

**COLORADO DEPARTMENT OF PUBLIC HEALTH and ENVIRONMENT
ENVIRONMENTAL AGRICULTURE PROGRAM**

**TOTAL VOLATILE SOLIDS (TVS) TEST POLICY
FOR
HOUSED COMMERCIAL SWINE FEEDING OPERATIONS**



**Colorado Department
of Public Health
and Environment**

**Environmental Agriculture Program
and Air Pollution Control Division
4300 Cherry Creek Drive South
Denver, CO 80246**

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Introduction

The Colorado Department of Public Health and Environment's Environmental Agriculture Program (Ag Program) and the Air Pollution Control Division (division) developed and revised this policy to provide owners and operators of housed commercial swine feeding operations (HCSFOs) in Colorado with testing and monitoring parameters and methods to demonstrate compliance with the total volatile solids (TVS) requirements of Regulation No. 2, Part B. To ensure that odorous compounds are removed from process wastewater before land application, the owner or operator must sample for TVS; test the sample using Ag Program-approved test methods; and, monitor the process wastewater throughout the year by sampling and testing on a prescriptive schedule. The Ag Program intends for this policy to address all facets of TVS testing and monitoring. Any questions concerning TVS requirements should be directed to the Ag Program at (303) 692-2135.

Regulatory Requirement (Regulation No. 2, Part B, IX.A.4.e.(1))

“All process wastewater that is land applied and not injected shall be pretreated to remove at least sixty five percent (65%) of the total solids and remove over ninety percent (90%) of the volatile fatty acids or achieve at least sixty percent (60%) removal of total volatile solids.”

Testing Method

The Ag Program requires that all TVS samples be tested using *Standard Methods for the Examination of Water and Wastewater*, 19th ed. (1995), SM 2540-E¹. The regulation allows any owner or operator of a HCSFO to test both total solids (TS) and volatile fatty acids (VFA) in lieu of testing for TVS. Any TS samples must be tested using *Standard Methods for the Examination of Water and Wastewater*, 19th ed. (1995), SM 2540-B¹. Any VFA samples must be tested using *Standard Methods for the Examination of Water and Wastewater*, 19th ed. (1995), SM 5560-C¹.

Monitoring frequency

TVS testing must occur throughout the year to ensure that each impoundment is consistently achieving a 60% TVS reduction. Testing of this frequency nature is called periodic monitoring. The Ag Program hereby establishes the following periodic monitoring schedule:

<u>Land application period</u>	<u>Testing shall occur</u>
March-April	No sooner than February 15
May-June-July	No sooner than April 15
August-September-October	No sooner than July 15

Each lagoon that supplies process wastewater for land application must be monitored on the above schedule. This schedule was developed to assist operators and is roughly based on seasonal variations and crop growing cycles. The Ag Program may, however, on a

¹ Test methods may be superseded by a later version of the cited method.

case-by-case basis establish different testing schedules for operations that conduct land application activities during other times or frequencies.

Sampling method

In order to show a reduction of TVS, sampling must occur at the lagoon inlet pipe and outlet pipe (or from the surface on the side of the lagoon opposite the inlet pipe, if there is no lagoon outlet pipe and the wastewater is pumped directly to a truck). Sampling at the inlet and the outlet should include a representative composite sample, meaning that it is not appropriate to take only one grab sample. In accordance with the Common Provisions Regulation (5 CCR 1001-2), II.C.6, samples must be taken in triplicate. The owner or operator may mingle the triplicate samples to create the representative composite sample, and then test only the representative composite sample at the laboratory; however, the owner or operator may also test all three samples at the laboratory. In this case, the arithmetic mean of the three samples shall be used for the representative composite sample. In the event that an individual sample is invalid, the arithmetic mean may be determined using the remaining two samples *upon the Ag Program's approval*. For operations with a multi-cell lagoon system, samples may be taken at the inlet of the first cell and the outlet of the last cell in order to show that the TVS reduction occurred across the entire lagoon system.

Example 1: An owner or operator has a one-cell lagoon with no outlet pipe. The triplicate sample should be taken at the inlet and a triplicate sample from the surface of the lagoon across from the inlet pipe. The owner or operator chooses to mingle the triplicate samples, leaving the owner or operator with a representative composite sample for the inlet and a representative composite sample for the outlet. Two composite samples are sent to the laboratory for testing.

Example 2: An owner or operator has a multi-cell lagoon with no outlet pipe. A triplicate sample should be taken at the inlet of the first cell and a triplicate sample from the surface of the last cell on the side of the lagoon farthest from the first cell. The owner or operator chooses to test all six samples at the laboratory. Upon receiving the laboratory results, the triplicate results from the inlet are averaged and the triplicate samples from the outlet are averaged. These averages are the representative composite sample for the inlet and outlet and are used to determine the TVS reduction.

Laboratory Constraints

Failure to demonstrate a 60% TVS removal prior to land application due to laboratory back-ups is not a valid excuse. Another laboratory should be used. Failure to demonstrate a 60% TVS removal prior to land application due to laboratory error is not a valid excuse. Additional samples should be taken until an acceptable TVS reduction is achieved.

Exceptions the Policy

An owner or operator may request or the Ag Program may require alternatives to the methods and schedules listed above. The Ag Program will evaluate each request on a case-by-case basis.