

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

**AEROBIC CONDITIONS (BOD₅/DO) 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 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 aerobic conditions requirements of Regulation No. 2, Part B. To ensure that aerobic conditions are maintained in an aerobic impoundment, the owner or operator must sample for biological oxygen demand (BOD₅) or dissolved oxygen (DO); test the sample using Ag Program-approved test methods; monitor each impoundment throughout the year by sampling and testing on a prescriptive schedule and, maintain the technologies and practices that provide the aerobic conditions. The Ag Program intends for this policy to address all facets of BOD₅ and DO testing and monitoring.

Any questions concerning BOD₅ and DO requirements should be directed to the Ag Program at (303) 692-2135.

Regulatory Requirement (Regulation No. 2, Part B, Section IV.B.)

All aerobic impoundments must "...ensure maintenance of aerobic conditions...to minimize to the greatest extent practicable the emission of odorous gases to the atmosphere..."

According to Regulation No. 2, Part B, an aerobic (impoundment) is defined as "a waste treatment method that utilizes air or oxygen...at a minimum at one (1) part per million of dissolved oxygen throughout the liquid column of the impoundment or a waste treatment method that is designed to meet the oxygen demand of the waste loading."

Based on this definition, the Ag Program will allow an owner or operator to demonstrate aerobic conditions by monitoring an impoundment for either DO (and meet the 1 ppm standard) or for BOD₅ (and meet the 50 lb BOD₅/acre/day standard). An owner or operator may select one of the standards with which to comply and may not alternate back and forth between BOD₅ and DO monitoring on a given impoundment. The Ag Program will allow an owner or operator to test some impoundments for BOD₅ and test other impoundments for DO. Whatever method is selected for monitoring will be identified in the HCSFO's Air Permit to Operate and Odor Management Plan.

Sampling Method

An impoundment must be sampled for aerobic conditions throughout the entire impoundment including both horizontal (lateral) sampling and vertical (at varying depths) sampling across the impoundment. This allows the owner or operator to check for "hot spots" in the impoundment. The Ag Program hereby establishes the following horizontal sampling scheme:

<u>Impoundment acreage</u>	<u>No. of representative composite samples required</u>
0 – 3.9 acres	3 (relatively equal and representative sections)
> 4.0 acres	1 per acre (relatively equal and representative sections)

At least one (1) representative composite sample must be taken near the center of the impoundment, which may necessitate using a boat to obtain the sample.

In accordance with the Common Provisions Regulation (5 CCR 1001-2), Section II.C.6., samples must be taken in triplicate in each section. In other words, a representative composite sample is a set of three grab samples from the same impoundment section combined into one grab sample. The representative (mingled) composite sample must be sent to the laboratory for analysis. Alternatively, the owner or operator may test all three samples at the laboratory and use the arithmetic mean of the three samples 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*.

The Ag Program will allow the owner or operator to determine his or her own vertical sampling scheme. The owner or operator should not sample the very bottom (semi-solid) layer of the impoundment, where solids accumulate.

Laboratory Testing Method

The Ag Program requires that all BOD₅ samples be tested using *Standard Methods for the Examination of Water and Wastewater*, 19th ed. (1995), SM 5210-1.¹

The Ag Program requires that if DO samples are sent to a laboratory, the samples must be tested using the *Standard Methods for the Examination of Water and Wastewater*, 19th ed. (1995), SM 4500-O.¹ The Ag Program does not require grab sampling and laboratory analysis of wastewater for DO testing. The Ag Program anticipates any DO testing will be performed with a portable DO meter in the field. Using the portable DO meter method, the data reported by the DO meter should be recorded on a field report. All field records should be summarized in the semi-annual or annual report and retained with a copy of the latest calibration certification for the DO meter.

Monitoring Frequency

BOD₅ and DO testing must occur throughout the year to ensure that each impoundment is consistently achieving aerobic conditions; such frequent testing is called periodic monitoring. Each aerobic impoundment must be monitored for aerobic conditions on a monthly basis for twelve consecutive months. After an impoundment demonstrates consistent aerobic conditions over a twelve-month period, the owner or operator may request that the Ag Program relax the monitoring schedule to a quarterly basis.

Aerobic Covers

For any Ag Program-approved alternative aerobic cover, whether new or existing, the Ag Program reserves the right to require testing and monitoring for aerobic conditions at any time. The Ag Program will evaluate testing and monitoring requirements for each cover on a case-by-case basis.

¹ Standard method or as amended in later versions of the method.

Compliance with Testing and Monitoring Requirements

A company is required to comply with testing and monitoring requirements at all times. The only exception is in the event of a valid upset or emergency condition that is verified and approved by the Ag Program. The requirement to ensure compliance with emissions standards is not excuseable due to third party causes. For example, a company sends a monthly BOD₅ sample to a laboratory for analysis, and the laboratory is behind in conducting analyses or the laboratory results are in error, the company, not the laboratory is responsible and should plan to send another sample to a different laboratory prior to submitting late or erroneous data to the Ag Program.

Exceptions to This Policy

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