

# *Environmental* **NEWS**

Fall 2010



 **Lancaster  
Laboratories**  
Celebrating *50* Years

From day one, Lancaster Laboratories has passionately delivered personal and quality service. And for the past 50 years, this work ethic has served our customers well and fueled our growth.

In this issue, see how far we've come from our three-person, 2,500 sq. ft. lab in 1961 (inset) to today's main campus nearly 1,000 times that with 1,100 US and EU employees all striving to serve global customers better each day—and for the next 50 years.

# The secret to our success

Viewpoint



by Timothy Oostdyk, Ph.D., executive vice president and COO

As we celebrate our 50<sup>th</sup> year in business, I am proud of how Lancaster Laboratories has evolved over the past five decades. Since our founder, Earl Hess, started the company in 1961 with two employees and a small, 2,500-square-foot building in rural Lancaster County, PA, the company has developed into a world-wide leader in laboratory services with more than 1,100 employees and facilities totaling more than 260,000 square feet.

We have sustained the economic and market pressures that the past 50 years have brought and have emerged stronger and more focused than ever. In fact as I have travelled throughout the world, I have been continually impressed by the extent of our reputation and the strength of the Lancaster Laboratories' brand.

People often ask me, "What's your secret?" The answer is somewhat simple, really. We value our employees, listen to our clients and embrace innovation.

## We value our employees.

We recognize and appreciate that our people really do make all the difference. Without intelligent, dedicated and talented team members, Lancaster Labs could never be as successful as we are today. With more

than 1,100 scientists, lab technicians and support staff, we hire some of the most well-known experts in their fields and invest in continuous training for our employees. Providing employees with meaningful and challenging opportunities, a positive, team-oriented atmosphere and family-friendly benefits results in satisfied employees. And in this business, satisfied employees are absolutely critical to performing quality work and providing the best possible service to our clients.

Our commitment to our staff is evidenced by our employees' loyalty. We have an extremely low turnover rate for our industry, and an impressive 16 percent of our staff have been with us for 20 years or more. (This year I was very pleased to mark 25 years with Lancaster Laboratories.)

## We listen to our clients.

What started as a small, local agricultural testing lab serving rural Lancaster County, PA, has now become a world leader in providing laboratory services. Over the years, we've consistently listened to what our clients wanted. We branched out into various markets and expanded our service offerings geographically. We paid attention to the external factors surrounding our business, identified new potential client bases to serve and acted on their needs.

To meet the increasing demand for our services, we expanded our Lancaster facility 11 times, and established a European facility in Ireland. We have also placed our scientists in client facilities throughout the US and Europe.

Recognizing a need to become more flexible in the way our clients work with us, we developed five service models from which clients can choose. Whether it's a typical fee-for-service price structure, assigning an

in-house team dedicated to a specific client project or placing our fully-trained staff members in a client's facility, we have adapted our service models to fit the needs for virtually any client or project type.

## We embrace innovation.

Since the beginning in 1961, Lancaster Laboratories has been defined by applying scientific innovation and technology to solving client challenges. It's in our DNA. It's what gets us excited. Innovation in our business can take many different forms. It can be applying the highest powered mass spectrometers in the world to characterize a complex biologic. It can be rapidly developing leading edge techniques to support emergency response actions. It can be utilizing equipment automation along with labor saving IT solutions to enable us to deliver highly cost competitive testing services. It can be meeting with regulatory agencies to help negotiate a path forward for our clients.

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In the last three years we have invested more than \$25 million of capital into our business. These ongoing investments enable us to continue to provide you with the most innovative scientific solutions.

To all of our clients who have worked with us throughout our 50 year history, we say a heartfelt thank you. Thank you for your business, for your ongoing trust in us, and for being a part of our story. And as we enter our next 50 years, our pledge to you is that we will stay focused on these "secrets" to our success, and we will continue to work hard every single day to make you very pleased with your decision to use Lancaster Laboratories.

## 1961

Number of Employees: 3  
Facility Size: 2,500 sq. ft.

## 1971

Number of Employees: 20  
Facility Size: 3,400 sq. ft.

## 1981

Number of Employees: 56  
Facility Size: 21,500 sq. ft.

# GC/MS testing provides clues to petroleum spill sources

When petroleum derived substances are found in the environment, there are many questions that need to be answered before an effective remediation plan can be implemented. Identifying whether the substance is a refined product or crude oil is a first step in determining an appropriate course of action. With years of hydrocarbon analysis experience, and the latest instrumentation, Lancaster Laboratories is well positioned to assist clients with their petroleum identification needs.

If initial testing indicates that environmental samples contain crude oil, there can be many possible sources of the contamination. For example, an ocean water sample containing oil may have been polluted by a pipeline leak, drilling activities or an oil tanker release. There are also naturally occurring phenomena, such as seeps, that result in petroleum being present in the environment. Determining the origin of the oil is key to preventing further environmental damage and assessing financial responsibility for clean-up efforts. The exact molecular structure of crude oil varies from source to source, making it possible to determine whether a suspected source might have caused the pollution.

One of the techniques used to identify a petroleum source, is based on analysis for biomarkers in the sample. Biomarkers are complex organic compounds composed of carbon, hydrogen and other elements that are found in petroleum. They show little to no change in structure from their parent molecules found in living organisms. Lancaster Labs has gained experience analyzing for biomarkers, including terpanes, steranes and triaromatic steroids, and providing data to petroleum experts who can then evaluate possible sources for the contamination. To do this, analysts first isolate the oil components from the sample, which may be anything from seawater to sediment to tar balls. The resulting sample extract is analyzed by GC/MS using select ion monitoring (SIM). The GC/MS separates and identifies the organic components, and the use of SIM allows detection of ultra-low concentrations of the biomarkers, achieving detection limits in

the part per trillion range for water samples. While quantitation of the individual compounds is achieved as part of the GC/MS output, the pattern of peaks in the resulting chromatogram is equally important in these determinations. If a standard from the suspected cause for the oil is available for compari-

able to develop and validate new methods for specialty compounds, such as components of dispersants used to disintegrate oil slicks.

“We have the ability and experience to quickly set up to provide analytical support to emergency response teams



Greg Drahovsky, chemist, reviews chromatograms for forensic analysis of petroleum hydrocarbon samples.

son, point sources can be ruled out or confirmed based on the relative ratios of the peaks and the presence or absence of specific biomarkers in the chromatograms. To facilitate this determination, Lancaster Labs has provided data to oil identification experts in the form of histograms, graphical representations of the data, which aid in comparing the chromatographic fingerprints of standards and samples.

In addition to expert analytical skills, response to an oil spill situation requires superlative service from all facets of the laboratory. Lancaster Labs holds required NELAP certifications that are recognized by many states, so that data will be accepted by multiple government agencies. In both California and the Gulf Coast regions, trained personnel are available on location to assist clients with sample containers, pickup, packing and shipping to Lancaster Labs. Analysts at the Lancaster facility can perform EPA test methods, as well as state specific methods for determining total petroleum hydrocarbons (TPH), and they are

working on oil spills,” says Duane Luckenbill, director of Environmental Services. He credits their three-shift operations and the capacity of their 260,000 square-foot laboratory for enabling Lancaster Labs to provide rush results in critical situations. Various formats of electronic data deliverables (EDD) are available for fast, accurate transfer of data from the laboratory to response teams.

## Specific services to support petroleum remediation projects include:

- Hydrocarbon analysis by GC/FID using SW-846 method 8015
- Polynuclear aromatic hydrocarbons (PAHs) and alkylated PAHs by GC/MS using SW-846 method 8270.
- Dioxins and furans
- Metals by ICP/MS

For more information on petroleum testing, contact Environmental Business Development at 717-656-2300.

## 1991

Number of Employees: 336  
Facility Size: 101,000 sq. ft.

## 2001

Number of Employees: 650  
Facility Size: 170,500 sq. ft.

## 2010

Number of Employees: 1,120  
Facility Size: 260,000 sq. ft.

## LLabweb Improves Online Access

Because timely information is a key component to most environmental remediation projects, Lancaster Laboratories was among the first laboratories to offer clients online access to their own data. As this issue is going to press, software developers at Lancaster Laboratories are putting the finishing touches on a new application, named LLabweb that will include many enhancements over the current version.

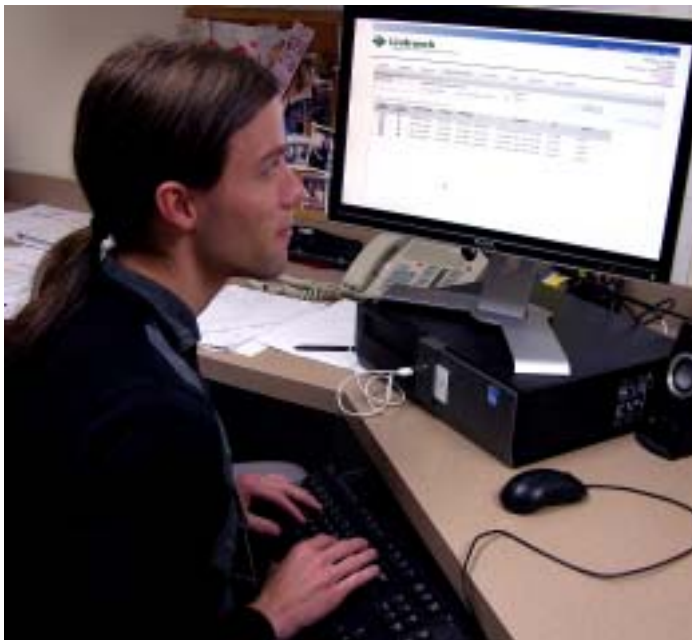
The initial release will allow clients to view and print signed analytical reports as a .pdf file. They will also have easy access to details of samples and sample groups, historical data and invoices. EDDs and data packages will also be included on LLabweb in the near future. Clients with large sample groups being analyzed for multiple parameters will appreciate LLabweb's sophisticated search feature

that allows efficient display of data searching by various parameters, including sample name and test name. The ability to export results directly into a spreadsheet or other application is a much requested enhancement that will be available with the new release.

Client feedback was critical in determining which features to

incorporate into LLabweb. "We have a very successful client access product available to clients of our Pharmaceutical Department, and LLabweb will have a lot of the same functionality," says Holly Trego, manager of the Environmental Applications Development Team. "Clients will really appreciate the dashboard that comes up initially displaying all their most recent projects," she adds.

To access LLabweb, clients will log onto the site and request an account. Their client service representative will activate the account and



Programmer Scott Paist works on the new version of LLabweb, which will be a free online service available to Lancaster Laboratories' environmental clients that will provide secure, convenient real-time access to data.

manage the permissions for the users. Once the account is established, clients will be able to manage their own passwords and access data through a secure web-based interface. Data will be available as soon as it is approved by the analyst. For more information about LLabweb, contact your client service representative at 717-656-2300.

## Data Packages streamlined

In order to meet regulatory requirements and validate test results, many clients require that data packages accompany their analytical results. A full data package for a large set of samples scheduled for multiple tests consists of hundreds of pages of raw data, summary forms and results. For ease of delivery and storage, Lancaster Laboratories offers data packages on a CD or as an image file, but data validators often prefer paper copies so that they can easily verify the test results.

Recently, Lancaster Labs solicited client feedback on the ease of use of their data packages, and they are implementing changes based on the comments they received. Data package users suggested a more logical order for the information presented based how they review the data. So Lancaster Labs rearranged the forms to consolidate information in the various sections. For example, the QC summary section was expanded to include the Calibration Summary Forms, and the Standards Data Section now includes the run logs, sequence files, tuning raw data and standards raw data. Based on the comments received, these changes will improve the efficiency of data review.

Additional changes are in the works to provide better consistency of the data presentation. Currently, many of the forms and case narratives are generated on independent data systems within the various laboratories analyzing the samples. Software developers at Lancaster Labs are making improvement to the laboratory information management system (LIMS) so that all of the forms and case narratives will be generated using a global data package application. After implementation, the pages generated from the new application will have a uniform appearance.

For more information about data packages, contact Dana Kauffman, Manager of Data Deliverables, at 717-656-2300.

## Detection of NDMA at Low PPT Levels

Chemists at Lancaster Laboratories have developed and validated a test method capable of detecting trace levels of N-Nitrosodimethylamine (NDMA), a suspected human carcinogen that may be harmful even at very low concentrations. The chemical is a byproduct



Heidi Ortenzi, senior chemist, spikes a liquid/liquid extractor on water samples for the detection of NDMA at low PPT levels.

of propellant production and has been found in groundwater near sites that manufactured or used rocket fuel. EPA has set an action level of 7 ng/L and the state of California has set a notification level at 10 ng/L.

The test method is based on a modification of EPA method 1625C, which employs an isotope dilution technique to measure the method performance in each sample. Analysts add isotopically labeled compounds to the sample prior to liquid/liquid extraction for water samples or microwave extraction for solid samples. NDMA-d6 is used as a

surrogate/internal standard and a second labeled compound is used as an additional internal standard.

The resulting extract is analyzed on a gas chromatograph/mass spectrometer (GC/MS) with Positive Chemical Ionization. Validation studies of the method performed at Lancaster Labs have yielded method detection limits of 0.5 ng/L in water samples and 16 ng/kg in solid samples. These values meet the concentrations that are of concern to state and federal regulators.

"We've added a level of specificity to the analysis by using an instrument with chemical ionization," says Chuck Neslund, who manages

Lancaster Labs' Specialty Services Group and was part of the team that developed the method. As with any trace level technique, background interference from non-sample sources can be a concern, but Neslund notes that Lancaster Labs' expertise with performing low level methods is a plus when analyzing NDMA.

Lancaster Labs is seeking NELAP accreditation to perform NDMA testing through the State of Pennsylvania. For more information about NDMA testing, contact Environmental Business Development at 717-656-2300.

## Dioxin Accreditation Awarded

The Pennsylvania Department of Environmental Protection (PADEP) recently extended Lancaster Laboratories' scope of accredited tests to include dioxin and furan testing in drinking water, non-potable water and solid and chemical materials.

The accreditation was granted for both EPA method 1613 and SW-846 method 8290.

Lancaster Labs is currently the only laboratory certified by PADEP to perform dioxin testing. As part of the approval process, a PADEP representative performed an on-site audit of Lancaster Labs' facilities and equipment, which included a new laboratory area designed and built specifically for dioxin testing. Method validation data generated by the high resolution gas chromatograph/high resolution mass spectrometer (HRGC/HRMS) used to perform the test was also inspected.

Because PADEP is a primary accrediting body for NELAP, the national accreditation program, Lancaster Labs is also seeking approval for dioxin testing from other states through reciprocity. Additionally, Lancaster Labs is approved to perform dioxin and furan testing on samples from Department of Defense (DoD) sites through its A2LA accreditation.

**A list of accreditations held by Lancaster Laboratories is included on its website at**

[www.lancasterlabs.com/certifications](http://www.lancasterlabs.com/certifications). For more information on dioxin testing, contact Environmental Business Development at 717-656-2300.

# Lancaster Labs responds to clients on the autumn 2010 *Remediation* article on false-positive Arsenic and Thallium data

In the autumn issue of *Remediation*, the U.S. Environmental Protection Agency Office of Technical Standards alerted the user community about the risks associated with false-positive data for Arsenic and Thallium analyzed by Inductively Coupled Plasma Atomic Emission Spectrometry (ICP-AES). The article states that false-positive rates may be as high as 99.9% for Thallium and 25-50% for Arsenic. Certain matrices do present possible issues when analyzed by ICP-AES, GFAA and non-collision/reaction cell ICP-Mass Spectroscopy (ICP-MS). The article highlights that analysis of samples with an ICP-MS that incorporates the use of a collision/reaction cell (CRC) significantly reduces and/or eliminates the risk of reporting biased results. The article goes on to state that this type of technology is not always available due to cost constraints and the limited number of analytical laboratories that have this type of instrumentation.

Fortunately, Lancaster Laboratories does possess this type of instrumentation. Lancaster Laboratories utilizes an ICP-MS that is equipped with both a CRC and High Matrix Interface (HMI). This cell allows for the

efficient removal of interferences that can cause false-positives and false-negatives. The High Matrix Interface (HMI) further improves our ability to remove matrix interferences by performing an aerosol dilution of the sample at the torch. The ICP-MS used in conjunction with CRC and HMI



Choon Y. Tian, analyst, avoids arsenic false positives on soil samples by using ICP/MS with CRC and HMI.

gives confidence to the user when they are making remedial decisions.

Lancaster Labs will be looking into the issue further with a follow-up case study in the next few months. Look for this report in the spring issue of *Environmental NEWS* and at [LancasterLabsEnv.com](http://LancasterLabsEnv.com).

## Seeing Green

Lancaster Laboratories is committed to establishing "Green" techniques and procedures that reduce waste and protect our environment.

A team of employees met to evaluate the bottle ordering system. The team focused on the total sample volume used for analytical testing as compared to the sample container sizes provided. As a result of the team's evaluation, they determined that the number and/or size of the sample containers could be reduced without affecting method compliance or the high level of quality that customers expect.

Enhancements to Lancaster Labs' bottle ordering system were made to incorporate the recommendations of the team; thus, fewer bottles will need to be filled in the field and the amount of waste disposal may be decreased by up to 50 percent.

*Just one more way Lancaster Laboratories continues to better serve our clients and the planet.*

## Contact us

**For information on services:**  
Environmental Business  
Development, 717-656-2300  
[env@lancasterlabs.com](mailto:env@lancasterlabs.com)

**For literature requests or address changes:** Susan Wike,  
717-656-2308, ext. 1835  
[slwike@lancasterlabs.com](mailto:slwike@lancasterlabs.com)

## Visit our website

If you haven't already, check out our website, which is located at [www.LancasterLabsEnv.com](http://www.LancasterLabsEnv.com). Recently updated, the site contains company news, acreditations/certifications, departmental capabilities, career opportunities, technical information, and a literature request and comment form. We welcome your comments on how we can serve you better.

*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.*

With Lancaster Labs for 22 years, environmental group leader Bob Brown says, "I'm still so proud to work at a place where clients view us as the best lab in the industry. And when we can save a customer with timely data to help them make decisions—sometimes in disaster situations—I'm reminded how valuable our work is. Even though work and time-constraints can be challenging, our impact on helping the environment makes the hard work worth it."

#### **What does your current job entail?**

I'm the group leader/principal chemist of the Extractable Petroleum Hydrocarbons/Miscellaneous GC Department. In this role, I supervise/coach a core group of five chemists that primarily helps support the petroleum industry's compliance with environmental regulations as they are mandated from state to state. I assist the analysts with maintaining existing methods and setting up new ones, as well as getting my hands in and on the instruments as well! I interact with our client service reps and many times directly with our clients, providing follow up answers and guidance relating to their data. I also serve as a technical resource by speaking at conferences when able and doing webinars on specific petroleum-related topics that (hopefully) are of interest to our clients.

## People are the Chemistry



Bob Brown with his family  
Corah and Sarah

#### **What is the scope of your team as it relates to clients?**

The group's primary function is to support our petroleum industry client's extractable analytical needs. These methods consist of Diesel Range Organics (DRO), risk-based assessment Extractable Petroleum Hydrocarbon (EPH), Total Petroleum Hydrocarbons (TPH), and many state DRO/TPH methods. We also perform headspace analyses for dissolved hydrocarbons and carbon dioxide (CO<sub>2</sub>), the EPA's Pharmaceutical Manufacturing Industry (PMI) method, and are possibly the only lab that offers

EPA method 25D, which measures volatile organic content of waste materials.

#### **You've been here for 22 years and seen countless changes. Is there anything that hasn't changed during your tenure?**

I'd have to say the culture of commitment to meeting clients' needs has remained a constant. I can remember my first summer here (I was a tech doing TPH by IR extractions); the department I was working in got word of a very large incoming project. We immediately convened a meeting in which we tried to consider all aspects of the project, including arrival dates/times of samples, 7-day coverage, even ordering new glassware to accommodate the increased demands on the washroom turning over what inventory we had. This left an impression on me. I've seen countless examples like this ever since. Although there are always kinks to work out throughout most stages of projects, we've always been able to respond to those demands and changes and ultimately meet - and most times exceed - expectations through planning and communication.

#### **How does your team's work impact/benefit society?**

We do a lot to keep environmental regulations enforced as they pertain to petroleum contamination. This involves everything from groundwater contamination due to a gasoline tank leak to real estate transfers to unfortunate events such as major oil spill disasters. We are involved in all of them. We do everything we can to provide the best data possible so that the best decisions possible can be made.

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

I chase my 15 month old daughter, Corah, around...she's terribly cute, smart - and very mobile!

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## See us at...

Battelle: 6th International Conference Remediation of Contaminated Sediments	New Orleans, LA	2/7-10/11
Pittcon	Atlanta, GA	3/13-18/11
AEHS West Coast Conference	San Diego, CA	3/14-17/11
ACS National Meeting	Anaheim, CA	3/27-31/11
DoD Environmental Monitoring & Data Quality Workshop	Arlington, VA	3/27-4/1/11
Brownfields 2011	Philadelphia, PA	4/3-5/11
Pennsylvania Environmental Conference	Lancaster, PA	4/13/11
Sediment Management Work Group		4/11
Texas TCEQ Environmental Conference	Austin, TX	5/3-4/11
NJ Water Environmental Association Conference & Exposition	Atlantic City, NJ	5/9-13/11
EPA Quality Management Conference		5/11
Society of American Engineers Expo	Grapevine, TX	5/24-27/11

## 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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