



THE COMMONWEALTH OF MASSACHUSETTS
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February 1, 2008

To: Brad Mitchell
Director, Division of Biosecurity and Regulatory Services
From: Trevor Battle
RE: Weather and Odor Dispersion at Krochmal Farms

In ideal weather conditions, moderate wind and bright sunshine combine to disperse/dilute offensive odors. Under certain weather conditions, however, odors can be trapped at the surface. One such condition is known as an inversion.

Inversions

Under normal conditions, air temperature decreases (or cools) with height. This decrease in air temperature with height allows for vertical movement of air and efficient dispersion/dilution of airborne pollutants and odors.

In an inversion, however, a layer of cool air at the surface is trapped (or capped) by a layer of warm air above it. This restricts the vertical movement of air as well the dispersion of odors.

The Oklahoma Cooperative Extension Office conducted an extensive study on weather and odor dispersion on farms [link below] and noted that 'very poor' odor dispersion occurs under the above conditions.
<http://pods.dasnr.okstate.edu/docushare/dsweb/Get/Document-2201/BAE-1739web%20color.pdf>

Causes

One type of inversion is known as a thermal inversion, which results from the nocturnal rapid cooling of air at the surface under clear skies and calm winds. Thermal inversions increase in frequency from late summer and fall and peak in the winter months in response to the decreasing amount of sunlight.

Odor Complaints & Weather Conditions [at Bedford]

The TewksburyOdor.org website has been tracking odor complaints since early July 2007. As of November 1, 2007 close to 400 complaints have been logged averaging approx. 6 complaints per day. The most odor complaints were registered between October 1st through 4th [approx. 80] and again between October 16th through October 19th [approx. 80].

The weather conditions during these two periods were characterized by mostly clear skies & calm winds, which would have resulted in very poor odor dispersion likely contributing significantly to the number of complaints.

The farms lower elevation was likely another contributing factor, since the Oklahoma study noted that odor plumes

can follow streams, valleys and other low lying areas. The area around Krochmal Farms is low lying with a river nearby.

Prevention:

While odors are a reality in most farming operations, odors can be minimized by limiting odor related activities (such as manure spreading) when weather conditions could result in poor and/or very poor odor dispersion (as defined by the Oklahoma Cooperative Extension Service). This can largely be achieved by avoiding late day manure spreading activities.

Detailed agricultural weather forecast for all Massachusetts counties can be obtained at the following website

<http://www.wagwx.ca.uky.edu/manowwx.2.html>

(University of Kentucky Agricultural Weather Page)

Sources used

- 1.) Archived weather data from Bedford, MA [weather underground inc.]
www.wunderground.com/history/airport/KOWD/2007/10/2/DailyHistory.html?req_city=NA&req_state=NA&req_statename=NA
- 2.) Oklahoma Coop Ex. "Movement of Odors Off-Farms"
<http://pods.dasnr.okstate.edu/docushare/dsweb/Get/Document-2201/BAE-1739web%20color.pdf>
- 3.) Odor reports from neighbors <http://tewksburyodor.org/results.asp>

