SJVAPCD Best Available Control Technology (BACT) Guideline 5.7.3*

Last Update: May 7, 2026

Turkey House

Pollutant	Achieved in Practice or Contained in SIP	Technologically Feasible	Alternate Basic Equipment
PM_{10}	- Use of the following poultry house design and management practices: a. Weatherproof housing structure; AND b. Minimum disturbance of manure/litter; AND c. Covering manure/litter stockpiles	1. 85% Control (Capture and Electrostatic Precipitator) 2. 80% Control (Capture and Wet Scrubber) 3. 70% Control (Capture and Cyclones) 4. 40% Control (Dry Filters Using Centrifugal Force for PM Removal)	
VOC	- Use of the following poultry house design and management practices: a. i) Enclosed housing with mechanical ventilation and computerized control of environmental conditions using sensors; or ii) use of acidifying litter amendments; AND b. Compliance with applicable District Rule 4570 Feed and Housing Mitigation Measures; AND c. Houses completely cleaned out at least twice per year; AND d. All mortality removed from houses at least once per day	1. 80% Control (Capture and Biofiltration) 2. 70% Control (Capture and Wet Scrubber)	
NH_3	- Use of the following poultry house design and management practices: a. i) Enclosed housing with mechanical ventilation and computerized control of environmental conditions using sensors; or ii) use of acidifying litter amendments; AND b. Compliance with applicable District Rule 4570 Feed and Housing Mitigation Measures; AND c. Houses completely cleaned out at least twice per year; AND d. All mortality removed from houses at least once per day	80% Control (Capture and Biofiltration or Wet Scrubber)	

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 s 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**

Proactive Best Available Control Technology (BACT) Determination

District BACT Guideline 5.7.3

Turkey House

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I. Introduction

The purpose of this project is to update previous District BACT Guideline 5.7.3, which applied to turkey houses. Previous District BACT Guideline 5.7.3 was last updated on November 23, 2011 and was removed from the District BACT clearinghouse pending an update on August 16, 2023.

The current update will incorporate any applicable and more stringent emission control standards that have been achieved in practice or determined to be technologically feasible since the last update. Any corrections and/or changes needed to ensure consistency with the District's BACT policy and other District practices will also be made.

The discussions in this update will be limited to the following topics:

- Source of emissions
- Previous and Current BACT requirements
- Top-down BACT analysis for pollutants
- Recommendations

II. Source of Emissions

The principal pollutants emitted from turkey houses are particulate matter (PM), Volatile Organic Compounds (VOC), and ammonia (NH_3). Factors that affect emissions from turkey houses include the moisture content of the litter, the pH, the ventilation rate for mechanically ventilated turkey houses, the temperature, and the amount of manure and length of the time the manure is present in the turkey house.

Manure as excreted by the birds has a high water content, most of which evaporates, emitting ammonia as the manure dries out. Ideally, litter in poultry houses should contain no more than 20-25% moisture.[1] High moisture content in the litter will lead to the development of anaerobic conditions and the production of hydrogen sulfide (H_2S) and other reduced sulfur compounds. High moisture content in the litter will also lead to greater production of VOCs and methane and will facilitate the further conversion of organic nitrogen to ammonia. Additionally, the greater the moisture content the more favorable the environment for microbes responsible for emissions of ammonia and VOC, which increases the likelihood that these compounds will be emitted. Moisture inside turkey houses is controlled by adequate ventilation and regular maintenance of waterers to minimize leaks.

In mechanically ventilated poultry houses, the ventilation rate affects the amount of particulate matter (PM), VOCs, and ammonia carried out of the houses. During

[1] Patterson, P. H. (2001) Lesson 11: Using Dietary and Management Strategies to Reduce the Nutrient Excretion of Poultry. Lesson 11 in Livestock and Poultry Environmental Stewardship Curriculum. MidWest Plan Service. Iowa State University, Ames, IA. Accessed April 2026 at: https://lpelc.org/wp-content/uploads/2019/03/LES_11.pdf

the growth of the flock, continuous airflow removes ammonia and other gases and reduces the moisture content of freshly excreted manure.

Primary PM_{10} emissions from poultry houses consist of dust and microscopic pieces of dander, skin, feathers and feed. These emissions pose a greater health risk to workers within the poultry facility than to people who are offsite. Various methods and management practices can be used to reduce PM_{10} emissions. The first set of control methods include those that are aimed at preventing the generation of emissions; whereas the second set consists of those aimed at preventing emissions that have already been generated from escaping into the atmosphere. Control methods such as house design, hygiene, and feeding practices focus on preventing PM_{10} generation. In an enclosed housing system, humidity and air flow can also be optimized at a level that results in the least amount of particulate matter being entrained in the air.

The potential for gaseous emissions, such as VOCs and ammonia, increases with greater manure storage time and greater manure accumulation in the houses.[2] The amount of manure and length of the time the manure is present in the turkey house is determined by the number of flocks that are raised on the litter before a complete cleanout. Fresh litter will have negligible emissions, while litter that has been reused for several flocks may have considerable emissions because of the accumulation of manure.

VOC emissions will vary with temperature because the rate of VOC formation, reduction to methane, and volatilization varies with temperature.[2]

Ammonia volatilization is the result of the microbial decomposition of nitrogenous compounds in poultry litter. The primary nitrogenous compound in poultry litter is uric acid, but nitrogenous compounds also occur in the form of undigested organic nitrogen in poultry feces. Whenever uric acid comes in contact with the enzyme urease, which is excreted in animal feces, the uric acid will hydrolyze rapidly to form ammonia and this ammonia will be emitted soon after. The formation of ammonia will continue more slowly (over a period of months or years) with the microbial breakdown of organic nitrogen in the litter. The rate of ammonia volatilization is influenced by a number of factors including the concentrations of nitrogenous compounds in the litter, temperature, air velocity, surface area, and moisture.

III. Previous BACT Requirements for Turkey Houses

As stated above, the District BACT Clearinghouse does not currently include a valid BACT guideline that applies to poultry houses for turkeys. Previous District

[2] US EPA (August 15, 2001) Emissions from Animal Feeding Operations, Draft Report, Section 2.3 – Summary of Factors Affecting Emissions. EPA Contract No. 68–D6–0011. (Research Triangle Park, NC: US EPA, Office of Air Quality Planning and Standards, Emissions Standards Division). https://www.epa.gov/sites/default/files/2020-10/documents/draftanimalfeed.pdf

BACT Guideline 5.7.3 listed the following practices and technologies as potential BACT options to control emissions from turkey houses.

Pollutant	Achieved in Practice or contained in SIP	Technologically Feasible	Alternate Basic Equipment
VOC	19% control - 1. Feeding animals in accordance with applicable NRC guidelines; AND 2. House design and management practices including (a) weatherproof housing structure, (b) dry manure/litter management, (c) daily inspection of water pipes and drinkers, and (d) daily removal of mortality; AND 3. Use of acidifying litter amendments per manufacturer recommendations	1. 98% control (Capture and Thermal Incineration) 2. 95% control (Capture and Catalytic Incineration) 3. 95% control (Capture and Carbon Adsorption) 4. 80% control (Capture and Biofiltration)	
PM_{10}	5% Control - House design and management practices including (a) weatherproof housing structure, (b) minimum disturbance of manure/litter, and (c) covering manure/litter stockpiles	1. 98% Control (Capture and Cyclones followed by Electrostatic Precipitator) 2. 95% Control (Capture and Cyclones followed by Baghouse) 3. 80% Control (Capture and Cyclones followed by Wet Scrubber) 4. 50% Control (Capture and Cyclones)	
NH_3	55% control - 1. Feeding animals in accordance with applicable NRC guidelines; AND 2. House design and management practices including (a) weatherproof housing structure, (b) dry manure/litter management, (c) daily inspection of water pipes and drinkers, and (d) daily removal of mortality; AND 3. Use of acidifying litter amendments per manufacturer recommendations	80% control (Capture and Biofiltration)	

IV. Top-Down BACT Analysis

As explained earlier, the principal pollutants emitted from turkey houses are particulate matter (PM), Volatile Organic Compounds (VOC), and ammonia (NH_3).

A. BACT Analysis for PM_{10} Emissions

Step 1 - Identify All Possible Control Technologies

Survey of BACT Guidelines:

The following BACT references were reviewed to identify potential control technologies for PM_{10} emissions from turkey houses:

- EPA RACT/BACT/LAER clearinghouse
- California Air Resources Board (CARB) BACT clearinghouse/guideline list (https://ww2.arb.ca.gov/capp/cst/tch/bact-guidelines-tool)
- San Joaquin Valley APCD (SJVAPCD) BACT clearinghouse (https://ww2.valleyair.org/permitting/best-available-control-technology/district-bact-clearinghouse/)
- South Coast AQMD (SCAQMD) BACT guidelines (https://www.aqmd.gov/home/permits/bact/guidelines)
- Bay Area AQMD (BAAQMD) BACT/T-BACT workbook (https://www.baaqmd.gov/permits/permitting-manuals/bact-tbact-workbook)
- Sacramento Metropolitan AQMD (SMAQMD) BACT clearinghouse (https://www.airquality.org/businesses/permits-registration-programs/best-available-control-technology-(bact))
- Monterey Bay Air Resources District (MBARD) BACT Guidelines
- Santa Barbara County APCD (SBAPCD) BACT clearinghouse (https://www.ourair.org/bact/)
- San Diego County APCD (SDAPCD) BACT Guidance Document (https://www.sdapcd.org/content/dam/sdapcd/documents/permits/SDAPCD-BACT-Guidance.pdf)

The EPA RACT/BACT/LAER clearinghouse does not include general guidelines, only determinations made by individual agencies. The CARB BACT clearinghouse/guideline list includes BACT guidelines and determinations submitted by California air districts.

No BACT guidelines or determinations for turkey houses were found in the references given above, except previous District BACT guideline 5.7.3, which was presented above and included the BACT options for the control of PM_{10} that are shown in the table below.

Previous SJVAPCD BACT Guideline 5.7.3 – Turkey House BACT for PM_{10}		
Achieved in Practice	Technologically Feasible	Alternate Basic Equipment
5% Control - House design and management practices including (a) weatherproof housing structure, (b) minimum disturbance of manure/litter, and (c) covering manure/litter stockpiles	1. 98% Control (Capture and Cyclones followed by Electrostatic Precipitator) 2. 95% Control (Capture and Cyclones followed by Baghouse) 3. 80% Control (Capture and Cyclones followed by Wet Scrubber) 4. 50% Control (Capture and Cyclones)	--

In addition, because turkeys are typically raised in the same houses as the broiler chickens or houses that are nearly identical to broiler houses, the BACT options listed in current District BACT Guideline 5.7.1 - Poultry Broiler House will also be considered as potential BACT options for turkey houses. Current District BACT Guideline 5.7.1 lists the following practices and technologies as potential BACT options for PM_{10} emissions from broiler houses.

SJVAPCD BACT Guideline 5.7.1 – Poultry Broiler House BACT for PM_{10}		
Achieved in Practice	Technologically Feasible	Alternate Basic Equipment
Use of the following broiler house design and management practices: 1. Weatherproof housing structure, AND 2. Minimum disturbance of manure/litter, AND 3. Covered manure/litter piles	1. 99% Overall Capture and Control (Cyclones followed by Electrostatic Precipitator or Baghouse) 2. 95% Overall Capture and Control: (Cyclones Followed by Wet Scrubber) 3. 60% Overall Capture and Control (High Efficiency Cyclones)	--

Survey of Applicable Rules and Regulations:

In addition, the following rules and regulations were reviewed to identify any emission limits or practices that could reduce PM_{10} emissions from poultry houses for turkeys:

- SCAQMD Rule 223 – Requirements for Confined Animal Facilities (amended 9/5/2025)
- SCAQMD Rule 403 – Fugitive Dust (last amended 6/3/2005)
- SCAQMD 1127 – Emission Reductions from Livestock Waste (adopted 8/6/2004)
- BAAQMD Regulation 2, Rule 10 – Large Confined Animal Facilities (adopted 7/19/2006)
- SMAQMD Rule 496 - Large Confined Animal Facilities (adopted 8/24/2006)
- SJVAPCD Rule 4550 - Conservation Management Practices (adopted 5/20/2004; re-adopted 8/19/2004)
- SJVAPCD Rule 4570 – Confined Animal Facilities (last amended 10/21/2010)
- Imperial County APCD (ICAPCD) Rule 217 - Large Confined Animal Facilities (LCAF) Permits Required (revised 2/9/2016)
- ICAPCD Rule 806 – Conservation Management Practices (revised 10/16/2012)
- Butte County AQMD (BCAQMD) Rule 450 - Large Confined Animal Facilities (adopted December 21, 2006)

No PM_{10} emission limits for poultry houses or measures to control PM_{10} emissions from poultry houses were found in SCAQMD Rules 223 and 1127; BAAQMD Regulation 2, Rule 10; SMAQMD Rule 496; District Rule 4570; ICAPCD Rule 217; ICAPCD Rule 806; or BCAQMD Rule 450. The requirements from SCAQMD Rule 403 and District Rule 4550 that potentially reduce PM_{10} emissions from poultry operations are discussed below.

SCAQMD Rule 403

SCAQMD Rule 403 – Fugitive Dust states that the purpose of the rule is to reduce the amount of PM entrained in the ambient air as a result of anthropogenic (man-made) fugitive dust sources by requiring actions to prevent, reduce, or mitigate fugitive dust emissions. The provisions of this rule apply to activities and man-made conditions capable of generating fugitive dust. SCAQMD Rule 403 applies to confined animal facilities that raise 3,360 or more fowl or 50 or more animals and requires these operations to implement specified conservation management practices (CMPs) to reduce emissions of fugitive dust. SCAQMD Rule 403 does not apply to dairy farms or confined animal facilities that have a combined disturbed surface area within one continuous property line of one acre or less

SCAQMD Rule 403 requires any person who operates or authorizes the operation of a confined animal facility subject to the rule to implement the applicable conservation management practices in Table 4 of the rule. The SCAQMD Rule 403 requirements that potentially apply to poultry housing are shown in the table below.

SCAQMD Rule 403, Table 4 (Conservation Management Practices for Confined Animal Facilities)	
SOURCE CATEGORY	**CONSERVATION MANAGEMENT PRACTICES**
Manure Handling (Only applicable to Commercial Poultry Ranches)	(1a) Cover manure prior to removing material off-site; AND (1b) Spread the manure before 11:00 AM and when wind conditions are less than 25 miles per hour; AND (1c) Utilize coning and drying manure management by removing manure at laying hen houses at least twice per year and maintain a base of no less than 6 inches of dry manure after clean out; or in lieu of complying with conservation management practice (1c), comply with conservation management practice (1d). (1d) Utilize frequent manure removal by removing the manure from laying hen houses at least every seven days and immediately thin bed dry the material.
Feedstock Handling	(2a) Utilize a sock or boot on the feed truck auger when filling feed storage bins.

SCAQMD Rule 403, Table 4, CMP 1a, which requires covering of manure prior to it being removed onsite can reduce emissions from onsite storage of poultry manure. The only requirements included in SCAQMD Rule 403 that could potentially affect emissions directly from poultry houses are the manure handling CMPs included in Table 4, 1c and 1d that require owners and operators of laying hen houses to either 1) utilize coning and drying manure management by removing manure at laying hen houses at least twice per year and maintain a base of no less than 6 inches of dry manure after clean out, or 2) utilize frequent manure removal by removing the manure from laying hen houses at least every seven days and immediately thin bed dry the material. However, these requirements only apply to laying hen houses, not poultry houses for meat-type birds, such as turkeys and broiler chickens. In addition, the SCAQMD Final Staff Report - Proposed Amendments to: Rule 403 – Fugitive Dust (June 2005)[3] states "*The coning and drying, and frequent manure removal CMPs (Rule 403, Table 4, 1c and 1d) were obtained from "The City of Yucaipa Guidelines to Manure Management Plans" that were developed in conjunction with Ordinance 216. While it is acknowledged that the manure handling coning and drying, and frequent manure removal CMPs were developed primarily to reduce vector problems (flies) and abate odor impacts, implementation of these practices is also expected to reduce ammonia and certain VOC emissions.*" The SCAQMD staff report does not indicate that these practices would reduce PM emissions or explain how these measures would reduce PM emissions and did not calculate any PM emission reductions for these measures. In addition, the CMPs included in SCAQMD Rule 403 for laying hen manure handling increase the frequency of manure removal from

[3] South Coast Air Quality Management District (SCAQMD). (June 2005). Final Staff Report - Proposed Amendments to: Rule 403 – Fugitive Dust. (Available under the June 3, 2005 SCAQMD Board Meeting, Agenda Item #40: http://www3.aqmd.gov/hb/2005/June/050640a.html

poultry houses, while the District Rule 4550 CMP for manure handling at poultry operations explains that reducing disturbance and handling of litter and manure will reduce PM emissions from poultry operations.[4] Therefore, although increasing the frequency of manure removal from poultry houses may reduce emissions of some gaseous pollutants, it is not expected to reduce PM emissions.

Based on the evaluation of the requirements SCAQMD Rule 403, the only measure that could reduce PM_{10} emissions from poultry operations for meat-type birds (e.g. broilers and turkeys) is covering manure prior to removing it offsite. This requirement has also been included in previous and current District BACT guidelines for poultry operations, and is the only requirement from SCAQMD Rule 403 that will be considered for this proactive BACT analysis.

District Rule 4550

District Rule 4550 – Conservation Management Practices states that the purpose of the rule is to limit fugitive dust emissions from agricultural operation sites. District Rule 4550 applies to agricultural operation sites located within the San Joaquin Valley Air Basin. Except for recordkeeping, the requirements of District Rule 4550 do not apply to confined animal facilities for turkeys with less than 55,000 turkeys; confined animal facilities for chickens, other than laying hens, with less than 125,000 chickens; confined animal facilities for laying hens with less than 82,000 laying hens, or confined animal facilities for animals that are not mature dairy cows, cattle, turkeys, chickens, or laying hens.

District Rule 4550 requires owners and operators agricultural operation sites subject to the rule to choose and implement the applicable conservation management practices (CMPs) specified in an approved CMP plan. The District Rule 4550 conservation management practices approved for poultry housing and manure handling operations are shown in the table below.

SJVAPCD Approved Conservation Management Practices (CMPs) for Poultry Operations			
PRELIMINARY CMPs	**DESCRIPTION**	**BENEFITS**	**EXAMPLES**
POULTRY OPERATIONS - MANURE HANDLING & STORAGE			
Time of manure spreading	To spread the manure at a time that would help reduce the amount of PM_{10} released in the air	Reduces the amount of fugitive dust released in the air	To spread manure during cooler times of day such as morning or evening and during times of low wind.

[4] San Joaquin Valley Air Pollution Control District (May 20, 2004). List of Conservation Management Practices, Poultry Operations – Manure Handling & Storage, Cleanout frequency. https://www.valleyair.org/rules/currntrules/r4550CMPList.pdf

SJVAPCD Approved Conservation Management Practices (CMPs) for Poultry Operations			
PRELIMINARY CMPs	**DESCRIPTION**	**BENEFITS**	**EXAMPLES**
Cleanout frequency	To adjust the frequency of cleanouts from the houses	Reduces particulates released from poultry litter/manure accumulating or stored inside houses. The less disturbance and handling of the litter/manure, the less emissions. Any time poultry bedding material is moved, some of the bulk material may become airborne. The bedding may be used for several grow out cycles before it becomes so laden with waste that it is unsuitable for continued use. Optimizing the reuse of the bedding material can reduce the number of material transfers, thus the opportunity for some of the material to become airborne. Implementation of this CMP implies that the generation of dust will become a factor in the determination to perform a house clean-out, and more reuse of bedding is anticipated.	To allow bedding materials and manure to remain in the house for multiple flocks or grow out cycles, or to decrease the frequency of house cleanouts to minimize dust emissions.
Outdoor Storage	To use of a structure design to store the bulk materials (e.g.: used poultry litter/manure) or to securely cover the bulk materials if it must be stored outdoors not within any enclosure	Prevents contact with precipitation and prevents windblown dispersion. Poultry litter consists mainly of light organic materials such as rice hulls or wood shavings. During a poultry house cleanout the used litter is scrapped out of the house and left in piles outdoors. If left in these outdoor piles for extended periods, winds can cause material to become airborne. Any technique that will shield the litter from wind will prevent or reduce the amount of material becoming airborne. Securely tarping the piles will protect the used litter from precipitation and windblown dispersal until the liter can be removed from the ranch. A partially enclosed structure, with walls situated in the prevailing wind direction, may be used to protect used litter stored onsite from precipitation and windblown dispersal.	To employ a structure design to store used poultry litter (manure and bedding material) onsite or to cover the bulk materials with tarps, plastics or suitable materials.
POULTRY OPERATIONS - FEEDING			
Boot or sock	Feed is loaded into the feed storage bins by employing a sock or boot on the feed delivery truck auger	To reduce the release of particulates	Use of a sock or boot on the delivery truck auger

As seen in the table above, the only practice included in the list of approved District CMPs that would reduce PM emissions directly from poultry houses is the cleanout frequency CMP, in which the frequency of disturbance and handling of the litter and manure is reduced by using bedding material for multiple flocks or grow-out cycles prior to removing the litter or manure from the poultry housing. Reducing disturbance and handling of the litter/manure reduces emissions of fugitive dust from these activities. However, reducing the frequency that litter or manure is removed from poultry housing has the potential to increase VOC and NH_3 emissions as manure accumulates and remains in the poultry housing areas for longer periods of time. In addition, current District BACT Guideline 5.7.1 includes a requirement to minimize disturbance of manure/litter as part of achieved in practice BACT for broiler houses, which reduces PM_{10} emissions in a similar manner to the cleanout frequency CMP. Because reducing the cleanout frequency of poultry housing areas may not always be feasible because of potential impacts on the health of the birds and is generally included under minimizing the disturbance of manure/litter, a general requirement to reduce the disturbance of manure/litter will be considered as part of the BACT analysis rather than a specific requirement to reduce the cleanout frequency of litter in the poultry houses.

As discussed above, the CMP that requires that manure and litter stored outdoors be securely covered has been included in previous and current District BACT guidelines for poultry operations and will be considered for this proactive BACT determination.

Additional Control Identified:

Big Dutchman, a company based in Germany, has developed a dry filter system that uses centrifugal force to remove PM from the exhaust from poultry houses.[5] The company states that the filter has dust separation rates of 50% to 70%.[6] The company states that these systems have been installed in Europe in Asia. The exact number of these systems that have been installed at poultry operations is unknown. It is also unknown if any of these systems have been installed in the United States or if the system is currently available in the United States. No installations in California have been identified. Based on the available information, it appears that most of these systems would have been installed at poultry facilities in Germany. The climate in Germany is significantly different than the San Joaquin Valley. One of Big Dutchman's experts for exhaust air treatment stated that more

[5] Big Dutchman (2013) MagixX & StuffNix Exhaust air treatment systems for efficient reduction of emissions from poultry houses. https://cdn.bigdutchman.com/fileadmin/content/egg-poultry/products/en/egg-production-poultry-growing-exhaust-air-treatment-MagixX-StuffNix-Big-Dutchman-en.pdf Accessed April 22, 2026

[6] The Poultry Site (2019) Low Emissions in Pig and Poultry Production: How Exhaust Air Washers Decimate Ammonia, Odours and Dust. https://www.thepoultrysite.com/news/2019/10/low-emissions-in-pig-and-poultry-production-how-exhaust-air-washers-decimate-ammonia-odours-and-dust

than 50% of Germany's poultry stock live in the federal state of Lower Saxony.[6] The maximum average high temperature in Lower Saxony is approximately 75 °F in the summer.[7] While in the San Joaquin Valley the maximum average high temperature in the summer is approximately 99 °F.[8] The high temperatures in the San Joaquin Valley require poultry houses to have higher ventilation rates to remove heat and cool the birds. Because of the significant difference in the climate where these systems have primarily been installed compared to the San Joaquin Valley and the potential the lack of information about the availability of the system in the United States, this system will be considered a technologically feasible control technology, rather than achieved in practice.

Controls Identified to Reduce for PM_{10} emissions from Turkey Houses

It should be noted that some poultry operations have started to raise "free-range" poultry to address concerns about animal welfare and consumer demand. Raising free-range poultry requires that the birds have an opportunity to roam outside for at least a part of the day. Providing the birds with the opportunity to roam outside necessitates that the poultry houses have openings to allow the birds to enter and exit; therefore, it may not be possible to completely enclose or seal free-range poultry houses to capture all of the emissions. Although capturing emissions from free-range poultry houses may require changing how the birds are raised, options that require the capture of emissions from the poultry houses will still be considered in this proactive BACT determination.

The following control technologies and practices were identified as potential options to control PM_{10} emissions from poultry housing for turkeys based on general applicability and transfer of controls and technology from similar operations:

1. Capture and Baghouse
2. Capture and Electrostatic Precipitator
3. Capture and Wet Scrubber
4. Capture and High-Efficiency Cyclones
5. Dry Filters Using Centrifugal Force for PM Removal
6. Use of the following poultry house design and management practices:
    a. Weatherproof housing structure, AND
    b. Minimum disturbance of manure/litter, AND
    c. Covered manure/litter piles

Step 2 - Eliminate Technologically Infeasible Options

Option 1 listed above, the use of a baghouse, will be eliminated from consideration as a technologically feasible control option. Recent BACT analyses performed by

[7] Weather Spark website: https://weatherspark.com/countries/DE/06 Accessed April 22, 2026
[8] Weather Spark website: https://weatherspark.com/compare/y/1482~1451/Comparison-of-the-Average-Weather-in-Fresno-and-Bakersfield Accessed April 22, 2026

the District for poultry facilities have concluded that this option is not a feasible option for poultry houses because feathers and large debris strongly adhere to the filter media and, unlike dust or other granular materials, cannot be dislodged using the available bag cleaning technologies, such as mechanical shaking and reverse pulse jets.

There are no other technologically infeasible options to be eliminated from Step 1.

Step 3 - Rank Remaining Control Technologies by Control effectiveness

The estimated PM_{10} control efficiencies of the remaining control technologies identified are discussed below.

1. Capture and Electrostatic Precipitator (Technologically Feasible)

   Previous District BACT Guideline 5.7.3 included 98% control of PM_{10} based on capture and the use of cyclones followed by an electrostatic precipitator as a technologically feasible option for the control of PM_{10} emissions from turkey houses and current District BACT Guideline 5.7.1 for poultry broiler houses includes 99% overall capture and control of PM_{10} using electrostatic precipitators as a technologically feasible option for the control of PM_{10} from broiler houses. However, several studies and other documents list lower control efficiencies for electrostatic precipitators used to control PM_{10} emissions from poultry operations. The measured and estimated PM_{10} control efficiencies for electrostatic precipitators controlling emissions from poultry operations listed in some of these documents are discussed below.

   The United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) and EPA Agricultural Air Quality Conservation Measures Reference Guide for Poultry and Livestock Production Systems (2017),[9] Appendix A.1: Table of Mitigation Effectiveness for Selected Measures lists a PM control efficiency of 30-80% for electrostatic precipitators controlling emissions from animal confinement.

   The Agrivita Canada Canadian AgriSafety Program study “Development and Assessment of Emerging Green Technologies to Reduce Aerosol Risks and Hazards in Livestock Production”[10] measured average PM_{10} and $PM_{2.5}$ reductions of 49% and 50%, respectively, when a commercially-available

[9] United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) and EPA (September 2017) Agricultural Air Quality Conservation Measures Reference Guide for Poultry and Livestock Production Systems. https://www.nrcs.usda.gov/sites/default/files/2022-06/Ag_AQ_Conservation_Measures_Poultry_and_Livestock_September_2017.pdf

[10] Agrivita Canada. 2019-2024 Canadian AgriSafety Program. Activity 2: Development and Assessment of Emerging Green Technologies to Reduce Aerosol Risks and Hazards in Livestock Production. https://www.agrivita.ca/2019-2024-canadian-agrisafety-program/activity-2.php#ProjectOverview Accessed April 22, 2026.

electrostatic precipitator system was evaluated for the reduction of PM, bacteria, and gases in experimental broiler rooms in Saskatchewan, Canada from 16 February to 22 March 2021.[11]

The results of the project Electrostatic Precipitation Air Cleaning of Particulate Matter (PM) Emissions at Animal Production Facilities conducted by Ohio State University and funded by the USDA National Institute of Food and Agriculture (NIFA)[12] indicates that the electrostatic precipitators tested at a commercial poultry egg production facility in September to November 2019, September to November 2020, and throughout February 2021 had mean $PM_{2.5}$, PM_{10}, and TSP removal efficiencies of 79.6%, 92.7%, and 94.6%, respectively, for the smaller indoor electrostatic precipitator and 93.6%, 94.0%, and 94.7%, respectively, for the larger exhaust electrostatic precipitator.[13]

The study "An Optimized Electrostatic Precipitator for Air Cleaning of Particulate Emissions from Poultry Facilities"[14] indicates that an electrostatic precipitator used to control particulate matter from a poultry house had average PM_{10} and $PM_{2.5}$ control efficiencies in the field of 84% and 86%, respectively.

The Iowa State University Extension and Outreach Air Management Practices Assessment Tool lists PM_{10} control efficiencies ranging from 49% to 57% and $PM_{2.5}$ control efficiencies ranging from 45% to 65% for electrostatic precipitators controlling emissions from animal housing.[15]

The study "Using an improved electrostatic precipitator for poultry dust removal"[16] indicates that the overall dust removal efficiency for an electrostatic precipitator used to control particulate matter from a poultry house ranged from

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11 Martel, M.C., Kirychuk, S., Predicala, B.Z., Bolo, R., Yang, Y., Thompson, B., Guo, H., & Zhang, L. (2023). Improving Air Quality in Broiler Rooms Using an Electrostatic Particle Ionization System. Journal of the ASABE, 66(4): pg. 887-896, 2023. https://elibrary.asabe.org/abstract.asp?aid=54297. https://agrivita.ca/documents/publications/act-2-martel-et-al-20231.pdf

[12] Ohio State University project: Electrostatic Precipitation Air Cleaning of Particulate Matter (PM) Emissions at Animal Production Facilities. Funded by United States Department of Agriculture (USDA) National Institute of Food and Agriculture (NIFA), Project OHO01125-CG, Grant No. 2016-67021-24434. https://www.nal.usda.gov/research-tools/food-safety-research-projects/electrostatic-precipitation-air-cleaning-particulate; https://portal.nifa.usda.gov/enterprise-search/projects/1007612

[13] Knight, Reyna M., Herkins, Matthew J., Hocter, Jeb S., Milliken, Shannon R., Zhao, Lingying, and Zhu, Heping. (2023) Field Evaluation of Electrostatic Precipitators for Particulate Matter Mitigation in a Manure-belt Layer Facility. Biosystems Engineering, Volume 230, 2023, Pages 131-144, ISSN 1537-5110. https://doi.org/10.1016/j.biosystemseng.2023.04.005

[14] Manuzon, R., Zhao, L., & Gecik, C. (2014) An Optimized Electrostatic Precipitator for Air Cleaning of Particulate Emissions from Poultry Facilities. ASHRAE Transactions. 120. 490-503. See: https://www.researchgate.net/publication/287888719_An_optimized_electrostatic_precipitator_for_air_cleaning_of_particulate_emissions_from_poultry_facilities

[15] Iowa State University Extension and Outreach Air Management Practices Assessment Tool https://www.extension.iastate.edu/ampat/electrostatic-precipitation. Accessed April 22, 2026

[16] Chai, M., Lu, M., Keener, T., Khang, S., Chaiwatpongsakorn, C., & Tisch, J. (2009) Using an Improved Electrostatic Precipitator for Poultry Dust Removal. Journal of Electrostatics, 67**,** pg. 870-875. https://doi.org/10.1016/j.elstat.2009.07.006

37% to 79% with the maximum removal efficiency occurring at -30 kV.

The research project report prepared for EPA "Final: Report: The Development and Evaluation of an Enhanced Electrostatic Precipitator for Poultry Dust Removal"[17] indicates that an electrostatic precipitator used to control particulate matter from a poultry house achieved up to 86% particulate matter removal.

Based on the available research that was located, it will be assumed that electrostatic precipitators used to control PM_{10} emissions from poultry houses can be optimized to achieve an estimated conservative PM_{10} control efficiency of 85%, which is on the higher end of the PM_{10} control efficiencies that have been measured.

2. Capture and Wet Scrubber (Technologically Feasible)

Previous District BACT Guideline 5.7.3 included 80% control of PM_{10} based on capture and the use of cyclones followed by a wet scrubber as a technologically feasible option for the control of PM_{10} emissions from turkey houses. Current District BACT Guideline 5.7.1 for poultry broiler houses includes 95% overall capture and control of PM_{10} based on the use of cyclones followed by a wet scrubber as a technologically feasible option for the control of PM_{10} from broiler houses. However, it is not clear that wet scrubbers installed to control emissions from animal housing at confined animal facilities can consistently achieve 95% control efficiency for PM_{10}.

The USDA NRCS and EPA document Agricultural Air Quality Conservation Measures Reference Guide for Poultry and Livestock Production Systems,[9] Appendix A.1 and the Iowa State University Extension and Outreach Air Management Practices Assessment Tool[15] list control efficiencies for wet scrubbers ranging from 60% to 90% for PM. For purposes of this proactive BACT determination, it will be assumed that the PM_{10} control efficiency of a typical wet scrubber used to control emissions from poultry housing is 80%.

3. Capture and Capture and High-Efficiency Cyclones (Technologically Feasible)

Previous District BACT Guideline 5.7.3 included 50% control of PM_{10} based on capture and the use of cyclones as a technologically feasible option for the control of PM_{10} emissions from turkey houses. Current District BACT Guideline 5.7.1 for poultry broiler houses includes 60% overall capture and control of PM_{10} based on the use of high efficiency cyclones as a technologically feasible option for the control of PM_{10} from broiler houses. However, there is very limited

[17] Tisch, W.J. (2006) Final Report: The Development and Evaluation of an Enhanced Electrostatic Precipitator for Poultry Dust Removal. Final Report to US EPA Small Business Innovation Research (SBIR) Program. EPA Contract Number: EPD06026. Available at: https://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.abstractDetail/abstract_id/7951/report/0

information on the control efficiency of cyclones used to control PM emissions from poultry facilities.

The EPA Air Pollution Control Technology Fact Sheet: Cyclones[18] states that the PM_{10} control efficiency of high efficiency cyclones ranges from 60% to 95%. One cyclone-like de-duster that was developed and evaluated to control emissions from confined animal facilities had PM separation efficiencies that were measured to be 50%, 77%, and 90% for particles with diameters of about 4 µm, larger than 7 µm, and larger than 10 µm, respectively, and 85% separation efficiency in terms of mass concentration measured using mass samplers.[19, 20] Because of the lack of available information about the performance of cyclonic separators to control emissions from confirmed animal facilities, for purposes of this BACT determination, a conservative PM_{10} control efficiency of 70% will be assumed for cyclones and cyclonic de-dusters controlling emissions from poultry houses.

4. Dry Filters Using Centrifugal Force for PM Removal (Technologically Feasible)

Various studies have measured the PM control efficiency of a commercially-available dry filter system using centrifugal force to remove PM at poultry operations. One study of the dry filter system at a commercial poultry farm measured a 72% reduction of the dust emission rate, but does not give a specific control efficiency for PM_{10}.[21] A study conducted in the United Kingdom on the dry filter system measured 67% reduction in PM_{10} from poultry houses.[22] Measurements from another study to evaluate PM mitigation options for the poultry industry in the Netherlands indicated that the dry filter system effectively reduced concentrations of PM_{10} in the exhaust air from a layer house by an average of 40.1%.[23] A study to evaluate the dry filter for removal of dust that was conducted at an aviary laying hen barn in North Rhine-Westphalia,

[18] US EPA. Air Pollution Control Technology Fact Sheet: Cyclones. EPA 452/F-03-025. Available at: https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100C75Q.PDF
[19] Zhang, Y., Wang, X., Riskowski, G. L., Christianson, L. L., and Ford, S. E. (2001) Particle Separation Efficiency of a Uniflow Deduster with Different Types of Dusts. Transactions of Amer. Soc. Heat. Refrig. Air Cond. Engr. (ASHRAE) 107(2): 93-98.
[20] Mostafa, E (2012) Air-Polluted with Particulate Matters from Livestock Buildings. In Air Quality - New Perspective. InTech. https://doi.org/10.5772/45766; https://cdn.intechopen.com/pdfs/37974/InTech-Air_polluted_with_particulate_matters_from_livestock_buildings.pdf
[21] Mostafa, E, and Buescher, W (2011) Indoor Air Quality Improvement from Particle Matters for Laying Hen Poultry Houses. Biosystems Eng 109:22–36. https://doi.org/10.1016/j.biosystemseng.2011.01.011
[22] Demmers, T., Saponja, A., Thomas, R., Phillips, G., McDonald, A., Stagg, S., Bowry, A., Nemitz, E., (2010) Dust and ammonia emissions from UK poultry houses, XVII-th World Congress of the International Commission of Agricultural and Biosystems Engineering (CIGR), Québec City, QC, Canada, 13–17 June 2010. https://library.csbe-scgab.ca/docs/meetings/2010/CSBE100942.pdf
[23] Winkel, A.; Mosquera, J.; Aarnink, A.J.A.; Groot Koerkamp, P.W.G.; Ogink, N.W.M. (2015) Evaluation of a Dry Filter and an Electrostatic Precipitator for Exhaust Air Cleaning at Commercial Non-Cage Laying Hen Houses. Biosystems. Eng. 2015, 129, 212–225. https://doi.org/10.1016/j.biosystemseng.2014.10.006

Germany measured PM_{10} reductions of 24% in the summer and 63% in the winter.[24]

Based on the information from the studies that have been performed to measure the control efficiency of dry filter systems using centrifugal force to remove PM at poultry operations, the PM_{10} control efficiency of this technology will be estimated to be 40% when used on poultry farms.

5. Use of the following poultry house design and management practices: a) Weatherproof housing structure, and b) Minimum disturbance of manure/litter, and Covered manure/litter piles (Achieved in Practice)

   Current District BACT guidelines do not list a specific PM_{10} control efficiency for this achieved in practice BACT requirement; however, previous District BACT guidelines and evaluations for poultry houses estimated 5% PM_{10} control for this option.

The control options being considered are ranked as follows based on their PM_{10} control efficiencies:

1. 85% Control (Capture and Electrostatic Precipitator) (Technologically Feasible)
2. 80% Control (Capture and Wet Scrubber) (Technologically Feasible)
3. 70% Control (Capture and High-Efficiency Cyclones/Cyclonic De-Duster) (Technologically Feasible)
4. 40% Control (Dry Filters Using Centrifugal Force for PM Removal) (Technologically Feasible)
5. Use of the following poultry house design and management practices (Achieved in Practice):
   a. Weatherproof housing structure, AND
   b. Minimum disturbance of manure/litter, AND
   c. Covered manure/litter piles

Step 4 - Cost Effectiveness Analysis

Since this is a proactive BACT determination that is not part of a specific permitting action, a cost effectiveness analysis is not required.

Step 5 - Select BACT

Since this is a proactive BACT determination that is not part of a specific permitting action, selecting BACT is not applicable. Recommendations for updates and corrections/changes to the current BACT requirements are discussed in the

[24] Strohmaier, C., Schmithausen, A. J., Krommweh, M. S., Diekmann, B., Büscher, W. (2018). Evaluation of a dry filter for dust removal under laboratory conditions in comparison to practical use at a laying hen barn. Environmental Science and Pollution Research, 25(29), 29511–29517. https://doi.org/10.1007/S11356-018-2981-3

following section and summarized in the draft updated BACT guideline attached in Appendix A.

B. BACT Analysis for VOC Emissions

Step 1 - Identify All Possible Control Technologies

Survey of BACT Guidelines:

The following BACT references were reviewed to identify potential control technologies for VOC emissions from turkey houses:

- EPA RACT/BACT/LAER clearinghouse
- California Air Resources Board (CARB) BACT clearinghouse/guideline list (https://ww2.arb.ca.gov/capp/cst/tch/bact-guidelines-tool)
- San Joaquin Valley APCD (SJVAPCD) BACT clearinghouse (https://ww2.valleyair.org/permitting/best-available-control-technology/district-bact-clearinghouse/)
- South Coast AQMD (SCAQMD) BACT guidelines (https://www.aqmd.gov/home/permits/bact/guidelines)
- Bay Area AQMD (BAAQMD) BACT/T-BACT workbook (https://www.baaqmd.gov/permits/permitting-manuals/bact-tbact-workbook)
- Sacramento Metropolitan AQMD (SMAQMD) BACT clearinghouse (https://www.airquality.org/businesses/permits-registration-programs/best-available-control-technology-(bact))
- Monterey Bay Air Resources District (MBARD) BACT Guidelines
- Santa Barbara County APCD (SBAPCD) BACT clearinghouse (https://www.ourair.org/bact/)
- San Diego County APCD (SDAPCD) BACT Guidance Document (https://www.sdapcd.org/content/dam/sdapcd/documents/permits/SDAPCD-BACT-Guidance.pdf)

The EPA RACT/BACT/LAER clearinghouse does not include general guidelines, only determinations made by individual agencies. The CARB BACT clearinghouse/guideline list includes BACT guidelines and determinations submitted by California air districts.

No BACT guidelines or determinations for turkey houses were found in the references given above, except previous District BACT guideline 5.7.3, which was presented above and included the BACT options for the control of VOC that are shown in the table below.

Previous SJVAPCD BACT Guideline 5.7.3 – Turkey House BACT for VOC		
Achieved in Practice	Technologically Feasible	Alternate Basic Equipment
19% control - 1. Feeding animals in accordance with applicable NRC guidelines; AND 2. House design and management practices including (a) weatherproof housing structure, (b) dry manure/litter management, (c) daily inspection of water pipes and drinkers, and (d) daily removal of mortality; AND 3. Use of acidifying litter amendments per manufacturer recommendations	1. 98% control (Capture and Thermal Incineration) 2. 95% control (Capture and Catalytic Incineration) 3. 95% control (Capture and Carbon Adsorption) 4. 80% control (Capture and Biofiltration)	--

In addition, because turkeys are typically raised in the same houses as the broiler chickens or houses that are nearly identical to broiler houses, the BACT options listed in current District BACT Guideline 5.7.1 - Poultry Broiler House will also be considered as potential BACT options for turkey houses. Current District BACT Guideline 5.7.1 lists the following practices and technologies as potential BACT options for VOC emissions from broiler houses.

SJVAPCD BACT Guideline 5.7.1 – Poultry Broiler House BACT for VOC		
Achieved in Practice	Technologically Feasible	Alternate Basic Equipment
1. a) Enclosed housing with mechanical ventilation and computerized control of environmental conditions using sensors, or b) Use of acidifying litter amendments; AND 2. Comply with applicable District Rule 4570 Feed and Housing Mitigation Measures; AND 3. Houses completely cleaned out at least twice per year; AND 4. All mortality removed from houses at least once per day	1. 98% Overall Capture and Control (Thermal/Catalytic Incineration with a Concentrator) 2. 95% Overall Capture and Control (Carbon Adsorption) 3. 80% Overall Capture and Control (Biofiltration) 4. 70% Overall Capture and Control (Wet Scrubber)	--

Survey of Applicable Rules and Regulations:

In addition, the following rules and regulations were reviewed to identify any emission limits or practices that could reduce VOC emissions from poultry houses for turkeys:

- SCAQMD Rule 223 – Requirements for Confined Animal Facilities (amended 9/5/2025)
- SCAQMD 1127 – Emission Reductions from Livestock Waste (adopted 8/6/2004)
- BAAQMD Regulation 2, Rule 10 – Large Confined Animal Facilities (adopted 7/19/2006)
- SMAQMD Rule 496 - Large Confined Animal Facilities (adopted 8/24/2006)
- SJVAPCD Rule 4550 - Conservation Management Practices (adopted 5/20/2004; re-adopted 8/19/2004)
- SJVAPCD Rule 4570 – Confined Animal Facilities (last amended 10/21/2010)
- Imperial County APCD (ICAPCD) Rule 217 - Large Confined Animal Facilities (LCAF) Permits Required (revised 2/9/2016)
- ICAPCD Rule 806 – Conservation Management Practices (revised 10/16/2012)
- Butte County AQMD (BCAQMD) Rule 450 - Large Confined Animal Facilities (adopted December 21, 2006)

The following air district rules were identified that include measures for which the stated purpose is to reduce VOC emissions from poultry facilities: SCAQMD Rule

223, SMAQMD Rule 496, District Rule 4570, and ICAPCD Rule 217. Other air district rules did not include specific measures to reduce VOC emissions from poultry facilities. For example, SCAQMD Rule 1127 states that the purpose of the rule is to reduce NH_3, VOC, and PM_{10} emissions from livestock waste, but only applies to dairies and related cattle operations and the manure from these operations, not poultry operations. BAAQMD Regulation 2, Rule 10 states that the purpose of the rule is to reduce emissions of air contaminants from large confined animal facilities through control measures established during permit review; however, the rule does not contain any specific measures that reduce emissions; instead it contains the general requirement that any permit issued for a large confined animal facility must include permit conditions to implement control measures that represent reasonably available control technology (RACT) to reduce emissions. Similarly, Butte County AQMD Rule 450 does not contain any specific measures that reduce emissions from confined animal facilities, but requires operators of large confined animal facilities to implement control measures to reduce emissions that are identified in an application submitted by the operator.

SCAQMD Rule 223, SMAQMD Rule 496, District Rule 4570, and ICAPCD Rule 217 were adopted to comply with California Health & Safety Code, Section 40724.6, which required each California air district that was designated as a federal nonattainment area for ozone as of January 1, 2004 to adopt and implement a rule or regulation that required Large Confined Animal Facilities, as defined by the California Air Resources Board (CARB), to obtain a permit from the district to reduce, to the extent feasible, emissions of air contaminants from the facility.

It should be noted that the District, as the air district that has jurisdiction over the largest agriculture area in California, took the lead in developing the initial mitigation measures for confined animal facilities. Other California air districts that were required to adopt rules with specific requirements for confined animal facilities generally adopted rules with identical or nearly identical mitigation measures as contained in the original version of District Rule 4570. The requirements of these rules that are expected to reduce VOC emissions from turkey houses are discussed below.

SCAQMD Rule 223

SCAQMD Rule 223 – Emission Reduction Permits for Large Confined Animal Facilities establishes the requirements for agricultural sources in the SCAQMD subject to permit as a result of California Health & Safety Code Section 40724.6 as effective January 1, 2004 and federal and state Clean Air Act requirements.

SCAQMD Rule 223 requires different types of Large Confined Animal Facilities to select from menus of options to reduce emissions from different areas and processes at the facility (e.g., feed, housing, solid manure, liquid manure, etc.).

The SCAQMD Rule 223 measures for poultry operations are shown in the tables below.

SCAQMD Rule 223 - Poultry Operation LCAF Mitigation Measures **(A) Poultry House** Each poultry house shall incorporate at least four (4) of the following mitigation measures:	
Class One Mitigation Measures	
1.	a. Remove cake manure daily in accordance with the recommendation of Natural Resource Conservation Services (NRCS) Agricultural Waste Management Field Handbook Chapter 10 Section 651.1002, or more recent NRCS guidance, or b. Clean under poultry cages daily in accordance with the recommendation of NRCS Agricultural Waste Management Field Handbook Chapter 10 Section 651.1002, or more recent NRCS guidance.
2.	Use poultry litter additives designed to reduce air emissions or moisture content in litter, such as aluminum sulfate or sodium bisulfate, according to manufacturer recommendations.
3.	Use a dry housing cleaning method at all times, except when a wet cleaning method is required for animal health or biosecurity issues.
4.	Use drinkers that do not drip.
5.	Adjust the height, volume, and location of drinkers daily.
6.	Use evaporative cooling pad or tunnel ventilation with no foggers in houses.
7.	Slope the ground of the houses or pens a minimum of 3%.
8.	Install mounds or berms up gradient to prevent the runoff of stormwater into pens (only an option for animals allowed to freely move between indoor housing structures and outdoor pens)
9.	Inspect water pipes and drinkers and repair leaks at least once a day.
10.	Maintain the roof structure and manage roof runoff in accordance with the recommendations of NRCS Practice Standard 561 – Heavy Use Area Protection, or more recent NRCS standards.
11.	Only use fogger systems designed, operated and maintained according to manufacturer recommendations that provide water droplets with an average size of 50 microns or less.
12.	Implement Alternative Mitigation Measure(s), not listed above, subject to approval of the Executive Officer.
Class Two Mitigation Measures	
13.	Vent housing to a VOC control device with an overall VOC capture and control efficiency of at least 80%.
14.	a. Use a belt litter removal system that dries the litter, or b. House animals in a tunnel ventilated houses with mechanical ventilation, or c. Use a litter drying system, such as a flat bed drying system.

SCAQMD Rule 223 - Poultry Operation LCAF Mitigation Measures **(B) Feed Operations** Owners/operators shall incorporate at least five (5) of the following feed mitigation measures:	
Class One Mitigation Measures	
1.	a. Feed according to National Research Council (NRC) guidelines, or b. Feed animals probiotics designed to improve digestion according to manufacturer recommendations, or c. Feed animals an amino acid supplemented diet to meet their nutrient requirements, or d. Feed animals feed additives such as amylase, xylanase, and protease, designed to maximize digestive efficiency according to manufacturer recommendations.
2.	Remove spilled feed from housing at least once every seven (7) days.
3.	Enclose grain in a weatherproof storage structure from October through May.
4.	Feed or dispose of feed within forty-eight (48) hour of grinding and mixing feed.
5.	Remove wet feed from animal housing within twenty-four (24) hours of a rain event.
6.	Remove spilled feed from facility at least once every seven (7) days.
7.	Implement Alternative Mitigation Measure(s), not listed above, subject to approval of the Executive Officer.

SCAQMD Rule 223 - Poultry Operation LCAF Mitigation Measures **(C) Handling of Solid Manure or Separated Solids** Owners/operators that handle or store solid manure or separated solids outside the animal housing shall incorporate at least one (1) of the following mitigation measures:	
Class One Mitigation Measures	
1.	a. Remove all Animal Waste from site within seventy-two (72) hours of removal from housing, or b. Send all animal waste to a storage facility designed, constructed, maintained, and operated to the recommendations in NRCS Practice Standard 313 (Waste Storage Facility) or more recent NRCS standard.
2.	Cover Animal Waste outside the housing with a waterproof covering from October through May, except for times, not to exceed twenty-four (24) hours per calendar year, when wind events remove the covering, the covering shall be in accordance with applicable recommendations in NRCS Agricultural Waste Management Field Handbook Chapter 10 Section 651.1003, or more recent NRCS guidance.
3.	Use a Dry Manure handling system in housing, such as stockpiles, solid land application, or a thin bed manure drying system, instead of a wet system such as flushing, manure Storage Ponds, or manure treatment Lagoons.
4.	Implement Alternative Mitigation measure(s), not listed above, subject to approval of the Executive Officer.
Class Two Mitigation Measures	
5.	Store all removed Animal Waste in an enclosure vented to a control device with an overall control efficiency of at least 80%.
6.	Send at least 51% of the Animal Waste removed from site to a digester, with an overall control efficiency of at least 80%, within seventy two (72) hours of removal from housing. The digester shall be designed, constructed, maintained, and operated in accordance with NRCS Agricultural Waste Management Field Handbook Chapter 10 Section 651.1006, or more recent NRCS guidance.

SCAQMD Rule 223 - Poultry Operation LCAF Mitigation Measures **(C) Handling of Solid Manure or Separated Solids** Owners/operators that handle or store solid manure or separated solids outside the animal housing shall incorporate at least one (1) of the following mitigation measures:	
7.	Compost Animal Waste removed from the housing with an Aerated Static Pile vented to a control device with an overall control efficiency of at least 80% designed, constructed, operated, and maintained in accordance with NRCS Agricultural Waste Management Field Handbook Chapter 10 Section 651.1004, or more recent NRCS guidance.

SCAQMD Rule 223 - Poultry Operation LCAF Mitigation Measures **(D) Handling of Manure in Liquid Form** Owners/operators that handle manure in a liquid form shall incorporate at least one (1) of the following mitigation measures:	
Class One Mitigation Measures	
1.	Manage the facility such that only storm water and water used to wash eggs enters the Lagoon.
2.	a. Use Phototrophic Lagoons, or b. Use an Anaerobic Treatment Lagoon designed, constructed, maintained, and operated in accordance with NRCS Agricultural Waste Management Field Handbook Chapter 10 Section 651.1004, or more recent NRCS guidance.
3.	Remove solids from the waste system with a Solid Separator System, prior to the waste entering the Lagoon that is designed, constructed, operated, and maintained in accordance with NRCS Practice Standard 629 (Waste Treatment), or more recent NRCS standard.
4.	Maintain Lagoon at a pH between 6.5 and 7.5.
5.	Implement Alternative Mitigation Measure(s), not listed above, subject to approval of the Executive Officer.
Class Two Mitigation Measures	
6.	a. Use Aerobic Lagoons designed, constructed, maintained, and operated to the recommendations in NRCS Agricultural Waste Management Field Handbook Chapter 10 Section 651.1004 or more recent NRCS guidance, or b. Use a mechanically aerated Lagoon designed, constructed, maintained, and operated according to the recommendations in NRCS Agricultural Waste Management Field Handbook Chapter 10 Section 651.1004 or more recent NRCS guidance, or c. Maintain organic loading in the Lagoon that is less than 3.5 mg (dry weight)/mL, or total volatile solids is less than 3.5 mg/mL.
7.	Use additional non-standard equipment or chemicals on the solid separator system, such as roller or screw presses or chemical coagulants and flocculants that increase the percent of solid separation achieved by the separator and is approved by the Executive Officer.
8.	Cover the lagoon or storage pond and vent to a biofilter or a control device with an overall control efficiency of at least 80%.

The requirements of SCAQMD Rule 223 are mostly identical to the requirements in the original version of District Rule 4570, with the exception that SCAQMD Rule 223 requires increased frequency for some measures (i.e. removal of cake manure and manure under cages daily rather than every 14

days, adjusting drinkers daily rather than every 14 days, and inspection and repair of water pipes and drinkers at least once a day rather than every 14 days). As discussed below, the District determined that frequent removal of cake manure was infeasible. The current Phase II requirements of District Rule 4570 also increased the required frequency for adjusting drinkers and inspection and repair of water pipes and drinkers to levels that were determined to be practical for these measures.

In addition, when District Rule 4570 was last amended in 2010, many of the Class Two mitigation measures were removed from the current Phase II requirements of the rule because they were theoretical measures that were infeasible or impractical and/or had not been demonstrated at confined animal facilities. Furthermore, the mitigation measures that require cleaning under poultry cages and use of a belt litter/manure drying system are only applicable to poultry facilities for egg-laying hens and are not applicable to poultry houses that raise meat-type birds. Furthermore, the liquid manure mitigation measures are not applicable to turkey ranches because all of the manure/litter at turkey ranches is generally managed in solid form rather than liquid form. The remaining requirements of SCAQMD Rule 223 for poultry operations raising meat-type birds are similar to the current requirements of District Rule 4570.

SMAQMD Rule 496

The purpose of SMAQMD Rule 496 - Large Confined Animal Facilities is to limit VOC emissions from large confined animal facilities. SMAQMD Rule 496 requires dairies and poultry ranches that are Large Confined Animal Facilities to select from menus of options to reduce emissions from different areas and processes at the facility (e.g., feed, housing, solid manure, liquid manure, etc.) and requires other Large Confined Animal Facilities to submit an emission mitigation plan demonstrating Best Available Retrofit Control Technology (BARCT). SMAQMD Rule 496 contains basically identical mitigation measures for poultry operations as the previous District Rule 4570, Phase I mitigation measures. The SMAQMD Rule 496 mitigation measures for poultry operations are also similar to measures in SCAQMD Rule 223. The SMAQMD Rule 496 measures for poultry operations are shown in the tables below.

SMAQMD Rule 496 - Poultry Ranch LCAF Mitigation Measures	
Feed Mitigation Measures a. The owner/operator shall incorporate at least five of the following feed mitigation measures. Measures 1 through 9 are classified as class one mitigation measures. If any of measures 1 through 5 are being utilized in the emission mitigation plan and the owner/operator is contractually obligated to use proprietary feed, the supplier of that feed must provide a quarterly certification to the owner/operator that the provided feed meets the mitigation measure(s). Additionally, the supplier must provide notice to the owner/operator 90 days before the provided feed ceases to meet the requirements of the mitigation measure. If the supplier fails to notify the owner/operator of such change the supplier will be responsible for any resulting violations.	
Class One Mitigation Measures	
1.	Feed according to National Research Council guidelines specified in “Nutrient Requirements of Poultry: Ninth Revised Edition, 1994,”or a more recent edition.
2.	Feed animals probiotics designed to improve digestion according to manufacturer recommendations.
3.	Feed animals an amino acid supplement diet to meet their nutrient requirements.
4.	Feed animals feed additives such as amylase, xylanase, and protease, designed to maximize digestive efficiency according to manufacturer recommendations.
5.	Use feed additives designed to reduce feed decomposition or oxidation.
6.	Remove spilled feed from animal housing at least once every seven days.
7.	Enclose grain in a weatherproof storage structure from October through May.
8.	Feed or dispose of feed within 48 hours of grinding and mixing feed.
9.	Remove uneaten wet feed from the animal housing within 24 hours of feed becoming wet due to rain.

SMAQMD Rule 496 - Poultry Ranch LCAF Mitigation Measures	
b. Housing Mitigation Measures The owner/operator shall incorporate four of the following mitigation measures in all animal housing. Measures 1 through 12 are classified as class one mitigation measures and measures 13 through 16 are classified as class two mitigation measures.	
Class One Mitigation Measures	
1.	Remove caked animal waste at least once every 14 days.
2.	Clean under poultry cages at least once every 14 days.
3.	Use poultry litter additives designed to reduce air emissions or moisture content in litter, such as aluminum sulfate or sodium bisulfate, according to manufacturer recommendations.
4.	Use a dry housing cleaning method at all times, except when a wet cleaning method is required for animal health or biosecurity issues.
5.	Use drinkers that do not have a drip system.
6.	Adjust the height, volume, and location of drinkers at least once every 14 days.
7.	Use no foggers in the house.
8.	Only use fogger systems designed, operated and maintained according to manufacturer recommendations that provide water droplets with an average size of 50 microns or less.
9.	Slope the floor of the house 3%.

SMAQMD Rule 496 - Poultry Ranch LCAF Mitigation Measures **b. Housing Mitigation Measures** The owner/operator shall incorporate four of the following mitigation measures in all animal housing. Measures 1 through 12 are classified as class one mitigation measures and measures 13 through 16 are classified as class two mitigation measures.	
10.	Install mounds or berms up gradient to prevent the runoff of storm water into pens (only an option for animals allowed to freely move between indoor housing structures and outdoor pens).
11.	Inspect water pipes and drinkers and repair leaks at least once every day.
12.	Maintain the roof structure and manage roof runoff in accordance with the applicable standards in the NRCS Field Office Technical Guide Code 558 or other applicable standards approved by the Air Pollution Control Officer, California Air Resources Board, and U.S. Environmental Protection Agency.
Class Two Mitigation Measures	
13.	Vent animal housing to a VOC control device with an overall VOC capture and VOC control efficiency of at least 80%.
14.	Use a belt litter removal system that dries the litter.
15.	House animals in a tunnel ventilated house with mechanical ventilation.
16.	Use a litter drying system, such as a flat bed drying system.

SMAQMD Rule 496 - Poultry Ranch LCAF Mitigation Measures **c. Solid Waste/Separated Solids Mitigation Measures:** The owner/operator of a poultry ranch that handles or stores solid animal waste or separated solids outside the animal housing shall incorporate at least one of the following mitigation measures. Measures 1 through 3 are classified as class one mitigation measures and measures 4 and 5 are classified as class two mitigation measures.	
Class One Mitigation Measures	
1.	Choose one of the following measures a. Remove all animal waste from facility within 72 hours of removal from animal housing, or b. Send all animal waste to a lagoon within 72 hours of removal from animal housing.
2.	Cover animal waste outside the animal housing with a waterproof covering from October through May, except for times, not to exceed 24 hours, when wind removes the covering.
3.	Use a solid animal waste handling system in housing, such as stockpiles, solid land application, or a thin bed animal waste drying system, instead of a liquid system such as flushing, animal waste storage ponds, or animal waste treatment lagoons.
Class Two Mitigation Measures	
4.	Send at least 51% of the animal waste removed from site to an anaerobic digester, with a VOC control device with an overall VOC capture and VOC control efficiency of at least 80%.
5.	Compost animal waste removed from the animal housing with an aerated static pile vented to a VOC control device with an overall VOC capture and VOC control efficiency of at least 80%.

SMAQMD Rule 496 - Poultry Ranch LCAF Mitigation Measures **d. Liquid Waste Mitigation Measures:** The owner/operator of a poultry ranch that handles or stores solid animal waste or separated solids outside the animal housing shall incorporate at least one of the following mitigation measures. Measures 1 through 3 are classified as class one mitigation measures and measures 4 and 5 are classified as class two mitigation measures.	
Class One Mitigation Measures	
1.	Manage the facility such that there are no lagoons at the facility.
2.	Choose one of the following measures: a. Use phototropic lagoons, or b. Use an anaerobic lagoon
3.	Remove solids from the waste system with a solid separator system, prior to waste entering the lagoon
4.	Maintain lagoon at a pH between 6.5 and 7.5
Class Two Mitigation Measures	
5.	Choose one of the following measures: a. Use an aerobic lagoon, or b. Use a mechanically aerated lagoon.
6.	Maintain organic loading in the lagoon that is less than 3.5 mg (dry weight)/mL
7.	Use additional non-standard equipment or chemicals on the solid separator system, such as roller or screw presses or chemical coagulants and flocculants, that increase the percent of solid separation achieved by the separator and is approved by the Air Pollution Control Officer, California Air Resources Board, and U.S. Environmental Protection Agency.
8.	Cover the lagoon or storage pond and vent to a VOC control device with an overall VOC capture and VOC control efficiency of at least 80%.

As mentioned above, when District Rule 4570 was last amended in 2010, many of the Class Two mitigation measures were removed from the current Phase II requirements of the rule because they were theoretical measures that were infeasible or impractical and/or had not been demonstrated at confined animal facilities and the mitigation measures for poultry facilities that produce eggs and handle liquid manure are not applicable to poultry ranches that raise turkeys. The remaining requirements of SMAQMD Rule 496 for poultry operations raising meat-type birds (e.g. broilers and turkeys) are similar to the requirements of District Rule 4570.

District Rule 4570

The purpose of District Rule 4570 - Confined Animal Facilities is to limit emissions of VOC from Confined Animal Facilities. District Rule 4570 requires the different types of Large Confined Animal Facilities to implement mitigation measures and select from limited options to reduce emissions from different areas and processes at the facility. As stated above, the mitigation measures included in the original version (Phase I) of District Rule 4570 served as model

that other California air districts used to develop rules for Large Confined Animal Facilities.

District Rule 4570 was last amended on October 21, 2010. The amendments were to incorporate the results of more recent scientific studies, strengthen requirements, decrease redundancy and ambiguity, and remove measures that were not applicable or had not been shown to reduce emissions. Examples of mitigation measures that were removed for poultry operations include removal of cake manure/litter at least once every 14 days and feeding or disposing of feed within 48 hours of grinding and mixing feed. It was determined that removal of caked manure/litter at least once every 14 days was not practical. Special machines are used to remove caked manure/litter from poultry operations; however, these machines cannot be used while birds are in the houses, so removal of caked manure is only performed between flocks (up to 21 weeks when turkeys are raised to full size). It was determined that feeding or disposing of rations within 48 hours of grinding and mixing feed was not applicable to poultry operations and would not reduce emissions. Poultry feed primarily consists of dry grain that has been ground and mixed offsite and shipped to the poultry operation. Because of the low moisture content of poultry feed it remains stable for fairly long periods of time and is not expected to contribute significantly to gaseous emissions while being fed to the birds.

The current District Rule 4570 measures for broiler, duck, and turkey operations are shown in the tables below.

District Rule 4570, Phase II – Broiler, Duck, or Turkey Mitigation Measures **A. Feed Mitigation Measures** Owners/operators of a broiler, duck, or turkey CAF shall implement at least one (1) of the following feed mitigation measures:	
1.	a. Feed according to NRC guidelines; or b. Feed animals probiotics designed to improve digestion according to manufacturer recommendations; or c. Feed animals an amino acid supplemented diet to meet their nutrient requirements; or d. Feed animals feed additives such as amylase, xylanase, and protease, designed to maximize digestive efficiency according to manufacturer recommendations.
2.	Implement an alternative mitigation measure(s), not listed above.

District Rule 4570, Phase II – Broiler, Duck, or Turkey Mitigation Measures **B. Housing Mitigation Measures** Owners/operators of a broiler or duck CAF shall implement at least four (4) of the following housing mitigation measures: Owners/operators of a turkey CAF shall implement at least five (5) of the following housing mitigation measures:	
1.	Use a dry housing cleaning method at all times, except when a wet cleaning method is required for animal health or biosecurity issues, pursuant to Section 5.4.

District Rule 4570, Phase II – Broiler, Duck, or Turkey Mitigation Measures **B. Housing Mitigation Measures** Owners/operators of a broiler or duck CAF shall implement at least four (4) of the following housing mitigation measures: Owners/operators of a turkey CAF shall implement at least five (5) of the following housing mitigation measures:	
2.	Use drinkers that do not drip continuously.
3.	Inspect drinkers at least once every seven (7) days and adjust the height, volume, and location of drinkers if necessary.
4.	Inspect water pipes and drinkers and repair leaks daily.
5.	If the facility houses turkeys in pens, install mounds or berms up gradient to prevent the runoff of storm water into pens.
6.	Implement an alternative mitigation measure(s), not listed above.

District Rule 4570, Phase II – Broiler, Duck, or Turkey Mitigation Measures **C. Solid Manure/Separated Solids Mitigation Measures:** Owners/operators of a broiler, duck, or turkey CAF that handles or stores solid litter/manure or separated solids outside the animal housing shall implement at least one (1) of the following mitigation measures:	
1.	Within seventy-two (72) hours of removal from housing, either: a. Remove all litter/manure from the facility; or b. Cover litter/manure outside the housing with a weatherproof covering from October through May, except for times when wind events remove the covering, not to exceed twenty-four (24) hours per event.
2.	Implement an alternative mitigation measure(s), not listed above.

District Rule 4570, Phase II – Broiler, Duck, or Turkey Mitigation Measures **D. Liquid Manure Mitigation Measures:** Owners/operators of a broiler, duck, or turkey CAF that handles manure in a liquid form shall implement at least one (1) of the following mitigation measures:	
1.	Use a phototropic lagoon.
2.	Use an anaerobic treatment lagoon designed in accordance with NRCS Guideline No. 359.
3.	Maintain lagoon pH between 6.5 and 7.5.
4.	Implement an alternative mitigation measure(s), not listed above.

As previously mentioned, turkey ranches generally do not handle any manure as a liquid, so the liquid manure mitigation measures are not applicable. However, the feed and housing mitigation measures for broilers, ducks, and turkeys will be considered for purposes of this proactive BACT determination.

ICAPCD - Rule 217

Imperial County APCD Rule 217 - Large Confined Animal Facilities (LCAF) Permits Required states that the purpose of the rule is to limit emissions of Volatile Organic Compounds (VOC) and Ammonia from Large Confined Animal

Facilities (LCAFs). The rule requires Large Confined Animal Facilities to obtain an air permit and requires the different types of Large Confined Animal Facilities to select from menus of options to reduce emissions from different areas and processes at the facility. ICAPCD Rule 217 was last revised February 9, 2016. The revisions incorporated requirements for poultry operations that were identical to the District Rule 4570, Phase II requirements shown above. The ICAPCD Rule 217 measures for broiler, duck, and turkey operations are shown in the tables below.

ICAPCD Rule 217 – Broiler, Duck, or Turkey Mitigation Measures **A. Feed Mitigation Measures** Owners/operators of a broiler, duck, or turkey CAF shall implement at least one (1) of the following feed mitigation measures:	
1.	a. Feed according to NRC guidelines; or b. Feed animals probiotics designed to improve digestion according to manufacturer recommendations; or c. Feed animals an amino acid supplemented diet to meet their nutrient requirements; or d. Feed animals feed additives such as amylase, xylanase, and protease, designed to maximize digestive efficiency according to manufacturer recommendations.
2.	Implement an alternative mitigation measure(s), not listed above.

ICAPCD Rule 217 – Broiler, Duck, or Turkey Mitigation Measures **B. Housing Mitigation Measures** Owners/operators of a broiler or duck CAF shall implement at least four (4) of the following housing mitigation measures: Owners/operators of a turkey CAF shall implement at least five (5) of the following housing mitigation measures:	
1.	Use a dry housing cleaning method at all times, except when a wet cleaning method is required for animal health or biosecurity issues, pursuant to Section C.1.e
2.	Use drinkers that do not drip continuously.
3.	Inspect drinkers at least once every seven (7) days and adjust the height, volume, and location of drinkers if necessary.
4.	Inspect water pipes and drinkers and repair leaks daily.
5.	If the facility houses turkeys in pens, install mounds or berms up gradient to prevent the runoff of storm water into pens.
6.	Implement an alternative mitigation measure(s), not listed above.

ICAPCD Rule 217 – Broiler, Duck, or Turkey Mitigation Measures **C. Solid Manure/Separated Solids Mitigation Measures:** Owners/operators of a broiler, duck, or turkey CAF that handles or stores solid litter/manure or separated solids outside the animal housing shall implement at least one (1) of the following mitigation measures:	
1.	Within seventy-two (72) hours of removal from housing, either: a. Remove all litter/manure from the facility; or b. Cover litter/manure outside the housing with a weatherproof covering from October through May, except for times when wind events remove the covering, not to exceed twenty-four (24) hours per event.
2.	Implement an alternative mitigation measure(s), not listed above.

ICAPCD Rule 217 – Broiler, Duck, or Turkey Mitigation Measures **D. Liquid Manure Mitigation Measures:** Owners/operators of a broiler, duck, or turkey CAF that handles manure in a liquid form shall implement at least one (1) of the following mitigation measures:	
1.	Use a phototropic lagoon.
2.	Use an anaerobic treatment lagoon designed in accordance with NRCS Guideline No. 359.
3.	Maintain lagoon pH between 6.5 and 7.5.
4.	Implement an alternative mitigation measure(s), not listed above.

Discussion of Rules for Turkey Houses:

The requirements of District Rule 4570, Phase I were used as model for other California air districts to develop their rules for Large Confined Animal Facilities. The District Rule 4570, Phase II requirements incorporated the results of more recent scientific studies, strengthened these requirements, and removed measures that were not applicable or had not been shown to reduce emissions. Therefore, the requirements of District Rule 4570, Phase II will primarily be considered for purpose of updating District BACT Guideline 5.7.3.

Controls Identified to Reduce for VOC emissions from Turkey Houses

As mentioned above, some poultry operations have started to raise “free-range” poultry to address concerns about animal welfare and consumer demand and this requires that the poultry houses have openings to allow the birds to enter and exit to roam outside for at least part of the day. Although completely sealing free-range poultry houses to capture all of the emissions may require changing how the birds are raised, options that require the capture of emissions from poultry houses will still be considered for in this proactive BACT determination.

The following control technologies and practices were identified as potential options to control VOC emissions from poultry housing for turkeys based on general applicability and transfer of controls and technology from similar operations:

1. 98% Control (Capture and Thermal Incineration)
2. 95% Control (Capture and Catalytic Incineration)
3. 95% Control (Capture and Carbon Adsorption)
4. 80% Control (Capture and Biofiltration)
5. 70% Control (Capture and Wet Scrubber)
6. Use of the following poultry house design and management practices:
   a. i) Enclosed housing with mechanical ventilation and computerized control of environmental conditions using sensors; or ii) use of acidifying litter amendments; AND
   b. Compliance with applicable District Rule 4570 Feed and Housing Mitigation Measures; AND
   c. Houses completely cleaned out at least twice per year; AND
   d. All mortality removed from houses at least once per day

Step 2 - Eliminate Technologically Infeasible Options

Option 1, Capture and Thermal Incineration (98% Control), and Option 2, Capture and Catalytic Incineration (95% Control), will be removed from further consideration. Although previous District BACT Guideline 5.7.3 listed thermal and catalytic incineration as technologically feasible options to control VOC emissions from turkey houses and these options are included in current District BACT Guideline 5.7.1 for poultry broiler houses, these options are generally not practical options for confined animal facilities because of the very large air flowrates that must be controlled and the resulting requirement for large amounts of auxiliary fuel to combust the very small concentrations of VOCs in the exhaust air from buildings housing animals. In addition to generally being impractical for controlling emissions from confined animal facilities, thermal and catalytic incineration also generate combustion pollutants that negatively impact air quality, including NOx, which is a precursor to tropospheric ozone and $PM_{2.5}$, and direct emissions of PM_{10} and $PM_{2.5}$.

Option 3, Capture and Carbon Adsorption (95% Control), will also be removed from further consideration. The EPA Air Pollution Control Cost Manual, Section 3.1 – VOC Recapture Controls, Chapter 1 – Carbon Adsorbers[25] indicates that the use of carbon adsorption to control VOC has certain limitations. The EPA Air Pollution Control Cost Manual states the following concerning some of these limitations:

> "*activated carbon is less effective for compounds that are highly polar, volatile or have small diameters*",
>
> "*activated carbon is less effective in situations where the waste gas has high relative humidity as the water molecules readily adsorb to the activated carbon*

[25] EPA (2018) EPA Air Pollution Control Cost Manual, 7th Edition, Section 3 – VOC Controls; Section 3.1 – VOC Recapture Controls, Chapter 1 – Carbon Adsorbers. https://www.epa.gov/sites/default/files/2018-10/documents/final_carbonadsorberschapter_7thedition.pdf

reducing the number of available absorption sites" and "*Moisture in the bed can also promote biological growth on the carbon surface*"; and

"*Wastes with oxygen bearing compounds, such as peroxides, ketones, organic acids, aldehydes and organic sulfur compounds should be avoided as activated carbon can cause exothermic reactions with these compounds. The heat from exothermic reactions can ignite any flammable compounds present in the waste stream.*"

The EPA Air Pollution Control Cost Manual, Section 3.1 – VOC Recapture Controls, Chapter 1 – Carbon Adsorbers, Table 1.1: Comparison of Activated Carbon, Zeolite and Polymer Adsorbents lists the following disadvantages of activated carbon adsorbents:

- Not effective for VOCs with high polarity (e.g., alcohols, organic acids).
- Not effective for highly volatile compounds (e.g., vinyl chloride, MTBE)
- Reduced capacity in high moisture applications.
- High annual costs for carbon replacement/regeneration when used for concentrated waste streams.
- Fire hazard if used with oxygen bearing compounds or VOCs having high heat of adsorption.
- Degrades during desorption cycles.

The majority of VOC emissions measured from confined animal facilities consist of polar and oxygen-bearing compounds, such alcohols, organic acids, and aldehydes, which as mentioned above, are not effectively controlled by activated carbon adsorbents. These compounds also can cause exothermic reactions with activated carbon that can cause fires in the activated carbon vessels. Furthermore, the exhaust from houses for animals on confined animal facilities can have high relative humidity. Many publications recommend that the relative humidity in poultry houses be maintained between 50% and 70%.[26, 27] However, the EPA Air Pollution Control Cost Manual states that "*the adsorption capacity of activated carbon is significantly impacted at levels below 50%*" relative humidity. Thus, the moisture in the exhaust from buildings housing animals can significantly lower the control efficiency of carbon adsorption. In addition, the moisture and contaminants in the exhaust from buildings housing animals can promote biological growth in the activated carbon, which can clog the pores and channels required for adsorption. Therefore, the use of carbon adsorption to control emissions from buildings

[26] Tabler, T., Yakout, H.M., Wells., J. (2019) Spring and Fall Broiler Production Presents Challenges. Mississippi State University Extension Service Publication 2780. https://extension.msstate.edu/publications/spring-and-fall-broiler-production-presents-challenges

[27] Czarick, M. and Fairchild, B. (2012) Poultry Housing Tips Relative Humidity...The Best Measure of Overall Poultry House Air Quality. The University of Georgia College of Agricultural and Environmental Sciences Cooperative Extension. Poultry Housing Tips, Volume 24, Number 2, February 2012. https://www.poultryventilation.com/resources/relative-humidity-the-best-measure-of-overall-poultry-house-air-quality/

housing animals on confined animal facilities is not practical and will not be considered further.

As an additional note, although zeolites are an alternative adsorbent material that can handle exhausts with high relative humidity and can be selected to remove specific polar compounds from air streams, the zeolites chosen must be selected to target specific compounds and as stated in the EPA Air Pollution Control Cost Manual, Section 3.1 – VOC Recapture Controls, Chapter 1 – Carbon Adsorbers, are generally "*not suitable for waste streams containing wide ranges of VOC*," such as in the exhaust from buildings housing animals on confined animal facilities. Furthermore, additional research is currently needed to determine if polymer adsorbents would be suitable for controlling emissions from poultry houses.

There are no other technologically infeasible options to be eliminated from Step 1.

Step 3 - Rank Remaining Control Technologies by Control effectiveness

The control options being considered are ranked as follows based on their VOC control efficiencies:

1. 80% Control (Capture and Biofiltration) (Technologically feasible)
2. 70% Control (Capture and Wet Scrubber) (Technologically feasible)
3. Use of the following poultry house design and management practices (Achieved in Practice):
   a. i) Enclosed housing with mechanical ventilation and computerized control of environmental conditions using sensors; or ii) use of acidifying litter amendments; AND
   b. Compliance with applicable District Rule 4570 Feed and Housing Mitigation Measures; AND
   c. Houses completely cleaned out at least twice per year; AND
   d. All mortality removed from houses at least once per day

Step 4 - Cost Effectiveness Analysis

Since this is a proactive BACT determination that is not part of a specific permitting action, a cost effectiveness analysis is not required.

Step 5 - Select BACT

Since this is a proactive BACT determination that is not part of a specific permitting action, selecting BACT is not applicable. Recommendations for updates and corrections/changes to the previous BACT requirements are summarized in the following section and summarized in the draft updated BACT guideline attached in Appendix A.

C. BACT Analysis for NH_3 Emissions

Step 1 - Identify All Possible Control Technologies

Survey of BACT Guidelines:

The following BACT references were reviewed to identify potential control technologies for NH_3 emissions from turkey houses:

- EPA RACT/BACT/LAER clearinghouse
- California Air Resources Board (CARB) BACT clearinghouse/guideline list (https://ww2.arb.ca.gov/capp/cst/tch/bact-guidelines-tool)
- San Joaquin Valley APCD (SJVAPCD) BACT clearinghouse (https://ww2.valleyair.org/permitting/best-available-control-technology/district-bact-clearinghouse/)
- South Coast AQMD (SCAQMD) BACT guidelines (https://www.aqmd.gov/home/permits/bact/guidelines)
- Bay Area AQMD (BAAQMD) BACT/T-BACT workbook (https://www.baaqmd.gov/permits/permitting-manuals/bact-tbact-workbook)
- Sacramento Metropolitan AQMD (SMAQMD) BACT clearinghouse (https://www.airquality.org/businesses/permits-registration-programs/best-available-control-technology-(bact))
- Monterey Bay Air Resources District (MBARD) BACT Guidelines
- Santa Barbara County APCD (SBAPCD) BACT clearinghouse (https://www.ourair.org/bact/)
- San Diego County APCD (SDAPCD) BACT Guidance Document (https://www.sdapcd.org/content/dam/sdapcd/documents/permits/SDAPCD-BACT-Guidance.pdf)

The EPA RACT/BACT/LAER clearinghouse does not include general guidelines, only determinations made by individual agencies. The CARB BACT clearinghouse/guideline list includes BACT guidelines and determinations submitted by California air districts.

No BACT guidelines or determinations for turkey houses were found in the references given above, except previous District BACT guideline 5.7.3, which was presented above and included the BACT options for the control of NH_3 that are shown in the table below.

Previous SJVAPCD BACT Guideline 5.7.3 – Turkey House BACT for NH_3		
Achieved in Practice	Technologically Feasible	Alternate Basic Equipment
55% Control - 1. Feeding animals in accordance with applicable NRC guidelines; AND 2. House design and management practices including (a) weatherproof housing structure, (b) dry manure/litter management, (c) daily inspection of water pipes and drinkers, and (d) daily removal of mortality; AND 3. Use of acidifying litter amendments per manufacturer recommendations	80% control (Capture and Biofiltration)	--

In addition, because turkeys are often raised in the same houses as the broiler chickens or houses that are nearly identical to broiler houses, the BACT options listed in current District BACT Guideline 5.7.1 - Poultry Broiler House will also be considered as potential BACT options for turkey houses. Current District BACT Guideline 5.7.1 lists the following practices and technologies as potential BACT options for NH_3 emissions from broiler houses.

SJVAPCD BACT Guideline 5.7.1 – Poultry Broiler House BACT for NH_3		
Achieved in Practice	Technologically Feasible	Alternate Basic Equipment
1. a) Enclosed housing with mechanical ventilation and computerized control of environmental conditions using sensors, or b) Use of acidifying litter amendments; AND 2. Comply with applicable District Rule 4570 Feed and Housing Mitigation Measures; AND 3. Houses completely cleaned out at least twice per year; AND 4. All mortality removed from houses at least once per day	80% Overall Capture and Control (Biofiltration or Wet Scrubber)	--

Survey of Applicable Rules and Regulations:

In addition, the following rules and regulations were reviewed to identify any emission limits or practices that could reduce NH_3 emissions from poultry houses for turkeys:

- SCAQMD Rule 223 – Requirements for Confined Animal Facilities (amended 9/5/2025)
- SCAQMD 1127 – Emission Reductions from Livestock Waste (adopted 8/6/2004)
- BAAQMD Regulation 2, Rule 10 – Large Confined Animal Facilities (adopted 7/19/2006)
- SMAQMD Rule 496 - Large Confined Animal Facilities (adopted 8/24/2006)
- SJVAPCD Rule 4550 - Conservation Management Practices (adopted 5/20/2004; re-adopted 8/19/2004)
- SJVAPCD Rule 4570 – Confined Animal Facilities (last amended 10/21/2010)
- Imperial County APCD (ICAPCD) Rule 217 - Large Confined Animal Facilities (LCAF) Permits Required (revised 2/9/2016)
- ICAPCD Rule 806 – Conservation Management Practices (revised 10/16/2012)
- Butte County AQMD (BCAQMD) Rule 450 - Large Confined Animal Facilities (adopted December 21, 2006)

Only one air district rule was located that applied to poultry houses and specifically stated that a purpose of the rule was to reduce or control NH_3 emissions, ICAPCD Rule 217. Other air district rules did not apply to poultry operations or did not include reduction of NH_3 as a specific purpose of the rule. For example, SCAQMD Rule 1127 states that the purpose of the rule is to reduce NH_3, VOC, and PM_{10} emissions from livestock waste, but only applies to dairies and related cattle operations and the manure from these operations, not poultry operations. BAAQMD Regulation 2, Rule 10 states that the purpose of the rule is to reduce emissions of air contaminants from large confined animal facilities through control measures established during permit review; however, the rule does not contain any specific measures that reduce emissions; instead it contains the general requirement that any permit issued for a large confined animal facility must include permit conditions to implement control measures that represent reasonably available control technology (RACT) to reduce emissions. Similarly, Butte County AQMD Rule 450 does not contain any specific measures that reduce emissions from confined animal facilities, but requires operators of large confined animal facilities to implement control measures to reduce emissions that are identified in an application submitted by the operator.

Although the primary purpose of SCAQMD Rule 223, SMAQMD Rule 496, and District Rule 4570 is to control VOC emissions from confined animal facilities, these rules will also be considered for potential measures that could control NH_3 emissions since many of the measures in these rules that control VOC emissions may also control NH_3 from these operations.

As mentioned above, California air districts that were required to adopt rules with specific requirements for confined animal facilities generally adopted rules with identical or nearly identical mitigation measures as contained in the original version of District Rule 4570. The requirements of these rules that are expected to reduce NH_3 emissions from turkey houses are discussed below.

SCAQMD Rule 223

SCAQMD Rule 223 – Emission Reduction Permits for Large Confined Animal Facilities establishes the requirements for agricultural sources in the SCAQMD subject to permit as a result of California Health & Safety Code Section 40724.6 as effective January 1, 2004 and federal and state Clean Air Act requirements.

SCAQMD Rule 223 requires different types of Large Confined Animal Facilities to select from menus of options to reduce emissions from different areas and processes at the facility (e.g., feed, housing, solid manure, liquid manure, etc.). The SCAQMD Rule 223 measures for poultry operations were shown in the tables above in the section for the BACT analyses for VOC emissions from turkey houses.

As mentioned above, the requirements of SCAQMD Rule 223 are mostly identical to the requirements in the original version of District Rule 4570, with the exception that SCAQMD Rule 223 requires increased frequency for some measures (i.e. removal of cake manure and manure under cages daily rather than every 14 days, adjusting drinkers daily rather than every 14 days, and inspection and repair of water pipes and drinkers at least once a day rather than every 14 days). As previously discussed, the District determined that frequent removal of cake manure was infeasible. The current Phase II requirements of District Rule 4570 also increased the required frequency for adjusting drinkers and inspection and repair of water pipes and drinkers to levels that were determined to be practical for these measures.

As explained above, when District Rule 4570 was last amended in 2010, many of the Class Two mitigation measures were removed from the current Phase II requirements of the rule because they were theoretical measures that were infeasible or impractical and/or had not been demonstrated at confined animal facilities. Furthermore, the mitigation measures that require cleaning under poultry cages and use of a belt litter/manure drying system are only applicable to poultry facilities that produce eggs and are not applicable to poultry houses that raise meat-type birds. Furthermore, the liquid manure mitigation measures

are not applicable to turkey ranches because all of the manure/litter at turkey ranches is generally managed in solid form rather than liquid form. The remaining requirements of SCAQMD Rule 223 for poultry operations raising meat-type birds are similar to the current requirements of District Rule 4570.

SMAQMD Rule 496

The purpose of SMAQMD Rule 496 - Large Confined Animal Facilities is to limit VOC emissions from large confined animal facilities. SMAQMD Rule 496 requires dairies and poultry ranches that are Large Confined Animal Facilities to select from menus of options to reduce emissions from different areas and processes at the facility (e.g., feed, housing, solid manure, liquid manure, etc.) and requires other Large Confined Animal Facilities to submit an emission mitigation plan demonstrating Best Available Retrofit Control Technology (BARCT). SMAQMD Rule 496 contains basically identical mitigation measures for poultry operations as the previous District Rule 4570, Phase I mitigation measures. The SMAQMD Rule 496 mitigation measures for poultry operations are also similar to measures in SCAQMD Rule 223. The SMAQMD Rule 496 measures for poultry operations were shown in the tables above in the section for the BACT analyses for VOC emissions from turkey houses.

As mentioned above, when District Rule 4570 was last amended in 2010, many of the Class Two mitigation measures were removed from the current Phase II requirements of the rule because they were theoretical measures that were infeasible or impractical and/or had not been demonstrated at confined animal facilities and the mitigation measures for poultry facilities that produce eggs and handle liquid manure are not applicable to poultry ranches that raise turkeys. The remaining requirements of SMAQMD Rule 496 for poultry operations raising meat-type birds (e.g. broilers and turkeys) are similar to the requirements of District Rule 4570.

District Rule 4570

The purpose of District Rule 4570 - Confined Animal Facilities is to limit emissions of VOC from Confined Animal Facilities. In addition to limiting VOC emissions, District Rule 4570 also includes measures that control ammonia (NH_3) emissions. District Rule 4570 requires the different types of Large Confined Animal Facilities to implement mitigation measures and select from limited options to reduce emissions from different areas and processes at the facility. As stated above, the mitigation measures included in the original version (Phase I) of District Rule 4570 served as model that other California air districts used to develop rules for Large Confined Animal Facilities.

District Rule 4570 was last amended on October 21, 2010. As discussed above, the amendments were to incorporate the results of more recent scientific studies, strengthen requirements, decrease redundancy and

ambiguity, and remove measures that were not applicable or had not been shown to reduce emissions. Examples of mitigation measures that were removed for poultry operations include removal of cake manure/litter at least once every 14 days and feeding or disposing of feed within 48 hours of grinding and mixing feed. It was determined that removal of caked manure/litter at least once every 14 days was not practical. Special machines are used to remove caked manure/litter from poultry operations; however, these machines cannot be used while birds are in the houses, so removal of caked manure is only performed between flocks (up to 21 weeks when turkeys are raised to full size). It was determined that feeding or disposing of rations within 48 hours of grinding and mixing feed was not applicable to poultry operations and would not reduce emissions. Poultry feed primarily consists of dry grain that has been ground and mixed offsite and shipped to the poultry operation. Because of the low moisture content of poultry feed it remains stable for fairly long periods of time and is not expected to contribute significantly to gaseous emissions while being fed to the birds.

The current District Rule 4570 measures for broiler, duck, and turkey operations were shown in the tables above in the section for the BACT analyses for VOC emissions from turkey houses.

As previously mentioned, turkey ranches generally do not handle any manure as a liquid, so the liquid manure mitigation measures are not applicable. However, the feed and housing mitigation measures for broilers, ducks, and turkeys will be considered for purposes of this proactive BACT determination.

ICAPCD - Rule 217

Imperial County APCD Rule 217 - Large Confined Animal Facilities (LCAF) Permits Required states that the purpose of the rule is to limit emissions of Volatile Organic Compounds (VOC) and Ammonia from Large Confined Animal Facilities (LCAFs). The rule requires Large Confined Animal Facilities to obtain an air permit and requires the different types of Large Confined Animal Facilities to select from menus of options to reduce emissions from different areas and processes at the facility. ICAPCD Rule 217 was last revised February 9, 2016. The revisions incorporated requirements for poultry operations that were identical to the District Rule 4570, Phase II requirements shown above. The ICAPCD Rule 217 measures for broiler, duck, and turkey operations were shown in the tables above in the section for the BACT analyses for VOC emissions from turkey houses.

Discussion of Rules for Turkey Houses:

As discussed above, the requirements of District Rule 4570, Phase I were used as model for other California air districts to develop their rules for Large Confined Animal Facilities. The District Rule 4570, Phase II requirements incorporated the

results of more recent scientific studies, strengthened these requirements, and removed measures that were not applicable or had not been shown to reduce emissions. Therefore, the requirements of District Rule 4570, Phase II will primarily be considered for purpose of updating District BACT Guideline 5.7.3.

Controls Identified to Reduce for NH_3 emissions from Turkey Houses

As mentioned above, some poultry operations have started to raise "free-range" poultry to address concerns about animal welfare and consumer demand and this requires that the poultry houses have openings to allow the birds to enter and exit to roam outside for at least part of the day. Although completely sealing free-range poultry houses to capture all of the emissions may require changing how the birds are raised, options that require the capture of emissions from poultry houses will still be considered for in this proactive BACT determination.

The following control technologies and practices were identified as potential options to control NH_3 emissions from poultry housing for turkeys based on general applicability and transfer of controls and technology from similar operations:

1. 80% Control (Capture and Biofiltration)
2. 80% Control (Capture and Wet Scrubber)
3. Use of the following poultry house design and management practices (Achieved in Practice):
   a. i) Enclosed housing with mechanical ventilation and computerized control of environmental conditions using sensors; or ii) use of acidifying litter amendments; AND
   b. Compliance with applicable District Rule 4570 Feed and Housing Mitigation Measures; AND
   c. Houses completely cleaned out at least twice per year; AND
   d. All mortality removed from houses at least once per day

Step 2 - Eliminate Technologically Infeasible Options

There are no technologically infeasible options to be eliminated from Step 1.

Step 3 - Rank Remaining Control Technologies by Control effectiveness

The control options being considered are ranked as follows based on their NH_3 control efficiencies:

1. 80% Control (Capture and Biofiltration or Wet Scrubber) (Technologically Feasible)

2. Use of the following poultry house design and management practices (Achieved in Practice):
   a. i) Enclosed housing with mechanical ventilation and computerized control of environmental conditions using sensors; or ii) use of acidifying litter amendments; AND
   b. Compliance with applicable District Rule 4570 Feed and Housing Mitigation Measures; AND
   c. Houses completely cleaned out at least twice per year; AND
   d. All mortality removed from houses at least once per day

Step 4 - Cost Effectiveness Analysis

Since this is a proactive BACT determination that is not part of a specific permitting action, a cost effectiveness analysis is not required.

Step 5 - Select BACT

Since this is a proactive BACT determination that is not part of a specific permitting action, selecting BACT is not applicable. Recommendations for updates and corrections/changes to the previous BACT requirements are summarized in the following section and summarized in the draft updated BACT guideline attached in Appendix A.

V. Recommendations

Based on the preceding analyses, the following updates are recommended for previous District BACT Guideline 5.7.3:

Add District Rule 4570 Feed and Housing Mitigation Measures as Achieved in Practice BACT Requirements for both VOC and NH_3

Turkey operations that are subject to District permitting requirements are also generally subject to the requirements of District Rule 4570 and must implement mitigation measures from District Rule 4570 to reduce emissions. Because nearly all, and possibly all, turkey operations subject to District permitting requirements are required to implement applicable District Rule 4570 feed and housing mitigation measures, these measures are achieved in practice. Therefore, it is recommended that the District Rule 4570 feed and housing mitigation measures be listed as achieved in practice BACT requirements for VOC and NH_3 under this update to BACT Guideline 5.7.3.

Update Electrostatic Precipitator PM_{10} Control Efficiency for Poultry Houses to 85%

Previous District BACT Guideline 5.7.3 included electrostatic precipitators as a technologically feasible option for the control of PM_{10} from turkey houses and listed a PM_{10} control efficiency of 98% for this option. As discussed in this proactive

BACT analysis, based on a review of the available studies and reports about electrostatic precipitators controlling emissions from poultry facilities that were located, it will be assumed that electrostatic precipitators used to control PM_{10} emissions from poultry facilities can be optimized to achieve a conservative PM_{10} control efficiency of 85%.

Remove Baghouse as a Technologically Feasible Option to Control PM_{10} Emissions

As discussed above, although previous District BACT Guideline 5.7.3 listed a baghouse dust collector as a technologically feasible option to control PM_{10} emissions from turkey houses, in recent BACT analyses for projects for poultry facilities, the District determined that this is not a feasible option to control emissions from poultry houses because feathers and large debris strongly adhere to the filter media and cannot be dislodged using the available bag cleaning technologies, such as mechanical shaking and reverse pulse jets.

Update the PM_{10} Control Efficiency for High-Efficiency Cyclones for Poultry Houses to 70% and add Cyclonic De-Duster

Previous District BACT Guideline 5.7.3 included high-efficiency cyclones as a technologically feasible option for the control of PM_{10} from turkey houses and listed a PM_{10} control efficiency of 50% for this option. As discussed previously in this proactive BACT analysis, based on the information from available reports and research, it will be assumed that high-efficiency cyclones and cyclonic de-dusters controlling emissions from poultry houses will have a typical PM_{10} control efficiency of 70%.

Add Dry Filters Using Centrifugal Force for PM Removal with an Estimated PM_{10} Control Efficiency of 40% as Technologically Feasible Option

As discussed above, some poultry facilities, primarily in Europe, have utilized commercially-available dry filters that use centrifugal force to reduce PM emissions from these facilities. Because there are no known installations of this technology in conditions that are similar to the San Joaquin Valley, it is not considered achieved in practice, but will be added as a technologically feasible option for control of PM_{10}.

Remove Thermal and Catalytic Incineration as Technologically Feasible Options for Control of VOC

Previous District BACT Guideline 5.7.3 listed thermal and catalytic incineration as technologically feasible options to control VOC emissions from turkey houses. However, as discussed above thermal and catalytic incineration are generally not practical options for confined animal facilities because of the high air flowrates and small concentrations of VOCs that requires large quantities of supplemental fuel.

In addition, these options generate combustion pollutants that negatively impact air quality, such as NOx, PM_{10}, and $PM_{2.5}$.

Remove Carbon Adsorption as Technologically a Feasible Option for Control of VOC

As discussed above, carbon adsorption is generally not a feasible option to control emissions from building housing animals at confined animal facilities because of the types of compounds emitted from confined animal facilities are not easily adsorbed and are a fire hazard because of the potential to cause exothermic reactions in the vessels, and because high relative humidity in the exhaust from animal housing can significantly reduce the effectiveness of carbon adsorption.

Add Wet Scrubbers as a Technologically Feasible Option for Control of VOC and NH_3

Previous District BACT Guideline 5.7.3 – Turkey House included wet scrubbers as a technologically feasible option for the control of PM_{10} from turkey houses and listed a PM_{10} control efficiency of 80% for this option. In addition, the Iowa State University Extension and Outreach, Air Management Practices Assessment Tool[28] includes wet scrubbers as a potential option to control NH_3, odor, PM, and VOCs from animal housing.

The Iowa State University Extension and Outreach, Air Management Practices Assessment Tool lists control efficiency ranges for wet scrubbers of 60% to 90% for PM, 50% to 90% for VOC, and 70% to 90% for NH_3. Wet scrubbers can achieve greater control efficiencies for NH_3, but this typically requires use of an acidic solution to capture more NH_3. As shown in earlier in this document, it will be assumed that a typical wet scrubber used at a poultry facility will have an 80% control efficiency for PM_{10} and will have VOC and NH3 control efficiencies that are in the middle of the ranges given in the Iowa State University Extension and Outreach, Air Management Practices Assessment Tool.

Wet Scrubber: 80% PM_{10} Control Efficiency; 70% VOC Control Efficiency; and 80% NH_3 Control Efficiency

Appendices

A: Draft Updated BACT Guideline 5.7.3

B: Previous BACT Guideline 5.7.3

[28] Iowa State University Extension and Outreach Air Management Practices Assessment Tool https://www.extension.iastate.edu/ampat/electrostatic-precipitation. Accessed April 21, 2026

Appendix A
Draft Updated BACT Guideline 5.7.3

SJVAPCD Best Available Control Technology (BACT) Guideline 5.7.3*

Last Update: May 7, 2026

Turkey House

Pollutant	Achieved in Practice or Contained in SIP	Technologically Feasible	Alternate Basic Equipment
PM_{10}	- Use of the following poultry house design and management practices: a. Weatherproof housing structure; AND b. Minimum disturbance of manure/litter; AND c. Covering manure/litter stockpiles	1. 85% Control (Capture and Electrostatic Precipitator) 2. 80% Control (Capture and Wet Scrubber) 3. 70% Control (Capture and Cyclones) 4. 40% Control (Dry Filters Using Centrifugal Force for PM Removal)	
VOC	- Use of the following poultry house design and management practices: a. i) Enclosed housing with mechanical ventilation and computerized control of environmental conditions using sensors; or ii) use of acidifying litter amendments; AND b. Compliance with applicable District Rule 4570 Feed and Housing Mitigation Measures; AND c. Houses completely cleaned out at least twice per year; AND d. All mortality removed from houses at least once per day	1. 80% Control (Capture and Biofiltration) 2. 70% Control (Capture and Wet Scrubber)	
NH_3	- Use of the following poultry house design and management practices: a. i) Enclosed housing with mechanical ventilation and computerized control of environmental conditions using sensors; or ii) use of acidifying litter amendments; AND b. Compliance with applicable District Rule 4570 Feed and Housing Mitigation Measures; AND c. Houses completely cleaned out at least twice per year; AND d. All mortality removed from houses at least once per day	80% Control (Capture and Biofiltration or Wet Scrubber)	

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 s 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.

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Appendix B
Previous BACT Guideline 5.7.3

SJVAPCD Best Available Control Technology (BACT) Guideline 5.7.3*

Last Update: 11/23/2011; Rescinded: August 16, 2023

Turkey House

Pollutant	Achieved in Practice or contained in SIP	Technologically Feasible	Alternate Basic Equipment
VOC	19% Control - 1. Feeding animals in accordance with applicable NRC guidelines; AND 2. House design and management practices including (a) weatherproof housing structure, (b) dry manure/litter management, (c) daily inspection of water pipes and drinkers, and (d) daily removal of mortality; AND 3. Use of acidifying litter amendments per manufacturer recommendations	1. 98% Control (Capture and Thermal Incineration) 2. 95% Control (Capture and Catalytic Incineration) 3. 95% Control (Capture and Carbon Adsorption) 4. 80% control (Capture and Biofiltration)	
PM_{10}	5% Control - House design and management practices including (a) weatherproof housing structure, (b) minimum disturbance of manure/litter, and (c) covering manure/litter stockpiles	1. 98% Control (Capture and Cyclones followed by Electrostatic Precipitator) 2. 95% Control (Capture and Cyclones followed by Baghouse) 3. 80% Control (Capture and Cyclones followed by Wet Scrubber) 4. 50% Control (Capture and Cyclones)	
NH_3	55% Control - 1. Feeding animals in accordance with applicable NRC guidelines; AND 2. House design and management practices including (a) weatherproof housing structure, (b) dry manure/litter management, (c) daily inspection of water pipes and drinkers, and (d) daily removal of mortality; AND 3. Use of acidifying litter amendments per manufacturer recommendations	80% Control (Capture and Biofiltration)	

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 s 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.

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