

FARM NUISANCE

DUST

Description

Of the three disturbances specifically mentioned in the *Farm Practices Protection (Right to Farm) Act*, **dust** is the most obscure. It can be defined by dictionary or reference definitions and it can be measured by specific instrumentation, however, the incidences of dust which are likely to cause a nuisance occur over a longer time frame than noise or odour, so are therefore not as easily captured as a specific concern. Not the case with broilers. In this case dust levels can rise to dramatically high levels during cleanout which occurs 6 -7 times a year. They are captured as a specific concern in broiler operations.

Dust can result from many farm practices and could be a source of complaint concerning farm activities.

The term “dust” is used to describe a range of particles sizes of material which can be transported by air. Dust has strict definition based on particle size, however in many instances when dust particles are transported in the air they are in close association with a wide range of particles including water molecules. At the particle size that is likely to cause pollution, irritation or nuisance, most of these particles (dust, mist, aerosol, or smoke) cannot be differentiated.

The human sensory system can detect some of these particle sizes by sight and others by taste or touch, but it is dusts which obscure visibility and accumulate on surfaces which are considered as a nuisance. There is a fine line in references as to when a dust changes from being a nuisance to being a pollutant.

Dusts are generally characterized using the three basic parameters of detectability, intensity and acceptability.

Detectability

The detectability of a dust is related to its particle size and concentration. As a general rule **dust** is particulate matter which is suspendible in air and 90% of which is capable of passing a 44 µm screen. Dust particles have aerodynamic diameters in the range of 0.05 to 50µm. The other particulate matter fractions which in most cases cannot be differentiated from dust include mists, aerosols and smoke.

Mists: means cloud-like aggregation of liquid droplets having a diameter of <100 µm which are temporarily suspended in air.

Aerosols: means small droplets of a liquid or particles of solid matter suspended in air that are fine enough in particle size, 0.01 - 100 µm, to remain dispersed for a period of time.

Smoke: means the gases, particulate matter and products of combustion emitted into the atmosphere when debris is burned or as borne particulate matter in a sufficient amount to be observable. By combining all of these particle sizes together we can refer to dust as particulate matter.

Particulate matter: is any material, except uncombined water, which exists in a finely divided form as a liquid or solid at standard conditions. It is only when the size of the particles reaches a level which is detectable by the human sensory system or when the concentration of these particles reaches a point at which they can be detected or the odors related to these particles are detected that they should begin to be perceived as a nuisance.

Intensity

The intensity of a given dust occurrence is defined by its ability to interfere with visibility or its collection on surfaces over a short time frame. For example, a low concentration of dust occurring over a long time frame may not be perceived as a nuisance if it does not accumulate on surfaces which are used by neighbours. However, if the low concentration does accumulate on visible surfaces it could become a nuisance. If the accumulation begins to interfere with the normal conduct of a business it would then be considered to be an air contaminant. (Is this necessary that it interfere with the normal conduct of business to be considered a air contaminant.)

The other aspect of intensity is the short duration, high concentration events which are visible and result in views being obscured. If these events result in visibility being obscured to the point of interfering with normal activities of business or a person they would be considered to be an air contaminant.

Acceptability

The acceptability of a dust will vary with individuals, and is likely to vary based on previous experience as well as the character of the dust and the frequency, duration, and intensity of the occurrence. Environmental conditions of wind speed and temperature will influence the dust occurrence and ultimately the sensory perception of dusts.

Measurement

The basic measurement parameter used to measure particulate matter or dust in the air is the term opacity. Opacity is the degree to which a quality or state of a body reduces the passage of light or obscures the view of a background object. It is expressed numerically from 0 percent (transparent) to 100 percent (opaque). This is usually measured by changes in light intensity of a beam of light across a known distance.

A secondary measure of dust is visibility. Visibility is the maximum distance at which the human eye is able to distinguish an object against its background. The ability to see an object (particle) depends on the contrast or brightness difference between the object and the background. Contrast $(C) = (B_h - B_o) / B_h$ where B_h and B_o stand for the brightness of the background and the object respectively. An observer can make out an object if the contrast against the background is greater than the eye's brightness contrast threshold. That threshold is generally held to have a value of 0.02, which means that the brightness difference has to be at least 2% for the eye to be able to distinguish an object.

Activities to Reduce Complaints

Reducing dust complaints is achieved by keeping the offending dust from reaching the complainant. Some strategies to achieve this are as follows:

- Avoid climatic conditions, when carrying out farm operations, which are conducive to the generation of dust.
- Avoid cultivation in situations where the soil will become excessively dry.
- Choose irrigation equipment which increases droplet size.

- Choose manure application methods which place manure on the soil surface rather than in the air.
- Choose cropping, crop residue and cover crop management practices which hold soil in place.
- Design fans, fan shrouds, chimneys and other ventilation structures to deliver emissions either to the ground or to the air in such a fashion as not to create drift of emission off the property.
- Choose spray equipment which places product on the target rather than into the air where it is subject to drift.
- Avoid burning or burn only under ideal ventilation condition or under ventilation conditions defined in regional by-laws.
- Develop wind screens, breaks or strategies to reduce dust movement off the property.
- Build new barns with fans facing inward away from neighbours
- Site new buildings sufficient distance from neighbors to avoid property
(See B.C. Ministry of Agriculture factsheet titled *Siting and Management of Poultry Barns* as an example)

Legislation

With respect to dust, under the *Farm Practices Protection (Right to Farm) Act*, a farmer is not liable in nuisance to any person for any dust resulting from the farm operation if:

- The farm operation is conducted in accordance with normal farm practices, and
- The farm operation is not conducted in contravention to the *Environmental Management Act*.

Environmental Management Act

Under the *Environmental Management Act*, the release of “air contaminants” from activities or facilities that cause pollution are prohibited. However, there is provision within the Act to allow for

1. the discharge into the air of an air contaminant from an incinerator operated under authority, licence or permit of a municipality,
2. the discharge of air contaminants authorized by a bylaw made under section 24 (3) (d),
3. the burning of leaves, foliage, weeds, crops or stubble for domestic or agricultural purposes or in compliance with the *Weed Control Act*;
4. the use of pesticides or biocides for agricultural, domestic or forestry purposes in compliance with the *Integrated Pest Management Act*, the *Pest Control Products Act* (Canada) and any other Act and regulation governing their use
5. fires set or controlled by a person
 - (i) acting under an order of a local assistant, as defined in the Fire Services Act, if the local assistant orders the fires for training purposes,
 - (ii) carrying out fire control under section 9 of the Wildfire Act, or
 - (iii) if the fires are resource management open fires under the Wildfire Act and are lit, fuelled or used in accordance with that Act and the regulations under that Act;
6. emissions from steam powered or internal combustion engines in compliance, if applicable, with the *Motor Vehicle Act* and regulations,
7. emission into the air of soil particles or grit in the course of agriculture or horticulture
8. emission of an air contaminant from combustion of wood or fossil fuels used solely for the purpose of comfort heating of domestic, institutional or commercial buildings,

9. emission of an air contaminant from food preparation in
 - (i) residential premises, or
 - (ii) retail food outlets.

NOTE: within Metro Vancouver the *Environmental Management Act* – air emissions requirements are administered by Metro Vancouver through the *Air Quality Management Bylaw* No. 1082 and the *Agricultural Boilers Emission Regulation Bylaw* No. 1082.

The question then is, when do dusts cause pollution?

Air pollution means the presence in the air of any substance (including any dusts) that causes or is capable of causing material physical discomfort to a person, or substantially alters or impairs the usefulness of the air. In the case of the Act dust is included as an Air Contaminant.

Air Contaminant means any substance that is emitted into the ***Air*** and that:

- (a) injures or is capable of injuring the health or safety of a person,
- (b) injures or is capable of injuring property or any life form,
- (c) interferes or is capable of interfering with visibility,
- (d) interferes or is capable of interfering with the normal conduct of business,
- (e) causes or is capable of causing material physical discomfort to a person, or
- (f) damages or is capable of damaging the environment.

(Metro Vancouver Bylaw 1082 and *Environmental Management Act*)

Air means the atmosphere but does not include the atmosphere inside a man made enclosure that is not open to the weather, an underground mine, or a place designated by order of the Lieutenant Governor in Council (*Environmental Management Act*)

Pollution means the presence in the environment of substances or contaminants that substantially alter or impair the usefulness of the environment (*Environmental Management Act*) (GVRD Bylaw 603)

References

ASAE Standards 1998, 45th Edition, Agricultural Cabs - Environmental Air Quality, ASAE S525-1.1 (November 1997) and ASAE S525-2 (April 1998), American Society of Agricultural Engineers, St Joseph, MI, USA

WCB Industrial Health and Safety Regulations - definitions

Rule 402. Nuisance, Rule 403. Fugitive Dust, and Rule 404. Particulate Matter-Concentration., South Coast Air Quality Management District, Rules and Regulations, California Environmental Protection Agency.

Visibility Defined: source (2001-01-30) Sigrist-Process Photometer AG, CH-6373 Ennetburgen, Netherlands (obtained 02/08/2001)

BC Ministry of Agriculture factsheet *Siting and Management of Dairy Barns and Operations*

BC Ministry of Agriculture factsheet *Siting and Management of Poultry Barns*