Bio Aerosol Emissions at Thorngrove Farm poultry unit

Hazard	Receptor	Pathway	Risk Management	Exposure	Consequence	Overall Risk
To Air						
Dust: Sources: Feed.	Neighbouring dwelling houses within 100m of installation Surrounding Land and Vegetation	Air	Feed delivered in sealed systems. Dust socks fitted to silo exhaust pipes. Closed system delivery of feed from silo to poultry house. Feed spills dealt with promptly.	Dust could have the potential to reach nearby neighbours and surrounding land during certain weather conditions.	Nuisance – dust on surrounding vegetation, cars and clothing. Smothering and direct damage to nearby vegetation.	Not significant if carefully managed.
Bedding	Neighbouring dwelling houses within 100m of installation Surrounding Land and Vegetation	Air	Use of suitable bedding materials, not blown into poultry house.	Dust could have the potential to reach nearby neighbours and surrounding land during certain weather conditions.	Nuisance – dust on surrounding vegetation, cars and clothing. Smothering and direct damage to nearby vegetation.	Not significant if carefully managed.
Litter System	Neighbouring dwelling houses within 100m of installation Surrounding Land and Vegetation	Air	Computer controlled environment keeping humidity between 55 and 60% minimising dust	Dust could have the potential to reach nearby neighbours and surrounding land during certain weather conditions.	Nuisance – dust on surrounding vegetation, cars and clothing. Smothering and direct damage to nearby vegetation.	Not significant if carefully managed.
Ventilation	Neighbouring dwelling houses within 100m of installation Surrounding Land and Vegetation	Air	Use of high velocity roof extraction fans and misting systems	Dust could have the potential to reach nearby neighbours and surrounding land during certain weather conditions.	Nuisance – dust on surrounding vegetation, cars and clothing. Smothering and direct damage to nearby vegetation.	Not significant if carefully managed.
House Cleaning	Neighbouring dwelling houses within 100m of	Air	Litter removed carefully during cleanout minimising dust. Full	Dust could have the potential to reach nearby neighbours and	Nuisance – dust on surrounding vegetation, cars and	Not significant if carefully managed.

	installation Surrounding Land and Vegetation		trailers sheeted before leaving installation.	surrounding land during certain weather conditions.	clothing. Smothering and direct damage to nearby vegetation.	
Bird Numbers/Type	Neighbouring dwelling houses within 100m of installation Surrounding Land and Vegetation	Air	319,990 Broilers.	Dust could have the potential to reach nearby neighbours and surrounding land during certain weather conditions.	Nuisance – dust on surrounding vegetation, cars and clothing. Smothering and direct damage to nearby vegetation.	Not significant
Broiler Production	Neighbouring dwelling houses within 100m of installation Surrounding Land and Vegetation	Air	High velocity roof extraction fans aiding dispersal. Use of wet air scrubbing on new houses	Dust could have the potential to reach nearby neighbours and surrounding land during certain weather conditions.	Nuisance – dust on surrounding vegetation, cars and clothing. Smothering and direct damage to nearby vegetation.	Not significant

Source of dust	Method	How is reduction achieved?	Achieved Yes/No	Comments
Poultry feed	Dust from silos	Covers put over feed silo pipes.	Yes	
	Dust extraction in feed mill areas	Filters reduce dust emissions to the outside.	No	
	Storage of feed	Use of covers for feed containers.	Yes	Sealed silos
	Feed spill control	Collection of any feed spill is undertaken to avoid dust being generated.	Yes	Spills cleared up immediately
	Form of feed	Mould feed into pellets so that dusty ingredients are bound together.	Yes	Use of pelleted feed
	Fat content	Increase fat content so that dusty ingredients are bound together.	Yes	Pelleted feed oil coated

	Spraying oil or water mist onto feed	Mainly prevents particles on surfaces from becoming airborne again by making them too heavy.	no	
	Feed ingredients	Both wheat and barley have been found to be more dusty than maize.	n/a	Integrator supplied
	Feeding method	Hand feeding is preferable to screw auger systems and automatic feeders, which can produce increased dust levels.	n/a	
		Fit a material sock to the end of the auger pipe that delivers the feed directly into the bin.	n/a	
		Cover the internal feed bin, e.g. with a ply-wood constructed top, and fit the auger pipe through the cover.	no	
		Feed pans may be preferable to tracks.	Yes	Prevents spillage/wastage
	Over administration of feed to birds	Avoid spilled feed crushed on the floor into particles which become airborne.	Yes	Timed feeding to appetite
Bedding material	Type of bedding	Sawdust and flax straw have been found to produce less dust than wheat, barley or rye straw.	Yes	Dust extracted shavings
	Treatment of bedding	Dust from straw can be reduced effectively if the straw is humidified prior to application.	n/a	

Source of dust	Method	How is reduction achieved?	Achieved Yes/No	Comments
	Amount of bedding	Deep bedding systems have been shown to contribute less dust to the environment than shallow bedding systems.	Yes	
	Application of bedding	Bedding applied internally.	Yes	
		Fit catching curtains when unloading and augering bulk bedding into housing.	no	
	Age of bedding	As bedding materials break down to a dry friable litter dust production increases.	Yes	Humidity control
Litter systems	Use of cage systems for layers	Dust emissions were much higher from houses using litter rather than cages with wire floors.	n/a	

Relative humidity	Increasing humidity	Using misting systems to increase the humidity at low ventilation rates has been shown to reduce inhalable dust.	Yes	Misting systems
Ventilation	Increasing ventilation	An effective method is by significantly increased and controlled airflow velocities.	Yes	Computer controlled
House cleaning	Good management	Good house cleaning between flocks is essential to reduce the volume and potential for air contamination within the house and via exhaust systems.	Yes	Terminal hygiene
	Dust removal by vacuum cleaner	In-house dust removal by vacuum cleaner when the birds are in situ, reduces dust that could be disturbed by ventilation and emitted.	no	
Genotype	Animal activity	Birds that exhibit higher activity levels create elevated levels of dust in the air.	Yes	Lighting control
	Feather crunchiness	Greater feather crunchiness causes increased dust levels at moulting periods.	n/a	
Number of birds	Reduced flock numbers	Less birds, less feed, less litter means less activity to produce dust airborne.	n/a	Integrator determined
Crop cycle length	Lower final body weight	Birds grown to a shorter cycle length and lower weight produce less dust as most dust is emitted from day 20.	n/a	

Dust control	Method	How is reduction achieved?	Achieved Yes/No	Comment
Screens and wind breaks	Natural and artificial	Rely on exhaust air directed towards them, typically from end-wall mounted systems, so that dust particles intercepted and air lifted into the atmosphere for better dilution and dispersion. Vegetative screens seen to reduce dust levels by approximately 50%.	no	
Dry filters	Collecting dust onto filters on exhaust vents	Dry filters can be fitted to internal air recirculation units.	no	
Electrostatic precipitation devices (ESP)	Attraction and collection of dust particles	ESPs impart electric charges to dust particles. Dust particles collected in a tray, or attracted to earthed surfaces.	no	

Passive dry air cleaning units	Filter panels that collect dust across the width of the house	Fans are located in the end-wall of the house, in front is a plenum chamber fitted with linked filter panels making a filter wall. As air is drawn through to the fans the filter separates the dust into collection pockets that can be emptied. Commercial results suggest a 70% reduction in visible exhaust dust.	no	
Active wet cleaning units	End-wall ventilated systems	Water air-cleaning units intercept dust as air passes through a water or chemical spray, often over a pad matrix.	Yes	Misting system
	Roof ventilated systems	Water is sprayed over the exhaust air from exhaust chimneys, binding the dust. All units are connected together and used water falling on the roof goes to central acidified treatment basin where odour and ammonia molecules are trapped. Requires the air pressure to be more than 30 Pa.	no	
Scrubbers	Bio-filters and acid-filters	Air passes through a water scrubber to remove the larger dust particles. Next, in the bio-filter system the air is passed over moistened beds of plant material, removing dust, odour, microbes and pathogens. In the sulphuric acid filter scrubber, 99% of ammonia molecules and other odorous compounds can be removed.	no	