CONCURRENT SESSION 4 – COVID-19 DECONTAMINATION RESEARCH EFFORTS

Questions and Answers

- **U.S. EPA:** Question for Vipin: Maybe I missed it, but what is the active ingredient chemical in Bioxy? Is it PAA?
  - **Vipin Rastogi, U.S. Army:** Bioxy, when dissolved in water, creates peroxyacetic acid and peroxide.
- **U.S. Army:** Question for Vipin: Thank you for the presentation. What was the starting number of viruses for the coupons?
  - **Vipin Rastogi, U.S. Army**: We were spotting roughly between 4.5-5 in the coupon, which was dried for 30-60 minutes, and we recovered 4-4.5, depending on the material. There was some loss during drying, which was not significant.
- **Lawrence Livermore National Lab:** Question for Vipin: Good study and presentation! I might have missed something with the audio issues about the medium change. With this step, is there a concern about loss of virus, or this was not observed with controls?
  - **Vipin Rastogi, U.S. Army**: With the median change, it will also change the control. The controls and tests were done in a similar fashion. I would say no virus was lost. What was lost, was lost in the control also. The median change was in the first 30-60 minutes.
- **Anonymous:** Question for Vipin: I did not hear the question and answer regarding viruses. Could you please repeat? Thanks.
  - **Vipin Rastogi, U.S. Army**: The total number of viruses ranged from 4.5-5. There was about a half-log drop. The loss of virus during drying during 60-minutes was not significant.
- **Anonymous:** Question for Leroy: Have you looked into PPE sterilization using ionized hydrogen peroxide (iHP)?
  - **Leroy Mickelsen, U.S. EPA**: Personally, I have not. The goal of this study was to use something that is easy to use that someone in a rural area could use to disinfect their respirator.
- **Anonymous:** Question for Leroy: Was the color change of the chemical indicator correlated with virus inactivation on the masks?
  - **Leroy Mickelsen, U.S. EPA**: No, there was no correlation. We did not use any viruses in this study. In my presentation, I referred to a couple of studies that even at 5ppm of hydrogen peroxide, if you ran it long enough, it would be efficacious for anthrax. There was another study where the dose of 50ppm hours was effective. When we look at the market, we see that we could find chemical indicators that change at a higher value. The one came across at 200ppm hours.
- **U.S. EPA:** Question for Leroy: Was there any degradation to the elastic bands after being exposed to the hydrogen peroxide? Do you think this could be repeated many times?
  - **Leroy Mickelsen, U.S. EPA:** We did not do extensive testing. We certainly examined them and did not notice any degradation. There have been other studies where they did multiple cycles of hydrogen peroxide exposure. They tested and did the degradation. The degradation comes in when you are wearing the respirator more than the decontamination process. One of the issues is that

when you are using them, if they get contamination on them (lipstick, makeup, etc.), it could hide the virus and not be as effective.

- **Anonymous:** Question for Leroy: I might have missed it – why did you decide on a target of 200 ppm hours instead of the 50 ppm hours you discussed at the beginning?
    - **Leroy Mickelsen, U.S. EPA:** We did not find that there was a readily available 50 ppm hours chemical. We wanted to use something that was already on the shelf.
- **Anonymous:** Question for Frances: Given the CDC states the risk of infection from fomite transmission is >1 in 10,000, do you think the reduction in absenteeism and in infections after using the system is from other factors (i.e., infection prevention, facemasks, etc.)?
    - **Frances Grinstead, CURIS System, LLC**: It is hard to be sure where people are exposed and why these things happen. There are several factors that play into this. The surrounding counties that had similar PPE uses and similar infection control methods, and use a different disinfectant, yielded different absentee rates. We cannot be 100 percent sure. It is a good indicator that we contributed to the reduction of absenteeism.
- **Anonymous:** Question for Frances: What is the expected or required hydrogen peroxide vapor concentration from the Curis system? Are there associated contact time requirements or maximum room volume limits? Thank you.
    - **Frances Grinstead, CURIS System, LLC**: The hydrogen peroxide ppm within our system operates differently than a vapor system, so you will see a lower ppm. Our 139ppm is what we expect to see. When we are measuring it and taking data, we have seen as high as 180ppm. As far as how big is the space that Curis is approved to work within, most disinfectants of this type are relegated to efficacy within the restraints of the area that have tested in. I think it is between 3600 and 3700 cubic feet.
- **Lawrence Livermore National Laboratory**: Question for Frances: Thanks for the good presentation. Does Curis recommend use of biological indicators to assess efficacy?
    - **Frances Grinstead, CURIS System, LLC**: Yes, we absolutely do. It is one of the ways you can make this science driven. Chemical indicators for us are an indication that hydrogen peroxide reached an area, not an indication of efficacy. Obviously if we are going for scary things like Clostridioides difficile, and other challenging organisms, we would want to incorporate the use and highly recommend incorporating the use of biological indicators. We feel like if our customers use this, they can get a good feeling that they had a successful decontamination in that space when used.
- **Defence Science and Technology Laboratory**: Question for Frances: Frances, very impactful work. My question is whether the level of relative humidity in the environment affected the peroxide dose applied to the surfaces using the fogging system and if so, how this application was managed.
    - **Frances Grinstead, CURIS System, LLC**: In this particular study, this is an exercise in the versatility and the ability for these different areas to loan and use and trade these devices and use them simply. It is a testament to the staff and the preparation to be able to do this. These foggers are designed to operate in a relative humidity in indoor spaces. That is why they all had extensive training ahead of time, to be sure they would be able to compensate for that.
- **Anonymous**: Question for Emily: I might have missed it, but what was the RH in the facility during fumigation? Were there any negative material interactions with the ClO_2?
    - **Emily Lorcheim, ClorDiSys Solutions, Inc.**: The humidity was 75% RH and we usually have success at 65% or higher. Since we validated the study at 75% previously, that is what we used.

There were not too many items in the room to begin with, but in general, chlorine dioxide is gentle. Very gentle solution as compared to other decontaminating agents.

- **START R10 Contractor**: Question for Emily: Were background concentration for Beta-lactam taken to compare before and after treatment of the ClorDiSys?
    - **Emily Lorcheim, ClorDiSys Solutions, Inc.**: What we did for the chemical indicators, was make a cocktail of what is typically used in that facility prior at a higher concentration than they actually did use. They then monitored that again to make sure we had elimination.
- **Framergy, Inc.**: Question for all presenters: What do you think about passive methods such as visible light active photocatalyst materials used as surface coatings? These materials do not use an active agent.
    - **Emily Lorcheim, ClorDiSys Solutions, Inc.:** We also do UV light disinfection. I work with a medical doctor in Puerto Rico, and we did a paper in collaboration with several doctors that compared invisible light as a method of disinfection such as UVA and UVB. We saw that had very minimal disinfectant capabilities. In some areas of the world that have restrictions to clean water, they will take water bottles filled with water to try to disinfect it, and that alone takes many hours and many days. Our devices will often, at a 10-foot distance, you can get a 99 percent or higher spores within 5 minutes. In relation to that, it is very quick. Visible light will be a long timeframe.
    - **Frances Grinstead, CURIS System, LLC**: Currently, the studies indicate that these methods decrease over time. There are promising studies out there. I am not sure that we are there yet to say that it is an approved method. On the amount of time it takes to be able to effect a kill fast enough, in a pandemic situation, we are talking about responding quickly. We do not have the luxury of giving it exposure over a long period of time. Our study done by Penn State University on respirators shows complete reduction and comparing that to what happens when you dry these masks. When you can treat these masks with a disinfectant or a proven system with the proper systems and protocols, done correctly and in a timely manner, it is effective. I think that in a pandemic situation, we must look to that to do it quickly.
    - **John Archer, U.S. EPA**: We did have a poster presented earlier in the week. If you have any more questions about that, we have done follow-on work to Leroy's work.