

Best Available Control Technology (BACT) Requirements for
Animal Feed Supplement Manufacturing – Palm Oil & Calcium
Oxide Process

FINAL

March 12, 2026

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SJVAPCD Best Available Control Technology (BACT) Guideline 5.6.2*

Emissions Unit: Animal Feed Supplement Manufacturing **Industry Type:** All
 – Palm Oil & Calcium Oxide Process

Equipment Rating: All

Last Update: March 12, 2026

Pollutant	Achieved in Practice or contained in SIP	Technologically Feasible	Alternate Basic Equipment
VOC	98% control (thermal incineration, scrubber with biofiltration system, or equivalent)		
PM ₁₀	Wet scrubber or equivalent technology achieving ≥ 95% control efficiency		

BACT is the most stringent control technique for the emissions unit and class of source. Control techniques that are not achieved in practice or contained in a state implementation plan must be cost effective as well as feasible. Economic analysis to demonstrate cost effectiveness is required for all determinations that are not achieved in practice or contained in an EPA approved State Implementation Plan.

* This is a Summary Page for this Class of Source.

I. Introduction

The purpose of this document is to proactively update the following Best Available Control Technology (BACT) guideline:

5.6.2 – Animal Feed Supplement Manufacturing – Palm Oil & Calcium Oxide Process

BACT guideline 5.6.2 was rescinded on August 16, 2023. Since that time permit staff has been conducting BACT analyses on a case-by-case basis for each project. This proactive update is necessary to incorporate the most stringent emission control standards that have been achieved in practice. Furthermore, the proactive update to this BACT guideline will bring consistency in implementing the BACT standard throughout the District for new and modified animal feed supplement manufacturing operations triggering BACT for emissions of particulate matter with an aerodynamic diameter of 10 microns or less (PM₁₀) and volatile organic compounds (VOC).

II. Background

The District is a public health agency whose mission is to improve the health and quality of life for all Valley residents through efficient, effective, and entrepreneurial air quality management strategies. Because of the climate and geography of the San Joaquin Valley, the District faces some of the most difficult air quality challenges in the entire nation. The District is responsible for developing plans to continue to improve the air quality in the San Joaquin Valley in order to reach attainment with health-based ambient air quality standards, and these plans become part of state and federal law. As a critical part of these plans to attain the established ambient air quality standards to mitigate adverse health impacts, District Rule 2201 – New and Modified Stationary Source Review Rule requires the use of BACT to minimize potential emissions of affected pollutants from new and modified equipment and processes.

District Rule 2201 defines BACT as the most stringent emission limitation or control technique of the following:

- Achieved in practice for such category and class of source;
- Contained in any State Implementation Plan approved by the Environmental Protection Agency for such category and class of source. A specific limitation or control technique shall not apply if the owner of the proposed emissions unit demonstrates to the satisfaction of the APCO that such a limitation or control technique is not presently achievable; or
- Contained in an applicable federal New Source Performance Standard; or
- Any other emission limitation or control technique, including process and equipment changes of basic or control equipment, found by the Air Pollution Control Officer (APCO) to be cost effective and technologically feasible for

such class or category of sources or for a specific source.

In order to determine the most stringent emission limitation or control technique for animal feed supplement manufacturing operations, the District has reviewed emission limits in Federal New Source Performance Standards (NSPS), National Emission Standards for Hazardous Air Pollutants (NESHAP), state and local air District rules and regulations, BACT determinations conducted at Federal, State and local level, and equipment listings for animal feed supplement manufacturing operations operating in the San Joaquin Valley Air Pollution Control District (SJVAPCD). This analysis forms the basis for determining AIP BACT standards for animal feed supplement manufacturing – palm oil & calcium oxide process.

III. Applicable Regulations and Achieved in Practice BACT Requirements for animal feed supplement manufacturing – palm oil & calcium oxide process

In order to evaluate the achieved in practice emission levels for animal feed supplement manufacturing operations, the requirements of the Federal and California regulations listed below were considered. In addition, BACT and Lowest Achievable Emission Rate (LAER) determinations from the US EPA RACT/BACT/LAER Clearinghouse (RBLC), the California Air Resources Board (ARB) statewide BACT Clearinghouse, and the BACT guidelines from the South Coast Air Quality Management District (SCAQMD), the Bay Area Air Quality Management District (BAAQMD), the Sacramento Metropolitan Air Quality Management District (SMAQMD), and the San Joaquin Valley Air Pollution Control District (SJVAPC) were also reviewed to evaluate the emission requirements and control technologies that are currently being utilized for animal feed supplement manufacturing – palm oil & calcium oxide process.

A. Evaluation of Federal, State and Local Regulations

40 CFR Part 63 Subpart DDDDDDD – National Emission Standards for Hazardous Air Pollutants for Area Sources: Prepared Feeds Manufacturing

40 CFR 63 Subpart DDDDDDD establishes National Emission Standards for Hazardous Air Pollutants (NESHAP) to reduce emissions of PM from new and modified prepared feeds manufacturing facilities¹ that utilize a material containing chromium or a material containing manganese and is an area source of emissions of hazardous air pollutants (HAP).

40 CFR 63 Subpart DDDDDDD establishes management practices and standards for all prepared feeds manufacturing facilities (paragraphs (a)

¹ A prepared feeds manufacturing affected source is the collection of all equipment and activities necessary to product animal feed from the point in the process where a material containing chromium or a material containing manganese is added, to the point where the finished animal feed product leaves the facility.

through (d)) and for pelleting operations at prepared feeds manufacturing facilities with an average daily feed production level exceeding 50 tons per day (paragraphs (a) through (f)).

- A. In all areas of the affected source where materials containing chromium or manganese are stored, used, or handled, you must comply with the management practices in paragraphs (a)(1) and (2) of this section.
 - 1. You must perform housekeeping measures to minimize excess dust. These measures must include, but not be limited to, the practices specified in paragraphs (a)(1)(i) through (iii) of this section.
 - i. You must use either an industrial vacuum system or manual sweeping to reduce the amount of dust;
 - ii. At least once per month, you must remove dust from walls, ledges, and equipment using low pressure air or by other means, and then sweep or vacuum the area;
 - iii. You must keep exterior doors in the immediate affected areas shut except during normal ingress and egress, as practicable. This paragraph (a)(1)(iii) does not apply to areas where finished product is stored in closed containers, and no other materials containing chromium or manganese are present.
 - 2. You must maintain and operate all process equipment in accordance with manufacturer's specifications and in a manner to minimize dust creation.
- B. You must store any raw materials containing chromium or manganese in closed containers.
- C. The mixer where materials containing chromium or manganese are added must be covered at all times when mixing is occurring, except when the materials are being added to the mixer. Materials containing chromium or manganese must be added to the mixer in a manner that minimizes emissions.
- D. For the bulk loading process where materials containing chromium or manganese are loaded into trucks or railcars, you must lessen fugitive emissions by reducing the distance between the loadout spout and the vehicle being loaded by either paragraph (d)(1) or (d)(2) of this section.
 - 1. Use a device of any kind at the bulk loadout spout that minimizes the distance to the vehicle being loaded.
 - 2. Use any other means to minimize the distance between the loadout spout and the vehicle being loaded.
- E. For the pelleting operations at new prepared feeds manufacturing facilities with an average daily feed production level exceeding 50 tons per day, you must capture emissions and route them to a cyclone

designed to reduce emissions of particulate matter by 95 percent or greater. You must also comply with the provisions in paragraphs (e)(1) through (3) of this section.

1. You must demonstrate that the cyclone is designed to reduce emissions of particulate matter by 95 percent or greater using one of the methods specified in paragraphs (e)(1)(i) through (iii) of this section.
 - i. Manufacturer specification;
 - ii. Certification by a professional engineer or responsible official; or
 - iii. A performance test conducted in accordance with § 63.11623 of this section.
 2. You must establish an inlet flow rate, inlet velocity, pressure drop, or fan amperage range that represents proper operation of the cyclone in accordance with the applicable requirement in paragraphs (e)(2)(i), (ii), or (iii) of this section.
 - i. If you demonstrate the cyclone design efficiency using manufacturer specifications in accordance with paragraph (e)(1)(i) of this section, the inlet flow rate, inlet velocity, pressure drop, or fan amperage range that represents proper operation of the cyclone must be provided by the manufacturer.
 - ii. If you demonstrate the cyclone design efficiency using certification by a professional engineer or responsible official in accordance with paragraph (e)(1)(ii) of this section, this certification must include calculations to establish an inlet flow rate, inlet velocity, pressure drop, or fan amperage range that represents proper operation of the cyclone.
 - iii. If you demonstrate the cyclone design efficiency using a performance test in accordance with paragraph (e)(1)(iii) of this section, you must monitor the inlet flow rate, inlet velocity, pressure drop, or fan amperage during the test and establish a range that represents proper operation of the cyclone based on the data obtained during the test.
 3. You must maintain and operate the cyclone in accordance with manufacturer's specifications. If manufacturer's specifications are not available, you must develop and follow standard maintenance and operating procedures that ensure proper operation of the cyclone.
- F. For the pelleting operations at existing prepared feeds manufacturing facilities with an average daily feed production level exceeding 50 tons per day, you must capture emissions and route them to a cyclone. The

cyclone must be maintained in accordance with good air pollution control practices and manufacturer's specifications and operating instructions, if available. If manufacturer's specifications and operating instructions are not available, you must develop and follow standard operating procedures that ensure proper operation and maintenance of the cyclone.

South Coast AQMD Rules

There are no explicit rules or regulations in South Coast AQMD that lists any emission limits or control technologies for animal feed supplement manufacturing – palm oil and calcium oxide process.

Bay Area AQMD Regulation 8, Rule 18 – Equipment Leaks (Last amended September 4, 2024)

There are no explicit rules or regulations in Bay Area AQMD that lists any emission limits or control technologies for animal feed supplement manufacturing – palm oil and calcium oxide process.

Sacramento Metropolitan AQMD Rules

There are no explicit rules or regulations in Sac Metro AQMD that lists any emission limits or control technologies for animal feed supplement manufacturing – palm oil and calcium oxide process.

San Joaquin Valley APCD Rules

There are no explicit rules or regulations in San Joaquin Valley APCD that lists any emission limits or control technologies for animal feed supplement manufacturing – palm oil and calcium oxide process.

Summary:

Based on the above review of Federal, State and Local rules and regulations, the following standard was found:

- Capture emissions and route them to a cyclone designed to reduce emissions of particulate matter by 95 percent or greater. [40 CFR Part 63 Subpart DDDDDDD]

B. Evaluation of Federal, State and Local BACT/LAER Guidelines

EPA RACT/BACT/LAER clearinghouse

The EPA RACT/BACT/LAER clearinghouse, available at

<https://cfpub.epa.gov/rblc/index.cfm?action=Search.BasicSearch&lang=en> was searched to determine limits established for animal feed supplement manufacturing – palm oil & calcium oxide process. The database was searched for records between 01/01/2016 and 03/04/2026 using process type 61.999 that covers other agricultural chemical manufacturing sources.

The search yielded no results.

SJVAPCD BACT guideline 5.6.2 – Animal Feed Supplement Manufacturing – Palm Oil & Calcium Oxide Process

The BACT requirements in this guideline became obsolete; therefore, the guideline was rescinded. However, the guideline will be consulted to establish a baseline.

The following table summarizes BACT requirements for animal feed supplement manufacturing – palm oil & calcium oxide process SJVAPCD. The requirements were last updated on February 17, 2004. BACT guideline is available in Appendix I.

Pollutant	Achieved in Practice or contained in the SIP	Technologically Feasible	Alternate Basic Equipment
VOC	Wet scrubber or equivalent technology achieving ≥ 70% control efficiency	<ol style="list-style-type: none"> 98% control (thermal incineration or equal) Biofiltration system 	
PM ₁₀	Wet scrubber or equivalent technology achieving ≥ 90% control efficiency		

SCAQMD BACT guidelines for animal feed supplement manufacturing

SCAQMD does not have a BACT guideline for animal feed supplement manufacturing – palm oil & calcium oxide process. However, they do have a BACT guideline for animal feed supplement manufacturing – dry material handling. The following table summarizes BACT requirements for animal feed supplement manufacturing at non-major polluting facilities in SCAQMD. The requirements were last updated on October 20, 2000. BACT guideline is available at the following link:

<https://www.aqmd.gov/docs/default-source/bact/bact-guidelines/bact-guidelines-2022/part-d---bact-guidelines-for-non-major-polluting-facilities.pdf?sfvrsn=8>

SCAQMD BACT Search – Non-Major Source Polluting Facilities			
	Criteria Pollutants		
Subcategory	VOC	PM₁₀	Inorganic
Animal Feed Mfg. – Dry Material Handling		Baghouse (07-11-97)	

BAAQMD BACT guidelines for animal feed supplement manufacturing

BAAQMD does not have a BACT guideline for animal feed supplement manufacturing – palm oil and calcium oxide process.

SMAQMD BACT guidelines for animal feed supplement manufacturing

SMAQMD does not have a BACT guideline for animal feed supplement manufacturing – palm oil and calcium oxide process.

Summary:

Based on the above review of Federal, State and Local BACT/LAER guidelines, the following standards are found to be the most stringent standards to this date.

	VOC	PM₁₀
Achieved in Practice or contained in the SIP	Wet scrubber or equivalent technology achieving ≥ 70% control efficiency	Wet scrubber or equivalent technology achieving ≥ 95% control efficiency
Technologically Feasible	<ol style="list-style-type: none"> 1. 98% control (thermal incineration or equal) 2. Biofiltration system 	
Alternate Basic Equipment		

C. Evaluation of Existing Permit Units in SJVAPCD

San Joaquin Valley APCD maintains records of all permitted equipment, existing and those canceled, in its permit database.

1. *Animal Feed Supplement Manufacturing – Palm Oil & Calcium Oxide Process*

The SJVAPCD permits database was queried to identify animal feed supplement manufacturing units that demonstrated control efficiencies for VOC emissions higher than those listed in the *Achieve in Practice or contained in the SIP* column in rescinded BACT Guideline 5.6.2.

It is evident from the permit units in **Appendix II**, more than one unit has achieved $\geq 70\%$ control efficiency for VOC emissions and the use of a wet scrubber or equivalent technology achieving $\geq 95\%$ control efficiency for PM₁₀ emissions.

D. Summary of Findings

Based on the review of summaries in Section III. A, B, C above, the most stringent emission levels required and/or achieved are summarized in the following table:

Pollutant	Achieved in Practice or contained in the SIP	Technologically Feasible	Alternate Basic Equipment
VOC	98% control (thermal incineration, scrubber with biofiltration system, or equal)		
PM ₁₀	Wet scrubber or equivalent technology achieving $\geq 95\%$ control efficiency		

IV. Determination that Emission Limits are Achieved in Practice BACT

A. Animal Feed Supplement Manufacturing – Palm Oil & Calcium Oxide Process

One of more units in the valley have a VOC control efficiency $\geq 70\%$ and utilize a wet scrubber or equivalent technology achieving $\geq 95\%$ control efficiency for

PM₁₀ emissions.

Technologically Feasible Emission Control Options

The District is not aware of any other commercially available emission control technologies that can achieve higher PM₁₀ or VOC control efficiencies than what thermal incineration or scrubber with biofiltration systems have been demonstrated to achieve for this class and category of source at this time. Therefore, no other emission control technologies will be listed as feasible at this time.

V. Recommendation

For animal feed supplement manufacturing – palm oil & calcium oxide process, the following emissions standards are recommended.

Pollutant	Achieved in Practice or contained in SIP	Technologically Feasible	Alternate Basic Equipment
VOC	98% control (thermal incineration, scrubber with biofiltration system, or equal)		
PM ₁₀	Wet scrubber or equivalent technology achieving ≥ 95% control efficiency		

VI. Appendices

- I: BACT Guideline 5.6.2
- II: Permitted Animal Feed Supplement Manufacturing Operations

Appendix I
BACT Guideline 5.6.2

San Joaquin Valley
Unified Air Pollution Control District

Best Available Control Technology (BACT) Guideline 5.6.2*

Last Update: 02/17/2004

Animal Feed Supplement Manufacturing - Palm Oil & Calcium Oxide Process

Pollutant	Achieved in Practice or contained in the SIP	Technologically Feasible	Alternate Basic Equipment
VOC	wet scrubber or equivalent technology achieving >= 70% control efficiency	1. 98% control (thermal incineration or equal) 2. Biofiltration system	
PM10	wet scrubber or equivalent technology achieving >= 90% control efficiency		

BACT is the most stringent control technique for the emissions unit and class of source. Control techniques that are not achieved in practice or contained in a State Implementation Plan must be cost effective as well as feasible. Economic analysis to demonstrate cost effectiveness is required for all determinations that are not achieved in practice or contained in an EPA approved State Implementation Plan.

***This is a Summary Page for this Class of Source**

Appendix II
Permitted Animal Feed Supplement Manufacturing
Operations

Permit	Control Device	VOC Control Efficiency	PM ₁₀ Control Efficiency
N-1045-1-6 (canceled)	Thermal Oxidizer	95%	n/a
C-3727-9-10	Wet scrubber and biofiltration system ²	98%	≥ 95% ³

² Project C-1152171 determined that the use of a wet scrubber and duct sprayers by unit C-3727-9 achieved a control efficiency of 99.8%. This was confirmed with a source test performed on November 2015 as the measured VOC emission rate (lb-VOC/ton-throughput) was determined to be 0.003 lb-VOC/ton-throughput, which was less than the permitted limit of 0.148 lb-VOC/ton-throughput. The facility modified the unit in 2018 to connect the exhaust of the scrubber to a biofiltration system serving permit C-3727-7, which has a permitted VOC emission limit of 0.131 lb-VOC/ton-throughput. The VOC emission limit of C-3727-7 and '-9 was combined and the new shared VOC limit is 0.22 lb-VOC/ton-throughput. This new process was source tested on January 2024 and the measured VOC emission rate was determined to be 0.127 lb-VOC/ton-throughput.

³ The baghouse serving the unit has a control efficiency of 99.9% per manufacturer's guarantee.