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# *Environmental* **NEWS**

Fall 2009

Lancaster Laboratories new Thermo Scientific DFS HRGC/HRMS offers greater sensitivity and specificity for measuring ultra-trace levels of dioxins/furans in environmental samples.

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# Our People, Your Place

Viewpoint



by J. Wilson Hershey, Ph.D., President

In today's cost-conscious environment, everyone is being required to do more with less. This is most evident in the employee headcount reductions and restrictions that many companies face. Using temporary workers is one of the few ways that organizations can meet their business objectives while still controlling costs, but this solution comes with a number of challenges. Temporary workers can be considered co-employed and have to be managed in specific ways to avoid having them be viewed as employees from a legal standpoint.

One way that firms handle this risk is to limit the amount of time that a temporary worker is allowed to remain in a position. Typically, after 12 months, even the best temps need to be replaced to avoid the pitfall of having them viewed as an employee. So after you spend months training someone, they have to leave and you get to do it again, wasting valuable time and money. And knowing that their days are numbered, temporary workers frequently start looking for other opportunities on their own before their contract expires.

Legal issues present an even more perilous problem than turnover. What criteria determine a worker's status and how can you avoid the liabilities related to co-employment? The IRS has posed a series of questions that can help you decide if your company is at risk for co-employment complications. Known as the 20 Factor Test (see sidebar), the

questions evaluate how much control the company has over a worker, and companies need to tread carefully to ensure their employment of temporary workers meet all the criteria.

At Lancaster Laboratories, we have a unique solution to your need for additional staff that protects you against the pitfalls of hiring temps. Our Professional Scientific Staffing (PSS)<sup>sm</sup> has been specifically designed to provide a "non-permanent" workforce for one or more years with no worries about co-employment issues. We recruit, hire, train and manage these scientists, who work in your facility. They are Lancaster Laboratories employees, with all the benefits that our in-house, full-time employees enjoy. We've structured our program so the employment relationship is clear and consistent with the IRS 20 Factor guidance. In fact, we're so certain that our model meets the co-employment test that we'll guarantee it in our contract.

We've successfully implemented PSS<sup>sm</sup> programs at client facilities from California to Massachusetts and even in the EU, as clients have begun to see the advantages of having their scientific staff selected and managed by a company that has nearly 50 years of experience delivering laboratory services. Our proven track record in human resources best practices and the fact that PSS<sup>sm</sup> scientists are full time employees of Lancaster Laboratories results in the highest quality staff and turnover rates that are dramatically lower than with traditional temporary employees. Our workers in your facility can cost you less than your own full-time employees, while providing a variable cost resource. We've been able to prove this by measuring productivity, turnaround time, quality, turnover and safety at PSS<sup>sm</sup> sites.

If you have the workload, but not the workforce, our PSS<sup>sm</sup> program can help increase capacity quickly without adding to fixed headcount. And our unique model has allowed us to help clients meet other resource challenges, too. Take the trend that's emerging in

some industries to focus on the core business and outsource any segments that aren't directly related to that. Obviously, samples can be sent to Lancaster Labs' facilities if an organization decides that laboratory testing isn't germane to their core business, but there may be other considerations that aren't met by traditional outsourcing. These include tight turnaround times, ability to work under your own quality systems and reluctance to share proprietary information with people outside the company. We've been able to address these needs by placing our scientists in client facilities.

For years, Lancaster Laboratories has used the tag line, "People Are The Chemistry," and nowhere is this more evident than our PSS<sup>sm</sup> program, where our highly motivated, efficient, well-trained scientists work solely on your projects at your location as trusted partners in achieving your company goals.

## 20 Factor Test

1. Instructions
2. Training
3. Integration
4. Services Rendered Personally
5. Hiring, Supervising, Paying Assistants
6. Continuing Relationship
7. Set Hours of Work
8. Full Time Required
9. Doing Work on Employer's Premises
10. Order of Sequence Set
11. Oral or Written Reports
12. Payment by Hour, Week, Month
13. Payment of Business and/or Traveling Expenses
14. Furnishing of Tools and Materials
15. Significant Investment
16. Realization of Profit or Loss
17. Working for More than One Firm at a Time
18. Making Service Available to General Public
19. Right to Discharge
20. Right to Terminate



## New HRGC/HRMS for Dioxin Testing

Using their many years of experience in organic extractions and GC/MS analysis, Lancaster Laboratories has added dioxin testing to its long list of environmental services. A high resolution gas chromatograph/high resolution mass spectrometer (HRGC/HRMS) was recently installed to perform the analytical portion of the test, and a 900-square-foot laboratory, specifically designed for dioxin extraction, has been outfitted for sample preparation.

Initially, the test methods that Lancaster Labs will offer include EPA methods 1613B and 8290A for water and soil samples. These methods are capable of isolating and identifying seventeen isomers of 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) and 2,3,7,8-tetrachlorodibenzofuran (TCDF). In the past, these tests were subcontracted to an approved laboratory, but setting them up in-house will allow clients who qualify their laboratories to use a single facility for their dioxin testing. Lancaster Labs is in the process of adding dioxin testing to its existing certifications.

One of the challenges of sample preparation for dioxin testing is controlling environmental factors so that very low concentrations of TCDD/TCDF can be reliably detected. "Our extensive experience with trace organic residue analysis allows us to understand the controls that are needed for preparing samples for dioxin testing. It's just a good springboard to move us into this next phase," explains Chuck Neslund, manager of Specialty Services at Lancaster Labs. Liquid/liquid and solid phase extractors will be used to

prepare samples for analysis on HRGC/HRMS. The extractions can be followed by additional solid/liquid phase cleanups to aid the detection of dioxins and furans.

A very sensitive HRGC/HRMS instrument is needed for dioxin testing since the concentration range required can extend down to the parts-per-quadrillion level. To meet these demands, Lancaster Labs chose a Thermo Scientific DFS HRGC/HRMS unit because



Analysts perform dioxin testing in Lancaster Labs' newest lab, which features a Thermo Scientific DFS high resolution gas chromatograph/high resolution mass spectrometer.

it offers excellent sensitivity and selectivity. "The high resolution mass spec is capable of differentiating dioxins from other interferents that may be present in the sample. Since the dioxin concentration may be orders of magnitude less than the interferents, the instrument has to be extremely sensitive," says Nelson Risser, the principal chemist responsible for validating the new instrument. In addition to their instrumental expertise, Risser points out that Lancaster Labs also has extensive experience in providing various deliverable formats, both electronic and hard copy, to summarize the analytical and quality control results.

After the water and soil methods are fully implemented, Lancaster Labs plans to offer dioxin testing in other matrices, like tissue and air. For more information on dioxin testing, contact Environmental Business Development at 717-656-2300.

## Lancaster Labs applies for DoD lab accreditation

Lancaster Laboratories recently applied for a new laboratory accreditation implemented by the Department of Defense (DoD). The DoD Environmental Laboratory Accreditation Program was established in an effort to promote consistency among various laboratory contractors and improve the procurement process for testing services. All laboratories that perform testing in support of DoD environmental restoration programs for any branch of the military will be required to conform to the DoD Quality Systems Manual for Environmental Laboratories. This manual is based on the Quality Systems Standard of the National Environmental Laboratory Accreditation Conference (NELAC), but there are additional requirements specific to the DoD program.

Lancaster Labs already holds accreditation from the American Association for Laboratory Accreditation (A2LA) for ISO 17025, General Requirements for the Competence of Testing and Calibration Laboratories. Since A2LA is approved by DoD as a third party accrediting body, Lancaster Labs will expand the scope of their existing accreditation to include the DoD elements. A2LA auditors inspected the laboratories during the last week of September.

Lancaster Labs anticipates approval for a wide range of analyses, including volatile and semi-volatile organics by GC/MS, GRO, DRO, air samples by TO-15, perchlorate, metals by ICP and ICP/MS, pesticides, PCBs, PAHs, cyanide, hexavalent chromium and anions by ion chromatography. For a complete list of parameters and the status of the DoD accreditation, contact Environmental Business Development at 717-656-2300.

# Microwave offers greener approach to SVOC extraction

In the process of helping clients monitor and maintain environmental safety, Lancaster Laboratories believes it also has a responsibility to be a good steward of the environment. Choosing testing technologies that minimize laboratory waste is one of the ways that Lancaster Labs can meet this goal, and the recent implementation of microwave extraction for semivolatile organic compounds (SVOCs) in soil is a good example of this practice. In addition to using less solvent, the new method is more rugged than the ultrasonic extraction technique that has been the mainstay technique at Lancaster Labs for many years.

Microwave extraction using EPA method 3546 is an approved method for preparing soil, sludge, tissue and other solid wastes for SVOC analysis. In this relatively new method, the sample and solvent are sealed in a Teflon extraction vessel, which is then placed in a microwave. The microwave energy raises the temperature of the solvent, and the closed vessel causes the pressure to rise so that the solvent remains a liquid at temperatures above its boiling point. The resulting extraction is very efficient at separating SVOCs from solid matrices, requiring only 10 percent of the solvent used in the traditional ultrasonic approach. The extraction is useful to prepare samples for many different chromatographic tests, including EPA methods 8082, 8081 and 8270.

Analysts at Lancaster Labs have validated the microwave extraction by performing precision, accuracy and method detection limit (MDL) studies, yielding results that are very similar to earlier

techniques. Currently, regulatory certifications are being updated as needed based on the data generated so that all clients can take advantage of the benefits offered by microwave extraction.

As manager of the Organic Extraction Laboratory, Rick Karam believes that there are many reasons why clients will appreciate the new technology. "The extraction efficiency of the microwave is comparable to the sonicators that we used in the past, but the microwave is more automated, which means there's less opportunity for error in the extraction. This translates to greater consistency in the data that clients receive from Lancaster Labs," he



Kerrie Freeburn, chemist in the Organic Extractions Department, performs microwave extraction for semivolatile organic compounds.

says. In addition, the microwave extraction takes less time than traditional methods, and this should translate to increased laboratory capacity and improved turnaround time.

## SW-846 Update IV Methods offered

Early in 2008, USEPA notified the regulated community of the availability of Final Update IV to the Third Edition of SW-846, Test Methods for Evaluating Solid Wastes. State regulators are implementing Update IV Methods in various ways, so it's important that clients check with their regulators to confirm their requirements. Currently, at least two states, North Carolina Division of Water Quality and South Carolina Department of Health and Environmental Control, are requiring laboratories to reference Update IV of SW-846, where applicable. Several methods in use at Lancaster Laboratories were among 23 methods revised as part of the update. In addition, Lancaster Labs

has also validated several new techniques that were published in Update IV. A complete list of the Update IV Methods currently available at Lancaster Labs is given below, but it's important to note that Lancaster Labs only performs the new versions with client approval since some agencies are still requiring the use of earlier versions.

- **3500C Organic Extraction and Sample Preparation**
- **3535A Solid Phase Extraction**
- **3545A Pressurized Fluid Extraction**
- **3550C Ultrasonic Extraction**

*continued on next page*

# Detecting Low Level SVOCs without Selected Ion Monitoring

Lancaster Laboratories recently installed two new Thermo Scientific DSQ II GC/MS instruments that provide improved detection limits for semivolatiles organic compounds (SVOC) to better meet regulatory requirements. In the past, clients with permits that require testing for very low concentrations needed to request two separate analytical tests: one full scan to monitor a

hexachlorobenzene (HCB), pentachlorophenol (PCP) and N-nitrosodimethylamine (NDMA) are examples of the pollutants that are frequently regulated at concentrations below the level detected by typical full-scan analysis. However, the method detection limits (MDLs) being generated with the DSQ II units for these compounds are about an order of magnitude lower than

Lancaster Labs has years of experience and certification for testing a variety of matrices with EPA method 8270C or 8270D, which are the analytical methods used. The laboratory is in the process of validating detection limits for the SVOCs and expects to be testing client samples by the end of the year. For more information about low level full scan SVOC testing, contact Environmental Client Services at 717-656-2300.



Tim Trees, principal chemist in the GC/MS Semivolatiles Department, analyzes water samples on a new Thermo Scientific DSQ II GC/MS instrument.

comprehensive list of compounds and a second, using Selected Ion Monitoring (SIM) for target compounds with lower reporting requirements. The newly acquired instruments provide greater sensitivity, often eliminating the need for the extra SIM testing.

The novel design of the Thermo Scientific DSQ II GC/MS units features a combination of noise reduction and increased source and detector performance that results in lower detection limits. Polynuclear aromatic hydrocarbons (PAHs),

those being reported with existing GC/MS instruments.

"Anyone needing lower reporting limits for SVOCs will benefit. These instruments offer significantly greater sensitivity while maintaining the selectivity of a full scan method," says Rick Karam, manager of the GC/MS Semivolatiles Department. "Instead of two separate tests, only one extraction, one analysis and one data package will be needed, resulting in greater efficiency for us and lower cost for our customers," he adds.

## SW-846 Update IV Methods offered

*List of the Update IV methods currently available at Lancaster Labs continued from opposite page*

- 3620C Florisil Cleanup
- 6010C ICP-AES
- 6020A ICP-MS
- 7471B Mercury in Solids
- 8015C Nonhalogenated Organics by GC
- 8081B Organochlorine Pesticides by GC
- 8082A Polychlorinated Biphenyls (PCBs) by GC
- 8141B Organophosphorus Compounds by GC
- 8270D Semivolatile Organic Compounds by GC/MS
- 8318A N-Methylcarbamates by HPLC
- 8330A Nitroaromatics and Nitramines by HPLC
- 9056A Anions by Ion Chromatography

For more information on the use of methods from Update IV, contact your Client Service Representative at 717-656-2300.



# ICP/MS services doubled

Lancaster Laboratories Metals Department is expanding its capabilities for metals by Inductively Coupled Plasma Mass Spectrometry (ICP-MS). Added in our Schedule of Services, this list will include the complete Target Analyte List (TAL), Boron, Lithium, Molybdenum, Phosphorus, Strontium, Tin, Titanium, Vanadium and Zirconium. Capabilities are being expanded to accommodate the increasing need for low detection limits on many elements. Previously, testing was limited to the traditional Graphite Furnace Atomic Absorption (GFAA) elements, which were typically the elements that were in need of these low limits. The evolution of ICP-MS technology has now made it practical to analyze typical Inductively Coupled Plasma Atomic Emission Spectrometry (ICP-AES) elements and typical GFAA elements together on one analytical run with the low sensitivity that's offered by ICP-MS.

Lancaster Laboratories utilizes the newest advances in ICP-MS technology when analyzing samples. The Metals Lab utilizes a collision/reaction cell as one of its accessories for ICP-MS for elements that are prone to polyatomic interferences. The collision/reaction cell serves the function of preventing polyatomic interferences from reaching the detector either through collision or reaction mechanisms. These polyatomic interferences are a primary reason for false positive results on a non-collision cell ICP-MS. Before this advance, samples either had to be switched to Inductively Coupled Plasma Atomic Emission Spectroscopy (ICP-AES) to avoid the interferences or diluted to reduce the interferences.

The Lab also uses a High Matrix Interface (HMI) which allows samples with higher total dissolved solids to be analyzed with little or no dilution. This accessory significantly improves matrix tolerance and reduces signal drift. Before the advent of HMI, ICP-MS instrumentation was limited to analyzing samples with less than 0.2 percent Total Dissolved Solids (TDS). With the HMI in place, samples can be analyzed with TDS values at 2 percent to 3 percent and still maintain excellent stability.

The collision cell and HMI serve two unique purposes that work in tandem to achieve superior results in difficult matrices. Use of the collision cell and HMI equates to lower reporting limits for our clients due to the fact that most samples can be run without dilution and subsequent elevated reporting limits. It also equates to reliable results since troublesome, polyatomic interferences are removed.

This expanded list of elements, coupled with our technical expertise and cutting edge technical advances make this new service a great value to the customer. For more information on this service contact environmental business development at 717-656-2300.

## Lancaster Labs earns historic A2LA Award



American Association for Laboratory Accreditation president Pete Unger (right) presents Lancaster Labs president Dr. Wilson Hershey with the A2LA award.

The American Association for Laboratory Accreditation (A2LA) has awarded Lancaster Laboratories, recognizing the Lab as the first to become accredited by A2LA and maintain accreditation for 30 consecutive years. A2LA president Pete Unger presented Lancaster Labs' president Dr. Wilson Hershey with the award on October 29. A2LA wrote in a press release:

Achieving this milestone is a testament to the importance the laboratory owners and staff place on quality, competence and producing reliable data for their clients. "Sustaining this level of quality and service for such a long time is no easy feat. Everyone at Lancaster Laboratories should be very proud," said Pete Unger, President of A2LA.

## Contact us

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*At Lancaster Laboratories, we believe that our people provide our strength. Their dedication to quality, professional competence and hard work is the key element in the company's success. In this regular feature, we introduce you to some of the people who have helped make Lancaster Labs an industry leader.*

Charged with setting up Lancaster Labs' new Dioxin Testing Lab, environmental principal chemist Nelson Risser is challenged with validating a new Thermo Scientific high resolution gas chromatograph/high resolution mass spectrometer (HRGC/HRMS) and obtaining a dioxin testing certification. Risser has witnessed firsthand the success and growth of Lancaster Labs as it was merely 8,000 square feet with 40 employees when he began his career in 1979. Today, with people like Nelson dedicated to expanding services for clients, Lancaster Labs boasts more than 40 certifications and accreditations, has grown to a 225,000-square-foot state-of-the-art facility and employs more than 1,000 people in the U.S. and Europe. Nelson holds a bachelor's degree in chemistry from Shippensburg University and an MBA from Penn State.

**What does your current job entail?**

I am currently working on setting up a new high resolution mass spectrometry laboratory and an associated sample preparation lab. The goal is to bring the new capability online by the beginning of 2010 and then continue to build capacity as we move into the future.

**What is the scope of your group?**

The Specialty Services Department supports clients' needs for non-routine testing services.

# People are the Chemistry



Nelson Risser relaxes at the cabin he built.

**Given all of your responsibilities, how would you describe a typical workday?**

My days are focused on learning new systems and developing the necessary configurations to meet our clients' requirements. This involves working with advanced instrumentation, software, design laboratory layouts and obtaining the required equipment and glassware in order for a complete operation to function efficiently. I am also called upon to troubleshoot and repair various types of analytical instrumentation in use around the laboratory.

**How would you characterize your leadership style?**

I like to work in a collaborative

manner. It is important to me that the folks I work with have a clear understanding of what is expected of me and of them. Using various methods of communication are critical to keep everyone in the loop concerning the status of work processes.

**You've been here for many years and seen countless changes. Is there anything that hasn't changed during your tenure?**

I started my career at Lancaster Labs in 1979 so I have been here for nearly 30 years. Most things continually evolve. The one thing that hasn't changed is Wilson Hershey's (president) involvement and presence at the lab. He has been here for almost 40 years, starting as a bench chemist. Also, there is always a sense of urgency to get the work done correctly and quickly to keep productivity levels high. And I have always been provided with new opportunities for career growth and development.

**What kind of volunteer activities have you been involved with?**

I enjoy doing construction work and have occasionally volunteered with Habitat for Humanity as well as a construction work service experience with a youth organization in Wyoming. I am a vocalist at my church and enjoy the challenges that provides.

**And when you're not working?**

Most of my spare time over the last two years has been spent building a cabin near the Middle Creek Wildlife area. This included excavation, carpentry, masonry, painting and plumbing among other things. Being raised on a farm, I enjoy working with big equipment like bulldozers and backhoes. Although we did not intend to live there full-time, in February, we decided to move there and are enjoying the quietness of the woods very much.



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## Visit us at...

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|---|-------------|----------------|
| Texas Association of Environmental Professionals                    | February 11 | Houston, TX    |
| AEHS International Conference on Soils, Sediments, Water and Energy | March 15-18 | San Diego, CA  |
| DoD Environmental Monitoring & Data Quality Workshop                | April 2010  | Louisville, KY |
| TCEQ Environmental Conference                                       | May 4-6     | Austin, TX     |
| Battelle Conference   | May 2010    | Monterey, CA   |

## Lunch and Learn with Lancaster Labs

Lancaster Labs' offers technical seminars on regulatory topics and supporting testing capabilities along with lunch on us. Topics include:

Vapor and Air Analyses: project planning, regulations and sampling protocol for soil gas, vapor intrusion or other air related projects.

Petroleum Analyses: methods, results interpretation and common interferences.

Detection Limits and Low Level Analyses: Understanding MDLs, LOQs and PQLs; interpreting analysis reports and determining when low level analysis techniques are needed.

Low Level Metals Analysis Using ICP/MS Reaction/Collision Cell with HMI to Eliminate Interferences.

Specialty Analyses and Method Development: Explosives, Perchlorate, Hydrazines, Alkyl PAHS.

Laboratory Testing QC/QA: detailed explanation laboratory QC sample value and data evaluation.

Call environmental business development to schedule a presentation at your site. 717-656-2300.

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