

Letters To The Editor

NIOSH Researchers Take Issue With Comments By XRF Company Spokesman

To The Editor:

I wish to respond to comments made by Steve Santy of Scitec/Andros that were published in the December 1997 issue of *Lead Detection & Abatement Contractor*.

Responding to conclusions regarding the performance of portable X-ray fluorescence (XRF) lead measurement instruments, Mr. Santy made critical comments about NIOSH research on portable XRF for measuring lead in paint.

Mr. Santy should not have characterized our research without having seen the results. Furthermore, his implication that our research was faulty cannot logically be made by anyone who has not reviewed the published data.

I wish to inform your readers that the research to which Mr. Santy refers (which was co-sponsored by a portable XRF manufacturer) will be published in the January 1998 issue of *Field Analytical Chemistry and Technology*, a peer-reviewed scientific journal. One of the referees was from a company that manufactures portable XRF instruments (a different company from that co-sponsoring the study). The number of samples tested was sufficient for the evaluation of quantitative analytical techniques, based on method evaluation guidelines published by NIOSH in 1995.

Our research was conducted to complement the results presented in the well-known Midwest Research Institute (MRI) study, and to deal with some of the limitations of the MRI study design. Our research was confined to the use of one manufacturer's instrument, since we did not have the resources (human or financial) to evaluate more than representative test technologies of each of three techniques (portable XRF, spot test kits, and portable anodic stripping voltammetry (ASV)). The conclusions drawn from our study will not be stated here, but they can be found in the *Field Analytical Chemistry and Technology* article when it comes out in print.

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To The Editor:

I wish to respond to comments by Steve Santy published in the December issue of *Lead Detection & Abatement*

Contractor concerning a NIOSH study conducted by Dr. Kevin Ashley and collaborators from Hybrivet, ESC, TN Technologies, and J&L Environmental.

The Ashley et al. study compared the performance of various field portable methods for measuring lead in paint (portable anodic stripping voltammetry or ASV, chemical spot test kits, and portable X-ray fluorescence or XRF). All of the methods studied were performed in the field at a Florida site under consideration for abatement. Environmental variability between the field measurement and subsequent laboratory analysis was minimized so that the comparison would concentrate on differences in method performance. The study compared various field methods for the determination of lead with laboratory analysis.

The approach used in the Florida study is similar to other NIOSH lead measurement performance studies conducted by Dr. Ashley and myself. These studies have been subjected to both NIOSH internal peer review and to the peer reviews of at least four different scientific journals. As a colleague of Dr. Ashley and one who has had the opportunity to review and comment on a number of his studies in the NIOSH internal peer review process, I take exception to Mr. Santy's comments on this research. Dr. Ashley's study will appear in the January issue of *Field Analytical Chemistry and Technology*.

Several NIOSH studies on environmental lead measurement, including Dr. Ashley's Florida study, focus on overall performance and complement research sponsored by HUD and EPA conducted at Research Triangle Institute (RTI), Midwest Research Institute (MRI), and elsewhere. Most, but not all, of the NIOSH research has confirmed the findings of other researchers. Mr. Santy suggests that the MRI study and instrument manufacturer research is sufficient to demonstrate XRF performance. I disagree.

For a wide variety of laboratory and field analyses where the sample is removed for analysis there is little controversy over performance. Why is this? One reason is that several studies, including NIOSH studies, have found that these methods agree well and have good accuracy. Furthermore, NIOSH evaluation of proficiency test data found that several hundred laboratories are getting results that are comparable to those produced in controlled laboratory evaluations conducted by researchers. Time and time again researchers find that methods developed and evaluated by researchers do not always perform as well as one would like when the method is transferred from the research laboratory to the commercial laboratory. That is even more difficult when the mea-

surements are to be performed in the field. Therefore, confirmation of research results by the organizations that do routine analyses gives one added confidence that good data are being produced.

The Ashley et al. Florida study found good agreement between laboratory analysis and ultrasonic extraction followed by ASV analysis conducted in the field, a method covered by the EPA National Lead Laboratory Accreditation Program (NLLAP) and the Environmental Lead Proficiency Analytical Testing (ELPAT) Program. Furthermore, NIOSH evaluates the performance of sample preparation and instrumental methods used by more than 375 participating organizations in the ELPAT program. An increasing number of organizations (currently 8 to 10 organizations) routinely use ultrasonic extraction and ASV analysis in quarterly proficiency testing. NIOSH studies on outlier rates, method variability, and bias among methods have found the method to give comparable data to that obtained by other methods used in ELPAT. (NIOSH ELPAT studies are published in journal articles and quarterly columns in the *AIHA Journal* and the *ACGIH Applied Occupational and Environmental Hygiene Journal*.)

The situation for direct measurement of lead using XRF is different. The National Lead Abatement Council (NLAC) proposal for an XRF registry that would have included proficiency testing of in-situ (direct surface) field portable XRF never materialized. Furthermore, current *HUD Guidelines* do not require confirmation of XRF results. Because of that, there is no large study or large data base available that confirms that direct on-surface measurement by XRFs routinely performed across the country is giving results similar to those in the MRI study. Does the system of XRF performance characteristic sheets, training of XRF operators, and performance checks using NIST SRM films result in data that are comparable with other techniques? The answer to this question is unclear.

XRF performance characteristic sheets are based upon the assumption that the materials in the MRI repository located in Kansas City are an adequate representation of the many different surfaces that one encounters in HUD lead compliance measurements. There is an instrument quality control check using NIST films, but that check does not give information on substrate differences. Most importantly, one must assume that the operators in the field can replicate MRI study performance.

The Ashley et al. Florida study should raise a red flag for XRF users. It shows that even though an XRF instrument has been evaluated in the MRI study and XRF performance characteristic requirements are followed, XRF measurements may not agree well with a more accurate laboratory lead measurement method. Would it have been better to evaluate multiple XRF instruments at multiple abatement sites? Of course. Was the Florida site atypical of other abatement situations? Nothing was apparent in the study to indicate that, except that there was a larger percentage of surfaces whose lead content was near the HUD compliance level than in the MRI repository.

The fact still remains that a considerable number of measurements were made and a large consistent bias and imprecision for direct on-surface XRF measurements were found. The owner of the Florida property where the Ashley et al. study was conducted cares very little if the XRF performed well on the surfaces in the MRI repository in Kansas City or if the instruments meets the requirements of XRF performance characteristic sheets. The owner does not care that the ultrasonic extraction with ASV analysis performed well in the ELPAT Program or in other instrument evaluation studies conducted at NIOSH, or that considerable effort has been expended by government and the private sector to develop the NLLAP Program. The owner wants an accurate lead determination so he or she makes the correct decisions concerning abatement and/or worker protection. The Ashley et al. study gives a simple graphical comparison of three field methods against laboratory analysis that can be readily understood by the client.

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We Welcome Your Letters!

Lead Detection & Abatement Contractor welcomes your opinions on what you read each month. Send letters to Susan Valenti, *Lead Detection & Abatement Contractor*, 7920 Norfolk Ave., Suite 900, Bethesda, MD 20814; fax to 301/913-0115; or e-mail to svalenti@iaqpubs.com. ■

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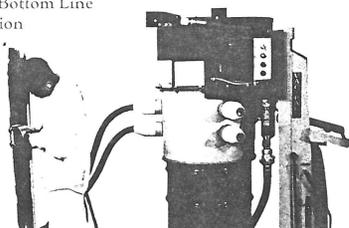
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