Laboratory Practices Committee Newsletter
Volume 5, Issue 1

Up Coming Events

WEFTEC Hybrid Event
October 5 - 7, 2020
New Orleans, LA

Covid-19 On-Line Resources

Current Priority: Corona Virus
WEF

Coronavirus (Covid-19)
CDC

Coronavirus (Covid-19)
USEPA

Clean Water Regulatory Issues in a Pandemic
WEF

Pandemic Continuity of Operations Essential Personnel
WEF

Overview of the Coronavirus, Transmission and Operation
California WEA

From the LPC Chair

So much of our lives have changed due to the Covid-19 crisis. Shelter in Place orders have caused water and wastewater laboratories to rethink their operations. We are identifying critical analyses, adjusting schedules, reorganizing priorities. Some of us are calling in favors just to make sure our staff have necessary PPE.

This issue of the LPC e-News has a Covid-19 focus with an article on how some labs are responding to crisis, a PPE lab quiz, and a list of on resources. It also includes our regular Lab Spotlight column and a summary of Bill Lipps' presentation on *Standard Methods* updates.

While our communities routinely take our work for granted, we are essential workers. Operators, engineers, scientists, and managers use the data we produce to ensure the quality of waters. Please stay safe and healthy.

Mary Johnson

P.S. Labs are doing innovative things to make sure their employees have the proper PPE. The last three pages of this newsletter is a procedure for sterilizing N95 masks provided by the City of Santa Cruz.

Standard Methods Update

Bill Lipps, from Shimadzu Scientific Instruments is the Part 4000 coordinator and the AWWA representative on the Joint Editorial Board (JEB) for Standard Methods. He is also a recipient of the ASTM International Award of Merit. Bill gave a talk on Standard Methods on the January 2020 WEF LPC Full Committee call.

Highlights from the talk:

- The online version of Standard Methods is being reformatted so that it's searchable.
- All editors for the 24th edition will be new. There will also be new part coordinators (PC) including part 1000. Terry Baxter and Dr. Ellen Braun-Howland are the WEF representative and the APHA representative on the JEB, respectively.
- There are a couple of new methods, including a Peracetic Acid method.
- The procedure for developing a method is (briefly): A joint task group (JTG) develops and writes a draft method. The draft is passed to the part coordinator who, following review, either sends it back to the JTG or forward to the JEB liaison and Standard Methods Manager. The JEB liaison edits the draft before sending it to the managing editor who reviews for style, grammar and readability, At this point the draft moves to the JEB for balloting. If balloting shows draft is unsuitable, the draft goes back to the JTG via the PC. Otherwise, the ballots are submitted to the managing editor who incorporates them into the draft and reviews for style, grammar, readability. The draft is then submitted to the main committee for balloting. The development process can take years depending on the complexity of the method and the time commitment of the JTG.

Volunteers are welcome! Volunteer responsibilities include writing and/or modifying methods and answering questions. If interested, please contact Bill Lipps.

Article written by Beth Conway
Photo courtesy of Society for Mining, Metallurgy, and Exploration

Laboratories adapt to working under Shelter in Place Conditions.

The emergence and spread of SARS-CoV-2 has resulted in the need for people to avoid proximity with each other to prevent transmitting or contracting the disease. For those who work in a critical infrastructure sector, such as wastewater, precautions are of double concern. Critical functions within wastewater treatment plants must stay operational to provide clean water and protect the health of the public. Laboratories are one of the critical functions. Five members of the WEF LPC Leadership Team provided information on how their lab has adjusted workplace procedures to ensure essential lab services continue to be provided.

All of the labs that responded have multiple precautions in place. Tactics fall into general groupings of physical separation, workload adjustments, disinfection, and outreach:

Physical Separation

- Split staff into shifts with shifts alternating on a half-weekly, weekly or bi-weekly schedule
- Use of PPE/masks and/or physical distancing where employees are in same setting
- Work from home where possible
- Electronic communication (e.g. Microsoft Teams)
- Samples are left at the door/window

Workload adjustments

- Testing only regulatory samples
- Testing essential NPDES and pretreatment samples
- Suspension of most voluntary and process control samples

Disinfection

- Sanitizing lab work areas and personal areas between shifts
- Sanitizing common areas daily

Outreach

- Arrangements to have other labs to serve as backup if needed

Additionally, one lab is assisting outside organizations in the city by sterilizing N95 masks to help meet need for masks.

For details, read on -

City of Santa Cruz, Ca

The entire lab is compliant with the demands for spatial separation by two tactics:

1. Scheduling: One microbiologist is in one week, and the other is home (paid);
2. Chemists are also similarly staggered in their schedule, we have three of those.
3. The QA/QC Chemist and the Microbiologist III can do data review and other non-bench work through VPN access into the network on days they are not here. The lab prepped laptops they can take home and return when they come back to work.

The City of Santa Cruz Environmental Laboratory converted its Biosafety II hood into a full-time N95 mask UV sanitization station as of April 1, to assist the local hospital, and the EOC (headed by the City's Fire Chief) because of the ongoing demand pressure for these masks.

We have established a protocol, publishable, if you want, to access the services, as well as laboratory protocols for handling, sterilizing and returning the masks to the original requesters.

Our lab has two staff microbiologists, and the junior one has now run a couple of UV sterilization of used masks satisfactorily.

Laboratories adapt to working under Shelter in Place Conditions (continued)

In addition, we have purchased back-up UV lamps for the hood. (The specs for the bulbs are 6000hrs, and we do not know how long this demand will last).

We have also submitted a letter of interest to participate in the Biobot sampling project to utilize wastewater influent as reliable index of the course of this (and future) pandemics. We received their sampling protocol, and expect to start sampling in May 2020.

Please see the attached picture of the UV hood used to sterilize masks [Following this article].

The protocol can be found at the end of this newsletter. Courtesy of Dr. K. Mohammad, City of Santa Cruz Environmental Laboratory

Deep Creek Lake Laboratory, Garrett County Public Utilities, Garrett County, Md

We are a small lab operation of two full time and one part time lab personnel including myself. Unfortunately, my part time tech retired just before things got bad and now my full time tech is out sick, non-Corona related but sick means Covid-19 testing and off until a negative result comes back. That leaves just me. Easy to avoid social interactions but still need to get the work done. We are a utility that operates 10 wastewater plants and 14 water systems so the NPDES permit and SDWA analysis are ongoing. Concerned about the samples if I were to get ill, I had to set up a system of three different labs covering two states to cover the required samples in the event I am not available. One lab will do our drinking water bact's, one lab will do our wastewater e.colis and the other lab will do all the remaining NPDES parameters. I hope it doesn't come into play but we are covered if needed. I need a raise!

The rest is similar to other responses, leave samples at door, come in only if wearing a mask, and maintain social distancing.

City of Peterborough, Environmental Protection Division, Ontario, Canada

- Lab Manager and QA/QC Chemist working from home
- Staff of 6 split into 2 shifts, each working half of the week
- Sanitizing before and after each shift
- Plant staff/sampling staff not to enter lab-samples set just inside lab door.
- Masks to be worn if staff need to pass each other/be in the same room.
- Communication and meetings through Microsoft Teams.
- External cleaning company disinfecting common areas daily (kitchen, washrooms, etc)
- Only testing regulatory samples.
- Glass window separates sample receiving staff and public dropping off samples.

Rock River Water Reclamation District Rockford, IL

In the RRWRD's lab of six people we have both reduced workload to essential NPDES and pretreatment testing and divided staff into two teams which work 14 days on and then have 14 days off. The goal is not to "cross-contaminate" and to have a team ready to cover if the working team has to shelter in place. We continue to accept some contract work. Clients are asked to deposit samples and documentation in a cooler located outside lab entrance to minimize contact between lab staff and delivery services.

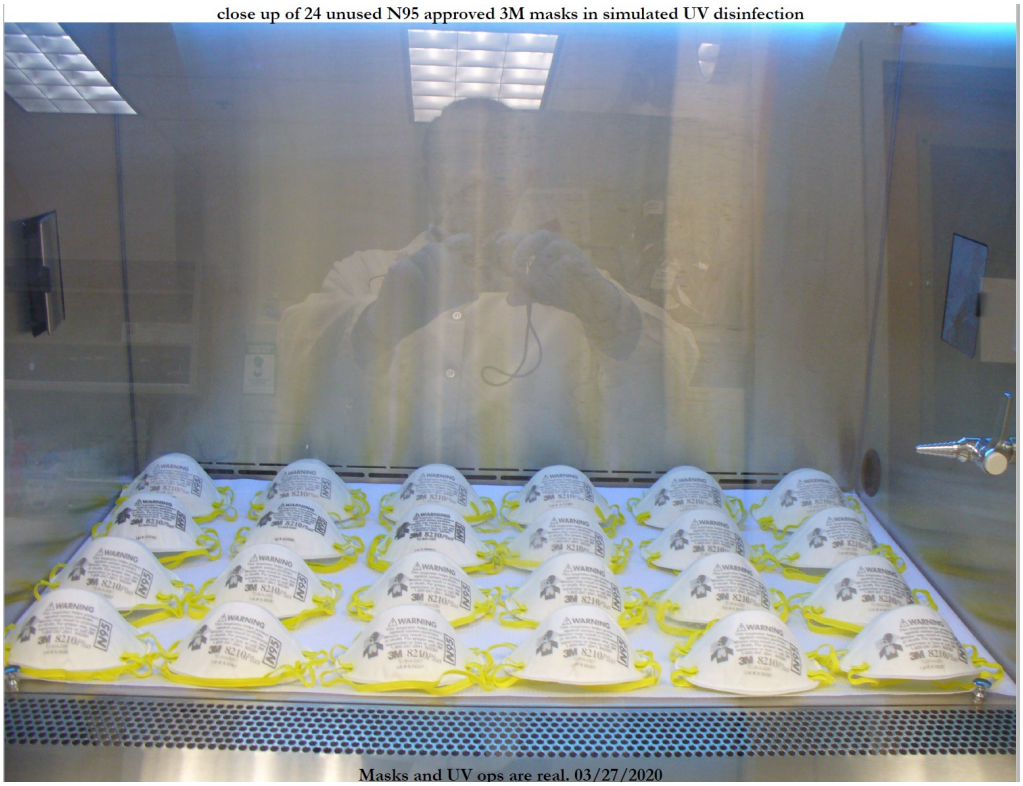
Laboratories adapt to working under Shelter in Place Conditions (continued)

Charlotte Water, Charlotte NC

We have a staff of 50. The Administrative Officer only comes in a few hours a week. Our Assistant QAO is working from home. The QAO, Lab Supervisors and I are alternating days on-site, but most are here 2-3 days/week. Field staff is working a normal schedule, but are using PPE and social distancing when they are in the Lab together. Analysts are divided into teams that alternate a M-W and Th-F schedule. Weekends are covered by 2 Analysts who are working in different sections of the lab. We have a day porter M-F to wipe surfaces, door handles, etc. All staff wipe down the lab work areas, their keyboards, offices, etc. when they arrive and when they leave for the day.

Clients have been contacted and most voluntary monitoring and process control samples have been suspended. Regulatory samples, including Industrial User monitoring, are being processed normally.

close up of 24 unused N95 approved 3M masks in simulated UV disinfection



Masks and UV ops are real. 03/27/2020

City of Sana Cruz, Ca mask sterilization

Photo courtesy of Akin Babatola/City of Santa Cruz, Ca

Article written by Beth Conway, Akin Babatola, Dale Baker, Krista Thomas, Mary Johnson, Myra Zabec-Thompson

Spotlight: Cypress Environmental Laboratory - City of Wichita Falls, TX

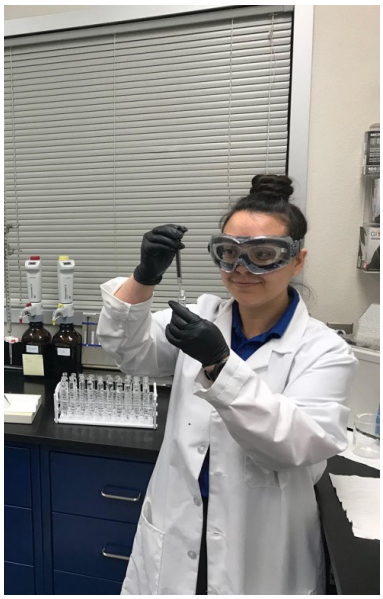
1. What is the name and location of your facility?
   Cypress Environmental Laboratory, City of Witchita Falls, TX
2. What is the average daily flow (MGD)?
   20 MGD, Maximum capacity 76 MGD.
3. How many analysts and/or technicians work in the laboratory?
   Lab staff of 3: 1 Lab Supervisor, 1 Senior Lab Tech, 1 Lab Tech 1
4. What analysis do you perform?
   We have historically analyzed drinking water and surface water samples. In 2014 we began operation of the largest Emergency Direct Potable Reuse (DPR) system in the world, and began analyzing wastewater effluent. The DPR was decommissioned in 2015 after record-breaking rainfall and we transitioned to an Indirect Potable Reuse (IPR) system.

   Now we monitor drinking water, surface water, wastewater effluent, and unknowns for:

   - Micro – Coliform P/A, E. coli Enumeration, Enterococci, Pseudomonas, Legionella, Actinomycetes, Algae/Cyanobacteria counts/speciation, Cyanotoxin-producing genes, and zebra mussels
   - Analytical – wet chemistry, anions, cations, TOC/DOC, metals, TTHMs, HAA5, Taste & Odor compounds (Geosmin, MIB, IPMP, 2,4,6-TCA, etc.), uknowns by FTIR
5. Do you accept samples for analysis from outside sources?
   We assist other municipalities as requested, but we do not do any contract samples.
6. Do you have one or more contract labs you send samples to for analysis?
   Yes, we contract out Crypto/Giardia, Total Culturable Viruses (TCV), Coliphage, and TCLP on sludge.
7. What instrumentation do you use?

   - TL2300 turbidimeters
   - DR6000 spectrophotometer
   - KEM autotitrators – hardness, alkalinity, chlorine speciation, chlorine dioxide
   - FlowCam – Algae/Cyanobacteria counts/speciation, particle counts, and zebra mussel detection by cross-polarization light microscopy (XPL)
   - QuantStudio 5 qPCR – Cyanotoxin-producing genes, zebra mussels
   - TOC analyzer – TOC/DOC by NPOC
   - Ion Chromatograph – 9 anions and 6 cations
   - ICP-MS – 22 metals
   - GC-MS P&T – TTHMs, BTEX
   - GC-ECD – HAA5
   - GC-MS/ECD – Taste & Odor compounds (all T&O compounds on the Standard Methods T&O wheel SM 2170
   - FTIR – unknowns
   - RadSeeker – unknown radiologicals

Spotlight: Cypress Environmental Laboratory - City of Wichita Falls, TX, continued



7. Do you utilize a LIMS system?
   No.

8. What sort of certification or licensure is required/encouraged for your workforce?

   - We require the Lab Supervisor and Senior Lab Tech to have a Bachelor's degree in Biology, Chemistry, or related field, and they must obtain a Class B Surface Water Treatment Operator license from the TCEQ.
   - We require the Lab Tech I to have an Associate's degree or equivalent experience, and they must obtain a Class C Surface Water Treatment Operator license from the TCEQ.
   - All staff are strongly encouraged to obtain a Class C Wastewater Treatment Operator license from the TCEQ due to our work with wastewater reuse.

9. Are there any 'out of the box' or 'pilot' testing your lab has assisted with?

   - Direct Potable Reuse – 2014-2015
   - Indirect Potable Reuse – 2017-Present
   - Taste & Odor Monitoring Program – 2016-Present

10. Is there anything unusual or special about your facility or lab?
    Our lab's analytical capabilities helped with the TCEQ approval of the Emergency DPR system in 2014. The ability to analyze samples for same-day results is very important when doing DPR. Since adding wastewater testing, we have become more of a truly environmental testing lab analyzing all types of waters.

11. Is there anything else you would like to share?
    We began operating a Taste & Odor monitoring program in 2016 due to frequent T&O outbreaks and customer complaints. We use Algae/Cyanobacteria speciation to categorize into T&O-producing groups to monitor reservoirs. We also perform monitoring by GC-MC/ECD to detect and quantify T&O compounds, so that we can begin treatment to eliminate the issue before it gets into the distribution system. As of today, we have gone 1,277 days without a customer complaint for T&O, and have had over 12 T&O episodes successfully mitigated.

    Our work on this was published in Opflow in 2018 and has been presented at: EPA Drinking Water Workshop 2019 – Cincinnati, WQTC 2019 – Dallas, NALMS 2019 – Burlington, Water Research Foundation Cyano Workshop 2020 – Denver, and is scheduled for presentation at ACE 2020 – Orlando, and Texas Water 2020 – Fort

    Due to the operation of our IPR system, we also perform in-depth testing on our wastewater effluent and monthly testing on our reservoir, comparing the wastewater effluent to the surface water to determine the effect it is having on the lake.

    Our reuse system has been featured in many case studies and also highlighted in Treatment Plant Operator in 2016.

Lab Spotlight written by Hunter Adams Photos courtesy of Hunter Adams

Lab Quiz

Communities depend on laboratories producing accurate and timely data in — or especially — during a pandemic. Check your knowledge of proper PPE and working under Covid-19 conditions.

1. True or False

   Employers must provide and maintain personal protective equipment (PPE) for laboratory employees.

2. True or False

   Personal Protective Equipment eliminates laboratory hazards.

3. True or False

   Common prescription eyeglasses are an acceptable substitute for safety glasses.

4. True or False

   Choosing a suitable glove material for the specific chemical exposure is the most important factor in providing adequate hand protection.

5. True or False

   There is no cure for noise-induced hearing loss, so prevention of excessive noise exposure is the only way to avoid hearing damage.

6. Which types of protective equipment are typically used in water and wastewater laboratories?

   a) protective work gloves
   b) lab coats
   c) eye protection
   d) head protection
   e) a, b, d, and d
   f) a, b, and c only

7. The CDC says the best way to prevent illness associated with Covid-19 is to avoid be exposed to the virus. Which of the following do they recommend?

   a) Clean your hands often
   b) Avoid close contact
   c) Cover your mouth and nose with a cloth face cover when you are around others
   d) Cover coughs and sneezes
   e) Clean and disinfect
   f) All of the above

8. True or False

   You can spread Covid-19 to others even if you do not feel sick

9. True of False

   Cloth face covers are meant to protect you from someone who may be sick.

You can find the answers on page 6 of this newsletter.

Lab Quiz: Answers

1. True.

2. False. PPE does not eliminate laboratory hazards. If the equipment fails, or if it is used incorrectly, exposure will occur. To reduce the possibility of failure, PPE must be properly fitted and maintained in a clean and serviceable condition. Also, employees must be trained in proper us of PPE.

3. False. Prescription eyeglasses must be fitted with protective lenses. If eyeglasses do not have protective lenses, the employee may use goggles that can be worn over the glasses or goggles that incorporate corrective lenses mounted behind the protective lenses.

4. False. A glove's physical properties are equally important. Select the glove that has the proper chemical resistance and provides the abrasion, tear, flame, and puncture resistance required for the job.

5. True.

6. (f) Water/wastewater laboratories seldom require head protection, but field work may require such protection.

7. (f) All of the above

8. True

9. False. The cloth face cover is meant to protect other people in case you are infected

Resources:

Standard Methods Online, Part 1000, 1090 Laboratory Occupational Health & Safety (2017)

CDC Website: *https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/prevention.html*

Lab Quiz written by Mary Johnson

LPC Chair:
Mary Johnson
Rock River Water Reclamation District
mjohnson@rrwrd.illinois.gov

LPC Vice Chair
Jim Burks
City of Springfield Environmental Services
jburks@springfieldmo.gov

WEF Staff Liaison:
Beth Conway
econway@wef.org

Educational Content Sharing

In an effort to share best practices, innovation and the latest information for lab analysts, the WEF Lab Practices Committee (LPC) will link to educational content that has been used (and is owned) by WEF member associations. (WEF LPC is not hosting the material but is linking to it.)

The goal of this effort is to provide a warehouse of useful webcasts, seminars, etc. that can be accessed by audiences from all over the country. We believe that there is material that just needs to be shared in order to educate larger audiences.

Please contact John Rigdon, jarigdon@gmail.com, with suggestions of webinars/workshop content that you recommend we obtain or with topics you would like to see.

Check out the WEF website LPC page to see the first contribution to our first Content Sharing project: IWEA's Laboratory Workshop Handbook.

On-Demand WasteWater Library

The OWWL (On-Demand WasteWater Library) steering committee is looking for volunteers to either write or review operator fact sheets. The topics to be covered include BOD, coliforms, pH, chlorine residual and DO. If interested or would like further information, please contact Krista Thomas at kthomas@peterborough.ca

OWWL
ON-DEMAND WASTEWATER LIBRARY

"Celebrating Lab Week in the Midst of a Global Pandemic

Next week is Lab Week (April 19-26), a time to celebrate all the ways laboratory professionals keep our communities safe and healthy. This year, with public health laboratories surging to handle the enormous COVID-19 testing loads, the vital importance of laboratories is more obvious than ever.

It also means that you are busier than ever, so APHL will be postponing our formal Lab Week celebrations until September (exact week TBD) so that everyone can fully participate. That being said, we hope that you still take some time next week to celebrate your hard work and perseverance, take heart from your colleagues near and far, and know that you are greatly appreciated."

Article courtesy of APHL

About the LPC

The Water Environment Federation's Laboratory Practices Committee (WEF LPC) is made up of volunteer members from academia, consulting firms, utilities, government agencies, and manufacturers.

WEF LPC develops technical products to promote general understanding of laboratory practices for water and wastewater.

Membership is open to all WEF members.

If you would like to be on the mailing list for this newsletter, send your name and email to econway@wef.org

The SARS-CoV-2 pandemic resulting in COVID-19 morbidities and mortalities has stressed global supplies of PPEs and especially fresh supplies of N95 respirators (N95). The City of Santa Cruz City recognized these constraints and resolved to extend the stockpile of N95s in Santa Cruz City and reduce risks associated with reuse of untreated, contaminated N95. The City also recognized that:

1. Ultraviolet germicidal irradiation (UVGI) has been shown to effectively inactivate a wide range of human pathogens including coronaviruses and other human respiratory viruses;
2. UVGI has been demonstrated to inactivate human respiratory viruses, including coronaviruses, on various models of N95s;
3. Levels of UVGI needed to inactivate human respiratory viruses are well below the level of irradiation that adversely affects the fit and filtration characteristics of N95s; and
4. UVGI can be safely administered when appropriate safeguards are in place.

The City's Environmental Laboratory; working with the City's Emergency Officer developed the procedure illustrated with a photograph and flow chart below, to be run in the laboratory under the supervision of Environmental Microbiologist III, Mohammad Karim PhD to eliminate risks associated with reuse of untreated, contaminated N95s.

FLOW CHART FOR UV DISINFECTION OF MASKS

1. **Use appropriate PPE (Disposable lab coat, N95 mask, safety goggles, face shield, long sleeve gloves) before handling soiled masks**

2. **Place the soiled masks with COC on the RED cart outside the microbiology lab**

3. **Receive the soiled masks through the window and place the masks with bags in the cooler on the GREY cart inside the microbiology lab. Sign the COC and make a copy to hand out to the courier.**

4. **Bring the cart in the main lab next to the Biosafety hood (BSL 2 hood)**

↓

5. **Transfer bags containing masks into the Biosafety hood.**

↓

6. **Carefully take out the masks from the bags inside the biosafety hood.**

↓

7. **Place a maximum of 16 masks in a batch inside the biosafety hood as shown in the picture; also place the COC on one of the inside walls of the hood for the process**

8. **Close the sash of the biosafety hood. UV light will turn on and the treatment will start.**

9. **Halfway through treatment the light automatically turns off. At this point, open the sash and carefully flip the masks on their surface and repeat step 8 until the UV light turns off again.**

10. **At the end of the UV treatment, place each mask in a clean Ziploc bag.**

11. **Place the clean masks inside the cooler on the white cart and bring the cart outside the lab in the designated mask pick up area**

12. **At the end of the decontamination process, place all the PPE and soiled bags that came with the masks in the autoclave bag and process immediately.**

(Total dose of UV irradiation per mask 50J).