



DEPARTMENT OF
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State of Washington

Fugitive Dust Control Plan and Best Management Practices for Cattle Feeding Operations

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Fugitive Dust Control Plan and Best Management Practices for Cattle Feeding Operations

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Washington State Department of Ecology
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1. Introduction

A beef cattle feedlot is a facility at which cattle are confined throughout the year, and fed high-energy rations for the eventual purpose of marketing. While there are dozens of small feedlot operations in Washington State, the Department of Ecology (Ecology) has recognized beef cattle feedlots with inventories of over 1,000 head as potential air pollution sources since the initial adoption of registration regulations in 1976. There are several feedlots located in Central and Eastern Washington, which support normal inventories in excess of 1,000 head. Ecology's primary air quality concern regarding feedlots is the generation of fugitive dust emission from feed pens, roads, and alleyways.

During the hot, dry weather typical in Central and Eastern Washington during the summer months, cattle are lethargic during the heat of the day. When temperatures drop in the evening, the cattle become active and have the potential to generate significant quantities of fugitive dust from pens. Vehicle traffic on unpaved roads and cattle movement in alleys can also contribute to fugitive dust emissions from feedlots as well as feed processing and handling areas. This dust may impact neighboring properties, and Ecology and local air pollution control authorities have received complaints from feedlot neighbors regarding fugitive dust.

Feedlot operators have reviewed and instituted various practices to control fugitive dust emissions. Fugitive dust control measures can require a significant commitment of time and resources by feedlot owners and operators.

Washington Administrative Code (WAC) 173-400-040 requires air pollution sources to take "reasonable precautions" to prevent the release of fugitive emissions. Since particulate emissions from feedlots are considered to be fugitive dust emissions, these guidelines are intended to use current regulations and clarify what constitutes "reasonable precautions" to minimize emissions of fugitive emissions, including fugitive dust, from feedlots. The primary mechanism for doing this is to identify best management practices (BMPs) for fugitive dust control and implement these practices according to flexible, site-specific fugitive dust control plans (FDCPs) developed by each feedlot and approved by Ecology or the appropriate local air authority (LAA).

This revised Control Guideline is put together to include previous established guidelines as well as incorporate new issues not previously covered. This revised guideline is composed of several existing guidelines and BMPs from various agencies and practicing feedlots. Portions of this revised guideline were taken from:

- "Fugitive Dust Control Guidelines for Beef Cattle Feedlots and Best Management Practices" published in 1995 by the Washington Department of Ecology
- "Fugitive Dust Control Guidelines and Best Management Practices for Confined Heifer Replacement Feeding Operations" published in 2009 by the Yakima Regional Clean Air Agency
- "Guide to Agricultural PM10 Best Management Practices, Agriculture Improving Air Quality, Animal Operations – Beef Cattle Feedlot" published in 2015 by the Governor's Agricultural Best Management Practices Committee in Arizona
- "Fugitive Dust Control Plan" published in 2018 by Simplot Feeders Limited Partnership

A. Purpose

The purpose of these guidelines is to provide guidance for effective control of fugitive dust emissions at Confined Cattle Feeding Operations (CCFO). Compliance with these guidelines does not necessarily constitute compliance with regulations. Components of the purpose are:

- To achieve sufficient control of fugitive dust emissions and fallout from beef cattle feedlots to ensure compliance with State laws and regulations.
- To achieve dust control by describing a menu of best management practices (BMPs) for cattle feedlots, which will be, implemented using flexible, site-specific fugitive dust control plans (FDCPs).
- To clarify what constitutes “reasonable precautions to prevent” emissions of fugitive dust as required by WAC 173-400-040(3) and WAC 173-400-040(8)(a).
- To help feedlot owners and operators on effective management of fugitive emission control measures, and provide a means by which cattle feedlots can demonstrate that they are taking reasonable precautions to protect the quality of Washington’s air.

B. Guidance development process

i) Who should comply with the Guidelines?

- All cattle feedlots with inventories of over 1,000 head of cattle confined and fed during the dry season are subject to air quality standards under WAC 173-400-040. See WAC 173-400-100(1)(j). However, compliance with a FDCP approved by Ecology under these guidelines is evidence of good agricultural practices under the fugitive dust provisions of RCW 70.94.640.
- These guidelines may also be followed for resolving fugitive dust emission problems, which may arise from feedlots with smaller inventories.

ii) How do the guidelines work?

- Cattle feedlot operators will prepare FDCPs for each feedlot and submit them to Ecology or the appropriate local air authority (LAA) for approval.
- A feedlot’s FDCP must identify BMPs and operational procedures which the feedlot proposes to use to control fugitive dust.
- Ecology or the LAA and the feedlot are expected to work together in good faith toward development of a dust control plan, which is acceptable to both the feedlot and the appropriate agency.
- Feedlots will implement approved FDCPs according to the criteria and/or implementation schedules outlined in their plans.
- A feedlot may make modifications to an approved FDCP as long as the effectiveness of the plan is not compromised.
- Ecology or the LAA may initiate negotiations with a feedlot to modify an approved plan, if that plan is not sufficiently effective in minimizing fugitive dust emissions.

iii) Where and when should dust control FDCPs be filed?

- Feedlots located within the boundaries of a LAA should submit plans to the authority.
- Feedlots located outside the boundaries of a LAA should submit plans to the appropriate Ecology Regional Office.
- Existing feedlots will submit plans within six months of the effective date of the guidelines, unless a later date is agreed upon by Ecology or the LAA.
- New or expanding feedlots will file a notice of construction (NOC) which includes a fugitive dust FDCP for the new facility or addition. This plan must be approved prior to construction.

Background

A. History of regulating cattle feedlots in Washington State

In 1977, the EPA published “Source Assessment: Beef Cattle Feedlots”. This document set the stage for BMPs, and today remains a great resource. At the state level, in 1995 the Fugitive Dust Control Guidelines was put in place to limit fugitive dust from pens, feeding bunks, alleyways, and roads. At that time, manure handling, and reuse activities were not addressed in the guideline. Several variations of the 1995 Guidelines have been either implemented in specific regions or used as a foundation for specific sources. This revised guideline will take the next step by including feedlot operations not previously managed as well as bring in additional BMPs used in other States.

B. Terminology from cattle feedlots

- i) Fugitive Emissions - Emissions of dust, gases, or vapors from sources due to use, agitation, leaks, and other unintended or irregular releases of dust and gases. Particulate emissions can be fugitive.
 - 1) Fugitive Dust is a subset of fugitive emissions consisting of airborne particulate matter.
- ii) Point Source Emissions - A single identifiable source of pollution.
- iii) Particulates – Composed of soil, dust, and dried manure. Gaseous emissions evolve from wet manure and urine deposited in the pens. Odor may be attributed to both. Can be made up of multiple compounds (solids, gasses, and liquids) combined into a particle.

C. Regulatory requirements

- i) Revised Codes of Washington–See Appendix A
- ii) Washington Administrative Codes–See Appendix A
- iii) Notice of Construction Requirements–A written application to allow construction of a new source, modification of an existing stationary source or replacement or substantial alteration of control technology at an existing stationary source.
 - (1) Reasonably Available Control Technologies (RACT) -The lowest emission limit that a particular source or source category is capable of meeting by the application of control technology that is reasonably available considering technological and economic feasibility. RACT is determined on a case-by-case basis for an individual source or source category taking into account the impact of the source upon air quality, the availability of additional controls, the emission reduction to be achieved by additional controls, the impact of additional controls on air quality, and the capital and operating costs of the additional controls.
 - (2) Types of equipment/process typically associated with a NOC permit (but not limited to):
 - Boilers
 - Generators
 - Hay Grinders
 - Corn Flakers
 - Other similar equipment
 - (3) Approval Order - a regulatory order issued by a permitting authority to approve the notice of construction application for a proposed new source or modification, or the replacement or substantial alteration of control technology at an existing stationary source.

- (a) Site Specific – NOC Permit will be site specific. Facilities with multiple locations will need a permit for each location.
 - (b) General Order – Depending on the operation, there may be a General Order that covers that operation at which point a Coverage Order would be issued.
- iv) New Source Review - The construction or modification of a stationary source that increases the amount of any air contaminant emitted by such source or that result in the emission of any air contaminant not previously emitted. For questions about applicability and thresholds, please contact Ecology or your LAA

Guidelines

A. Best Management Practices available

Best Management Practices available to effectively minimize particulate emissions, but not limited to:

iv) Particulates:

1) Pens

- Manure mounding and spreading
- Manure removal
- Concrete aprons
- Feed higher moisture feed to beef cattle
- Provide shade in corral
- Use drag equipment to maintain pens
- Effective placement of wind barriers
- Surface Amendments/Applications
- Fixed water application – Sprinklers
- Mobile water application – Water trucks
- Increasing animal density – Cross fencing

2) Road and alleyways

- Spreading sawdust, apple pomace, or other materials over the surface alleyways.
- Apply and maintain aggregate cover
- Apply and maintain pavement in high traffic areas
- Apply and maintain synthetic particulate suppressant (not limited to the following)
 - Calcium Chloride (CaCl)
 - Soybean feedstock (SBF) processing byproducts
 - Calcium Lignosulfonate (lignin)
 - Polyvinyl acrylic polymer emulsion (PVA)
 - Polyacrymide (PAM)
 - Emulsified petroleum resin
- Apply and maintain water as a dust suppressant
- Install and maintain a track-out control device
- Apply and maintain oil on roads or feed lanes
- Speed management to help reduce fugitive emissions during transportation
- Install speed control signs
- Restrict access to through traffic

3) Feed processing and handling

(a) When transporting feed with a front end loader, the operator will:

- Load the bucket in such a way as to not have material falling off during transport.
- Not exceed a 10 mph speed limit when transporting commodities

- Keep the loader bucket as low as safety allows when transporting feed
 - Loader operator will unload bucket at feed mill or in a truck in such a way as to minimize drop of material
 - To the degree practicable, feed will only be transported when winds are less than 15-mph.
- (b) Other techniques, options, and processes
- Use natural and/or man-made structures, vegetation, trees, straw bales, etc. to block drift during processing.
 - Remove spilled and unused feed from feeding area on a regular basis.
 - Sequence feedstuffs into mixer in a manner that will maximize mixing efficiency, and minimize emissions.
 - Add molasses or tallow to feed, as this addition will reduce fugitive dust emissions.
 - Store and maintain feed stock in enclosed areas
 - Enclose bulk material handling operations or utilize a windbreak.
- 4) Manure management (but not limited to)
- Cover manure hauling trucks if load is susceptible to being wind blown
 - To the degree practicable, do not load manure when wind exceed 15 mph
 - A feedlot must have an appropriate place to store and manage manure removed from pens. Composting operations must also control fugitive dust emissions
- v) Techniques to reduce production of odor inducing emissions such as volatile organic compounds (VOCs), ammonia, and hydrogen sulfide (through effective dust control):
- 1) VOCs—Any carbon compound that participates in atmospheric photochemical reactions. BMPs for VOCs may include (but not limited to):
 - Feed and nutrient management
 - Proper silage/feed management
 - Aeration of ponds and lagoons
 - Manage feed lanes and walkways for manure buildup
 - Apply and maintain water to pens
 - 2) Ammonia—Evolved by the anaerobic manure decomposition, is the most widely studied odorous gas. Ammonia is evolved or volatilized from the urine, which been animals excrete and, thus, is emitted whether aerobic or anaerobic digestion of feedlot waste occurs. BMPs for ammonia may include (but not limited to):
 - Apply and maintain water to dilute and reduce the buildup of ammonia in pens
 - Fixed water application—sprinklers
 - Mobile water application—water trucks
 - 3) Hydrogen sulfide—Results from the microbial breakdown of organic matter in the absence of oxygen gas, this process is commonly known as anaerobic digestion. Keeping the manure in an aerobic condition will help minimize Hydrogen Sulfide emissions. BMPs for hydrogen sulfide may include (but not limited to):
 - Feed and nutrient management
 - Agitation of the ground with dragging skids
 - Apply and maintain water to dilute and reduce the buildup in pens

- vi) Monitoring and adaptive management—Type of management plan implemented to alter the BMPs based on the following criteria:
- (1) Dust monitoring reports from the last night and previous days
 - (2) Visual observation of the feedlot
 - (3) Current and forecast weather conditions including but not limited to temperature, precipitation, and wind
 - (4) Pen floor moisture and general condition of pens determined by physically checking the site

B. Fugitive Dust Control Plans (FDCP)

- i) A description of the feedlot, including:
- 1) A map or drawing of the feedlot which adequately represents the layout of the feedlot and provides enough detail to allow Ecology or the LAA to adequately review the feasibility and appropriateness of various BMPs for the facility. The map or drawing should show all:
 - a. Pens
 - b. Feeding bunks
 - c. Feeding preparation operations
 - d. Alleyways
 - e. Paved roads
 - f. Dirt or gravel roads
 - g. Manure management operations
 - 2) A description of the operational capacity of the feedlot, including the maximum number of cattle, which could be confined, the tons of feed that will be processed, and other equipment operations.
 - 3) A description of weather conditions including temperature, rainfall, pen floor conditions, predominant wind direction and speed, seasonal variations, etc.
 - 4) A description of the water available to the feedlot for emissions control. This description should include the source and quantity of water available, and any permit or other limitations, which would impact the feedlot's ability to employ water application as a BMP.
 - 5) A description of site-specific features or characteristics, which could complicate or prevent implementation of particular BMPs. For example: pens built on bedrock may inhibit installation of underground sprinkling systems, or narrow alleys may prevent water application by truck for portions of a facility.
- ii) The key elements of a FDCP
- 1) Description of BMPs for control of emission from cattle pens, sorting alleys, feed alleys, roads, feed preparation activities, manure management, etc., should be described. Descriptions must include:
 - (a) Which BMP or BMPs will be used and where they will be used.
 - (b) A description of the equipment and materials to be used, including a description of the normal operational capacity or application rate of any equipment.
 - (c) An operational plan for implementing each BMP.
 - (i) The operational plan should describe how the feedlot will implement BMPs and conditions or criteria the feedlot will use to determine when and how to implement each BMP.
 - (ii) It is recognized that feedlot operations and conditions are variable and that the same BMP may be implemented differently by individual feedlots. This variability makes the description of how BMPs will be operated, an especially important component of a feedlot's FDCP.

(iii) The operational plan must describe the criteria the feedlot will use to determine when to implement each BMP and the criteria for selecting application rates, if applicable.

Examples of the criteria include:

1. Pen conditions, such as moisture, surface compaction, amount of loose material, mound condition, etc.
2. Current and forecast weather.
3. Inventory capacity.

2) Identification of a contact person at the facility who is knowledgeable about and responsible for the BMPs in the feedlot's dust control plan and their implementation.

3) A schedule of future BMP implementation, if applicable.

(a) If a feedlot intends to implement an additional BMP or BMPs in the future, a target date for implementation of the future BMPs should be included in the feedlot's FDCP.

4) Training for feedlot personnel

5) Adjustments for weather conditions.

6) Adjustments when releases are observed.

7) Monitoring, record keeping and reporting as required by Chapter 173-400-105 WAC

iii) How are plans developed and approved?

1) A cattle feedlot is responsible for preparing a FDCP and submitting the plan to Ecology or the appropriate LAA for approval. Agricultural extension agents, consultants, or other assistance may be used in developing and reviewing the plan

2) Within 45 days of receipt of FDCP, Ecology or LAA staff will review the plan and notify the feedlot of plan approval or request additional information or propose alternative practices to approve the plan. Ecology or LAA will contact feedlot if more review time is needed.

3) Feedlots respond to Agency requests for information or modification of the plan within 30 days.

4) The approval process may include good faith discussion, evaluation, collection of information, and other efforts to resolve differences of opinion about the plan, so long as reasonable progress toward the development and approval of the feedlot's FDCP is being made.

5) The purpose of good faith negotiation is to share information and resolve differences of opinion regarding a feedlot's FDCP. Both the feedlot and Ecology or the LAA need to be able to exchange information freely and in good faith. Information obtained by Ecology or the LAA in the course of negotiation is not obtained for the purpose of any future enforcement activity.

6) If agreement on a feedlot's FDCP cannot be reached within 180 days after submittal, and after thorough good faith evaluation of alternatives and consideration of plan effectiveness, costs, and other pertinent matters, Ecology will disapprove the feedlot's FDCP and the feedlot will be subject to compliance actions as appropriate under RCW 70.94 and WAC 173-400 or applicable local air regulations.

iv) How can changes be made to an approved plan?

1) A feedlot may make modifications to an approved FDCP, as long as the effectiveness of the plan is not compromised. Changes to a plan must be documented and include how the changes will improve their plan. Ecology or the LAA must be notified of the changes within 45 days.

Modifications include, but are not limited to:

- Discontinuance or addition of equipment identified as a BMP in a FDCP.
- Changes in use of equipment identified as a BMP in a FDCP.
- Changes in operational procedures that will affect the BMPs in a FDCP.
- Changes in criteria used to determine BMP implementation and application rates.

v) How does an Agency determine when a dust control plan is adequate?

- 1) In considering whether a dust control plan achieves the purpose of the guidelines, Ecology or LAA may consider:
 - Whether the plan utilizes BMPs identified in Section 3 of these guidelines.
 - Consistency between the proposed BMPs and the BMPs outlined in these guidelines.
 - The extent of use and effectiveness of a proposed measure in reducing dust at other feedlots.
 - The ability of the proposed BMPs to maintain conditions which adequately minimize fugitive emissions.
 - Other measures in the plan which may be effective in minimizing fugitive dust, but which are not recognized BMPs.
 - The adequacy of the operational plan, including the criteria used to begin, end, and apply the proposed BMPs.
 - Adequacy to the details in section 3.b.iii.
 - Developing a checklist to approve or disapprove.
- vi) How will compliance with the plan and effectiveness of the plan be determined?
 - 1) Compliance
 - a. After a FDCP has been approved, a feedlot may be inspected to determine if the BMPs and their operational plans are in effect.
 - b. All Cattle Feedlots must follow and comply with their FDCP.
 - 2) Effectiveness
 - a. After a FDCP has been approved, a feedlot may be inspected to determine if the BMPs and their operational plans are in effect.
 - b. If inspections indicate that the plan is not effective, Ecology or the LAA will request information from the feedlot or propose additional or alternative dust control measures. As with the development of the initial plan, Ecology or the LAA and the feedlot will work together in good faith to revise the FDCP to increase its effectiveness as outlined in 3.b.iii-v.

C. Annual registration

- i) Annual registration activities include:
 - 1) There is an annual registration fee based on various factors.
 - 2) Emission inventory—Ecology-initiated or permit condition-driven
 - 3) On-site and record inspections
 - 4) Compliance-based activities—driven by complaints or inspections
 - 5) General record keeping – responsible official change notifications, name changes, updating contact info, etc.
 - 6) Additional information about registration and associated fees can be found in WAC 173-455

Appendices

Appendix A. Statutory, regulatory, and reference background

This section is intended to provide the primary regulatory framework for cattle feedlots. Other sections of Washington Administrative Code 173-400 may apply, but sections listed below have the most significant bearing on the industry.

WAC 173-400, General Regulations for Air Pollution Sources, contains several provisions that pertain to air emissions generated by feedlots, including the following:

1. WAC 173-400-040, **General Regulations for maximum emissions**, which includes restrictions on visible emissions, offsite particulate fallout, fugitive dust emissions, odors, and emissions detrimental to persons or property.
 - 1.1. WAC 173-400-040(1), **Visible emissions**, restricts emissions to no greater than 20% opacity for more than 3 minutes in any one hour period.
 - 1.2. WAC 173-400-040(2), **Fallout**, states in part, “No person shall cause...the emission of particulate matter...to be deposited beyond the property under direct control...of the source in sufficient quantity to interfere unreasonably with the use and enjoyment of the property upon which the material is deposited.”
 - 1.3. WAC 173-400-040(3), **Fugitive Emissions**, requires the use of “reasonable precautions to prevent the release of air contaminants” from any source which is considered a source of fugitive emissions.
 - 1.4. WAC 173-400-040(4), **Odors**, requires recognized good practice to reduce odors to a reasonable minimum.
 - 1.5. WAC 173-400-040(5), **Emissions detrimental to persons or property**, states in part, “No person shall cause...the emission of any air contaminant from any source if it is detrimental to the health, safety, or welfare of any person, or causes damage to property of business.”
 - 1.6. WAC 173-400-040(8)(a), **Fugitive dust sources**, requires the use of reasonable precautions to prevent fugitive dust from becoming airborne.
2. WAC 173-400-100, **Source Classifications** – Cattle Feedlots.
3. WAC 173-400-101, **Registration** – Registering and reporting air contaminant sources and source emissions.
4. WAC 173-400-105, **Records, monitoring, and reporting**, allows the department to require facility specific information to determine compliance, monitoring data for air contaminants, and access to the facility for inspections.
5. WAC 173-400-110, **New source review**, requires departmental approval in the form of a regulatory order prior to the installation of a new air pollution source or installation of new or additional air pollution control equipment. Any feedlot expansion which constitutes enlargement and may increase emissions as defined in WAC 173-400(3), will require approval prior to construction.

6. WAC 173-455, **Air Quality Fee Rule**, defines applicability and fees associated with air quality.
7. RCW 70.94.154, **RACT requirements**, requires that all existing sources of air pollution use reasonably available control technology (RACT) to minimize emissions.

WAC 173-400-040, **General standards for maximum emissions** states in part:

“Further, all emissions units are required to use reasonably available control technology (RACT) which may be determined for some sources or source categories to be more stringent than the applicable emission limitations of any chapter of Title 173 WAC.”

8. RCW 70.94.460, **Odors and dust caused by agricultural activities**
9. Substitute Senate Bill 5196, amending RCW 70.94.460, Cattle feedlots implementing best management practices, effective 7/23/2017.
10. EPA “Source Assessment: Beef Cattle Feedlots”, EPA-600/2-77-107, June 1977.

Appendix B. Dust complaint flow chart

