

Setting Acceptable Odour Criteria using Steady-state and Variable Weather Data

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Setback distances between livestock operations and neighbouring residents have been used as an effective tool to avoid odour nuisance. Appropriate odour criteria should be selected in order to obtain reasonable setback distances by air dispersion models. Model predictions for odour travel distances at which odour dilutes to a certain odour concentration, e.g. the chosen acceptable odour concentration, are different using steady-state and variable weather conditions. Hence, the acceptable odour concentration criteria should be different using these two types of weather data. The selected odour criteria for these two types of weather conditions should result in the same setback distance, therefore, odour occurrence frequency should also be considered in addition to odour concentration. In this study, by using Calpuff model, the odour dispersion from a typical swine barn in Saskatchewan, Canada was modeled using both steady-state and annual hourly variable weather conditions. The model predicted concentrations under steady-state conditions and the annual occurrence frequencies of these weather conditions, and the model predicted concentrations and the exceeding frequencies under variable (hourly) weather conditions are compared and the equivalent combination of odour concentrations and frequencies under these two types of weather conditions are identified in order to achieve the same odour travel distances. These equivalent odour concentrations and frequencies under these two types of weather conditions may be used as acceptable odour criteria to determine setback distances from livestock farms.