145

RESIDENTIAL INDOOR SURFACE DUST SAMPLING FOR CONTAMINANTS TRACKED IN FROM CONTAMINATED YARDS. L. Wilder, Agency for Toxic Substances and Disease Registry, Atlanta, GA; S. Burchette, R. Turpin, U.S. Environmental Protection Agency, Edison, NJ; M. Trespalacios, A. Mignone, Roy F. Weston, Inc. Edison, NJ

Environmental sampling for contaminants used to determine public health impact is increasingly focusing on actual points of human exposure and on the environmental sampling data's ability to predict the actual human exposure dose. The Agency for Toxic Substances and Disease Registry (ATSDR) and its public health assessment cooperative agreement states depend heavily on the environmental sampling data collected by the Environmental Protection Agency (EPA) and other agencies for use in determining a contaminant's impact on public health. An area of continuing interest for determining human exposure (via ingestion) is that of contaminated indoor surface dust that is tracked indoors from contaminated yards. Public health assessors are routinely requested to determine health risks from indoor dust data. Likewise, public health assessors are routinely requesting environmental agencies to conduct indoor dust sampling for site-related contaminants. Many types of sampling equipment, sampling methodologies, and health interpretation approaches are in use throughout the country. Because information that compares results of these different approaches is quite limited, ATSDR and EPA's Environmental Response Team (ERT) have conducted indoor dust sampling at 3 sites using up to 4 sampling techniques (vacuum and wipe) in up to 4 areas in each residence. Sampling methods used included modified ASTM D 5438-93 vacuum, EPA ERT's HEPA vacuum, University of Cincinnati DVM, and HUD surface wipe protocol. Sample locations included main entryway, main living space, child's bedroom, and child's main play area. Up to two surface (0-2 inches) soil samples were collected form the yard: near the main entryway, and from a high use area. In 2 of the 3 sites, biological (blood) samples were collected from the residents. Comparisons of the results of different sampling techniques, sampling locations, and biological exposure information should lead to a more standard approach to both indoor dust sampling and the public health implications.

146

EXPOSURES TO LEAD-BASED PAINT DUST IN AN INNER-CITY HIGH SCHOOL. J. Decker, R. Malkin, CDC/NIOSH, Atlanta, GA

In response to concerns about lead-based paint (LBP) in a dilapidated 85-year-old high school, an evaluation was conducted to determine if a lead exposure hazard existed for school staff. Deteriorating LBP was present on walls and ceilings throughout the school. At the time of the evaluation, abatement of LBP had been completed in approximately one-third of the school.

One-hundred eighteen wipe samples for lead dust were collected from floors, teachers' desks, and interior window sills. Areas selected for sampling were based on the work location of the participants providing blood for lead analysis. Forty-five employees (50% of the staff) participated. Wipe samples from hands were collected from all participants. The geometric means (GMs) for lead dust loadings on sills in nonabated rooms (n=23) and abated rooms (n=16) were 342 and 103 $\mu g/ft^2$, respectively. Nine sills in nonabated rooms and one sill in an abated room exceeded the Department of Housing and Urban Development (HUD) guidelines (500 $\mu g/ft^2$ lead), which were intended to protect infants and children in residential housing following lead hazard control work. The applicability of the HUD guidelines to schools has not been established. GMs for lead loadings on floors in nonabated rooms (n=26) and abated rooms (n=14) were 136 and 70 $\mu g/ft^2$ lead, respectively. Seventeen floor samples from nonabated rooms and 3 samples from abated rooms exceeded HUD guidelines (100 $\mu g/ft^2$ lead). The GMs for desktops in nonabated (n=23) and abated rooms (n=16) were 15.8 and 15.4 $\mu g/ft^2$ lead, respectively. All blood lead levels (BLLs) were low, ranging from 0.6-5.6 micrograms per deciliter ($\mu g/dL$). The geometric mean BLL was 2.2 $\mu g/dL$, similar to that of the general U.S. population. The GM for lead on hands was 9 μg.

Despite severely peeling LBP and significant lead dust loadings on surfaces, a hazard from LBP was not found for staff at the school. There were no relationships between surface lead and hand lead, BLL and abatement status of assigned work area, or BLL and hand lead.

147

MONITORING LEAD IN THE WORKPLACE USING A PORTABLE X-RAY SPECTROMETER. N.G. West, J.P. Wheeler, Health and Safety Laboratory, Sheffield, UK

The development of portable X-ray fluorescence spectrometers provides an opportunity for in-situ elemental analysis of contaminants in the workplace. The purpose of the present work was to determine the applicability of the technique for various types of hygiene survey; in particular measurement of toxic metals on substrates such as carpets and textiles which are difficult to monitor using conventional surface sampling techniques. The Thermo Electron SP 9000 portable spectrometer is supplied with three in-built calibrations for different types of matrix. The calibration most suited to industrial hygiene surveys is the 'thin film' mode and its performance has been assessed for arange of samples including deposits on air filters, overalls, gloves and carpets. To check the in-built calibration, sets of independent calibration standards were prepared for each sample type using pure lead oxide. In each case it was found that there was a good correlation between the measured amount based on the in-built calibration, and the actual lead concentration in the standard. However, systematic differences were found between the two sets of results in each case and a correction factor based on the results for the air filters, was applied. Using this correction factor, results for different types of overalls were found to be within approximately 10% of the true concentration, for gloves within 30% and for carpets within 40%. This accords with the predicted effectiveness of a 'thin film' based calibration for samples of varying thickness and matrix composition. It is concluded that portable X-ray spectrometers provide a very effective means of rapidly screening inorganic contaminants in the workplace.

148

FIELD DEMONSTRATION OF TECHNOLOGIES FOR REMOVAL OF LEAD-BASED PAINT FROM RESIDENTIAL HOUSING. J. Kominsky, Environmental Quality Management, Inc., Cincinnati, OH; P. Clark, A. Edwards, U.S. Environmental Protection Agency, Cincinnati, OH; V. Hock, S. Drozdz, U.S. Army Corp of Engineers, Champaign, IL; J. Lyskawa, Power Environmental Abatement Technologies, Inc., Buffalo, NY

The foremost cause of childhood lead poisoning in the United States today is lead-based paint (LBP) found in older housing. Exposure to lead in paint can come from the paint chips themselves, from dust caused by abrasion of paint on friction surfaces, or from caulking or exterior paint. A study was conducted to demonstrate LBP removal from architectural wood components in unoccupied residential housing using four technologies: granulated carbon dioxide (CO2) blasting, pelletized CO2 blasting, encapsulant paint remover (EPR), and wet abrasive blasting with an engineered abrasive (WAB-EA). The three former technologies were demonstrated on interior components, the latter on exterior components. An X-ray fluorescence (XFR) spectrum analyzer (K-shell) was used to quantify the change in lead levels on the substrate before and after paint removal. Inductively coupled plasma atomic emission spectroscopy (ICP-AES) and analysis was used to quantify the change in lead levels in airborne particulate and settled dust wipe samples before and after paint removal. Aerodynamic particle size distributions of lead particulate were measured by a multi-stage personal cascade impactor. The paint removal effectiveness of the EPR and WAB-EA technologies was comparable with overall residual lead levels below the HUD guideline ($1 mg/cm^2$); both technologies removed the paint to bare substrate with no apparent damage (light sanding prior to painting) to the underlying substrate. The CO_2 technologies yielded residual paint levels of $>5 mg/cm^2$ and rendered the substrate unuseable for its intended purpose. Although the airborne particulate and settled dust levels varied with LBP abatement technology, the EPR technology consistently showed the lowest levels.

149

DISCUSSION OF THE HAZARDOUS MATERIALS ISSUES OF LEAD IN VINYL FLOOR TILES. D. Coltrin, D. Kahane, L. Deschambault, Forensic Analytical Specialties, Inc., Hayward, CA

While vinyl floor tiles have long been tested for asbestos content, it is rare that concern is raised for their lead content. In this study, we used a standard SW-846 bulk prep method

1997
American Industrial Hygiene Conference & Exposition

AIHCE '97
Taking Responsibility
Building Tomorrow's Profession

The premier conference for occupational and environmental health and safety professionals

Conference May 19–23, 1997 • Dallas Convention Center • Dallas, Texas

Abstracts

Co-sponsored by American Industrial Hygiene Association and American Conference of Governmental Industrial Hygienists

1997 Abstracts Index
by Session Topics

Taking Responsibility . . . Building Tomorrow's Profession Papers 1–6

1

Paper Withdrawn by Author

2

PRAGMATIC PRINCIPLES FOR AVOIDING MANAGEMENT PITFALLS. M.L. Sanders, Naval Engineering Field Activity, Poulsbo, WA

Making the transition from an industrial hygienist managing programs to a manager programming industrial hygienists can be traumatic and career damaging. Keen technical and verbal skills are common entrance requirements to the people-management arena, but industrial hygienists who desire to make that professional move must be aware of three particularly dangerous pitfalls which neither of those skills will protect against.

One pitfall results from failure to distinguish between leadership and management, another from failing to distinguish between organizational process and function, and the third for failing to recognize the customer. Industrial hygienists must have the insight to recognize and evaluate those pitfalls, avoiding or backfilling in order to walk safely over them.

Specific and succinct descriptions of principles for both the prevention and the resolution of these problem areas have been developed; use of these principles is the catalyst for efficacious management. Whether the professional industrial hygienist is in the private or the public sector, assuming the responsibility for a controlled management response using these principles in the face of business adversity can turn impending failure into resounding success and ensure career growth.

3

SCIENTIFIC CONTRIBUTIONS TO THE REVISION OF THE OSHA'S 1,3-BUTADIENE HEALTH STANDARDS. C.T. Chen, OSHA, Washington, DC

The current OSHA's 1,3-butadiene (BD) health standard is an 8-hour time-weighted average (TWA) exposure of 1,000 ppm for workers exposure to BD which is adopted from 1968 American Conference of Governmental Industrial Hygienist's (ACGIH's) threshold limit values (TLVs®) in 1971 to prevent irritation and narcosis effects. Due to the demonstration that BD causes multiple cancers in two animal studies in 1983, OSHA was petitioned by unions in 1984 and referred by EPA in 1985 for regulatory action. In 1990, OSHA published a proposed BD standard with an 8-hour TWA exposure of 2 ppm, a short-term exposure limit (STEL) of 10 ppm, and the ancillary provisions. There are many scientific studies contained in OSHA BD docket which enhanced the completion of a BD standard. Animal bioassays, human epidemiologic studies, experimental investigations on the metabolites and their mechanism in vitro and in vivo systems provides convincing evidence that BD is a probable human carcinogen. Three out of five quantitative risk assessments used NTP study with exposures of 6.25–625 ppm BD to calculate their best estimates of risk. Due to the availability of three breakthrough studies on BD, OSHA was able to allow the use of cartridges and canisters for respiratory protection that would enhance workers' protection, address industry's concerns, and reduce compliance cost. A series of plant visits conducted by the National Institute of Occupational Safety and Health (NIOSH) produced worker exposure profiles and information on technological feasibility which greatly helped in economic analysis. An epidemiologic study sponsored by the International Institute of Synthetic Rubber Producers (IISRP) completed in late 1995 clearly demonstrated an excess risk of cancer among workers exposed to BD which is complementary to the animal studies. This promoted IISRP to engage with unions to reach agreement on a standard with an 8-hour TWA exposure of 1 ppm, a STEL of 5 ppm, and other aspects of standard. This demonstrates that studies from various disciplines of science will greatly enhance the development of a workplace health standard. The opinion expressed here is sole of author.

4

CIH PLUS IHIT UTILIZATION BY INDUSTRY OR INDUSTRY GROUP, AND PRELIMINARY PROJECTIONS OF FUTURE NEED FOR SUCH INDUSTRIAL HYGIENE PROFESSIONALS. L.W. Whitehead, CIH University of Texas-Houston Houston, TX, M. West Baylor College of Medicine, Houston, TX

Estimates of future need for public health professionals are very useful for planning educational programs and incentives for graduate education, and for staffing projections. No such estimates are known to exist for