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Dear James,

**Sutton Veny Farm EPR/PP3232EF/A001 Application Not Duly Made Letter**

Thank you for forwarding a copy of the Sutton Veny Farm EPR/PP3232EF/A001 Application Not Duly Made Letter. I have reviewed the observations detailed in the letter which relate to the Site Specific Bioaerosol Risk Assessment carried out for the proposed poultry unit at Sutton Veny Farm and in response provide the below comments.

***EA Comment:***
*The Monitoring data included as part of your SSBRA is from Galley Hill intensive Farm. This site is not comparable to the Sutton Veny site as it is double the capacity of the proposed development and there is no information given to suggest the ventilation and infrastructure is comparable*

It is recognised that the installation at Galley Hill Farm is, at 450,000 broiler places, approximately double the capacity of the proposed installation at Sutton Veny (223,900 broiler places). Whilst the total capacity at Galley Hill is greater, it should be noted that the existing infrastructure and ventilation system installed at Galley Hill is very similar to the proposed equivalent at Sutton Veny. At Galley Hill each poultry building measures 103 m x 23.1 m with a building ridge height of 5.5 m. The proposed buildings at Sutton Veny would measure 97.6 m x 23.2 m, with a building ridge height of 4.6 m. At Galley Hill Farm the ventilation system comprises uncapped high speed ridge mounted fans with additional gable end fans to provide additional ventilation in hot weather; this ventilation system is also proposed for the development at Sutton Veny.

It is acknowledged that due to the higher overall bird capacity and higher bird numbers per shed at Galley Hill Farm; the downwind measurement data for sampling undertaken may

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not be representative of emissions and consequent downwind concentrations at the proposed Sutton Veny development. The higher bird numbers therefore means that data from Galley Hill is likely to show higher downwind concentrations of bioaerosols than will occur at Sutton Veny. Even with monitoring data from what is considered to be a 'legitimately comparable' test site, it must be recognised that standard bioaerosol monitoring techniques rely on relatively short duration sampling of air quality and therefore monitoring data may not provide an accurate representation of potential bioaerosol emissions from the proposed Sutton Veny site over longer time periods.

***EA Comment:***

*On the basis of the bioaerosol concentrations monitoring data you have provided, sensitive receptors at 40, 45 or 85 metres would be exposed to levels of bioaerosol significantly (at least 5x) in excess of current guideline values accepted by Public Health England (PHE) for bioaerosols from composting sites. This projected impact is unacceptable and we would not issue the site with a permit on this basis*

*If we were to assume that emissions varied pro rata with the number of bird places, and halved the ambient values measured on this basis, they would still exceed guidance levels for bioaerosols from compost. Please note there are currently no bioaerosol guideline values for Intensive Farms but we and Public Health England consider the composting bioaerosol values to be the most appropriate.*

Based on research data summarised in section 3.2.1 of the SSBRA and measurement data from Galley Hill Farm, it is possible that there will be occasions when receptors within 100 m of the proposed facility at Sutton Veny are exposed to ambient concentrations which exceed the current guideline values for bioaerosols accepted by Public Health England. This has been addressed in the SSBRA through the allocation of potentially 'high consequence' of exposure (severe consequences, evidence that exposure may result in serious damage) to all receptors within 100 m of the footprint of the poultry sheds. This is considered to be a precautionary approach with regards to realising the hazard presented to each receptor, although it is also recognised that the guidelines values are themselves precautionary, with no objective dose-response relationship evidence to suggest that there will be severe, or even any, consequences resulting from exposures in exceedance of the guideline values.

It is suggested that the overall risk of exposure should not be based exclusively on the assumption that receptors within 100 m of the proposed development will be chronically exposed to ambient concentrations which may exceed current guideline values for bioaerosols accepted by Public Health England. In reality exposure of receptors to such concentrations may be acute (occasional, short term exposures), of relatively low significance if the receptors are predominantly upwind of the proposed poultry houses with respect to the prevailing wind direction.

The Cranfield University Guidance on the evaluation of bioaerosol risk assessments for composting facilities (2009), sets out that the overall magnitude of risk should take into account, not only the consequence of exposure (in this case based on measurement data from Galley Hill Farm), but also the probability of exposure, which in this case should

include consideration of the frequency that the receptor is downwind of the poultry buildings, the frequency that release takes place, and the proportion of time that the receptor location is occupied.

For the proposed development at Sutton Veny the calculated probability of exposure included a number of 'worst case' scenarios based on the following assumptions:

- It was assumed that residential premises are permanently occupied. However, even with 100% occupancy, it is unlikely that receptors will be outdoors and potentially directly exposed to bioaerosols at all times when the receptor is downwind of the proposed poultry buildings, especially during the winter months when receptors are more likely to be indoors for prolonged periods with windows and doors shut.
- In all commercial premises receptors are present 42 hours per week (25% of the time). Again, even with 25% occupancy, it is unlikely that individuals will be outdoors and potentially directly exposed to bioaerosols at all times when the receptor is downwind of the proposed poultry buildings, especially during the winter months when receptors are more likely to be indoors for prolonged periods with windows and doors shut.
- The proportion of time that the wind blows towards the receptors was based on the maximum extents of the poultry buildings and the total area covered by the receptors. Therefore it is assumed that when a receptor is downwind of the poultry facility it is also downwind of all of the proposed poultry sheds at any one time. This would not be the case in reality.

At all receptors identified the 'worst case' probability of exposure is below 10% and taking into account the 'high' consequence of exposure allocated to all receptors within 100 m of the poultry building the overall magnitude of risk is predicted to be medium/low at all receptors, and reduced to low/very low with control measures in place as described in the SSBRA to further reduce the probability of exposure.

In reality it is possible that the actual impact would be lower than that demonstrated by the Site Specific Risk Assessment for Sutton Veny, however, this assessment cannot be supported without monitoring data from a what is considered to be a 'legitimately comparable' test site and a better understanding of source and dispersion characteristics of bioaerosol emissions from poultry facilities.

***EA Comment:***

*After taking the above information into account,* ***we require that you update your site specific bioaerosol risk assessment with the following;***

- *Monitoring data from a legitimately comparable site to Sutton Veny if available, which demonstrates that the risk from bioaerosols from the operation of your proposed installation is likely to be acceptable,*
- *In the event you do not have comparable monitoring data, you can alternatively provide evidence to demonstrate that the ventilation system at*

*your proposed site provides adequate dilution and dispersion sufficient to reduce bio-aerosol concentrations at the sensitive receptors to acceptable concentration levels (i.e. 300; 1,000 and 500 cfu/m$^3$ for gram-negative bacteria, total bacteria and Aspergillus fumigatus respectively).*

- *An assessment of the risk and impact of bioaerosol release from gable-end fans, including a layout plan showing the locations of gable end fans with respect to sensitive receptors. Bearing in mind the sheds are not yet built, it may be worth considering the effect that the orientation of the sheds (and the positioning of their release points) may lessen impacts on nearby receptors.*

At this stage, if the Environment Agency consider that monitoring data from Galley Hill is not 'legitimately comparable' to the proposed site at Sutton Veny, then aside from the research data summarised in section 3.2.1 of the SSBRA, further monitoring data is not available. In the absence of monitoring data from what is considered to be a 'legitimately comparable' site, a detailed site specific appraisal of the effectiveness of the proposed ventilation system at Sutton Veny and its ability to provide adequate dilution and dispersion of bioaerosols cannot be undertaken by analogy.

ADAS is aware that the Environment Agency have recently commissioned a research project to add to existing data on the scale of bioaerosol emissions from intensive livestock units and the consequent downwind bioaerosol concentrations. It is understood that the objective of this research is to compare measurement results directly with concentrations previously determined for biowaste processing operations and to establish whether applying a similar condition to the intensive agriculture sites regulated by the EA might be appropriate.

Taking into account the points raised above, the recognised knowledge gap concerning bioaerosol emissions from poultry rearing facilities, and uncertainties with regards to whether regulation of intensive poultry installations as an analogous application of the approach used for biowaste sites is appropriate, it is not clear that the use of such an approach to regulation to the proposed site at Sutton Veny is appropriate.

It is our understanding that there is currently no formally recognised methods of accurately modelling off-site concentrations, due to factors such as uncertainties with regards to source characteristics of bioaerosols and rates of atmospheric decay, and how these will affect the rate of atmospheric dispersion and decay. In correspondence with bioaerosol specialists at the Environment Agency, before the Sutton Veny SSBRA was undertaken it was confirmed that given the lack of source terms, modelling of the likely concentrations of bioaerosols downwind of the site was not appropriate. ADAS has the capability to undertake atmospheric dispersion modelling if required, however without formal published guidance from the Environment Agency with regards to an appropriate methodology there is uncertainty about the how such work would be done and in particular how the results would be interpreted.

However, if the dilution rates achieved in an odour dispersion modelling assessment undertaken for the Sutton Veny site are used as a simple analogy for dilution and dispersion

of bioaerosol emissions as a gaseous emission source, and assuming no atmospheric "decay" or reduction in viable bioaerosol concentration it can be shown that bioaerosol concentrations would be dispersed as follows:

Based on a modelled point source odour emission rate 8,629.1 $ou_E$/s from the chimneys on the ridge mounted fans, a release point diameter of 0.6 m and an efflux velocity of 11.0 m/s, the internal odour concentration is calculated to be 1,560 $ou_E/m^3$. Comparison of the building odour concentration to the predicted average annual 98$^{th}$ percentile hourly mean odour concentrations at 28 identified discrete receptor points (not including nearby allotments) demonstrates reductions in odour concentrations which range between 99.66 and 99.97%.

This reduction factor has been applied to average bacterial and fungi concentrations measured at the exhaust points of two broiler farms studied as part of the Defra research project *'Characterising poultry dust properties, assessing human health implications, quantifying emission levels and assessing the potential for abatement'* (2009). Based on an average bacterial exit concentration of 393,308 cfu/m$^3$, predicted average annual 98$^{th}$ percentile hourly mean bacterial concentrations would only marginally exceed the 1,000 cfu/m$^3$ guideline value for bacteria at two identified receptors representing the residential property, Java Bungalow and the northern section of the Deverill Road Trading Estate, where concentrations are predicted to be 1,351 cfu/m$^3$ and 1,193 cfu/m$^3$ respectively. Based on an average fungi exit concentration of 2,118 cfu/m$^3$, predicted average annual 98$^{th}$ percentile hourly mean concentrations of fungi would be below the 500 cfu/m$^3$ guideline value for A. *fumigatus* spp at all identified receptor points.

The results of this simple analogy support the findings of the SSBRA undertaken for Sutton Veny, in that based on a low probability of exposure at all identified primary sensitive receptors, the overall magnitude of risk is low, as exposure of receptors to ambient concentrations of bioaerosols which exceed the current EA guideline values will be limited to occasional, short periods of time.

***EA Comment:***

- *Evidence to demonstrate why employees/customers of the neighbouring horse riding school should not be considered as sensitive receptors of bioaerosol impact. Otherwise, we require that you consider the impact of bioaerosol on these sensitive receptors.*

In bioaerosol risk assessments it is common practice to consider open areas to which land owners and public may have regular access. It is of our understanding that the Environment Agency does not explicitly class transient receptors including footpaths, recreational open spaces, bridleways, highways or livestock as potentially sensitive receptors to bioaerosols, in line The EA Interim Position Statement which defines a sensitive receptor as:

*People likely to be within 250m of the composting operation for prolonged or frequent periods. This term would therefore apply to dwellings (including any associated gardens) and to workplaces where workers would frequently be present. It does not apply to the operators of composting facilities or their staff while carrying out the composting operation, as their health is covered by Health and Safety legislation"*

The open grass areas situated to the east of the proposed poultry buildings which belong to the horse riding school are considered to have a low sensitivity ranking, as exposure of horse riders using these areas will be transitory and therefore unlikely to occur over prolonged periods of time. The open grass areas used by the horse riding school are considered as secondary receptors in the SSBRA and are characterised as 'agricultural land' in section 4.2 of the report. The agricultural buildings at Beech Farm are included in the SSBRA and termed as secondary receptors, as they are not located within 250m of the proposed operational boundary.

***EA Comment:***

- *Include in your report an appropriate site plan showing the installation boundary, as the site plan referenced in the Bioaerosol Risk Assessment Report shows the ownership boundary. It would be useful to indicate the proposed locations of the sheds, their release points and the locations of all receptors for consideration.*

The SSBRA will be updated to include a site plan which shows the proposed locations of the sheds and their release points and the installation boundary.

***EA Comment:***

- *Antibiotics can affect levels of bioaerosols. Please ensure you include details of any proposed use of antibiotics and assess the risk of anti-biotic resistant bioaerosol (pathogens) development as a result.*

It is recognised that the use of antibiotics may increase the risk of generating resistant microorganisms and that repeat exposure of bacteria to antimicrobial agents can lead to antimicrobial resistance. Research undertaken to date, however recognises that there is uncertainty with regards to the rate at which aerosolization of antibiotic resistant bacteria within poultry houses occurs and subsequent transmission to the outdoor environment.

Research undertaken by Brooks *et al*. (2010) suggests that internal poultry house environments can be expected to have elevated concentrations of bacteria and endotoxin levels, and that (antibiotic) resistance was found to increase with age of the flock. Although this study found that levels of antibiotic resistant bacteria were present within the house, little transmission occurred to the outside air. Even with transmission of antibiotic resistant bacteria to the outside environment, it must be recognised that there is no dose response relationship dataset and therefore it would difficult to predict the magnitude of risk to human health. There is also, as far as we are aware, no formal regulatory guidance provided by the Agency or other regulatory authority about this issue, and therefore no objective criterion which can be universally applied to applications such as this.

ADAS has requested details with regards to the proposed use of antibiotics at Sutton Veny, but clearly it is difficult to predict what practices would be used in future on the proposed development at this stage. It is our understanding that any proposed antibiotic use would follow best practice techniques and be done so responsibly and according to strict veterinary supervision in line with the RUMA guidelines and the DEFRA 'UK Five Year Antimicrobial Resistance Strategy 2013-2018'. By following strict management techniques it is expected that the need for antimicrobial treatment will be significantly reduced and antibiotic use will not be the prime defence against preventing disease and stock losses.

In summary, I consider the risk assessment undertaken for Sutton Veny Farm followed the procedures set the in the guidelines for undertaking Site Specific Bioaerosol Risk Assessments and the simplistic modelling analogy carried out above supports those findings.

If you have any queries please feel free to contact me on **01902 271273** or at **ger.parry@adas.co.uk**.

Yours sincerely

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