

## CONCURRENT SESSION 5 – WASTE MANAGEMENT

### Questions and Answers

- **U.S. EPA:** Question for Marissa: Is there a role for community members in your focus groups, perhaps those who have experienced disasters and waste/debris issues?
  - **Marissa Matsler, Oak Ridge Institute for Science and Education Research Participant with U.S. EPA:** Yes – thanks for that question – I think there is a lot to be learned from communities about how disasters unfold. Currently we are trying to figure out how we are going to be including community groups in our current study. We have mostly been talking, as I mentioned to folks, working for the government on that side of things, but when we get into our case studies, we are really looking forward to hearing from community groups and their experiences on the ground.
- **U.S. EPA:** Question for Marissa: Have you decided what incidents your case studies will cover? If yes, what incidents are you focusing on?
  - **Marissa Matsler, Oak Ridge Institute for Science and Education Research Participant with U.S. EPA:** We are currently not sure; we are still hovering around a few different ideas. Some of the incidents that have risen to the top for us right now are wildfires – particularly the 2020 Oregon wildfires – we are also looking at Hurricane Maria – we have heard a lot about the response to Hurricane Maria especially in Puerto Rico, so that might be one of our studies. It was also really great to hear, in this session, about the work on animal carcasses – that has also been something folks have brought to the fore, especially from APHIS. So, we are also hoping to look at avian flu, perhaps, in poultry as another case study.
- **U.S. EPA:** Question for Lindsay: Did you take African Swine Fever Virus (ASFV) samples of muscle or bone tissues prior to composting, and if so, what level were they?
  - **Lindsay Gabbert, U.S. Department of Homeland Security:** Thank you for that question. In this particular study, we did not take samples of bone marrow or muscles, just because we wanted to leave carcasses as intact as possible for the study. However, we do know based on literature and other ASFV clinical studies that it is present in those tissues, and we would expect it to be present for the longest amount of time in the bone marrow.
- **U.S. EPA:** Question for Lindsay: What is the purpose of the wood chips, is this to limit the movement of the aqueous waste?
  - **Lindsay Gabbert, U.S. Department of Homeland Security:** I am not a composting subject matter expert, but I have been told that the base carbon materials – the wood chips – is actually used to allow oxygen into the pile. On top of the wood chips, we placed pine shavings, which are a lot thinner; we were told that was to absorb any liquids or leachate coming from the animals.
- **U.S. EPA:** Questions for Rouzbeh: What scale this approach has been used? Is this bench scale or larger? What kind of assessment has been conducted to account for the different environmental conditions that mobilize pollutants (both organics and inorganics).
  - **Rouzbeh Tehrani, Temple University:** Is this for the first technology or the second approach?
  - **Timothy Boe, U.S. EPA:** It does not specify, so maybe it is relative to both.

- **Rouzbeh Tehrani, Temple University:** The first one – right now we are at the bench scale. Interestingly we found the space in nephrology, so that was quite a shift for us. I would be more than happy, if someone has a mix of hazardous waste, or at least something that we can synthesize in the lab, to work with those types of hazardous wastes, but still we are at the bench scale. Same with the plant, as we are constantly doing testing with it. This is just an indigenous plant; it is a very robust plant, found in a lot of different places around us. This one has moved to a little bit of a pilot scale to recover strategic elements from electronic waste, but none of them has been on the field unfortunately at this point.
- **U.S. EPA:** Question for Rouzbeh: Are there any challenges related to scale up of these bio-remediation processes for waste treatment?
  - **Rouzbeh Tehrani, Temple University:** One of the parts I would like to test with someone who has experience in the field is that we are very interested to know what mixtures they are dealing with and if they are specifically after removing certain contaminants that are typically more expensive or have regulatory issues. Right now, I do not have anything running on the field at the industrial scale; everything we have is either at the bench or pilot scale. I do not know if that answers the questions or not. But in terms of scale-up, one important part of it is that the plants do not need much maintenance. The idea is that we use them almost as a sponge. So, we have used them for acid mine drainage samples, and we have used it for fly ash. These are pHs that run from 3-12 and they still tolerate those pHs, so I do not see any problem with these plants working out there. We have worked with various salinity, high ionic strains, and pHs, so with the plants, I am ok. With the nano-absorbents project, indeed we are moving to a bigger scale, and the whole idea is that it does not matter how much waste you have; we continuously recirculate these nano-absorbents in a contained system until they're fully exhausted. Moving to another full field, we are running these hollow fiber membrane diode emitters, so that's still at the pilot/bench scale; have not moved to that industrial scale yet.
- **U.S. EPA:** Question for Preston: Do you believe that the surrogate used in this study behaves in any way different than the actual virus?
  - **Preston Burnette, Jacobs Technology, Inc.:** That is a great question, and we do not have a good answer. We did not contaminate the pigs or use live viruses in our study – or even use other surrogates – because the amount that we were grinding, we used up to 50-90 thousand pounds of pigs. Our assumptions were that the DNA would act as the indicator, collected on the filters. When we were grinding the animals and carbon material, the grinding action would have produced aerosols and that if these were infected pigs, that the DNA would act as a marker. We do not know if it would behave as DNA, but the pig/carcass material would hold the virus, and some of it might not – like the skin might not have any virus but the blood/vital organs/things like that would. We cannot differentiate in our filters what part of the pig we collected – we just see DNA. So, it builds in somewhat of a safety factor as well, so we can assume that is virus particles as well, and that the ASFV could have made it that far away from the grinder. While that is not a great answer, it does kind of build in a safety factor in designing – in using grinders.
- **U.S. EPA:** Question for Preston: Related to earlier question for Ms. Gabbert, do you anticipate any challenges with the use of this technology in colder climates?
  - **Preston Burnette, Jacobs Technology, Inc.:** No. With the limits in the United States – I know the forestry industry uses grinders all over the United States – colder climates as well. So, I do not see the equipment being the problem. For composting – if it is extremely cold and freezing weather, you might have a problem starting a compost pile. But that's part of the reason we use ground material – the composting can start much quicker than using a whole animal. The

organisms start breaking down the tissue rather quickly. So, I think if you could compost in colder climates in general – whether composting manure or things like that – that you could compost ground carcasses.

- **U.S. EPA:** Question for Marissa: Are you planning to engage other stakeholders like local public health or facility owners and operators in your focus groups and interviews?
  - **Marissa Matsler, Oak Ridge Institute for Science and Education Research Participant with U.S. EPA:** Yes – we have been thinking about public health as an important group to engage in this work. Facility owner/operators are also a good group we are hoping to get to in our case-study work, so that is ongoing. But thank you so much for that question because we are hoping to talk to folks that are running landfills, other waste managers, waste haulers as well – to get an idea of that staging/transport/disposal process – so that will be key. We are still trying how best to involve public health folks, so please reach out if you have ideas about that.
  - **Emily Snyder, U.S. EPA:** Folks should put people that Dr. Matsler could reach out to in her interviews and focus groups in the Cvent Attendee Hub Chat when we are done with our session.
  - **Marissa Matsler, Oak Ridge Institute for Science and Education Research Participant with U.S. EPA:** I also meant to say that earlier as well with the question about case studies – the ones that I mentioned, those are some places that we have been hearing a lot about, but if there are other interesting case studies, please reach out and let us know.
- **Minnesota Department of Agriculture:** What further studies are you looking at for composting for ASFV? Will there will be a study on using "chopped" carcasses for study? Minnesota and North Carolina have been looking at cold weather composting but for obvious reasons cannot use live ASFV.
  - **Lindsay Gabbert, U.S. Department of Homeland Security:** Obviously we are seriously limited for our studies by having to conduct these in high containment We do not have any heavy equipment, we must move the pigs by hand ourselves, etc. So, currently, we are entertaining ideas for further composting studies; we do not actually have any planned. A couple of times when I have given this talk, a lot of people have asked about insect activity and if we have monitored any insects coming out of the pile – like flies – for contamination with ASFV, so that is something we are entertaining right now.
- **U.S. EPA:** Question for Lindsay: Were there any nasty odors from the compost pile? Also, have you done any monitoring of air samples for virus escape with dust/moisture?
  - **Lindsay Gabbert, U.S. Department of Homeland Security:** That was actually a big fear that I had – I am not really used to working in environments with decomposing carcasses – so I actually brought toothpaste to put under my nose in case I needed it, but I did not. The smells were actually worse in the beginning when we had to open up the pigs, and then over time during the composting process, the smell was pretty manageable. We did not do any sort of air sampling; there was not a lot of dust or particulate matter in the room at all, and the rooms were also under negative pressure with HEPA filters.
- **U.S. EPA:** Question for Rouzbeh: Do you anticipate that your process could change the classification of the waste?
  - **Rouzbeh Tehrani, Temple University:** That is one of the hopes that I have. Let's say you do have a waste that has a low concentration of a very highly regulated compound vs. something that is in high concentration but is not as big of a worry. So, I want to play with these mix and matches (one highly regulated, one is not; one is high concentration, one is not), so once we offer that selectivity to this controlled absorption systems, I hope that we can eventually come up with that classification part. Meaning that – I have always had this fear, in the laboratory as a

grad student, what if someone mixes all these in a big jar of waste that is not necessarily that toxic, but then someone puts something in it, and now you have a 5-gallon jar of that toxic contaminant that has to be processed differently? I hope that once we have that in the field and if we – at least in simulated industrial cases – we can actually do something for industrial classification.

---