Introduction

Lead has been used as a constituent in many products and applications throughout our society. As a result, many people, especially children, have the potential to be exposed to lead, sometimes resulting in serious consequences. This fact sheet provides information on lead hazards, regulatory requirements, Air Force policy, and lead management issues associated with inspection, sampling, abatement, and disposal of lead-based paint (LBP) containing materials.

Background

While exposure to lead is a concern for all, childhood lead poisoning is one of the most common and preventable pediatric health problems in the United States today. Experts agree there are three major sources of lead exposure to children: (1) LBP, (2) lead-contaminated soil and dust, and (3) drinking water. These sources are considered major because of the number of children potentially exposed.

Children can be exposed to lead through ingestion of lead containing paint chips and dust via hand to mouth activities. Lead was a common ingredient in residential interior and exterior oil-based paints produced prior to 1950. As the LBP deteriorates from age or mechanical forces, lead is released into the environment. The most common household occurrence of lead is in house dust on window sills where the window trim has been coated with LBP. This is because the LBP is abraded during window opening/closing over a long period of time.

The major source of lead exposure for adults is from operations involving maintenance, renovation, abatement work, and corrosion control of items previously painted with LBP. Workers who may be exposed to lead include abrasive blasters, inspectors, painters, and cleaning personnel working in areas where lead containing dust may be present. In addition to these potential occupational exposures, lead may be brought into military family housing units on the clothing of personnel who work in lead-related areas. This occurs when personnel do not employ proper work practices or use proper personal protective equipment when performing lead-related work.

To prevent further environmental contamination and reduce the risk of exposure, several laws and regulations governing lead exposure and LBP have been promulgated.

Federal Statutes and Regulatory Requirements

Efforts to reduce the use of LBP began in 1971 with the enactment of the Lead-Based Paint Poisoning Prevention Act (LBPPPA). The LBPPPA required housing authorities to conduct random inspections of public and Indian housing for LBP hazards.

The Consumer Products Safety Act (CPSA) restricted the amount of lead in paints manufactured after 27 February 1978 for sale directly to consumers and in paints to be used in residences, schools, hospitals, parks, playgrounds, public buildings, and other areas where consumers have direct access to painted surfaces (non-industrial facilities). In addition, the Consumer Products Safety Commission banned the use of paint containing more than 0.06 percent lead by weight on interior and exterior residential surfaces, toys, and furniture.

In 1992, the Residential Lead-Based Paint Hazard Reduction Act (LBPHRA) was enacted. The LBPHRA directed the Environmental Protection Agency (EPA) and the Department of Housing and Urban Development (HUD) to jointly issue regulations requiring disclosure of known LBP and/or LBP hazards by persons selling or leasing housing constructed before the phase-out of residential LBP use in 1978. Under that authority, EPA and HUD issued information and disclosure requirements which became effective in the Spring of 1996. Under the Toxic Substance Control Act (TSCA), the EPA has developed a LBP information pamphlet for distribution to target housing owners, occupants, lessors, and buyers receiving Federal assistance. A target house is one built before 1978, except those occupied solely by elderly or handicapped residents with no children under the age of six, or zero living dwellings (i.e., efficiencies, dormitories, military barracks, and hotels). There is also an exemption for buildings that have been inspected and declared "free of lead-based paint" by a certified lead risk assessor. The cutoff date of 1978 coincides with the restrictions on use of LBP established by the CPSA.

The pamphlet, "Protect Your Family From Lead In Your Home," must be distributed to designated facility (including Military Family Housing) occupants and is available from the Environmental Protection Agency (EPA) and Housing Urban Development (HUD). National Lead Information Center, (800) 424-5323, or from PROACT.

In August 1996, EPA finalized a federal regulation under Section 402 of TSCA to ensure that individuals conducting LBP activities in target housing and child-occupied facilities are properly trained and certified, that training programs providing instruction in such activities are accredited, and that these activities are conducted according to reliable, effective and safe work practice standards. LBP activities include inspection, risk assessment, and abatement. The EPA also finalized a Federal

regulation under Section 404 of TSCA that will allow States and Indian Tribes to seek authorization to administer and enforce the regulations developed under Section 402.

The implementing regulations for TSCA Section 402 and 404 requirements are found in Title 40 Code of Federal Regulations (CFR) Part 745. This regulation specifies training and certification requirements for LBP inspectors, risk assessors, project designers, supervisors, and workers, as well as establishes safe, effective, and standardized methods to conduct LBP actions. The rule establishes minimum criteria for training, accreditation, individual certification, and training curricula. Training programs may first apply to EPA for accreditation of their LBP activities courses or refresher courses on or after 31 August 1998. Guidance is also provided to aid States and Indian Tribes in developing their own programs. For States or Tribes that do not develop their own programs by 31 August 1998, federal jurisdiction will apply. To date, 17 States have established programs: Arkansas, California, Connecticut, Illinois, Maine, Massachusetts, Maryland, Minnesota, Missouri, New Hampshire, New Jersey, Ohio, Rhode Island, Texas, Vermont, Virginia, and Wisconsin.

Title 40 CFR 745.226, "Certification of individuals and firms engaged in lead-based paint activities: target housing and child-occupied facilities," states that by 30 August 1999 "no individual can perform LBP activities as defined in the rule without certification from EPA; and all LBP activities as defined in the rule must be performed according to applicable work practice standards." Individuals may first apply to EPA for certification to engage in LBP activities on or after 1 March 1999. There are no prerequisites to be trained; however, there are education and/or experience prerequisites for certification. The education and/or experience prerequisites for certification vary for the different LBP professional disciplines and are included in the rule. For example:

INSPECTORS and ABATEMENT WORKERS:
No experience or education requirements;

SUPERVISORS:
One year of experience as a certified LBP abatement worker, OR at least two years of experience in a related field (such as lead, asbestos, or environmental remediation work), or in the building trades;

RISK ASSESSORS:
A Bachelor degree and 1 year of experience in a related field (e.g., lead, asbestos, environmental remediation work, or construction), OR an Associate degree and 2 years experience in a related field (e.g., lead, asbestos, environmental remediation work, or construction); OR certification as an industrial hygienist, professional engineer, registered architect and/or certification in a related engineering/health/environmental field (e.g. safety professional, environmental scientist); OR a high school diploma (or equivalent), and at least 3 years of experience in a related field (e.g., lead, asbestos, environmental remediation work or construction).

PROJECT DESIGNERS:
Successful completion of an accredited training course for supervisors, AND a Bachelor's degree in engineering, architecture, or a related profession, and 1 year of experience in building construction and design or a related field; OR four years of experience in building construction and design or a related field.

Title 40 CFR 745.227, "Work practice standards for conducting LBP activities: target housing and child-occupied facilities," provides the basic federal regulatory requirements that will be required when performing LBP activities in target housing and child occupied facilities. These minimum work practices will become effective in March 1999. However, many States are in the process of establishing, or have already established, LBP requirements which are currently effective and modeled from the pending federal work practice requirements.

Occupational exposure control guidelines are provided in the Occupational Safety and Health Administration (OSHA) standards for lead including the General Industry Standard for Lead found in Title 29 CFR 1910.1025 and the Construction Industry Standard for Lead found in 29 CFR 1926.62. The OSHA standards also provide work practice guidance which limits the potential to track lead containing dust and debris outside of the work area and into child occupied areas.

The Resource Conservation and Recovery Act (RCRA) regulates hazardous waste through a "cradle-to-grave" system to ensure proper management from generation of the waste until ultimate disposal. The implementing regulations for RCRA can be found in Title 40 CFR Parts 260 through 282. LBP abatement projects can produce large quantities of potentially hazardous wastes. Disposal restrictions are based on the possibility that lead content in such wastes may leach into the water table if placed in a landfill. Specific laboratory tests required under RCRA are designed to measure this potential.

State and Local Regulatory Requirements

In general, State laws and regulations must be equivalent to, or more stringent than, federal standards. There are some variations from State to State, and certain States have enacted very stringent hazardous waste and air quality requirements. For instance, EPA Region I (New England States) currently has the lead role in research and development of LBP waste management. States in this region have more detailed standards, and consequently more guidance in implementing these standards than States in other regions. In addition to successful completion of training courses, some States have specific lead activities experience requirements before certification is granted. At the base level, it is imperative that the Bioenvironmental Engineering Flight (BEF) and Environmental Management Flight coordinate LBP activities (sampling, inspection, assessment, abatement, disposal, etc.) with the appropriate State, county, and local agencies in advance of planned actions which may create a lead hazard.

USAF Policy

Department of Defense (DoD) policy on LBP, issued in November 1992, requires DoD components to develop a LBP risk assessment, screening, and control program. The documents, "Air Force Policy and Guidance on Lead-Based Paint in Facilities," Department of the Air Force, Chief of Staff, HQ USAF/CC, 24 May 1993, and "The Child Blood Lead Screening Program," HQ AFMOA/SGP, 2 April 1993, implement the Air Force program.

Overall, the Air Force policy states that priority should be given to finding and reducing or eliminating the risk of existing lead hazard conditions in high-priority facilities and emphasizes in-place management to control existing hazards and reduce the risk of hazardous exposure to acceptable levels. High priority facilities are facilities or portions of facilities which are or may be used by children under age seven, and include child development centers, on-base licensed family day care homes, youth centers, medical and dental treatment waiting areas, AF-maintained Department of Defense schools, and military family housing units.

Specifically, Air Force policy requires installations to identify, evaluate, control, and eliminate existing LBP hazards. In addition, priorities are to be given to bases where children with elevated blood lead levels are identified. In these cases, investigations are to be conducted to determine the source of the lead and recommend remedial actions.

Finally, the Air Force policy directs the focusing of efforts on facilities constructed prior to 1980 rather than 1978 as required under EPA and HUD guidance. The reason for this last provision is that the 1978 CPSA restrictions on use of lead in paint did not include federal facilities. The policy assumes on-hand stocks of LBP in 1978 would continue to be used in military facilities. Allowing two years for stocks to be depleted, it is reasonable to conclude that new paint procured for non-industrial AF facilities was formulated within the lead restrictions specified by the CPSA.

The following Air Force functional area responsibilities are assigned to implement this policy:

Civil Engineering (CE): Ensures facilities are inspected on a prioritized basis for deteriorated painted surfaces, appropriate in-place management and abatement are performed, and occupant relocation actions are taken when a LBP hazard determination deems it is necessary. Additionally, CE ensures precautions are taken to reduce occupant and worker exposure to lead, and maintains compliance with environmental protection requirements for proper disposal of LBP debris. CE must also ensure restrictions on lead in paints are included in all maintenance, repair, modification, renovation, and construction activities performed in-house or by contract. Finally, CE activities must be performed by workers or designers certified by appropriate agencies.

Medical Services: Ensures facilities are evaluated for LBP health hazards on a prioritized basis and appropriate LBP hazard determinations are made. Medical services also provides lead exposure prevention education to occupants of military family housing, facility managers, other appropriate personnel and provides appropriate screening physicals for occupationally exposed workers. Bioenvironmental Engineering in the design of LBP management and control strategies, assisting in abatement project clearance testing. Military Public Health provides training to housing occupants and workers on LBP issues and assists in lead toxicity investigations.

Air Force policy concerning LBP issues at closure installations can be found in the instructions attached to HQ AFMOA/SGPA letter "Lead-Based Paint Instruction (LBP) for Facilities at Closure Installations," 2 December 1993. A LBP survey will be programmed for the closure installation as part of the Environmental Baseline Survey (EBS). Bioenvironmental Engineering can either conduct the LBP survey or be the contracting officer's technical representative for a contracted survey.

Base LBP Program

Recognizing the potential health risks associated with lead exposure, the USAF requires each base to implement a proactive

plan for dealing with potential lead hazards. AF policy guidelines recommend the following actions be implemented when establishing a LBP program at base-level.

1. Conduct a blood lead screening program and establish a Lead Toxicity Investigation Team(LTIT). Specific details for the blood screening program are contained in "Child Blood Lead Screening Program," HQ AFMOA/SGP, 2 April 1993. The LTIT should consist of, at a minimum, the Medical Treatment Facility Commander, the Chief of Aerospace Medicine, and representatives from the Pediatric Clinic, Military Public Health Office, Bioenvironmental Engineering, Public Affairs, the Judge Advocate, Civil Engineering, the Clinical Laboratory, and Military Family Housing.

   The primary purpose of a LTIT is to identify the source of lead exposure to an affected patient and other family members, provide a hazard evaluation and recommend potential corrective action. Corrective actions may include the following activities:

   - Isolate obvious hazard areas where peeling paint is evident;
   - Relocate the family to a "safe unit" if contamination appears to be widespread;
   - Remediate obvious hazards such as peeling paint (in some cases extensive abatement might be required);
   - Conduct wipe samples after abatement to ensure the housing units have been adequately cleaned; and
   - Recommend the Pediatric Clinic conduct testing of children who may have been exposed in a similar manner.
2. Perform visual inspections. These are designed to identify areas of deteriorated paint in high priority facilities (child care and youth centers or residential housing areas).
3. Perform risk assessments designed to identify areas with the greatest hazard.
4. Perform comprehensive sampling and testing. Results from these tests will help determine future abatement strategies.

LBP debris generated from abatement projects must be managed in accordance with RCRA and comply with transportation, treatment, storage and disposal requirements. Additionally, each base must comply with the requirements of TSCA and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) if a reportable quantity (RQ) of hazardous debris is released to the environment. The RQ for lead is 10 pounds if the particulates are less than 100 micrometers in diameter. All releases of this nature must be reported to the National Response Center (NRC), (800) 424-8802, the State Emergency Response Commission (SERC), and the Local Emergency Planning Committee (LEPC). Each MAJCOM may have additional reporting requirements.

Training

Training programs for LBP hazards should be designed to inform employees of potential lead exposure hazards. The training program must comply with the requirements of the Occupational Safety and Health Administration (OSHA) Respiratory Protection standard, 29 CFR 1910.134 and the OSHA Lead standard, 29 CFR 1910.1025, or Lead in Construction standard, 29 CFR 1926.62. Briefly, employers are required to provide information and training for all employees exposed to lead above the action level (30 micrograms per cubic meter) or who may suffer skin or eye irritation from lead. The training program must inform employees of specific hazards associated with their work environment, protective measures which can be taken, the danger of lead to their bodies (including their reproductive systems), and their rights under the standard. All new employees must be trained prior to initial assignment to areas where there is a possibility of exposure to lead over the action level and annually thereafter.

Recordkeeping

When individual lead and LBP evaluations are performed, permanent records must be maintained. These records should document all aspects of the following activities:

- Training and worker protection
- Personal exposure modeling
- Educational seminars
- Comprehensive LBP survey results
- Blood lead screening results
- LTIT results such as blood levels, hazard evaluation, remediation efforts, etc.
- Maintenance records
- Abatement records
- Waste testing and disposal

Specific filing and disposition instructions are contained in Air Force Manual (AFMAN) 37-123, "Management of Records" and AFMAN 37-139, "Records Disposition Schedule."

LBP Testing

There are several methods used for the identification of lead in paint. These methods can be seperated into two distinct categories: laboratory analysis of bulk samples, and field testing using test kits and/or analyzers. Each type has its own unique assets and limitations.

Laboratory Analysis - The most accurate detection method is laboratory analysis of bulk samples. This method requires a paint chip, measuring a minimum of one square inch, be removed from the surface in question and submitted for analysis at a laboratory that participates in the National Lead Laboratory Accreditation Program (NLLAP). The EPA Office of Pollution Prevention and Toxics (OPPT) established the NLLAP to recognize laboratory accrediting agencies, such as the American Association for Laboratory Accreditation and the American Industrial Hygiene Association, as competent to certify lead laboratories. NLLAP was established to ensure the public laboratories which participate are capable of analyzing paint, dust, and soil samples for lead. A list of such laboratories is available from the National Lead Information Center, (800) 424-5323, or PROACT.

Paint chip samples are analyzed in a controlled laboratory environment using highly specialized techniques such as Atomic Absorption Spectrometry (AAS) and Inductively Coupled Plasma - Atomic Emission Spectrometry (ICP-AES). Results may be reported in weight per area (milligrams per square centimeter (mg/cm2)) or weight percent, which are not equivalent due to the varying density and thickness of paint. These methods offer extremely accurate results; however, they are very costly, time consuming, destructive in nature and cannot provide the confidence necessary to characterize the lead content in a facility unless a chip is collected from every suspect surface.

Field Testing - Field test kits use a chemical reaction to provide qualitative results. Sodium sulfide or sodium rhodizonate is used to cause either a black, gray, blue, or scarlet color change when lead is present. While this method of field testing is significantly less expensive than laboratory analysis, it does have several limitations. These include:

- No numerical results provided. (field testing is a qualitative method);
- It damages the surface being tested;
- It cannot be used with reddish paint because sodium rhodizonate causes a scarlet color change; and
- Barium and calcium ions in some plaster may interfere with the test reaction.

Potential sources of error include; insufficient sample contact with the indicator solution, user inability to detect weak color changes, insufficient developing time, use on paint which is too thick (dilutes the lead concentration), and chemical interference which causes false positive or false negative indications.

Field X-Ray Fluorescence (XRF) test units are the preferred method of field analysis, due, in part, to their portability and accuracy. XRF instruments contain radioactive sources which are placed against a painted substrate. Gamma radiation emitted from the radioactive source excites the lead atoms in the paint causing them to give off characteristic X-rays. The instrument is calibrated to sense the magnitude of the characteristic x-rays, which are proportional to the concentration of lead in the painted surface. Some instruments also provide for substrate corrections. XRF instruments allow an individual to inspect a facility both qualitatively and quantitatively, while significantly reducing the possibility of having to collect paint samples. The results are obtained relatively quickly and usually have a precision of +/- 0.3 mg/cm2.

Use of XRFs is the preferred analytical method for LBP coated surfaces; however, there are some disadvantages. The instruments are expensive to purchase and maintain due to complicated electronics and presence of radioactive sources. Radioactive source strength decays over time and must be periodically replaced. Also, users must receive special training and a radioactive material permit must be obtained for the source. The installation Bioenvironmental Engineer has the primary responsibility for performing quantitative analysis of LBP and typically maintains appropriate certifications and permits to perform XRF testing.

Abatement and Cleanup

To ensure a successful LBP abatement project there are several tasks the base must complete during the project planning phase, including:

1. finding a qualified contractor;
2. developing an abatement plan;

3. developing a testing plan; and
4. coordinating and scheduling the abatement.

The goal of any LBP abatement is to safely and cost-effectively reduce exposure to interior LBP and lead dust in order to better protect children and families from the irreversible medical effects of lead. Important considerations prior to undertaking a LBP abatement project are the intended use and overall condition of the facility, as well as the general condition of the LBP. These three factors are crucial in helping to identify the type of abatement strategy to employ. There are four general strategies for lead paint abatement:

Paint Stripping - Paint stripping can be accomplished using a variety of chemical and physical techniques. Chemical paint strippers are effective but difficult to use. Use of strippers requires special personal protective equipment and containment and disposal of the waste stream. Chemical strippers can release lead from the coating which can potentially be absorbed by underlying wood substrates. When new (non-lead) paint is applied, the lead remaining in the wood after stripping can be re-absorbed by the fresh paint, thus creating a new potential hazard. It is recommended an XRF analysis of the newly painted surface be performed to verify the new coating is free of lead hazards. Physical techniques include paint removal using abrasives or heat. Use of abrasives is discouraged as this method can generate large amounts of lead containing dust. Use of heat guns at high temperatures can cause volatilization of lead and create a potential exposure hazard.

Replacement - Removal of components such as windows, doors, and trim that have lead-painted surfaces and installing new components free of lead-containing paint. Removal has a high potential for generation of lead dust and debris and will require close attention to worker health and safety practices.

Encapsulation - Making lead paint inaccessible by covering or sealing painted surfaces.

Enclosure - Resurfacing or covering of surfaces by mechanically durable affixed materials. This strategy provides relatively long-term protection.

Abatement contractors should have verifiable experience in building renovation and restoration procedures and be aware of all applicable federal, State, and local regulations pertaining to lead abatement work and relevant licensing or certification requirements. All abatement workers must be trained and certified (as required by the EPA and/or State regulations) in LBP abatement and have a pre-abatement medical examination. In addition to skills specific to lead abatement, abatement workers may need basic construction skills to perform various abatement tasks, such as:

Demolition;
Painting;
Carpentry; and
Floor Installation.

The types of general construction skills needed will depend on the base's choice of abatement and modernization strategies and methods.

There are two basic post-abatement cleaning methods that, when used concurrently, have proven effective in LBP abatement projects. The dry cleaning method utilizes a high efficiency particulate air (HEPA) vacuum to clean all surfaces of a dwelling at the conclusion of a LBP abatement project. The wet cleaning method uses a high-phosphate detergent to wash all surfaces of a dwelling at the conclusion of the LBP abatement project. An alternative for trisodium phosphate (TSP)-based detergent used during the clean-up phase of LBP abatement operations is Ledizolv, manufactured by LSZ Incorporated, (212) 684-9641. This product contains no TSP and is as effective as TSP-based products.

After final cleanup, visual inspections can be performed to ensure all surfaces are free of dust and debris. Upon completion and before occupancy by residents is permitted, surfaces should be wipe tested to ensure lead levels do not exceed accepted standards. This surface dust testing process (collecting wipe samples)is referred to as "clearance testing," and the highest acceptable dust lead levels (100 micrograms per square foot (ug/ft^2 - Window Trough) are referred to as "clearance criteria." These clearance criteria are specified in the US Department of Housing and Urban Development "Guidelines for the Evaluation and Control of Lead-based Paint in Housing." Surface sampling should not be conducted if there is a visible accumulation of dust or debris. In this case, wipe sampling should be deferred until thorough cleanup has been completed.

Waste Disposal

Removed substrate components that contain LBP can be either hazardous or non-hazardous waste. All LBP removed from a substrate by virtually any method will, almost without exception, be hazardous waste and should be disposed of accordingly. Typically, the polyethylene sheeting used to contain dust during the abatement and personal protective suits will be non-

hazardous waste as long as they are decontaminated with a HEPA-filtered vacuum. The following specific factors must be considered for their effect on waste disposal when using different paint removal methods for abatement.

Chemical Strippers

Using chemical strippers will increase the volume of hazardous waste. Most strippers are very caustic (pH 13), and even after use, will generally have a pH of 9 - 10. Several manufacturers of chemical strippers are researching methods and materials that will render the removed paint and stripper non-hazardous. If such products are used at your installation, BEF/CE personnel should ensure the validity and applicability of any such product claims before the waste is disposed as non-hazardous in your State.

Abrasion

Depending on the mechanical method employed, removed paint chips generally include some spent medium, such as steel shot or walnut hulls. Exceptions to this are the needle gun, which results in paint chips and dust only, and sanding-grinding operations which result in dust (and used abrasive pads). Using any of these mechanical removal methods significantly increases the risk of adverse occupational exposure to lead. Coordination with your base BEF is critical if this abatement method is selected. Mechanical removal systems should be equipped with HEPA collection devices to capture the paint dust and chips as they are generated. This collected material will almost always be hazardous waste.

Heat Gun

The use of heat guns for LBP abatement results in a concentrated mass of paint chips. These chips are generally put into containers by hand, or are HEPA vacuumed from polyethylene sheeting laid down to catch the chips. These paint chips will generally be hazardous waste. Lead vaporization can occur at temperatures of 700 degrees F or greater. Occupational exposure risks may be reduced by ensuring heat guns are operated below this temperature.

Removal of Components

The removal of structures (window sills, door frames, etc.) containing or contaminated with LBP vastly increases the volume of waste material. Wastes from this type of abatement are typically windows and windowsills, doors and door frames, shelves, baseboards, and other trim. Though the amount of waste increases with this type of abatement, the adherence of the LBP to a substrate may decrease the amount of leachable lead in the waste. As a result, the chance of component waste failing the Toxicity Characteristic Leaching Procedure (TCLP) test may be lower than that of paint removal waste. The TCLP test is the procedure the EPA requires to determine if a toxic chemical containing waste (such as lead-based paint debris) is considered a hazardous waste. Lead containing waste is considered hazardous if the concentration of lead analyzed in a TCLP test exceeds 5.0 milligrams lead per liter.

Other Considerations

Disposing of construction and demolition (C&D) debris in landfills consumes enormous amounts of space and is both economically and environmentally costly. A cornerstone of the Air Force's pollution prevention policy is the reduction (through source reduction and recycling) of the amount of municipal solid waste sent to landfills. C&D debris contaminated with LBP can cause the debris to be handled as a special or hazardous waste, requiring disposal at a licensed hazardous waste facility. However, debris found to be non-hazardous can be landfilled with municipal solid waste or recycled. C&D waste streams should be carefully controlled to ensure lead containing materials are segregated and a minimum amount of lead contaminated debris enters the waste stream. TCLP analytical strategies should be carefully established to ensure representative samples are analyzed when determining if the C&D debris is hazardous or special waste.

Pollution Prevention Success Stories

Lackland AFB

Lackland AFB successfully tested a new process which greatly reduces the amount of C&D debris requiring disposal in landfills. The test was conducted on two 2,000 square foot buildings. The buildings were first demolished by conventional methods, the debris was then wetted to reduce dust emissions, and fed into a large trailer mounted industrial tub grinder. The specific tub grinder used in the test is capable of grinding 6,000 cubic yards of debris per day. Only 35 minutes were needed to grind the debris from each building at a total cost of $3,125. Pre-demolition lead levels in the buildings ranged from 52 to 32,884 parts per million (ppm). TCLP analysis of composite samples after grinding revealed lead levels of approximately 0.14 mg/L, well below the federal 5.0 mg/L lead cutoff point for defining the debris as a hazardous waste. The Texas Natural Resource Conservation Commission (TNRCC) designated the ground debris as a special waste, resulting in landfill tipping fees of only $75 per cubic yard, compared to $385 per cubic yard for hazardous waste. We recommend your BEF or Environmental Flight personnel check with your State officials concerning their viewpoint toward this process. Additional information on this process can be obtained from PROACT.

Blastox for Use in Lead-Based Paint Abatement

Blastox, manufactured by TDJ Group Incorporated, (847) 639-1113, is added to abrasive blasting media to eliminate the need to treat the LBP contaminated media as hazardous waste. The manufacturer claims this product actually stabilizes lead in the spent media and prevents it from leaching. This stabilization renders the waste non-hazardous and not subject to RCRA hazardous waste regulations. Mr. James Lively, TDJ Group Incorporated, told PROACT that Blastox has been evaluated by the US Army Construction Engineering Research Laboratory (USACERL) and the evaluation results were coordinated through the EPA.

According to Mr. Vincent Hock, USACERL, (800) 872-2375 ext 6753, or (217) 373-6753, Blastox does perform as claimed. In the USACERL report, Blastox-treated LBP waste from wood and steel structures tested below the lead regulatory limit when analyzed by the TCLP method. Further, Multiple Extraction Procedure (MEP) testing indicates there is no problem with long-term lead stability. The full details of the USACERL tests are contained in the following documents available from PROACT:

> "Demonstration of Lead-Based Paint Removal and Chemical Stabilization Using Blastox," USACERL, October 1996; and
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> "User Guide and Specification for Using Blastox to Remove and Stabilize Lead-Based Paint," Draft Report, USACERL, February 1995.

The EPA reviewed the above reports and addressed RCRA issues in an EPA Office of Solid Waste and Emergency Response (OSWER) letter, 16 August 1995. According to the EPA, adding water to the mixture of Blastox and paint chips is treatment and would require a treatment permit. However, this is only appropriate if the Blastox-treated LBP waste is a hazardous waste. To make a hazardous waste determination, a TCLP test is required. Part of the standard procedure during the TCLP analysis is to add water to the waste sample. However, this initiates the lead stabilization process, binds the lead, and prevents leaching. Thus the TCLP results will usually indicate the LBP waste is below regulatory limits and therefore is not a hazardous waste. Since the LBP waste is not a hazardous waste, the issue of whether the addition of water is considered treatment is not pertinent. Further, the EPA considers the TCLP to be an appropriate method for making this waste determination. Finally, if the waste were determined to be hazardous, adding water to the waste could still be accomplished without a treatment permit providing the waste is treated on-site in tanks or containers as provided in Title 40 Code of Federal Regulations Part 262.34, "Accumulation time."

In summary, Blastox effectively binds the lead and the resulting waste typically tests below regulatory limits. The use of this product in LBP abrasive blasting abatement operations increases the cost of the blasting media but may be more cost effective when hazardous waste disposal costs are considered. For more information on this product, please contact PROACT or Mr. James Lively, TDJ Group Incorporated, (847) 639-1113.