Bridges

Connecting the Nation's Environmental Laboratories

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Environmental Measurements' Competency Policy for Assistance Agreements Forum

By Lara P. Phelps, Senior Advisor, US Environmental Protection Agency, Office of the Science Advisor

The US Environmental Protection Agency's (EPA's) Forum on Environmental Measurements (FEM) recently implemented an Agency-wide policy requiring assurance of competency by organizations generating or using environmental data under certain Agency-funded assistance agreements. Organizations must submit such documentation prior to award of the agreement, or if that is not practicable, prior to beginning any work involving the generation or use of environmental data under the agreement.

The Science Technology Policy Council (STPC) approved the Policy on December 12, 2012; recipients must comply by October 1, 2013. The Policy applies to competitive and non-competitive assistance agreements expected to exceed $200,000 (in federal funding), and that involve the generation or use of environmental data.

The Competency Policy was not intended to be a surprise, an "I gotcha," or a reporting burden in any way. The FEM intended to provide a check-and-balance for ten-year-old quality assurance (QA) and quality control (QC) requirements. In fact, for some measurement methods, these requirements have been in place since the very beginning of the Agency.

While QA/QC is nothing new, in March 2004, the FEM began paying attention to these requirements in a policy for Agency laboratories to demonstrate competency. These laboratories can demonstrate competency through a documented quality system and an external or third party assessment of that quality system.

Since then, the Agency released two policies for the competency of organizations receiving Agency-funds. The first – for acquisition agreements – was finalized in March 2011; the second – for assistance agreements – was finalized in December 2012. The Agency's Deputy Administrator, who was Acting Administrator at the time, also issued in March 2013 a requirement for all EPA field-sampling and measurement organizations to comply, or demonstrate competence, to a set of ten Field Operation Group Guidelines by 2016.

Quality system requirements for environmental data activities (i.e., generation or use) are not new and this policy verifies those performing such activities follow such requirements. Below are some examples of how information already required can be used for a demonstration of competency.

Organizations may submit a statement of competency accompanied by, or referring to, documentation applicable to the statement of work, such as:

- Current accreditation or certification documentation that includes the scope of accreditation, accrediting body and contact information;

continued on page 2

Inside this issue

APHL ASSOCIATION OF PUBLIC HEALTH LABORATORIES

continued from page 1

- Recent or ongoing participation in EPA accepted audits/assessments of proficiency, with results; external proficiency testing or round robin programs with provider and results; or inter-laboratory studies (other than proficiency testing);
- An organizational chart and position descriptions showing pertinent staff, like the quality manager, with major responsibilities and qualifications (e.g., position description, training certificates, degrees, active participation in quality assurance associations);
- Reported results from former quality assurance project plans (e.g., reviews, audits, assessments); or
- Reported results from recent or ongoing internal and external audits, including open and closed corrective/preventative actions.

Information is available through the FEM's website at http://www.epa.gov/fem/lab_comp.htm. The site also provides examples of competency demonstration and questions and answers to help further clarify the policy's application. Contact Lara Phelps, phelps.lara@epa.gov or 919.541.5544 with questions.

Environmental Public Health Fellowship Program: Workforce Development

By Alejandro Preciado, PhD, Environmental Public Health Fellow, alejandro.preciado@doh.hawaii.gov; and Alfred E. Asato, PhD, Coordinator, Chemical Response Laboratory, Hawaii Department of Health, State Laboratory Division, Laboratory Emergency Response Program, alfred.e.asato@doh.hawaii.gov

Many, if not most, environmental public health laboratories face the daunting task of recruiting, hiring and training young scientists to replace experienced personnel as they leave the workforce.

In 2012, APHL awarded the Hawaii Public Health Laboratory an Environmental Public Health Laboratory (EPHL) fellowship. This award enabled the laboratory to bring on-board a recent graduate from the University of Hawaii's doctoral chemistry program. The fellow focused on developing analytical methods for environmental contaminants and their metabolites in clinical specimens. These new, validated methods would then be applied to biomonitoring projects that otherwise could not be pursued due to manpower constraints.

Hawaii faces unique challenges because of its location in the middle of the Pacific Ocean. In an age of economic globalization, there is increasing pressure to advance development worldwide, often at the expense of environment and public health. For example, plastic detritus caught up in the Pacific Gyre, aka the "Great Pacific Garbage Patch," washes up on Hawaii shores every day. Moreover, agricultural and residential sources of environmentally-persistent chemicals lead to contaminated soils, and unexpected ecological disasters like the "Great Molasses Spill of 2013," and one quickly realizes the importance of biomonitoring studies to address our public health concerns.

At the onset, our EPHL fellow conducted an in-depth literature search and consulted local public health officials to identify and prioritize environmental contaminants that pose a potential long-term risk to public health due to chronic exposure. We focused our biomonitoring efforts on two environmental contaminants: phthalates and arsenic. Both EPHL biomonitoring projects hope to obtain baseline chemical exposure data for Hawaii's population.

The presence of these phthalates in the body may adversely affect the human endocrine and metabolic systems. Furthermore, this class of chemicals has been linked to undesirable health outcomes such as obesity, which is rampant in Hawaii. While exposure assessments collated in the National Health and Nutrition Examination Survey reports address phthalate levels in various populations, no such study exists for Hawaii. For our study we selected a small, but representative panel of phthalates, and modified an established gas chromatography–mass spectrometry method to measure levels in urine specimens collected from local residents at a hospital and clinical laboratory on Oahu.

For the ongoing arsenic biomonitoring project, we collected toenails from state laboratory volunteers to measure total arsenic levels by inductively coupled plasma-dynamic reaction cell-mass spectrometry (ICP-DRC-MS). This is an adjunct study to an earlier joint

continued on page 3

continued from page 2

Hawaii Health Department and CDC-ATSDR arsenic exposure investigation of a target population residing on former sugarcane lands.

Participating in the EPHL fellowship program allowed the fellow to gain valuable experience in method development for trace chemical analysis. There were many lessons learned through our early studies, most notably, that method development demands a quality system and hands-on approach not easily learned from textbooks. For example, the 2012 APHL publication "*Guidance for Laboratory Biomonitoring Programs: Developing Biomonitoring Capabilities*" was invaluable as a start-up tool for our projects.

In a time of diminished funding for public health laboratories, emphasis on workforce development must continue as public health laboratories strive to form collaborative efforts to train, develop and strategically place personnel. Forming collaborative efforts, like a fellowship, can greatly aid public health labs to develop research ideas while contributing to the capacity and efficiency of public health laboratories.

Editor's note: *For information on APHL's Environmental Public Health Fellowship program: http://www.aphl.org/mycareer/fellowships/environmental-health/Pages/default.aspx.*

Measurement of Enterovirus and Norovirus in Water by Culture and RT-qPCR Methods

By David Bina, Lance Presser, Steve Gradus, and Sanjib Bhattacharyya; City of Milwaukee Health Department Laboratory

Environmental surveillance of surface and other drinking water sources is an important function of the City of Milwaukee Health Department Laboratory (MHDL). MHDL began its environmental virology testing in 1994 in preparation for the Environmental Protection Agency (EPA) Information Collection Rule (ICR). The ICR was part of a national research project to support the development of national drinking water standards[1] and in no small way was in response to the Cryptosporidium outbreak in Milwaukee in 1993.[2,3]

The ICR collected data that included microbial pathogens, indicator organisms, disinfectants and disinfectant by-products present in drinking water sources from 296 public water systems that served at least 100,000 people. It ran from July 1997 through December 1998 and provided a clear picture of the inconsistency of source water quality (see Figure 1).

MHDL performed analysis for several aspects of the ICR, including virus testing[4] following the EPA Virus Monitoring Protocol.[5] Viruses were concentrated by filtering 200 liters of source water through an MDS Zetapor Virosorb filter. MHDL received the filters and eluted the virus with one liter of 2% beef extract. This eluate was further concentrated using the organic flocculation concentration procedure. Portions of the concentrated sample were inoculated onto Buffalo Green Monkey Kidney (BGMK) cells and these cultures were observed microscopically for 14 days for cytopathic effects, followed by further subculture to fresh BGMK cells for an additional 14 days. MHDL tested six water treatment plants' (WTPs') source water (two local and four out-of-state) and shared this data with the EPA to contribute to the nationwide data.

While the ICR procedure could detect mammalian orthoreoviruses and some culturable enteroviruses, it was unable to detect unculturable viruses such as norovirus or enteroviruses that do not grow on BGMK cells. To improve the detection of viruses, the EPA developed Method 1615 for measurement of enterovirus and norovirus occurrence in water by culture and real-time quantitative Polymerase Chain Reaction (RT-qPCR) assays.[6,7]

MHDL currently implements EPA Method 1615 by filtering and concentrating water samples similar to the original method. Subsamples are used for culture on BGMK cells and quantitative molecular assays for enterovirus and norovirus genogroups GI and GII. Hepatitis G is used as an internal control. While the culture portion of the procedure still requires 4 weeks, the qPCR analysis may be completed within 24-48 hours. This allows MHDL to provide valuable information to our WTPs in a more timely manner.

continued on page 4

continued from page 3

Method 1615 for monitoring water viruses is part of the third Unregulated Contaminant Monitoring Regulation which will occur during 2013-2015 to monitor 30 contaminants (28 chemicals and 2 viruses), and will provide a basis for future regulatory actions to protect public health. Public water systems serving 1,000 or fewer people can work with public health developments or contract reference laboratories to use EPA Method 1615 to monitor water contamination with enterovirus and noroviruses GI and GII.[8]

MHDL looks forward to using this method to better serve our WTPs and sewage districts, and to make excess capacity available to other facilities, as well as academic research partners.

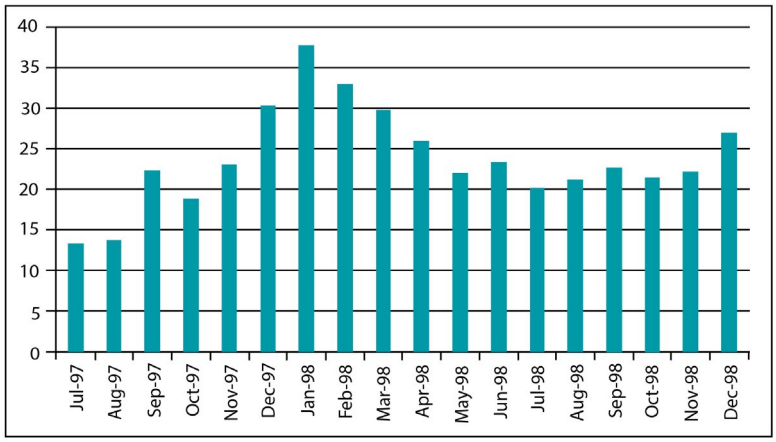

Figure 1. Percent treatment plants reporting a positive occurrence of virus during ICR period (http://www.epa.gov)

Acknowledgement: *We acknowledge technical support and EPA controls from Dr. Shay Fout, Environmental Protection Agency, Office of Research and Development, National Exposure Research Laboratory, Cincinnati, OH. We appreciate support from the Milwaukee Water Works and Milwaukee Metropolitan Sewerage District during the ICR study and virus monitoring sites. We thank MHDL staff Elizabeth Zembrowski for assistance in virus culture and Julie Becker for critical review of the article.*

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Indiana Laboratory System: 2nd Annual Environmental Members' Meeting

By Jyl Madlem, Laboratory Program Advisor, Indiana State Department of Health Laboratories

The 2nd annual gathering of the environmental water laboratorians, hosted by the Indiana State Department of Health Laboratories, kicked off at 8:30 am on September 16, 2013 in Indianapolis. Attendance increased 29% over last year to 36 environmental laboratorians representing 26 laboratories throughout Indiana and surprisingly, Kentucky.

The agenda expanded greatly over 2012's "let's get to know one another" strategy. Being the first meeting of its kind, and the culmination of a 2011 APHL Innovations Grant, not much was known about Indiana's water laboratories. The 2012 meeting introduced the members to one another, encouraged discussion of issues and concerns, and planted seeds for ideas related to disaster preparedness.

continued on page 5

continued from page 4

Attendees at this year's session involved senior members of the Indiana State Department of Health Laboratories staff, including: j

- Judith Lovchik, PhD, D(ABMM), Director;
- Lixia Liu, PhD, D(ABMM), Deputy Director;
- Phil Zillinger, Chemistry Division Director and Water Chemistry Certification Officer;
- Jyl Madlem, MS, MT(AMT), Laboratory Program Advisor; and
- Shelley Matheson, State Training Coordinator.

In addition, outside speakers offered sessions of interest to attendees.

Astbury Water Technology's John Rigdon spoke on laboratory quality, its importance, and best practices. John fielded several great questions from the group regarding proficiency testing, the frequency of testing, and wastewater certification in Indiana.

Stacy Jones from the Indiana Department of Environmental Management (IDEM) addressed issues such as the revised total coliform rule and a live demonstration of IDEM's new electronic reporting web portal (http://www.in.gov/idem/5964.htm). Many attendees were highly interested in this and eager to know when it is rolling out. Stacy also addressed wastewater certification from IDEM's perspective of system monitoring, funding and compliance.

During the Preparedness/Continuity of Operations discussion, Jyl Madlem presented a live demonstration of the WLA Tool Kit and what she called "Jyl's Gems"—items of potential importance to the attendees—including the Sampling Guidance for Unknown Contaminants in Drinking Water and the Water Laboratory Alliance Training Center.

Additionally, there were discussions of emergency preparedness in Indiana, including the importance of being prepared for bio- and chemical threats and also natural disasters. Recovery from tornadoes and floods are much more common in Indiana, and as a result, laboratories discussed the importance of knowing where to turn in the event these types of threats affect their laboratories.

Shelley Matheson, State Training Coordinator for the ISDH Laboratories, discusses the Indiana Laboratory System with Andrew Clifton from Environmental Certification Laboratories. Photo Credit: Lori Rector.

For example, Sherry Laboratories has five facilities throughout Indiana. If one of their laboratories is non-operational, they have the option to ship samples to another of their own facilities. However, Hoosier Microbiological Laboratories is a standalone laboratory, and when asked where they would ship their samples, Ken Kaufman replied, "Not to Sherry." While the group laughed at Ken's joke and the competitive nature of these laboratories, talk turned more serious with the point of knowing one another and having the infrastructure defined and in place to ship samples in the event of a disaster.

All attendees received a folder containing conference materials including new "hot links" on the Indiana Laboratory SharePoint Site, APHL's State Lab System diagram, EPAs Water Laboratory Alliance flyer, and a copy of Public Health Reports article on the Indiana Laboratory System. Credit: Jyl Madlem.

continued on page 6

continued from page 5

All attendees received a variety of resources to help plan their response efforts, including: the EPA Water Laboratory Alliance Response Plan toolkit and training materials, information on the Indiana Laboratory System SharePoint site, cards containing links to online resources, a copy of The Indiana Laboratory System: Focus on Environmental Laboratories article, as well as copies of the presentations.

Also new this year was the vendor hall; an addition stemming directly from the program evaluations from last year's meeting. There were a total of seven vendors present at this year's meeting. They were well-received and participants spent a great deal of time with them.

Program evaluations indicate all attendees were either very satisfied or satisfied with the registration process, the facilities, the material presented and speakers. The majority of attendees liked the interaction with other laboratorians the conference afforded. Among other comments was the appreciation for the informal atmosphere encouraging attendees to ask questions during presentations. There were several suggestions for topics and speakers for next year, indicating anticipation for the 3rd Annual Environmental Members Meeting.

If you are interested in learning more about Indiana's Environmental Members Meeting, including the resources made available and how to conduct your own meeting, contact Jyl Madlem at jmadlem@isdh.in.gov.

Benefits of Being an APHL Member: Leading the Way for Sound Science From Safe Drinking Water Determinations to Hydraulic Fracturing Impacts

By Martina McGarvey, DM, Pennsylvania Department of Environmental Protection, Bureau of Laboratories, Director, mmcgarvey@pa.gov

APHL membership offers a variety of benefits for environmental and agricultural laboratories by providing technical and leadership-learning experiences, including committee participation, online and hands-on training courses and annual conferences. APHL also offers scholarships for members subject to fiscal limitations for travel and training. A cooperative agreement with the US EPA allows APHL to provide many of these services. As the director of a state environmental laboratory, I believe that membership in APHL contributes to a solid foundation for meeting new technical, testing and accreditation requirements, even with reduced funding and a decreased number of laboratory staff.

The National Environmental Laboratory Accreditation Program accredits the Pennsylvania Department of Environmental Protection (DEP) Bureau of Laboratories (BOL) for drinking water, waste waters, and solid matrices. The DEP BOL provides analytical testing services primarily for the PA DEP programs to meet federal and state environmental statutes and programs such as the Clean Air Act, Safe Drinking Water Act, Clean Streams Act, Environmental Clean Up, Radiation Protection, PA Oil and Gas Act, and various Mining Reclamation regulations and monitoring. The PA DEP BOL also provides testing for other government agencies including the Susquehanna River Basin Commission, the PA Fish and Boat Commission, and the US Geological Service.

As the director of a state environmental laboratory, I believe that membership in APHL contributes to a solid foundation for meeting new technical, testing and accreditation requirements, even with reduced funding and a decreased number of laboratory staff.

To meet the needs of these diverse programs, APHL committees, workgroups, and listservs provide a cohort of experts from small municipal laboratories to state and federal laboratories to share knowledge, techniques, and collaboration addressing emerging issues such as hydraulic fracturing, harmful algal blooms, unregulated contaminants in drinking water, electronic data deliverables, and biomonitoring.

APHL resources directly support the PA DEP BOL with training for radiation measurements, radiation protection, Water Laboratory Alliance membership, Media Messaging, and Lean Management techniques. In addition, a peer-review of the PA DEP Laboratory by APHL provided suggestions for continuing laboratory systems improvements, support of technical and leadership training, and the administration of a public environmental

continued on page 7

continued from page 6

laboratory support community. The expertise provided by APHL members and resources support our continuing efforts to maintain well-managed and efficient laboratory operations.

I encourage environmental laboratories to consider membership in APHL to take advantage of the available services and benefits.

Editor's Note: *To learn more about APHL membership, see https://www.aphl.org/membership/Pages/default.aspx. To learn more about the PA DEP BOL, see http://www.youtube.com/watch?v=95tfUmb-CKQ.*

Upcoming NAMP Webinars for Radiochemistry

By Berta Oates, NAMP Administrator, boates@portageinc.com

In April 2012, the Department of Energy's National Analytical Management Program (NAMP) launched its first series of two-hour educational lectures on topics in radiochemistry conducted by renowned university professors and leading scientific experts. Since then, NAMP, in cooperation with the Environmental Protection Agency, other Federal agencies, and its university partners, has conducted 17 free, live, interactive conferences as part of an initiative to meet the expanding need for radiochemists in the US workforce. NAMP records and archives each presentation as an online resource vital to promoting and encouraging the field of radiochemistry as a career choice. Two NAMP radiochemistry webinars were awarded Continuing Education Credits from the American Academy of Health Physics: "Source Preparation for Alpha Spectroscopy," presented by Dr. Michael K. Schultz with the University of Iowa, and "Verification and Validation of Radiological Data for Use in Waste Management and Environmental Remediation," presented by Dr. Thomas Rucker with Science Applications International Corporation (now a part of Leidos).

The first NAMP webinar series, "Actinide Chemistry," included 11 presentations on actinide chemistry and one presentation on radium chemistry. The actinide chemistry series, which concluded in April 2013, laid the foundation for the current series, "Environmental Radiochemistry and Bioassay." In September, presenters David C. Burns, Bob Shannon and Dr. Robert Litman completed a two-part webinar on Gamma Spectrometry, marking the fifth of 12 planned webinars. Upcoming sessions in this series include Guide to Uncertainty in Measurement (GUM), Alpha Spectrometry, and Beta Spectrometry.

Radiochemistry webinars are scheduled well into 2015 and beyond. In April 2014, a nuclear fuel cycle series will begin, presenting topics ranging from uranium mining, nuclear fuel fabrication, nuclear fuel recycling, waste forms, and final disposal. Two additional series – on nuclear forensics and nuclear medicine – are in development.

With attendance at the live broadcasts totaling 3,100, and nearly 1,600 viewings of archived webinars to date, NAMP has taken great strides toward advancing knowledge of radiochemistry. For more information on NAMP, information on upcoming sessions, and to access the archived webinars, visit the NAMP website at http://www.wipp.energy.gov/namp/.

Upcoming NAMP Webinars

- Detection Decisions and Detection Limits – December 12, 2013
- Guide to Expression of Uncertainty in Measurement (GUM) – January 23, 2014
- Mass Spectrometry – February 27, 2014
- Alpha Spectrometry – March 27, 2014
- Applications in Liquid Scintillation Counting – April 24, 2014
- Unconventional Drilling/Hydraulic Fracturing and Natural Radioactivity – May 22, 2014

APHL Webinars for Environmental Labs

Efficient and Sustainable Laboratory Operations

This webinar will share some of the tools and approaches that have emerged over time to help organizations become more efficient, greener and more sustainable. Examples drawn from the network of public health and environmental laboratories will illustrate how these tools and approaches can work within a laboratory setting.

Improvement to Method 1623 to Detect Cryptosporidium

One global public health challenge is detecting pathogens in water. Advances in laboratory procedures are allowing for better detection of pathogens like Cryptosporidium— which can cause gastrointestinal illness. The illness may be severe and sometimes fatal for people with weakened immune systems. This program will discuss the newer procedures (with disperant addition) to improve the detection of Cryptosporidium in water.

Comprehensive Training Program for Environmental Chemistry Labs

The Colorado Department of Public Health and Environment's environmental chemistry laboratory has developed and continues to develop a comprehensive training program which utilizes documents and guidelines from the Clinical and Laboratory Standards Institutes (CLSI), the Environmental Protection Agency (EPA) and the FDA. This program will discuss this comprehensive program, lessons learned and the application of the training program across diverse laboratory work units (Microbiology, Newborn screening, etc.).

Join APHL—an Association for Environmental Laboratory Leaders

APHL serves as a focal point for environmental laboratory communication, training, policy and interactions with the federal government.

An Associate Institutional membership with the Association of Public Health Laboratories offers environmental laboratory directors and their staff opportunities to connect with their counterparts from across the country to address shared issues and strengthen relationships with other health decision makers at the local, state and federal level.

Membership benefits include:

- Networking and laboratory linkages
- Professional development and training
- Policy and regulatory updates
- Technical assistance
- Unlimited access to APHL's Member Resources Center

For an application, visit https://www.aphl.org/membership/Pages/default.aspx

New Associate Institutional members receive a discount of 50% their first year of membership.
Questions? Contact Drew Gaskins, associate specialist member services, at 240.485.2733 or drew.gaskins@aphl.org

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The Association of Public Health Laboratories is a national non-profit located in Silver Spring, MD, that is dedicated to working with members to strengthen governmental laboratories with a public health mandate. By promoting effective programs and public policy, APHL strives to provide public health laboratories with the resources and infrastructure needed to protect the health of US residents and to prevent and control disease globally.

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