

Notice

This Engineering Guide was recently converted to a PC format and it has not been proof read by our engineering staff. Therefore, it is subject to change at a later date.

Ohio EPA

Division of Air Pollution Control

Engineering Section

Engineering Guide #47

Question:

How should OAC rule 3745-17-11 be applied to the product collection cyclones used at alfalfa dehydrating plants? (This question was submitted by Chuck Hull of the Northwest District Office on July 17, 1984).

Answer:

1. The allowable emission rates for product collection cyclones used at alfalfa dehydrating plants should be determined according to OAC rule 3745-17-11(B), Table I, based on the Process Weight Rate of each specific process^{1, 2}. Figure II is not applicable to such operations.
2. "Process Weight Rate" (PWR), as defined by OAC rule 3745-17-01 (B)(12), should include the weight of the moisture contained in the alfalfa and in the alfalfa products. (See Engineering Guide #7).

[If any product recovery cyclone(s) at an alfalfa dehydrating plant violate(s) OAC rules 3745-17-11, 3745-17-07 (air pollution nuisances prohibited) and/or 3745-17-07 (related to visible emissions), the field office personnel should pursue action to require the installation of additional control equipment and to insure compliance with all applicable air pollution control law].

Technical Background:

Technical literature dealing with air pollutant emission control for alfalfa dehydrating plant dryers (also called "drums") was reviewed for the development of this Guide^{4, 5}.

For the primary cyclone, the most frequently used (i.e., "typical") control strategy involves recycling a portion (30-40%) of the primary cyclone exhaust to the dryer.

"Skimming" is also practiced, and it involves the recycling of a portion of the primary cyclone's exhaust to a point in the ducting ahead of the same cyclone. In addition, controlling the temperature of the dryer and the alfalfa feed rate can result in reduced particulate emissions from the primary cyclone.

However, the "typical" strategies discussed above may not adequately control primary cyclone emissions, and a source may violate OAC rules 3745-17-07, 3745-17-11 and/or 3745-15-07. therefore, additional control measures may be necessary to achieve compliance. These measures include the use of secondary control equipment following the dryer's primary cyclone. High-efficiency mechanical collectors and/or medium-efficiency scrubbers can also be used to reduce particulate emissions to the required levels. Scrubbers have been particularly effective involving odor problems.

Other product collection devices used in the alfalfa dehydrating process are the meal and pellet collection cyclones ^{3,5}. These devices are usually controlled by "secondary cyclones". In some plants the exhausts of these secondary cyclones are returned to the primary cyclone of the dryer. However, this practice only increases the already difficult problem of dryer emission control ⁴. Currently the best approach to controlling the particulate emissions from the hammermill (meal) and the pellet systems is the use of a fabric filter system ^{5, 6}.

Legislative History and Considerations:

In 1974 and 1975 the Ohio EPA became a party to Consent Orders with two alfalfa dehydrating firms ^{1, 2}. These Orders defined process modifications (change in equipment and reduced dryer throughput) and add-on control equipment (device to recirculate part of the primary cyclone effluent to the dryer) as the methods for achieving compliance with an allowable emission rate based upon Table I of OAC rule 3745-17-11. At that time, the parties and the Ohio EPA "agreed that uncontrolled mass rate of emissions does not have reasonable application to an alfalfa dehydrating operation" ^{1, 2}.

These legal settlements form the basis for the DAPC's position as to how OAC rule 3745-17-11 should be applied to the product recovery cyclones at alfalfa dehydrating plants. A number of Permits to Operate have been issued on the basis of these settlements. The DAPC does not believe it would be reasonable to change the policy established by these

settlements at this time. However, as indicated above, we do reserve the right to pursue the installation of additional controls if any applicable air pollution control laws are being violated.

References:

1. Consent Order, Lakeview Farms, Inc., Canton, Ohio; Case No. 73-AV-174, February 25, 1975.
2. Consent Order, Verhoff Alfalfa Mills, Inc., New Bavaria, Ottawa and Napoleon, Ohio; Case Nos. 74-AV-295, 74-AV-296, 74-AV-297, November 4, 1974.
3. "Compilation of Air Pollutant Emission Factors - Second Edition", U.S. Environmental Protection Agency, Research Triangle Park, North Carolina, Pub. No. AP-42, Chapter 6, pp. 6.1-1, April 1976
4. "Emission Control Feasibility Study of Alfalfa Dehydration in Nebraska". Draft Preliminary Report by PEDCo Environmental, Inc., Kansas City, Missouri, October 1977.
5. "Emission Control in the Grain and Feed Industry, Volume I - Engineering and Cost Study", EPA-450/3-73-003a, U.S. EPA, Research Triangle Park, North Carolina 27711, December 1973.
6. "Particulate Emissions from Alfalfa Dehydrating Plants - - Control Costs and Effectiveness", U.S. EPA, Washington, D.C., Pub. NO. EPA-650/2-74-007, January 1974

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