, OR 97446
541-995-6008

BELFOR Environmental, Inc.

12821 NE Airport Way
Portland, OR 97230
503-408-7404

Brandsafway LLC (formerly Brand Energy)

201 Estest Dr.
Longview, TX 75602
903-757-5754

Bravo Development, LLC
148 S Cole Rd
Boise, ID 83709
208-941-2023

Central Environmental, Inc.
311 N. Sitka Street
Anchorage, AK 99501
907-561-0125

Day & Zimmermann NPS, Inc.
1827 Freedom Road, Suite 101
Lancaster, PA 17601
717-391-3184

Envirocon, Inc.
PO Box 16655
Missoula, MT 59808
406-523-1150

Enviromex Contracting, Inc. (2)
8900 SW Burnham St. #E-24
Tigard, OR 97223
503-713-3309

Environmental Resources, Inc.
PO Box 5954
Salem, OR 97304
503-991-3545

First Response Environmental Services
PO Box 3323
Central Point, OR 97502
541-621-0911

Gre-Energy Constructors, Inc.
PO Box 13218
Salem, OR 97309
503-877-1495

Har-Bro West, Inc.
2750 Signal Parkway
Signal Hill, CA 90755
562-528-8050

Cascade Insulation, Inc.
22356 Nelson Road
Bend, OR 97701
541-388-2600

Courtesy Environmental LLC
2012 C St.
Vancouver, WA 98663
360-836-5004

Eagle Creek Contracting LLC
2289 Claude St NE
Salem, OR 97301
503-931-3535

Enviromex Contracting, Inc. (1)
12435 Clow Corner Road
Dallas, OR 97338
503-831-2000

Environmental Quality Management Inc.
18939 120th Ave NE, Suite 103
Bothell, WA 98011
425-673-2900

Environmental Resources, Inc.
19450 SW Cipole Rd. #207
Tualatin, OR 97062
503-991-3545

Global Pacific Environmental
PO Box 2759
Vancouver, WA 98660
360-993-4479

Green Deconstruction Services Inc. (GDSI)
PO Box 20278
Portland, OR 97294
503-236-4299

Ideal Demolition Services, LLC
2473 W Success Way
Emmett, ID 83617
208-365-1514

IRS Environmental of Portland

777 SW Armco Avenue
Hillsboro, OR 97123
503-693-6388

Keystone Contracting, Inc.

417 NW 209th Street
Ridgefield, WA 98642
360-887-0868

Lake Oswego Insulation Company (1)

5930 SW Jean Road
Lake Oswego, OR 97035
503-245-6460

Lions Contracting

5105 NE 144th Avenue
Vancouver, WA 98682
503-270-8180

Minority Abatement Contractors

3200 NE 65th Street
Vancouver, WA 98663
360-750-1900

Northstar CG, LP

10367 SE Helena Street
Milwaukie, OR 97222
503-255-5999

Northwest Abatement Corporation

7735 SE 68th Avenue
Portland, OR 97206
971-263-9815

NRC Environmental Services, Inc.

6211 N Ensign St
Portland, OR 97217
503-283-1150

Pacific Environmental Group, Inc. (1)

PO Box 22306
Eugene, OR 97402
541-767-3770

IRS Environmental of Washington

PO Box 15216
Spokane, WA 99215
509-927-7867

Koos Environmental, Inc.

PO Box 4068
Coos Bay, OR 97420
541-266-0511

Lake Oswego Insulation Co. (2) Mid-Valley

27171 Clear Lake Road
Eugene, OR 97402
541-953-8301

Lodge Environmental, Inc.

2084 Roosevelt Blvd. Suite A
Eugene, OR 97402
541-461-8001

Net Compliance Environmental LLC

2112 E. 26th Street
Vancouver, WA 98661
360-699-4015

Northstar Demolition & Remediation LP

404 N. Berry Street
Brea, CA 92821-3104
714-672-3501

Northwest Technologies, Inc. A Corp of ID

11911 W Franklin Rd
Boise, ID 83709
208-323-0757

Oregon Abatement

4929 NE 35th Avenue
Portland, OR 97211
503-740-9758

Pacific Environmental Group, Inc. (2)

2302 Ermine Court SE
Albany, OR 97322
541-926-8707

Pacific Northwest Environmental
19645 SE Sunnyside Road
Damascus, OR 97089
503-658-6606

Performance Abatement Services, Inc.
13600 NE 10th Avenue
Vancouver, WA 98685
360-574-8400

Professional Minority Group, Inc.
27090 SE Highway 224
Eagle Creek, OR 97022
503-761-5924

Rose City Contracting, Inc.
29791 SW Kinsman Road
Wilsonville, OR 97070
503-685-9505

SMAF Environmental LLC
PO Box 672
Prineville, OR 97754
541-447-5643

Tektonics Corporations
306 W Moore St
Walla Walla, WA 99362
509-529-8424

W.L. Thomas Environmental, LLC
PO Box 8
Albany, OR 97501
541-928-5383

Pacific Technologies, Inc.
PO Box 4846
Boise, ID 83711
208-344-8668

Petrochem Insulation, Inc.
110 Corporate Place
Vallejo, CA 94590
707-644-7458

Rhine Demolition, LLC
1124 112th Street East
Tacoma, WA 98445
253-537-5852

Safeway Services LLC
285 Liberty Street NE
Salem, OR 9731
713-824-1730

SPS Environmental Services
1201 S. Childers Road
Orange, TX 77630
409-886-3959

Western States Environmental Services
PO Box 787 OR 877 Beatty Street
Medford, OR 97501
541-770-2482

Zilco Northwest LLC
PO Box 1781
Beaverton, OR 97075-1781
503-519-1462

Checklist for Determining Contractor Qualifications

1. Regardless of how you may feel about a particular contractor, always ask for a list references from previous projects. That list should include persons willing to describe the reliability of the contractor and the quality of work performed by the contractor.
2. All asbestos contractors must have an Oregon DEQ asbestos abatement license and use only Oregon certified workers and supervisors.
3. You may also want to ask your contractor to provide air-monitoring data from previous projects done in accordance with Oregon OSHA or Oregon DEQ requirements. That information can also help you determine if the work habits and general procedures that contractor uses are acceptable.
4. All contractors must have written standard operating procedures and employee protection plans which include specific reference to Oregon OSHA medical monitoring and respirator training programs. In addition, the contractor must make available a copy of the Oregon OSHA and the DEQ asbestos rules. (Oregon rules: under OAR 340-248-0005 through -0290.)
5. Contractors must also provide a list of any penalties that the contractor has paid due to not completing contractual requirements, because of cost overruns, and/or liquidated damages.
6. Any citations levied against the contractor by any Federal, State, or local government agencies for violations related to asbestos abatement should be identified by the contractor. Included with that information should be the name or project location, the date(s) of the project, and how the allegations were resolved.
7. Contractors should also supply a description detailing all legal proceedings, lawsuits, or claims that have been filed or levied against them or any of their past or present employees for asbestos related activities.
8. The contractor should also supply a list of all equipment that will be used for asbestos work. That list should include negative air machines, HEPA vacuums, the type of respiration equipment they will use, scaffolding, decontamination facilities, disposable clothing, etc.



OREGON LANDFILLS ACCEPTING ASBESTOS WASTE

The following is a list of landfills permitted by the Oregon DEQ to accept asbestos waste. OAR 340-248-0280(6) requires that you notify the landfill prior to disposal. DEQ suggests you contact the landfill at least a 24 hours before disposal in order to allow the landfill operator time to prepare a site for burial.

<u>LANDFILL NAME</u>	<u>COUNTY</u>	<u>ADDRESS/PHONE</u>
NORTHWEST REGION		
Hillsboro Landfill	Washington	3205 SE Minter Bridge Road Hillsboro, OR 97123 503-640-9427
LANE COUNTY		
Short Mountain Landfill	Lane	84777 Dillard Access Road Eugene, OR 97405 541-726-3047
WESTERN REGION		
Brown's Island Landfill	Marion	2895 Faragate Street South Salem, OR 97306 503-588-5169
Coffin Butte Landfill	Benton	28972 Coffin Butte Road Corvallis, OR 97330 541-745-2018
Dry Creek Landfill	Jackson	5500 Highway 140 White City, OR 97503 541-440-4271
Roseburg Landfill	Douglas	384 McClain West Avenue Roseburg, OR 97471 541-440-4268

<u>LANDFILL NAME</u>	<u>COUNTY</u>	<u>ADDRESS/PHONE</u>
EASTERN REGION		
Baker Sanitary Landfill	Baker	39144 West Sutton Creek Road Baker City, OR 97814 541-523-2626
Chemical Waste Management of the Northwest Landfill	Gilliam	17629 Cedar Springs Lane Arlington, OR 97812 541-454-2030
Columbia Ridge Landfill	Gilliam	18177 Cedar Springs Lane Arlington, OR 97812 541-454-2030
Crook County Landfill	Crook	5601 SW Houston Lake Road Prineville, OR 97754 541-447-2398
Finley Buttes Landfill	Morrow	73221 Bombing Range Road Boardman, OR 97818 541-481-2233
Klamath Falls Landfill	Klamath	801 Old Fort Road Klamath Falls, OR 97601 541-883-5121 Option 7
Knott Landfill	Deschutes	61050 SE 27th Street Bend, OR 97702 541-317-3163
Wasco County Landfill	Wasco	2550 Steele Road The Dalles, OR 97058 541-296-4082

Waste Lamps & Ballasts

This fact sheet provides guidance to individuals that create and manage waste lamps and ballasts. Complete management regulations can be found in the Code of Federal Regulations (CFR), Title 40, Part 273 and 261 and the Oregon Administrative Rule (OAR) Chapter 340, Division 113.

Environmental concerns

Fluorescent lamps and High Intensity Discharge (HID) lamps, including mercury vapor, high-pressure sodium, and metal halide lamps from businesses, can contain levels of mercury and lead that make them hazardous waste when disposed. Mercury and lead are toxic metals that can accumulate in living tissue and cause adverse health effects. Businesses and government in Oregon discard several million lamps each year, making these lamps the largest source of mercury in our solid waste-stream. When a lamp is broken, or placed in a landfill or incinerator, metals are released into the environment that may contaminate the air, surface or groundwater.

Lamp ballasts manufactured prior to 1978 likely contain polychlorinated biphenyls (PCBs). When released into the environment, PCBs persist for many years and bioaccumulate in organisms. Studies have shown that PCBs cause cancer in animals, and repeated exposure to PCBs has shown adverse reproductive and developmental effects in animals. Exposure to PCBs can cause liver damage, nausea, dizziness, eye irritation and bronchitis in humans.

Management of lamps as universal waste

The universal waste rule was designed to encourage the collection of certain hazardous wastes that are generated by a wide variety of businesses and institutions. Depending on your individual situation, other options may be preferred to managing your waste lamps as universal waste. A summary of lamp management options is presented in a table on page 2. For specific requirements, refer to the rules listed in the table.

Advantages of managing waste lamps under the universal waste rule are:

- Universal wastes are not counted towards hazardous waste generator status;
- No manifesting required unless the waste lamps are transported through states or treated or disposed in states that do not recognize mercury-containing lamps as a universal waste;
- Increased storage time available; and
- Reduced administrative requirements for record-keeping, training, and emergency preparedness.

Universal waste management requirements

Handlers of waste lamps managed under the universal waste rule must:

- Manage lamps in a way that prevents releases of the waste to the environment;
- Contain lamps in containers such as cardboard boxes or fiber drums, which are adequate to prevent breakage;
- Keep containers closed;
- Minimize lamp breakage and immediately clean up any broken or damaged lamps; and,
- Store broken lamps in a closed, structurally sound container.

Universal waste handlers are prohibited from crushing lamps, or diluting lamps with other wastes. Waste lamps must be sent to a universal waste destination facility for recycling or disposal.

Labeling and marking

Each container of waste lamps must be labeled or marked clearly with one of the following phrases: "Universal Waste—Lamps", "Waste Lamps," or "Used Lamps."

Accumulation time

Waste lamps may be accumulated for up to 1 year. Accumulation of universal waste lamps longer than 1 year is permitted if the handler can demonstrate, if inspected by the Department, that more time is needed to accumulate the quantities necessary to facilitate proper recovery, treatment or disposal.



State of Oregon
Department of
Environmental
Quality

Land Quality Division Hazardous Waste Program

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Mercury Containing Lamp Management Options

Management As:	Conditions Which Must Be Met	Applicable Rules	Comments
Universal Waste	Management of waste subject to applicable universal waste management standards.	See 40 CFR Part 273* and OAR 340 Division 113**	Universal waste rule is designed to encourage collection of waste. Waste lamps are ultimately subject to hazardous waste management requirements when treated or disposed.
Conditionally Exempt Hazardous Waste	Generator of waste lamps must be a conditionally exempt generator (<220 lbs. hazardous waste generated per month and <2,200 lbs. hazardous waste stored at any one time).	See 40 CFR 261.5	Waste lamps may be disposed of in solid waste landfill, if allowed by the operator.
Solid Waste	Waste lamps <u>must not</u> exhibit hazardous waste characteristics.	See OAR 340-102-0011 for hazardous waste determination requirements	Some fluorescent lamps do not exhibit hazardous waste characteristics.
Hazardous Waste	Generator must follow applicable hazardous waste regulations.	See 40 CFR 260-266, 268, OAR 340 Divisions 100 to 106, and 108	Most restrictive management requirements. Waste must be sent directly to permitted hazardous waste facility.

* 40 CFR is Title 40 of the Code of Federal Regulations and contains the Federal environmental regulations.

** OAR 340 is Chapter 340 of the Oregon Administrative Rules and contains the State environmental regulations.

Lamp crushing

Crushing of universal waste lamps is prohibited under the universal waste regulations. However, crushing is allowed if the waste will be managed as hazardous waste. (See discussion below under "Management of Waste Lamps as Hazardous Waste".)

- Limit the time waste can be accumulated;
- Be subject to hazardous waste generation fees;
- Require additional training, emergency preparedness and contingency plans to be developed; and
- Require annual reporting of waste generated.

Management of waste lamps as hazardous waste

Generators of waste lamps may decide, in lieu of the management as universal waste, to manage their waste lamps as hazardous waste.

Management of lamps as hazardous waste is more restrictive than under the universal waste rule and, depending on the amount of hazardous waste generated, may:

Conditionally exempt hazardous waste

Waste lamps may be managed as conditionally-exempt generator waste if the generator of the waste is a conditionally-exempt hazardous waste generator. A conditionally-exempt hazardous waste generator is a generator that produces less than 220 pounds of hazardous waste per month. When determining if they are conditionally-exempt, hazardous waste generators must count

all their hazardous waste (lamps and other hazardous waste) generated during the calendar month.

To remain "conditionally-exempt" from the more stringent hazardous waste management requirements, generators who produce less than 220 pounds of hazardous waste must:

- Ensure delivery of their waste to a hazardous waste disposal or recycling facility, or a solid waste disposal facility, and
- Accumulate no more than 2,200 pounds of hazardous waste at any one time.

Crushing lamps

Crushing lamps is permitted if the waste lamps are managed under the hazardous waste regulations or if the waste lamps are determined to be a solid waste. Lamps must be crushed in commercially available crushing units that are designed to control mercury emissions.

Crushing is allowed provided that the generator of the lamps:

- Crushes lamps in a well-ventilated and monitored area to ensure compliance with applicable OSHA exposure limits for mercury;
- Ensures that employees crushing lamps are thoroughly familiar with proper waste mercury handling and emergency procedures; and
- Stores crushed tubes in closed, non-leaking containers.

When making a decision to crush lamps, be aware that the crushing may add additional costs to prepare lamps for disposal or recycling. In addition, lamp recyclers may prefer whole lamps to crushed ones. Crushing units also can pose health and environmental risks because of the release of mercury vapors.

Management of waste lamps as solid waste

Waste lamps may be managed as solid waste if they do not exhibit a hazardous waste characteristic. In many cases, any such characteristic exhibited will be for mercury. Waste lamps used in special situations, such as photo processing, or larger HID lamps, can also exhibit hazardous waste characteristics for cadmium or lead.

To manage waste lamps as solid waste, a generator must first determine that their lamps do not exhibit a hazardous waste characteristic.

A generator may do this by:

- Testing a representative sample of the waste, using the Toxicity Characteristic Leaching Procedure (TCLP); or,
- Using process knowledge of the waste. In this case, knowledge of the waste could be obtained from the manufacturer. Lamp manufacturers now offer low mercury lamps that do not exhibit hazardous waste characteristics. Be sure to have documentation from the manufacturer that the lamps you are using have been tested and are not hazardous waste. You must be able to demonstrate that the data used in your waste determination is for the type of lamps (i.e., the brand and model) you are disposing.

For more information regarding how to perform a hazardous waste determination, refer to the Department's Hazardous Waste Determination Fact Sheet.

Lamp collection services

The following is a partial list of firms that offer waste lamp services. DEQ does not endorse specific recyclers or disposal firms.

DEQ, by providing the list, does not imply that the companies are in compliance with applicable laws. DEQ cautions generators to personally evaluate the services and compliance status of any company they use to manage their waste.

- *AERC/MTI, Hayward CA (800)628-3675*
- *American Appliance Recyclers, White City, OR (541) 826-2211*
- *Earth Protection Services, Inc., Tigard, OR (503) 620-2466*
- *Environmental Protective Services of Oregon, Inc. Brooks, OR (503) 550-0255; Portland (503) 408-8956*
- *Ecolights Northwest, Seattle, WA (206) 343-1247*
- *Lighting Resources, Ontario, CA (888) 923-7252*
- *Onyx Environmental Services, Vancouver, WA (877) 652-6292*
- *Philip Services Corp., Washougal, WA (800) 547-2436*
- *Safety-Kleen, Clackamas, OR (503) 655-579; Springfield, OR: (541) 747-5804*

Management of lamp ballasts

Light ballasts are the primary electrical components of fluorescent light fixtures and are generally located within the fixture under a metal cover plate. In older ballasts, a tar-like substance surrounds the components of the ballast that is designed to muffle the noise that is inherent in the operation of these ballasts.

Before the U.S. Environmental Protection Agency (EPA) banned the manufacture of PCBs in 1978, PCBs were commonly used in ballasts. All lamp ballasts manufactured since 1978 that do not contain PCBs should be marked by the manufacturer with the statement "No PCBs."

For ballasts manufactured prior to 1978, or for those that do not contain a statement regarding PCB content, you should assume that they contain PCBs.

PCB-containing ballasts contain approximately 1 to 1½ ounces of PCBs. If the ballast fails, PCBs may drip out of the fixture. If it does, measures should be taken to limit or avoid personal exposures.

Disposal of ballasts containing PCBs

The best option for non-leaking PCB ballasts is to recycle them at a facility with EPA approval for recycling PCB ballasts. Use a broker with EPA interim status as a PCB commercial storage facility to transport them to the recycling facility. Non-leaking PCB ballasts that are not recycled must be managed and disposed at a PCB disposal facility.

Leaking PCB ballasts must be managed as PCB waste and disposed in a facility regulated under the Federal Toxic Substances Control Act (TSCA).

Brokers that collect PCB ballasts:

*EcoLights Northwest, Seattle, WA
(206) 343-1247*

Facilities with EPA approval for recycling fluorescent light ballasts:

(Call company for shipping guidelines.)

- *Earth Protection Services, Inc., Tigard, OR (503) 620-2466*
- *Mercury Waste Solutions, MN (877) 636-6514*
- *Onyx Environmental Services, Vancouver, WA (877) 652-6292*
- *Trans-Cycle Industries, AL (800) 909-9997*

Additional information from DEQ

- Universal Waste Regulations
- Universal Waste Handler Fact sheet
- Hazardous Waste Determination Fact Sheet
- Oregon Hazardous Waste Regulations

For more information on Hazardous Waste Management, contact DEQ at (503) 229-5913 or visit our website.

For PCB disposal information contact EPA Region X at (503) 326-3399 or visit:

<http://yosemite.epa.gov/R10/OWCM.NSF/pcb/pcb>

Need technical assistance managing waste?

DEQ Technical assistance is available:

- Free on-site visits
- Free telephone consultations
- Hazardous waste training

DEQ Technical assistance can help you:

- Understand how hazardous waste regulations apply to your business
- Determine which wastes are hazardous
- Complete reporting forms
- Manage wastes better
- Reduce disposal costs
- Minimize the waste you produce
- Determine what areas need improvement

If you would like technical assistance or have any questions about your hazardous waste determination responsibilities, please contact the DEQ field office nearest you:

- *Bend (541) 388-6146*
- *Eugene (541) 686-7838*
- *Medford (541) 776-6010*
- *Portland (503) 229-5263*
- *Salem (503) 378-8240*

For more information on technical assistance, please visit:

<http://www.deq.state.or.us/wmc/hw/hwta.html>.

Alternative Formats

Alternative formats of this document can be made available. Contact the DEQ Office of Communication and Outreach for more information: (503) 229-5696.

Hazardous Waste/Toxics Reduction Policy Clarification

Guidance Title: Management of Building Demolition Waste

Guidance Number: 1997-PO-002A

Effective Date: November 21, 1997

Purpose

This policy interpretation supersedes policy number 97-002 and clarifies the requirements for management of building demolition wastes that may contain architectural components or other debris that are painted with lead-based paint. This policy does not address "household" wastes that may contain lead based paint. Management requirements for those wastes are addressed under DEQ Policy #96-001. This policy also does not affect the responsibility to comply with requirements for handling of asbestos as part of building demolition activities. Those requirements are specified in OAR 340-032-5600 through 5650.

Applicability

This policy applies to anyone handling commercial building demolition wastes that may contain debris painted with lead-based paints.

This policy statement is intended solely as guidance for employees of the Department of Environmental Quality (DEQ). It does not constitute rulemaking by the Environmental Quality Commission and may not be relied upon to create a right or benefit, substantive or procedural, enforceable by law or in equity, by any person. DEQ may take action at variance with this policy statement.

Discussion

Building demolition wastes often include items such as wood trim, siding and other architectural components that have been painted with lead-based paint. The presence of lead-based paint on such items can be detected using relatively simple sensing devices. Under RCRA, generators of demolition wastes that contain items painted with lead-based paint are required to determine whether or not these wastes are hazardous. The Toxicity Characteristic Leaching Procedure (TCLP) is the test that usually is most relevant to making such determinations. However, taking a representative sample of demolition debris for purposes of TCLP testing is often difficult, and no definitive state or federal guidance has been developed to address this issue. In addition, once disposed of in a landfill

setting, lead in lead-based paint poses little risk of contaminating ground water resources, since it does not readily solubilize or migrate through subsurface formations.

Given the uncertainties involved with performing accurate TCLP tests on demolition debris, the high volumes of these materials, the relatively low risk of exposure to these materials when managed accordingly, and the costs and questionable environmental benefits of managing such debris as hazardous wastes, DEQ has adopted the following policy regarding the management of such demolition debris:

1. Hazardous waste determinations (i.e., TCLP testing) will generally not be required of generators of demolition debris that may contain materials coated with lead-based paint, provided that:
 - A. The generator of such debris takes reasonable precautions, prior to demolition, to minimize contamination of the debris from other sources of contaminants. Such precautions will generally involve inspecting the structure and removing potentially hazardous materials such as mercury thermostats, lead piping, and containerized paints, solvents or other chemicals. If such materials are found and are determined to be hazardous wastes, they must be managed in accordance with applicable DEQ hazardous waste regulations; and
 - B. The demolition debris is disposed of at a solid waste landfill that is permitted by DEQ and which meets the current design standards for municipal solid waste disposal facilities of 40 CFR Part 258.



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For the purposes of this policy, current design standards for municipal solid waste disposal facilities of 40 CFR Part 258 means the facility has, at a minimum, a composite liner and leachate collection system as specified in 40 CFR 258.40(a)(2) and meet 40 CFR 258.53 ground-water sampling and analysis requirements.

2. Demolition debris that contain materials coated with lead-based paint may be disposed of at DEQ-permitted landfills that do not meet the disposal facility standards of 40 CFR Part 258 (i.e., landfills which meet the standards of OAR 340 Division 95), only if the debris has been determined not to be hazardous waste in accordance with proper waste determination protocols (e.g., knowledge of process, TCLP waste analysis).

3. This policy shall not restrict DEQ's right to require a complete hazardous waste determination for any demolition debris, based on information indicating that such a determination is necessary and appropriate.

As a general matter, DEQ encourages demolition contractors to recycle as much material as possible from demolition projects. This policy clarification is expected to enhance such recycling efforts, by streamlining procedures and eliminating unnecessary regulatory requirements. However, DEQ does not advocate the composting or the burning as hogged fuel wood demolition debris containing lead paint. Demolition wastes that are not reused or recycled may be disposed of in a solid waste landfill permitted by DEQ, as long as the procedures specified above have been followed.

Lead in Construction

**OAR 437
Division 3/D
Division 2/I
Division 2/J**

Lead in Construction**Why is lead so bad?**

Lead can damage your nerves, stomach and intestines, kidneys, reproductive functions, and red blood cells. Workers who are exposed to high levels of lead risk long-term health problems and must be carefully monitored. Symptoms usually build up slowly from repeated exposure to small amounts of lead. You can be exposed to lead for months – or years – and not have any symptoms, but the longer you're exposed, the greater your risk of developing health problems.

How does lead enter your body?

There are two ways: You can breathe in lead from dust or fumes or you can swallow lead if it gets on your hands or face or in your food, drinks, or tobacco. Once lead gets into your body, it travels in your blood to organs such as the liver, kidneys, brain, and heart. After a few weeks, it moves into your bones and teeth where it can stay for years. Most of the lead that gets into your body is eliminated as waste in a few weeks. However, the lead that stays in your body can build up to dangerous levels if you are continually exposed.

The only way you can be exposed to lead is if you "disturb" it. Work tasks that disturb lead include:

- Heat gun work
- Manual sanding
- Manual scraping
- Spray painting
- Remodeling (including replacing dry wall, windows, and siding)
- Torch burning

Tasks such as these are called trigger tasks because they trigger a set of requirements in our lead rule – **1926.62, Lead** – that you must follow to protect your employees. (See Trigger tasks and interim protection, below.)

Is there lead where your employees will be working?

There's only one way to know: Sample the material they will be working with and find out if it contains lead. If your employees will be working on a home that was built before 1978, the best thing to do is hire a certified lead-based paint inspector or a risk assessor, who can tell you if lead is present and how much is there. Lead paint test kits are also available, but they may not be 100 percent reliable.

How to know if your employees could be overexposed

There's only one way to know: Sample the air they breathe while they're working. This is called air monitoring or exposure monitoring. You can do air monitoring yourself if you know how and if you have the equipment, which you can rent. You can also hire a consultant or your workers' compensation insurance carrier may be able to help.

- If your employees are exposed to lead at or above 30 micrograms per cubic meter of air (30 µg/m³) averaged over an eight-hour period, they're overexposed. This is called the action level and you must follow specific requirements in our lead rule to protect them.
- A lead exposure level of 50 micrograms per cubic meter of air (50 µg/m³) averaged over an eight-hour period is called the permissible exposure limit or PEL. You must ensure that your employees aren't exposed to lead at a level greater than the PEL – even when they're wearing respirators. You must also follow specific requirements in our lead rule to protect them.

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350 Winter St. NE
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Trigger tasks and interim protection

If your employees do trigger tasks, you must assume they're exposed at levels above the PEL until you've done air monitoring to determine their exposures. You must also provide all of the following until you can show they're exposed below the action level:

- Appropriate respirators
- Protective clothing
- Clean areas for changing and storing clothes
- Hand-washing facilities
- Blood sampling for lead
- Training that covers lead health hazards and all parts of the lead standard

Providing appropriate respirators

Provide your employees with appropriate respirators when:

- They're doing any trigger task
- Their exposure to lead is greater than the PEL
- Engineering and administrative controls do not reduce their exposures to or below the PEL
- An employee requests a respirator

The appropriate respirators for your employees – which include tight-fitting, supplied-air, and powered air-purifying respirators – depend on their exposure levels.

If your employees use respirators, you must have a respiratory protection program that meets specific requirements of **1910.134, Respiratory protection** (including the medical evaluation requirement and the appendices).

Providing protective clothing

Provide your employees with protective work clothing and equipment that prevents contamination when:

- They're doing any trigger task
- They're exposed to lead above the PEL
- They're exposed to lead compounds that may cause skin or eye irritation

Protective work clothing includes:

- Coveralls or disposable full-body work clothes
- Gloves, hats, and shoes or disposable shoe coverlets
- Face shields and vented goggles

Providing clean areas for changing and storing clothes

Clean change areas are required. Change areas must have separate storage areas for protective work clothing and street clothes.

Employees can't leave the workplace wearing the protective clothing they wore during their work shift.

Providing hand washing facilities

Hand-washing facilities must include warm water and soap and meet the requirements of **437-002-0141(5) Washing Facilities**.

If you can't provide showers, make sure employees wash their hands and face at the end of their shifts. Encourage them to go home and shower immediately.

Providing blood sampling

All your employees who may be exposed to lead at or above the action level must have baseline blood sampling for lead.

Providing training

All employees must understand the requirements of **1910.1200, Hazard communication**. Those who are exposed to lead at or above the action level must have additional training, including how their work could expose them to lead and the use of respirators.

Resources

- Division 2/I – **1910.134, Respiratory protection**
- Division 2/I – **1910.134, Respiratory protection, Appendices**
- Division 2/J – **437-002-0141(5) Washing Facilities**
- Division 2/Z – **1910.1200, Hazard communication**
- Division 3/D – **1926.62, Lead**

1926.62

Oregon OSHA's construction industry rule for controlling exposure to lead.



What you should know and not a word more!



About this guide

Oregon OSHA's quick guide to 1926.62 is an Oregon OSHA Standards and Technical Resources publication. Oregon OSHA quick guides are for employers and employees who want to know about our requirements and get back to business quickly.

Who should read this guide?

Read this guide if you want to:

- Understand the key requirements of Oregon OSHA's lead rule for the construction industry, 1926.62
- Understand how to comply with 1926.62



Note: This guide doesn't cover the requirements for the Environmental Protection Agency's *Renovation, Repair, and Painting* rule. This rule requires contractors who do renovation, repair, or painting projects that disturb lead-based paint in homes, child care facilities, and schools built before 1978 to be certified and follow specific work practices to prevent lead contamination. The rule is enforced by the Oregon Construction Contractors' Board (CCB) and the Department of Human Services (DHS), Lead Poisoning Prevention Program.

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What 1926.62 covers

This rule covers construction work where your employees may be exposed to lead.

Examples of activities covered by the rule:

- Disturbing paint on structures built before 1978
- Doing demolition and salvage work
- Removing or encapsulating materials containing lead
- Renovating structures that contain lead
- Installing products that contain lead
- Emergency cleanup of lead-contaminated materials
- Transporting, storing, or disposing of lead-containing materials where construction work is performed
- Doing maintenance work involving these activities



Who could be exposed?

- Carpenters
- Contractors
- Demolition workers
- Drywallers
- Electricians
- Handymen
- Heating/air conditioning installers
- Maintenance workers
- Painters
- Plumbers
- Wallpaperers
- Window replacement installers

Determining your employees' exposure levels

Is lead present where your employees will be working? If so, you'll need to determine whether their work will expose them to lead. This is called an **initial determination**.

You can find out if your employees are exposed to lead by sampling the air they breathe with special equipment. This is called **air monitoring** (also, **exposure monitoring**).

You can take an air sample representative of the work shift that you think has the highest exposures to lead.



The amount of lead in the air is measured in micrograms per cubic meter ($\mu\text{g}/\text{m}^3$). One microgram equals one millionth of a gram.



You can do air monitoring yourself if you know how to do it and if you have the right equipment, which you can rent. You can also hire a consultant, or your workers' compensation insurance carrier may be able to help.

Know the action level and the permissible exposure limit

- **Action level:** This is the exposure level at which you must act to protect your employees. Thirty micrograms per cubic meter of air ($30 \mu\text{g}/\text{m}^3$) averaged over an eight-hour period is called the action level.
- **Permissible exposure limit:** You must ensure that your employees aren't exposed to lead at levels greater than the permissible exposure limit even if they're wearing a respirator. Fifty micrograms per cubic meter of air ($50 \mu\text{g}/\text{m}^3$) averaged over an eight-hour period is called the permissible exposure limit or **PEL**.

Using other information for your initial determination

- If you've sampled for airborne lead in the past 12 months, you can use that data for your initial determination if the testing conditions and tasks are similar. You can use the data from one or more projects as long as the tasks, conditions, and the percentage of lead involved are similar.
- You can use exposure-level data from industrywide studies or from manufacturers' tests of products similar to those your employees are exposed to, if the data shows workers' exposures are below the action level. Exposure-level data is also called **objective data**.



My employees are remodeling an older home. How do I know if lead is present?



If the home was built before 1978, the best thing to do is hire a certified lead-based paint inspector or a risk assessor, who can tell you if lead is present and how much is there. Lead paint test kits are also available, but they may not be 100 percent reliable.

Get more information at the Oregon Health Authority's [Lead Poisoning and Exposure to Lead Information](#) page.

If you find out that lead is present and your employees disturb it (to replace windows, for example), you have to assume they're exposed to lead above the PEL until you complete your initial determination.

Trigger tasks and interim protection

Trigger tasks

The following tasks can expose workers to extreme amounts of lead. If your employees do any of these tasks, you **must** assume they're exposed to lead at levels above the PEL until you've done an initial determination.

- Cutting with a torch
- Heat gun work
- Manual sanding
- Manual scraping of dry materials
- Sanding with a dust collection system
- Spray painting
- Manual demolition of structures such as dry wall, windows, and siding
- Sanding without dust collection systems
- Abrasive blasting
- Lead burning
- Torch burning
- Welding

These tasks are called “trigger tasks” because they trigger a set of interim measures you must take to protect your employees.

Interim protective measures

If your employees do trigger tasks, you **must** provide them with all of the following until you can show they are exposed below the action level:

- Appropriate respirators
- Protective clothing
- Clean areas for changing and storing clothing
- Hand washing facilities
- Blood sampling for lead
- Training that covers lead health hazards and all parts of 1926.62

Air monitoring after your initial determination

If your employees are exposed to lead above the action level, you must do additional monitoring that is representative of the exposure of each employee.

If: Employees are exposed between the action level and the PEL.

Then: Monitor every six months until two consecutive measurements, taken at least seven days apart, are below the action level.

If: Employees are exposed above the PEL.

Then: Monitor quarterly until exposures are below the action level.



Notify your employees of their monitoring results no later than five days after you receive the information.



If any of your employees' monitoring results are above the PEL, include that information in the notification and tell them how you will lower their exposure.



If your employees aren't exposed above the action level, you don't need to do additional monitoring unless a change in a work process or a job could raise the exposure level.

Observing exposure monitoring

Your employees have the right to observe any monitoring you do to assess their exposures to lead.

This includes:

- An explanation of the measurement procedures
- Observing all steps related to lead monitoring where the exposures are occurring
- Recording the monitoring results or receiving copies of the results

Using engineering and administrative controls

Use *engineering* and *administrative* controls to keep your employees' exposures to lead at or below the PEL. If engineering and administrative controls don't do this, your employees must also use respirators.



Engineering controls change equipment, tools, or processes so employees' exposures to lead are eliminated or reduced. Using a sander attached to a HEPA vacuum to reduce dust is an example.



Administrative controls change employees' work practices and reduce their exposures temporarily. Prohibiting workers from working in areas that expose them to lead above the action level is an example of an administrative control.

Developing a written compliance program

You must have a program in writing that describes how you will keep your employees' exposures at or below the PEL.

Your program must:

- Describe each activity that exposes employees to lead
- Include any engineering plans and studies you used to determine your methods for controlling lead exposures
- Describe the technology you considered to keep exposures below the PEL
- Include air monitoring data that shows the source of lead emissions
- Include a detailed implementation schedule
- Include safe work practices for personal protective equipment, housekeeping, and hygiene facilities
- Include a job rotation schedule if you use administrative controls
- Describe your arrangements with other contractors so that affected employees know they may be exposed to lead
- Include regular workplace inspections by a competent person



A competent person is someone who can identify workplace hazards and who has the authority to take prompt corrective action to eliminate them.



Update your compliance program annually.

Providing respirators

Provide your employees with appropriate respirators when:

- They're doing any trigger task
- Their exposure to lead is greater than the PEL
- Engineering and administrative controls do not reduce their exposures to or below the PEL
- An employee requests a respirator



The table shows examples of appropriate respirators for various exposure levels.

Exposure level	Appropriate respirator
Up to 10 times the PEL	Tight-fitting respirator with N-100, R-100, or P-100 filters,* depending on the type of exposure
Up to 50 times the PEL	Supplied-air respirator with helmet or hood; powered air-purifying respirator with helmet, hood, or loose-fitting face piece with N-100, R-100, or P-100 filters,* depending on the type of exposure
More than 50 times the PEL	Powered air-purifying respirator with tight-fitting, full face-piece; supplied-air respirator with tight-fitting, full face-piece in continuous flow mode or other positive-pressure mode

* N means not resistant to oil; R means resistant to oil; P means oil proof.



You must also have a *respirator program* that meets these requirements of 1910.134, *Respiratory protection*:

- 1910.134(b) Definitions
- 1910.134(c) Respiratory protection program
- 1910.134(d) Selection of respirators, except (d)(1)(iii)
- 1910.134(f) Fit testing
- 1910.134(g) Use of respirators
- 1910.134(h) Maintenance and care of respirators
- 1910.134(i) Breathing air quality and use
- 1910.134(j) Identification of filters, cartridges, and canisters
- 1910.134(k) Training and information
- 1910.134(l) Program evaluation
- 1910.134(m) Recordkeeping

Providing protective clothing and equipment

Provide your employees with protective work clothing and equipment that prevents contamination when:

- They're doing any trigger task before you've done an initial determination
- They're exposed to lead above the PEL
- They're exposed to lead compounds that may cause skin or eye irritation

Protective work clothing includes:

- Coveralls or disposable full-body work clothes
- Gloves, hats, and shoes or disposable shoe coverlets
- Face shields and vented goggles

Things to do:

- Make sure your employees vacuum their shoes and work clothing with a HEPA vacuum before they remove them. Never use compressed air.
- Make sure your employees remove their protective clothing at the end of their shift in change areas provided for that purpose.
- Make sure your employees place contaminated protective clothing in a closed, properly labeled container in the change area.
- Provide clean and dry protective clothing to your employees at least weekly – and daily to any employees whose exposure levels are more than four times the PEL.
- Repair or replace their protective clothing to maintain its effectiveness.
- Label containers of contaminated clothing as follows:
“Caution: Clothing contaminated with lead. Do not remove dust by blowing or shaking. Dispose of lead-contaminated wash water in accordance with applicable local, state, or federal regulations.”
- Inform in writing any person who cleans protective clothing about lead's harmful effects.

Keeping the site clean

- Use only vacuums that have HEPA filters for cleaning.
- Consider shoveling, wet sweeping, or brushing only when vacuuming isn't effective.
- Don't use compressed air to remove lead from surfaces unless you use a ventilation system that captures the airborne dust at the source.

Ensuring proper hygiene

For employees who are exposed to lead above the PEL:

- Food, beverages, tobacco products, and cosmetics are not allowed in work areas.
- Clean change areas are required.
- Showers are required, when feasible.
- A clean eating area is required.
- Employees must wash their hands and face before eating, drinking, smoking, or applying cosmetics.

For employees who are exposed to lead regardless of the exposure level:

- Change areas must have separate storage areas for protective work clothing and street clothes.
- Employees can't leave the workplace wearing the protective clothing they wore during their work shift.
- If you can't provide showers, make sure employees wash their hands and face at the end of their shifts. Encourage them to go home and shower immediately.
- Employees can't enter lunchrooms or eating areas with protective work clothing unless lead dust has been removed by vacuuming or another method that keeps the dust from spreading.
- Hand washing facilities must include warm water and soap and meet the requirements of 437-002-0141(5) *Washing Facilities*.

Providing medical surveillance

All your employees who may be exposed to lead at or above the action level must have baseline blood sampling for lead and zinc protoporphyrin.



Blood sampling for lead and zinc protoporphyrin is called **biological monitoring**.

The medical surveillance program

You must have a **medical surveillance program** for employees who may be exposed to lead at or above the action level for more than 30 days in any consecutive 12 months. A medical surveillance program includes biological monitoring and medical exams.

Biological monitoring – what to do

Do blood sampling for lead and zinc protoporphyrin for each employee covered by your medical surveillance program according to this schedule:

Employees covered	Schedule
All employees covered by the medical surveillance program	Do blood sampling at least every two months for the first six months and every six months thereafter
Employees whose last blood sampling and analysis showed a blood lead level at or above 40 micrograms per deciliter (40 µg/dl)	Do blood sampling at least every two months
Employees who are removed from exposure to lead due to elevated blood lead levels	Do blood sampling at least monthly



Notify your employees no later than five working days after you receive their blood sampling results.



Notify employees whose blood lead levels are greater than 40 µg/dl that they are subject to temporary medical removal with medical removal protection benefits when their blood lead level is greater than 50 µg/dl. See “Providing medical removal protection,” Page 16.



If the results of blood sampling indicate that an employee's blood lead level is greater than 50 µg/dl, provide a follow-up blood-sampling test within two weeks.

Medical exams – what to do

Provide medical exams for each employee covered by your medical surveillance program according to this schedule:

Employees covered	Schedule
Employees who have a blood sampling test during the past 12 months with a blood lead level at or above 40 µg/dl	At least annually
Employees who report symptoms of lead intoxication	As soon as possible
Employees who are removed from exposure to lead because of a final medical determination	As medically appropriate



Provide the physician conducting a medical exam with the following information:

- A copy of 1926.62 including the appendices
- A description of the employee's duties related to the exposure
- The employee's exposure level (or anticipated exposure level) to lead and any other toxic substance
- A description of any personal protective equipment the employee uses
- Any previous blood lead determinations
- Any previous written medical opinions about the employee



If you choose a physician to conduct an employee's medical exam, the employee can choose another physician for a second opinion.



Give your employee a copy of the written medical opinion from each examining or consulting physician.

Providing medical removal protection

Remove an employee from work who has an exposure to lead at or above the action level when:

- A periodic and a follow-up blood-sampling test indicate that the employee's blood lead level is at or above 50 µg/dl.
- A **final medical determination** finds that the employee has a medical condition that puts the employee at increased risk from exposure to lead.



A final medical determination is the examining physician's written opinion of the employees' health status.



You must provide an employee up to 18 months of medical removal protection benefits each time the employee is removed from exposure to lead.

A "removed" employee can return to work when:

- Two consecutive blood-sampling tests indicate that the employee's blood lead level is at or below 40 µg/dl.
- A subsequent final medical determination finds that the employee no longer has a detected medical condition.

Training employees

Two things you must do to train your employees:

For all employees

Inform all employees about lead hazards, following the requirements of 1926.59, *Hazard communication*.

For employees who are exposed to lead at or above the action level

Provide training at least annually that covers the following:

- The content of 1926.62 and its appendices
- The nature of the work that could result in exposure to lead above the action level
- The purpose, selection, fitting, use, and limitations of respirators
- The purpose of the medical surveillance and the medical removal protection programs
- The engineering controls and work practices associated with employees' jobs
- The content of any compliance plan in effect
- Instructions to employees that they should not use chelating agents except under the direction of a licensed physician
- Employees' right to access records under 1910.1020, *Access to Employee Exposure and Medical Records*

Posting signs

Post this sign in work areas where employees are exposed to lead above the PEL.

WARNING
Lead Work Area
Poison
No Smoking Or Eating

Keeping records

Exposure monitoring

Keep records of all monitoring data obtained from employee exposure assessments.

Include:

- The date, number, duration, location, and results of each of the samples taken, if any
- A description of the sampling and analytical methods used and evidence of their accuracy
- The type of respirators worn, if any
- The names, Social Security numbers, and job classifications of the employees monitored and of all other employees whose exposure the measurement represents
- The environmental variables that could affect the measurement of employees' exposures



Keep these records for at least 30 years, following the requirements of 1910.1020, *Access to Employee Exposure and Medical Records*

Medical surveillance

Keep a record for each employee subject to medical surveillance.

Include:

- The employees' names, Social Security numbers, and descriptions of their duties
- A copy of the physician's written opinions
- Results of any air monitoring done for employees and provided to the physician
- Any employee's medical complaints about lead exposure

Keep or ensure that the examining physician keeps the following medical records:

- A copy of the medical examination results including medical and work history
- A description of the laboratory procedures and a copy of any standards or guidelines used to interpret the test results
- A copy of the results of biological monitoring



Keep these records for the duration of employment plus 30 years, following the requirements of 1910.1020, *Access to Employee Exposure and Medical Records*

Medical removals

Keep records of employees removed from current exposure to lead.

Include:

- The employees' names and Social Security numbers
- The dates they were removed from exposure to lead and the dates they returned to their former jobs
- A brief explanation of how medical removals are accomplished
- A statement that indicates if the reason for removal was an elevated blood lead level



Keep these records for least the duration of each employee's employment.



Objective data for exemption from initial monitoring

Keep records of objective data used to exempt employees from initial monitoring for at least 30 years.

Requests for records

Make these records available, upon request, to employees, former employees, their designated representatives, and to Oregon OSHA.

Important terms

action level – 30 micrograms per cubic meter of air (30 µg/m³) averaged over an eight-hour period.

administrative controls – changing employees' work practices to reduce their exposures temporarily. Rotating employees among jobs, changing their work schedules, and prohibiting them from doing hazardous tasks are examples.

biological monitoring – blood sampling for lead and zinc protoporphyrin.

engineering controls – changing equipment, tools, or work processes to eliminate or reduce employees' exposures to lead.

air monitoring (also, exposure monitoring) – determining if employees are exposed to lead by testing air samples in their work areas.

final medical determination – a written opinion on the employees' health status by the examining physician or physicians.

initial determination – air monitoring to find out if employees may be exposed to lead at or above the action level – 30 µg/m³ averaged over an eight-hour period.

medical removal – requirement to remove an employee from work whose blood lead level is at or above 50 micrograms per deciliter.

medical surveillance program – biological monitoring and medical exams.

objective data – data that shows employees aren't exposed to lead dust or fumes in concentrations at or above the action level.

permissible exposure limit – 50 micrograms per cubic meter of air (50 µg/m³) averaged over an eight-hour period. Also called PEL.

respirator program – program that meets the requirements of 1910.134, *Respiratory protection*.

trigger task – high-exposure work tasks that require additional measures to protect employees. Additional measures include respirators, protective clothing, change areas, hand washing facilities, blood sampling, hazard communication, and safety training.

written compliance program – describes how employees' exposures will be kept at or below the PEL.

1926.62: Key requirements summary

Requirement	Where lead is present regardless of exposure	Airborne lead		Blood lead	
		at or above action level	above PEL	above 40 µg/dl	above 50 µg/dl
air monitoring – initial determination	required				
air monitoring – after initial determination		required	required		
air monitoring – allowing employees to observe	required	required	required		
air monitoring – notifying employees		required	required		
air monitoring – trigger tasks			required		
engineering and administrative controls			required		
hazard communication training	required	required	required		
hygiene practices	required	required	required		
keeping the site clean – housekeeping	required	required	required		
lead warning signs			required		

1926.62: Key requirements summary

– continued

Requirement	Where lead is present regardless of exposure	Airborne lead		Blood lead	
		at or above action level	above PEL	above 40 µg/dl	above 50 µg/dl
medical surveillance – biological monitoring		required	required	required	required
medical surveillance – exams		required	required	required	
medical surveillance – temporary removal		required	required		required
protective clothing and equipment			required		
recordkeeping – exposure monitoring		required	required		
recordkeeping – medical removals					required
recordkeeping – medical surveillance		required	required		
appropriate respirators			required		
training that covers lead health hazards and all parts of 1926.62		required	required		
written compliance program	required	required	required		

Notes

Notes

Oregon OSHA Services

Oregon OSHA offers a wide variety of safety and health services to employers and employees:

Appeals

503-947-7426; 800-922-2689; admin.web@oregon.gov

- Provides the opportunity for employers to hold informal meetings with Oregon OSHA on concerns about workplace safety and health.
- Discusses Oregon OSHA's requirements and clarifies workplace safety or health violations.
- Discusses abatement dates and negotiates settlement agreements to resolve disputed citations.

Conferences

**503-378-3272; 888-292-5247, Option 1;
oregon.conferences@oregon.gov**

- Co-hosts conferences throughout Oregon that enable employees and employers to learn and share ideas with local and nationally recognized safety and health professionals.

Consultative Services

503-378-3272; 800-922-2689; consult.web@oregon.gov

- Offers no-cost, on-site safety and health assistance to help Oregon employers recognize and correct workplace safety and health problems.
- Provides consultations in the areas of safety, industrial hygiene, ergonomics, occupational safety and health programs, assistance to new businesses, the Safety and Health Achievement Recognition Program (SHARP), and the Voluntary Protection Program (VPP).

Enforcement

503-378-3272; 800-922-2689; enforce.web@oregon.gov

- Offers pre-job conferences for mobile employers in industries such as logging and construction.
- Inspects places of employment for occupational safety and health hazards and investigates workplace complaints and accidents.
- Provides abatement assistance to employers who have received citations and provides compliance and technical assistance by phone.

Public Education

**503-947-7443; 888-292-5247, Option 2;
ed.web@oregon.gov**

- Provides workshops and materials covering management of basic safety and health programs, safety committees, accident investigation, technical topics, and job safety analysis.

Standards and Technical Resources

503-378-3272; 800-922-2689; tech.web@oregon.gov

- Develops, interprets, and gives technical advice on Oregon OSHA's safety and health rules.
- Publishes safe-practices guides, pamphlets, and other materials for employers and employees
- Manages the Oregon OSHA Resource Center, which offers safety videos, books, periodicals, and research assistance for employers and employees.

Need more information?

Call your nearest Oregon OSHA office.

Salem Central Office

350 Winter St. NE, Rm. 430
Salem, OR 97301-3882

Phone: 503-378-3272

Toll-free: 800-922-2689

Fax: 503-947-7461

en Español: 800-843-8086

Web site: www.orosha.org

Bend

Red Oaks Square

1230 NE Third St., Ste. A-115

Bend, OR 97701-4374

541-388-6066

Consultation: 541-388-6068

Eugene

1140 Willagillespie, Ste. 42

Eugene, OR 97401-2101

541-686-7562

Consultation: 541-686-7913

Medford

1840 Barnett Road, Ste. D

Medford, OR 97504-8250

541-776-6030

Consultation: 541-776-6016

Pendleton

200 SE Hailey Ave.

Pendleton, OR 97801-3056

541-276-9175

Consultation: 541-276-2353

Portland

16760 Upper Boones Ferry Road, Ste. 200

Tigard, OR 97224-7696

503-229-5910

Consultation: 503-229-6193

Salem

1340 Tandem Ave. NE, Ste. 160

Salem, OR 97301

503-378-3274

Consultation: 503-373-7819

Appendix D

Personnel Qualifications & Certifications

State of Oregon
Oregon Health Authority

EVREN NORTHWEST, INC

is certified by the Oregon Health Authority to conduct Lead-Based Paint Activities

Certification Number:	2088--LBP FIRM
Issuance Date:	7/1/2020
Date of Expiration:	7/1/2023



Oregon
Health
Authority

State of Oregon
Oregon Health Authority

Heather M. Caporaso

is certified by the Oregon Health Authority to conduct Lead-Based Paint Activities

Inspector

Certification Number:	2585--Indv--I
Issuance Date:	9/13/2021
Expiration Date:	9/13/2024



Oregon
Health
Authority

STATE OF OREGON
CONSTRUCTION CONTRACTORS BOARD
LEAD-BASED PAINT CERTIFICATE

This document certifies that:

HEATHER MICHELLE CAPORASO
PO BOX 14488
PORTLAND OR 97213

is licensed in accordance with Oregon Law as
Lead Inspector Contractor

LICENSE NUMBER: 9152585-I

EXPIRATION DATE: 09/26/2023

ENTITY TYPE: N/A



THIS IS TO CERTIFY THAT

HEATHER CAPORASO

HAS SUCCESSFULLY COMPLETED THE TRAINING COURSE

for

ASBESTOS INSPECTOR / MANAGEMENT

PLANNER REFRESHER

In accordance with TSCA Title II, Part 763, Subpart E, Appendix C of 40 CFR

Course Date: 12/01/2022

Course Location: Online

Certificate: IMR-22-7191B



CCB #SRA0615 4-Hr Training

AHERA is the Asbestos Hazard Emergency Response Act enacting Title II of Toxic Substance Control Act (TSCA)

Expiration Date: 12/01/2023

For verification of the authenticity of this certificate contact:
PBS Engineering and Environmental Inc.
4412 S Corbett Avenue
Portland, OR 97239
503.248.1939

A handwritten signature in black ink, appearing to read "Andy Fridley", is written over a horizontal line.

Andy Fridley, Instructor

THIS IS TO CERTIFY THAT

HOLLY ROMER

HAS SUCCESSFULLY COMPLETED THE TRAINING COURSE

for

ASBESTOS INSPECTOR INITIAL COURSE

In accordance with TSCA Title II, Part 763, Subpart E, Appendix C of 40 CFR

Course Date: 1/9/2023 - 1/11/2023

Course Location: Portland, OR

Certificate: IN-23-1032C



CCB #SRA0614 24-Hr Training

24-Hour AHERA Inspector Training; AHERA is the Asbestos Hazard Emergency Response Act enacting Title II of Toxic Substance Control Act (TSCA)

Expiration Date: 01/11/2024

For verification of the authenticity of this certificate contact:
PBS Engineering and Environmental Inc.
4412 S Corbett Avenue
Portland, OR 97239
503.248.1939

A handwritten signature in black ink, appearing to read "Andy Fridley", written over a horizontal line.

Andy Fridley, Instructor