Transcript of Facebook Q & A event 12/12/2022 – Part 2 of 2

PRES: Presenter

AH: Andrew Hitchings

JH: Jonathan Hall

PRES: Hello there and welcome to the December edition of the Facebook Q&A. If you watch the November video, you'll know that we received a large amount of questions, so we've actually split them into two, and this is the second video. This video is shorter and contains much more technical questions. With me are Andrew Hitchings and Jon Hall both Project Executives at the Environment Agency with responsibility for Walleys Quarry.

And Claire writes to say: Why are the comparisons being compared to different regulators i.e., W.H.O which is the World Health Organisation than American Standards Agency. The thresholds for each regulator will be different there needs to be one threshold only. Otherwise, you're changing the boundaries for results to fit the purpose. If another regulator, or standard, needs to used, we need to know why. When working in a lab you don't change the standard to suit the threshold. She says, this makes sample results invalid. So, why can the Environment Agency use different regulators? And then Michael actually comes in to comments on this one. He says, I can actually answer this WHO does not have a lifetime guideline. The only outstanding contentious issue is that UKHSA chose to use US EPA, US Environmental Protection Act guidelines for medium term exposure which were not breached. Whereas WHO guidelines for medium term exposure were breached. Somewhat of a moot point, he says, now that the chronic term guidelines have been exceeded and will be for years to come. Andrew you've looked at Claire's question.

AH: Yes, thanks Neil and Michael has covered a large part of the answer, so, the standards that are available differ between different organisations and different countries. World Health Organisation obviously cover multiple countries, but not all countries have standards for everything. So, the Environment Agency or in the case of the health guidelines UK Health and Security Agency must decide on the most relevant standards to use. As the Environment Agency will always use an English or UK standard where they exist. Where they don't will generally use a World Health Organisations or an EU standard, before we move to single country standards. It turns out that US Environmental Protection Agency have more standards than other countries, so they are often used in this kind of work. In terms of the choice of health standards that are used for Walleys Quarry, the UK Health Security Agency is the statutory public body that looks after health. They publish a monthly report on Walleys Quarry, which looks at the data that's collected by the Environment Agency's Mobile Monitoring Facilities and compares that against a raft of relevant health standards. So, I think probably that's the best place for Claire to look, in terms of wanting to get general answer to her question, and if she specifically wants to know about one of the standards of the UK Health Security Agency has used than I think it's probably best if she asks them.

PRES: Ok, thanks Andrew. Two further questions from Claire now, and they are on a theme, bear with me, I'll read them both out. Claire writes to say: What monitoring is done to see what bacteria are being carried by air from the landfill? Add to this bioaerosol, spores, and endotoxins. She says spores will travel for a long distance as that's how they scatter. Baculus is one of the bacteria that produce these when under stress, and the dust does travel offsite to people's homes and gardens. This is not acceptable and needs to be controlled. How do you monitor the dust emissions offsite? In the last video you said it was ok. What do you do to test this? How do you know where the dust lands? Why is there not dampening down, when other landfills do this? And she also writes: There is a distinct pattern to endotoxins and lung disease, or issues with breathing. The endotoxins come

from gram negative bacteria. E coli, she says, is a good example of this. These endotoxins are very dangerous to our health and in brackets, (she says, I know this as I used to work in an endotoxin laboratory to make sure the product is safe for use in cancer patients). Who monitors all of these issues and what are you doing to check these are in safe levels? Gram- negative bacteria will be in the landfill. There is no doubts. What proportion is in there? We have no idea. Who monitors the landfills own ecosystem, that has been made-up of unique landfill over the years? After all, the gases are emitted by the bacteria, would it not make good scientific sense to monitor what proportion of bacteria exist in the landfill? There's a lot in there. I know. Jon will go to you, please.

JH: Thanks, Neil. Yes, so a lot to cover there and but yeah, definitely around bioaerosols and dust, so, I'll start with dust. We don't routinely require landfill operators to monitor dust emissions, generally speaking, at Walley Quarry or any other sort of permitted landfill sites. Dust monitoring or Particulate Matter monitoring is only required in very specific case by case issues. However, having said that, this is one of them. So, we do in fact have four Mobile Monitoring Facilities or MMF's in place, and they do monitor for a range of particulates, so, including PM 2.5's, PM 10's and total suspended particulates, or TSP for short. So, data from the MMF's shows there has been no exceedances of relevant air qualities for Particulates at any of the MMF's, from our analysis carried out between June 2021 and May 2022. The levels of Particulates around Walleys Quarry are comparable to those seen other Particulate Monitors in the wider area. So, Nottingham, Birmingham, Stoke on Trent. So, quite similar to those, but for further details on the Air Quality Monitoring please do have a look at our Walleys Quarry Citizen Space website and we're also going to link below this video too. So, part of the question was about how dust is managed. So, all operators are required to have a dust management plan and that's part of their operating techniques. This plan is incorporated into the permit, and we regulate against the plan to assess compliance with it. So, dust management at Walleys Quarry includes measures to control dust based on best management practises and covers the following. So, it will include waste haulage and on-site traffic, waste acceptance tipping and compaction, site engineering works and then wind erosion of the operational services, but also stockpiles and haulage roads. There are three types of monitoring for dust on the site, and so that's done by real time metrological data through visual inspection by site staff and by four monitoring points set up on the perimeter that check for deposited dust. But in summary, we do not consider dust to be a significant issue at Walleys Quarry, based on our Compliance Assessments, the MMF data and the reports from the public. So, that's me running through dust and moving to bioaerosols. Similarly, we do not routinely require landfill operators to monitor bioaerosol emissions. So that doesn't happen at Walleys, and it doesn't happen at other permitted landfill sites. Landfills are complex bioreactors and will be the source of various bacteria, fungi, endotoxin, and microorganisms which are all ubiquitous in the wider environment. So, this does make it difficult to distinguish the impacts from a landfill site. The risk of bioaerosols emissions from landfills was considered by the Health Protection Agency, which is the precursor of the UK Health Security Agency (UKHSA), in their advice and on health impacts from landfill sites. So, we'll include a link to that report below this video, so you can have a look at that. But the HPA advice states the controlling dust on landfill sites will further reduce emissions of bioaerosols. So, just linking back to the first discussion I had on dust and based on that and the results we've seen from Particulate Monitoring, we do not consider there to be a need for further assessment of bioaerosols.

PRES: Okay, thanks, Jon. Joseph and Tim have also been in touch and they're talking about whether are MMF's are able to monitor, for other Particulate Matters, collection, and analysis of samples and about the technical equipment used. Jon, you've been looking at this for us as well.

JH: I have, yes, thanks Joseph and Tim. So, our MMF's monitors for Hydrogen Sulphide, Methane, Sulphur Dioxide. Oxides of Nitrogen, Benzene, Toluene, Ethylbenzene, M &P Xylene, and the

different particulate fractions that I mentioned before, including the TSP, which is the Total Suspended Particulates. So, when we talk about PM 10's and PM 2.5's, basically the number refers to the aerodynamic diameter of the dust particles. So, it being 10 Microns or 2.5 Microns, respectively. So, the analyser used to measure PM concentration is a Palas Fidas 200 optical measuring system. It provides measurements, it can cover TSP's, PM 10's, PM 4's, PM 2.5, and PM 1 in real time, and then stores the information in as 15-minute averages. You can see much greater detail of our work to study Ambient Air Quality at Silverdale in our study of Ambient Air Quality of Silverdale report, which is dated from the 4th of March 2021 through to 31st of May 2022. That's the study period and that's been published on our Citizen Space website and again, we'll put a link to it below the video. So, hope that's been helpful.

PRES: Thanks Jon. Next up is Tim and Tim actually uploaded 2 graphs along with this question and I will put the graphs on below this video just for context. Tim has asked us; I notice that our regular extended overnight peaks with these incidents often lasting from 9 o'clock at night until 7 o'clock in the morning with elevated levels of H2S and CH4. Can you explain why is these peaks do not seem to occur in the daytime hours and what are your thoughts on these regular occurrences? And he also puts up another graph and he says, can someone please explain these sustained 12-hour overnight peaks? Andrew, let's go back to you please for a response for Tim.

AH: Ok, thanks Neil and what Tim has posted as some of the data traces that are taken from our Mobile Monitoring Facilities, and he's got those from the data that we make available on various reports on the Citizen Space page. Before I go into answering Tim's question, I'll just take this opportunity to mention that we got one of our technical team to do a quick explainer of the Mobile Monitoring Facilities when they did their regular quality assurance visit and that's been uploaded to Facebook group and we'll put the linking after this video. (It is pinned to the top of the group). So, turning to Tim's questions. So, Tim's first graph from the night of the 29th of September shows the phenomenon that we have previously described as cold drainage flow, or its technical name is sometimes described as Katabatic Flow. Landfill gas is denser than air, so when conditions where windspeed is low, and temperature changes rapidly, you can get something was known as a temperature inversion, where any fugitive landfill gas is effectively trapped close to the ground, and it cannot disperse. Because of the topography around Walleys Quarry, this gas tends to pool, and it will eventually flow to the lowest point on the site, which has been taking it past MMF9 and into Galingale View. That's why we've generally seen higher values at MMF9 and the trace that Tim put up was from MMF9. The characteristics of dispersion around Walleys Quarry have been quite well analysed by ourselves and also by the Defra Scientific Advisory Group (SAG) and there's a lot more information on their report about how the fugitive emissions kind of flow around the site. These temperature inversions that I described, are particularly seen in Spring and in Autumn, where you get the high changes in temperature, as you kind of go from the sort of warm days to the much colder nights. While where here discussing weather, I will also mention something we've talked about before, and that's the difference between Summer and Winter. So, in Summertime generally the air is warmer, landfill gas is more buoyant, and it disperses better and that's why across the entire landfill sector you generally see less odour over in Summer from landfills than you see in Winter. What I've given you there is my non-technical explanation of these weather factors. We are working on an explainer video and an animation that will provide a lot more kind of explanation for you. Before, I move off this topic though, I think if I just cover a couple of other comments. There are kind of indicative of comments that I made last month. We now seeing much less of a percentage exceedance of the odour threshold which is something that we report on our Citizen Space Page every week. Around 5% is the worst we've seen in recent months. Sometimes, it's nothing, it's been hovering kind of 1 or 2 % and this compares to it being well over 20% in the Spring of 2021 and 2022. What those exceedance figures don't show is the scale of the exceedance. The odour threshold for

Hydrogen Sulphide is 7 Micrograms per metre cubed. The 20 grams, 20 Micrograms per metre cubed from Tim's first picture is pretty much the highest value we've seen since before the summer. These concentrations were significantly higher in the past and are trending downwards as the site makes improvements. In Tim's second graph of the 17th to 18th of October, there's been another temperature inversion there, but for almost the entire time the Hydrogen Sulphide levels are actually below the odour threshold. So, whilst you've seen the temperature inversion, because the fugitive emissions are not on site in the same way they were before, you're not seeing the same kind of odour nuisance. And that's the key point, that I just want to reiterate, we can't control the weather or topography around Walleys Quarry but what we can do is we got the capture, contain, and destroy strategy which is about removing the sources of Hydrogen Sulphide in the first place.

** END OF Q&A, Presenter wraps up asking for feedback and advises Questions Thread to open below.

PRES: Ok, thanks Andrew and thanks for to Jon as well. We're currently working to refresh our FAQ content on Citizen Space. So, the next designated questions thread will open on Monday the 2nd of January at 9:00am and close on Friday the 6th of January at 5:00pm. From all the team bye for now though and thank you for watching.