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Lead-Based Paint: Planning Your Paint Removal Project

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Lead-based paint was used on steel bridges, towers, storage tanks, buildings, and other facilities through the 1980s, and in some cases into the 1990s. Lead-based paint may have to be removed during facility maintenance (figure 1) or when historic buildings are being restored.

Lead is a serious health hazard if it is inhaled or ingested. Scraping or sanding lead-based paint creates paint particles that are a hazardous waste and can be a health hazard if proper safety precautions are not taken. Before beginning a maintenance or restoration project, conduct a risk analysis to determine if any of the material you'll be disturbing has lead-based paint.

Highlights...

- Paint on older buildings, towers, and bridges—even some built as late as the early 1990s—may contain lead or other heavy metals.
- Lead and other heavy metals can cause serious problems for human health and the environment.
- Any project that disturbs lead-based paint requires planning to ensure that the project complies with environmental and safety regulations.
- This tech tip provides information for planning projects that involve lead-based paint.

Figure 1—Steel towers may be coated with lead-based paint. Special precautions for climbing won't be needed when taking samples from a tower's lower steps, but samples elsewhere may need to be taken by a certified climber following all appropriate safety guidelines. The same precautions apply to persons taking samples in precarious spots under bridges.

Lead-based paint doesn't have to be on the surface. It could be underneath layers of paint applied more recently. This tech tip refers to lead-based paint, but paint may contain other heavy metals, such as chromium and cadmium, or

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other hazardous substances. Because this tech tip focuses on planning a project, it does not address specific requirements for worker safety or techniques for paint removal or containment (covering the lead-based paint so it does not represent a hazard).

The Missoula Technology and Development Center (MTDC) has published nine other tech tips on lead-based paint. They are available at *http://www.fs.fed.us/t-d/* (Username: t-d, Password t-d). Search for "lead-based." To learn more about rules, regulations, and training for lead-based paint removal and containment projects, check the "Additional Information" section of this tech tip.

Risk Assessments

Lead-based paint in good condition poses little risk to public health or the environment when it is not disturbed. However, if lead-based paint is disturbed (figure 2) during restoration or maintenance projects, paint dust and flakes pose a health risk and may cause environmental impacts. Because of the toxic nature of heavy metals, the U.S. Environmental Protection Agency (EPA) and the U.S. Department of Labor Occupational Safety and Health Administration (OSHA) have strict guidelines for environmental protection and worker health and safety.

Figure 2—Graffiti scraped into steel structures could cause paint to flake off and fall on adjacent soils or in waterways.

Lead and Human Health

Exposure to lead-based paint can cause serious health problems. Lead poisoning damages the central nervous system, causing seizures, comas, and in extreme cases, death. Overexposure to lead-based paint may cause reproductive problems including impotence, sterility, reduced fertility, and increased risk of birth defects. Other problems may include permanent kidney damage or lowered hemoglobin levels in the blood (hemoglobin carries oxygen to the cells). Children are at greater risk than adults, because lead can interfere with neurological development.

Project Planning

If you plan your lead-based paint removal project before starting the work, you will save time and money. A residential or commercial project will be more complex and require stricter safeguards than a project involving a tower in a remote location. As the risk of worker safety or environmental contamination increases, more protection is required. Project managers will have to take measures to control health risks and environmental impacts.

Project managers need to be trained in risk assessment and abatement procedures. Workers should be trained and qualified for the types of work they will be doing and made aware of the risks involved. Refer to the "Additional Information" section of this tech tip for rules, regulations, training, and additional resources.

As with any project, Forest Service workers shall prepare, review, and sign a job hazard analysis (JHA). Protocols, procedures, and concerns involving lead-based paint shall be discussed at regular safety meetings.

When planning the project, assume the paint coating contains lead or other heavy metals. Proceed with caution (figure 3) until you have test results. Normally, no special controls are needed when collecting samples of dust or flakes for testing—simply scrape the samples into a bag. If your sampling creates excessive dust or flaking, you may wish to use a vacuum with an appropriate filter to prevent contaminating the area.

Figure 3—The beginning phase of a project involves onsite inspection to determine whether lead or other heavy metals are present.

KTA-Tator, Inc., has produced two books with information on lead-based paint project planning and design: the "Industrial Lead Paint Removal Handbook" and "Project Design, Industrial Lead Paint Removal Handbook, Volume II."

The project design book outlines KTA-Tator's 11-phase process (see appendix A):

Phase 1: Determine the Presence of Lead
Phase 2: Conduct Coating Assessment To Determine Painting Strategy
Phase 3: Assess Risks to Other Personnel, Public, Environment
Phase 4: Establish Site-Specific Limitations on Emissions
Phase 5: Select Removal/Containment To Achieve Required Emission Control Level Consistent with Maintenance Strategy
Phase 6: Select Environmental Monitoring Strategy
Phase 7: Establish Worker Lead Protection Requirements
Phase 8: Establish Waste Handling Requirements
Phase 9: Establish Project Clearance Criteria
Phase 10: Prepare Project Cost Estimate
Phase 11: Prepare Project Specifications

Performance-Based Contracts

Rules and regulations for lead-based paint removal can be complex and may change frequently. Your contracts for a project involving lead-based paint should require the contractor to be responsible for identifying and complying with all applicable rules and regulations.

Be aware of the rules and regulations so you can tell contractors where they should seek the appropriate information. Contractors need to verify the requirements for your specific job. Lead is a hazardous material and contractors need to be licensed and qualified for the types of work they will be performing. Some States require contractors to be licensed for industrial lead-based paint removal.

Occupational Safety and Health Administration Regulations

Worker protection and safety are governed by OSHA. Lead exposure limits and employee safety regulations can be found under OSHA's health standard, Lead Exposure in Construction, 29 CFR 1926.62. As indicated earlier, paints may contain metals other than lead. These measures apply to most toxic metals found in coatings.

Specific OSHA regulations govern cadmium and hexavalent chromium. Cadmium is addressed under OSHA health standard 29 CFR 1926.1127. Hexavalent chromium is addressed in 29 CFR 1926.1126 (figure 4).

Worker safety measures must be at least as protective as the requirements of 29 CFR 1962.62 or the metal-specific health standard (such as those for cadmium and hexavalent chromium), when one exists.

Working conditions that include increased risk of exposure to lead, such as working in confined areas or using a cutting torch to remove or replace steel components, may require more restrictive safety measures to keep worker exposure below the permissible limits. The permissible exposure limits (PEL) for workers cannot exceed 50 micrograms of lead per cubic meter of air averaged over an 8-hour workday. If employees are required to work over 8 hours a day, the limits must be modified to remain within the permissible exposure limits.

Figure 4—Flaking paint may contain lead or other heavy metals that can present health hazards.

Review OSHA guidelines and refer to Phase 7 in "Project Design: Industrial Lead Paint Removal Handbook, Volume II" for more detailed information.

EPA Regulations

The EPA is responsible for implementing the Resource Conservation and Recovery Act (RCRA). RCRA was enacted in 1976 and provides direction for the handling and land disposal of hazardous wastes from the time the waste is generated (cradle) to the time it is disposed (grave). RCRA rules are found in 40 CFR 239 through 299.

If a project generates waste, the responsible party must determine whether the waste is hazardous. If so, an EPA identification number must be obtained and a waste manifest must be used to track the waste's transport offsite for treatment, storage, or disposal (40 CFR 262 "Standards Applicable to Generators of Hazardous Waste").

The EPA has proposed to regulate work on commercial buildings and steel towers under the Toxic Substances Control Act, 40 CFR part 745. This regulation is not in effect, but may be in the future. Information on this regulation can be found at *http://www.epa.gov/lead/pubs/bldgs.htm*.

Under the Clean Air Act, the EPA establishes the National Primary and Secondary Ambient Air Quality Standards (40 CFR part 50) for six principal air pollutants: carbon monoxide, ozone, lead, nitrogen dioxide, particulate matter, and sulphur dioxide. Primary standards set limits to protect public health. The EPA tracks the levels of these pollutants each year and posts the results at *http://www.epa.gov/airtrends/*.

The Federal Clean Water Act (enacted originally in 1948 as the Federal Water Pollution Control Act) provides direction for restoring and maintaining water quality. The two basic approaches the EPA takes to implement and enforce this act are to:

1) Control the concentrations of toxins in the water
2) Control the discharge of toxins into the water at the point of discharge (figure 5)

Figure 5—When conducting inspections or working on bridges or other structures near open water, follow Federal and State regulations governing water quality.

Federal facilities, including those managed by the Forest Service, are required to follow all Federal, State, and municipal requirements regarding control of water pollution. For example, during lead-based paint removal projects, the

Clean Water Act could come into play under:

- 40 CFR 117, Determination of Reportable Quantities for Hazardous Substances (*http://www.epa.gov/tri/frnotices/tri1045.pdf*)
- 40 CFR 122, EPA Administered Permit Programs: The National Pollutant Discharge Elimination System (*http://cfpub.epa.gov/npdes/*)
- 40 CFR 131, Water Quality Standards (*http://www.epa.gov/wqsdatabase/*)

Under the Safe Drinking Water Act, the EPA sets standards for drinking water quality and oversees the implementation of the standards:

- 40 CFR 141, National Primary Drinking Water Regulations (*http://www.epa.gov/safewater/regs.html*)

Federal and State rules and regulations are frequently being amended and revised. Be sure you are working with the most recent updates.

About half the States have jurisdiction over lead-based containment or removal projects. Their regulations may be more stringent than Federal regulations. Check with the appropriate State and Federal agencies to ensure compliance with all applicable rules and regulations.

Conclusions

Lead is a toxic substance that can cause serious problems for individuals and the environment. Any lead-based containment, abatement, or removal project requires planning to ensure that it complies with all applicable rules and regulations. OSHA and EPA rules must be followed. State laws may differ from Federal laws. Plan your project properly to ensure the safety of your workers and the environment.

Additional Information

Neese, Jasen; Yager, Duane; Tour, Jim; Eriksson, Merv. 1998. Lead-based paint: abatement alternatives for bridges. Tech. Rep. 9871–2814–MTDC. Missoula, MT: U.S. Department of Agriculture Forest Service, Missoula Technology and Development Center.

U.S. Department of Transportation Federal Highway Administration. 1997. Lead abatement on bridges and steel structures. Tech. Rep. FHWA-RD-98-182. Washington, DC: U.S. Department of Transportation Federal Highway Administration. Available at *http://www.tfhrc.gov/hnr20/lead/intro/set.htm*.

The National Highway Institute can offer a 4-day course in "Hazardous Bridge Coatings: Design and Management of Maintenance and Removal Operations" (FHWA-NHI-130069). The course focuses on the maintenance or removal of bridge paint systems that contain lead or other potentially toxic materials. It offers a step-by-step method for designing, specifying, and managing bridge painting operations that comply with applicable regulations.

Additional information about the class is available at *http://www.nhi.fhwa.dot.gov/*. Select "Enroll in a Course." Search for "Course Number: 130069."

The Society for Protective Coatings (SSPC) sells a number of reports on this topic. Contact SSPC, 40 24th Street, 6th Floor, Pittsburgh, PA 15222-4656 (*http://www.sspc.org*). The reports include:

- Industrial Lead Paint Removal Handbook. Item 93-02.
- Project Design: Industrial Lead Paint Removal Handbook. Vol. II. Item 95-06.
- Industrial Lead Paint Removal Handbook and Project Design. Two-volume set. Item 94-20.
- Guides on Environmental Protection. Item 05-01. A compilation of eight guides, including the "Guide for Containing Debris Generated During Paint Removal Operations," the "Guide for the Disposal of Lead-Contaminated Surface Preparation Debris," and "Conducting Ambient Air, Soil, and Water Sampling During Surface Preparation and Paint Disturbance Activities."

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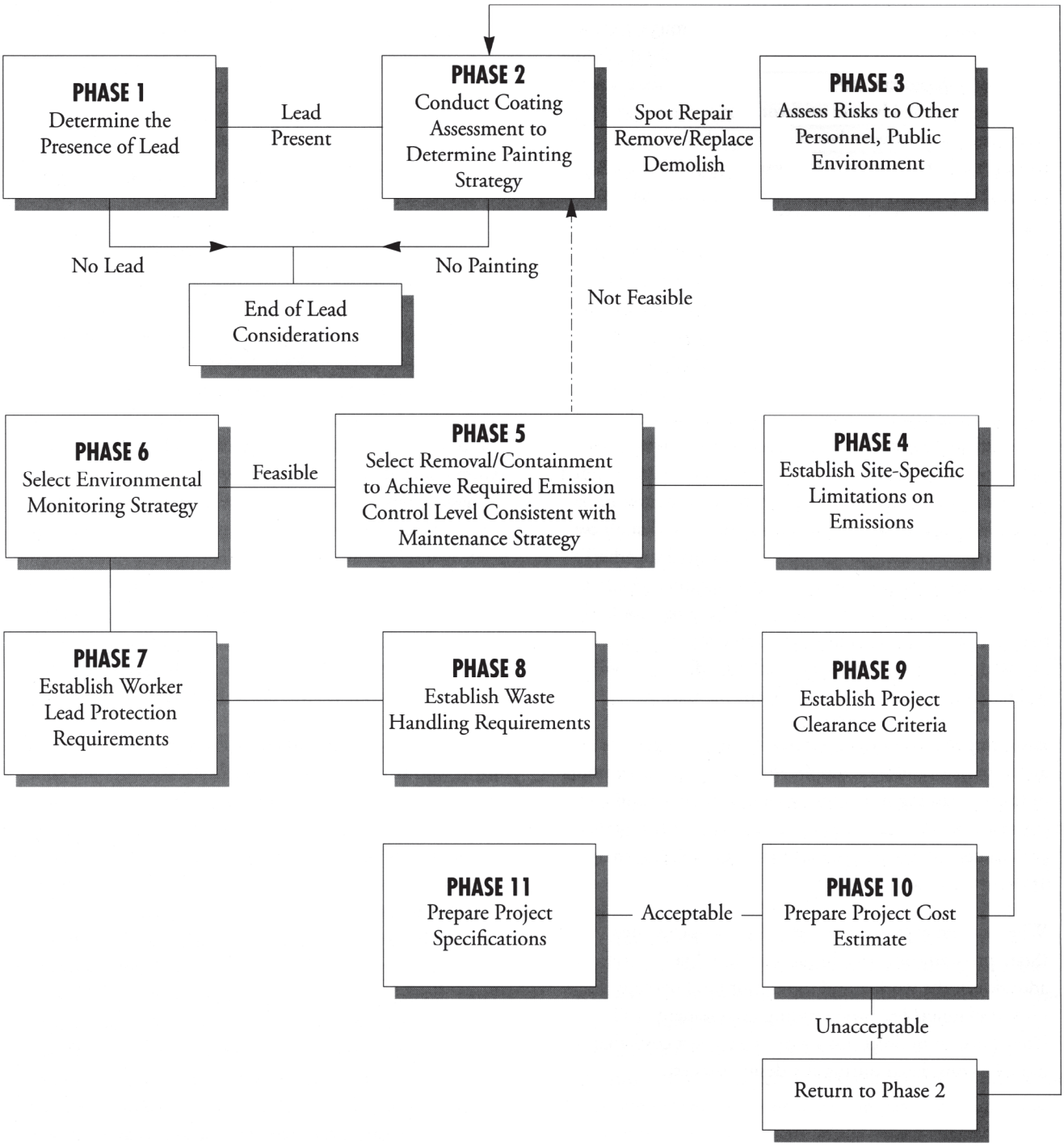
Appendix A—Design Path for Project Design—Industrial Lead Paint Management



This flow chart is reproduced with permission from "Project Design, Industrial Lead Paint Removal Handbook, Volume II," published in 1994 by Technology Publishing Co.

About the Author

Bob Beckley received a bachelor's degree in political science from the University of Montana in 1982. He began his Forest Service career as a timber technician on the Nez Perce National Forest. Bob was a smokejumper when he came to the Missoula Technology and Development Center in 1990. He assists in the explosives program and works as a project leader and public affairs specialist.

James "Scott" Groenier, professional engineer, began working for MTDC as a project leader in 2003. Scott earned a bachelor's degree in civil and environmental engineering from the University of Wisconsin at Madison and a master's degree in civil engineering from Montana State University. He worked for the Wisconsin and Illinois State Departments of Transportation and with an engineering consulting firm before joining the Forest Service in 1992. He worked as the east zone structural engineer for the Eastern Region and as a civil engineer for the Ashley and Tongass National Forests before coming to MTDC.

Library Card

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Electronic copies of MTDC's documents are available on the Internet at:

http://www.fs.fed.us/t-d/ (Username: t-d, Password: t-d)

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Forest Service and Bureau of Land Management employees can search a more complete collection of MTDC's documents, videos, and CDs on their internal computer networks at:

http://fsweb.mtdc.wo.fs.fed.us/search/

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