San Joaquin Valley
Unified Air Pollution Control District
Best Available Control Technology (BACT) Guideline 8.3.2*

Emissions Unit: Animal Rendering Operations
Industry Type: Animal Rendering
Equipment Rating: All
Last Update: December 7, 2022

Pollutant	Achieved-in-Practice or contained in SIP	Technologically Feasible	Alternate Basic Equipment
NOx	Use of an aqueous scrubber system (or equivalent controls) to reduce reduce nitrogen compounds (measured in terms of ammonia) upstream of the thermal oxidizer to the maximum practically feasible extent; and use PUC-quality natural gas as a supplemental fuel in the regenerative thermal oxidizer (RTO)	None	None
SOx	Use of an aqueous scrubber system (or equivalent controls) to reduce sulfur compounds (measured in terms of H2S) upstream of any other control devices	1. 98% control using wet scrubber (or equivalent control)	None
PM_{10}	95% control using one or more of the following control technologies: • Odor scrubber with a particulate removal system that consists of a particulate scrubber, shell and tube condenser, a Venturi scrubber, a cyclone, an air cooled condenser, and a contact condenser or a combination thereof, or • Thermal oxidizer utilizing natural gas with a minimum chamber temperature of 1400°F and minimum retention time of 1.0 seconds with a particulate removal system that consists of a particulate scrubber, shell and tube condenser, a Venturi scrubber, a cyclone, an air cooled condenser, and a contact condenser or a combination thereof.	None	None
VOC	95% control using one or more of the following control technologies: • Odor scrubbing system utilizing a scrubbing medium with appropriate chemical reagent(s), or • Thermal oxidizer utilizing natural gas with a minimum chamber temperature of 1400°F and minimum retention time of 1.0 second.	None	None

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

Best Available Control Technology Analysis

Animal Rendering Operations

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I. Introduction

The objective of this project is to proactively revise the existing Best Available Control Technology (BACT) guideline 8.3.2 for animal rendering operations (See Appendix B). In general, dead animals or animal materials from local slaughterhouses are transported to rendering facilities. The material is ground to uniformly and introduced into cookers. The cookers evaporate water from the raw material while separating fats and tallow. The remaining material, after separating the fats and tallow, is called meat and bone meal. Meat and bone is further processed and screen to produce various commodities. Vapors from the cookers are generally routed through air-cooled condensers, scrubbers, and/or regenerative thermal oxidizers to reduce various pollutants including odors.

Generally, animal rendering operations generate emissions of various compounds such as particulate matter, sulfur compounds, volatile organic compounds, and inorganic compounds, many of which are odorants. If a regenerative thermal oxidizer (RTO) is used to control emissions and other odorants from the rendering processes, it is possible to generate nitrogen oxide (NOx) and sulfur oxide (SOx) emissions as nitorgen-bearing and sulfur-bearing compounds are oxidized in the RTO. In such cases, it is necessary to employ control technologies to remove the nitrogen and sulfur-bearing compounds prior to combustion in the RTO. Often this can be accomplished by scrubber equipment already in use by the animal rendering operation. All of this will be addresed in the analyis below.

II. BACT Categories

BACT guideline, which is the focus of this project, is:

- BACT guideline 8.3.2 – Animal Rendering Operation

As stated in Section I above, this BACT guideline applies to any animal rendering operation.

III. Top-Down BACT Analysis

As discussed in section VIII under Rule 2201 – BACT discussion, under project N-1201629, operations under permits N-2107-9 and ‘-14 triggers BACT for NOx, SOx, PM10 and VOC emissions.

Emission reduction techniques listed in BACT guideline 8.3.2 and project specific BACT discussion under similar project C-1172884 are reviewed to determine BACT requirement for the proposed equipment under permits N-2107-9 and ‘-14.

A. BACT analysis for NOx Emissions

BACT guideline 8.3.2 did not list techniques that would reduce NOx emissions from animal rendering operations. The following search has been conducted to identify the techniques that reduce NOx emissions from animal rendering operation.

Step 1 - Identify All Possible Control Technologies

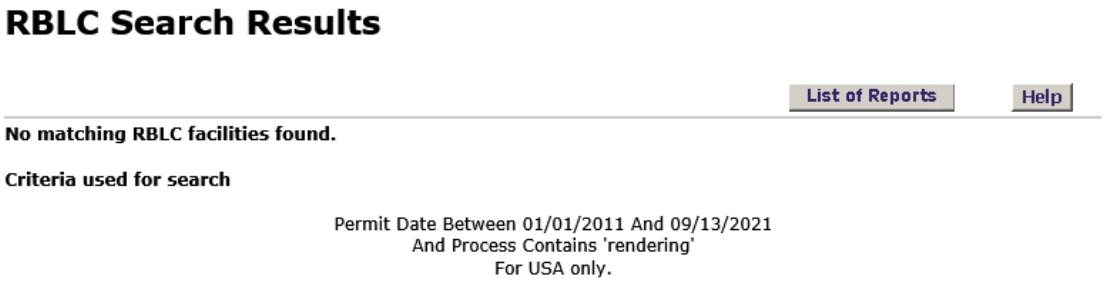
BACT Clearinghouse Survey:

The following BACT clearinghouses were consulted:

- EPA RACT/BACT/LAER clearinghouse
- CARB BACT clearinghouse
- South Coast AQMD BACT clearinghouse
- Bay Area AQMD BACT clearinghouse
- Sacramento Metro AQMD BACT clearinghouse
- Santa Barbara AQMD BACT clearinghouse
- San Joaquin Valley APCD BACT clearinghouse

EPA RACT/BACT/LAER clearinghouse
The database (https://cfpub.epa.gov/rblc/index.cfm?action=Search.BasicSearch&lang=en) was searched using the following criteria:

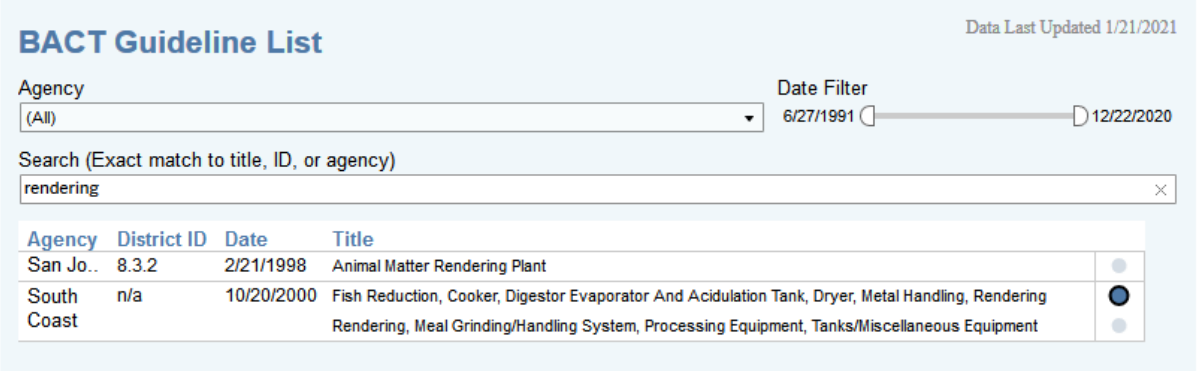
Permit Date: 1/1/2011 to 9/13/2021
Process Type - “All Process Types”
Process Name Contains – rendering
Pollutant Name – All Pollutants



No relevant facilities were found.

CARB BACT clearinghouse

The database (https://ww2.arb.ca.gov/our-work/programs/technology-clearinghouse/clearinghouse-tools/bact-guidelines-tool) was searched using "rendering" keyword. The following results were found:



BACT Guideline List

Data Last Updated 1/21/2021

Agency: (All)

Date Filter: 6/27/1991 – 12/22/2020

Search (Exact match to title, ID, or agency): rendering

Agency	District ID	Date	Title
San Jo..	8.3.2	2/21/1998	Animal Matter Rendering Plant
South Coast	n/a	10/20/2000	Fish Reduction, Cooker, Digestor Evaporator And Acidulation Tank, Dryer, Metal Handling, Rendering Rendering, Meal Grinding/Handling System, Processing Equipment, Tanks/Miscellaneous Equipment

South Coast AQMD BACT guidelines for "rendering" and "fish reduction" were located. The most up-to-date guideline were obtained from SCAQMD website (http://www.aqmd.gov/docs/default-source/bact/bact-guidelines/bact-guidelines-2021-test/part-d---bact-guidelines-for-non-major-polluting-facilities.pdf)

Rendering BACT guideline (10-20-2000):

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
Best Available Control Technology (BACT) Guidelines for Non-Major Polluting Facilities*

10-20-2000 Rev. 0

Equipment or Process: Rendering

	Criteria Pollutants					
Subcategory/ Rating/Size	**VOC**	**NOx**	**SOx**	**CO**	**PM_{10}**	**Inorganic**
Processing Equipment[1)]					Vent to Afterburner or Boiler Fire Box (≥ 0.3 sec. Retention Time at ≥ 1200 °F) (1988)	
Meal Grinding and Handling System					Enclosed Grinding and Screening Operation with Mechanical Conveyors Transporting Meal (1988)	
Tanks and Miscellaneous Equipment					Maintain Internal Temperature Below 140 °F (1988)	

1) Processing equipment includes crax pressing, filtering, centrifuging, evaporators, cookers, dryers, and grease and blood processing.

* Means those facilities that are not major polluting facilities as defined by Rule 1302 - Definitions

BACT Guidelines - Part D 110 Rendering

Fish Reduction BACT guideline (2-5-2021):

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
Best Available Control Technology (BACT) Guidelines for Non-Major Polluting Facilities*

10-20-2000 Rev. 0
2-1-2019 Rev. 1
2-5-2021 Rev. 2

Equipment or Process: Fish Reduction

	Criteria Pollutants					
Rating/Size	**VOC**	**NOx**	**SOx**	**CO**	**PM_{10}**	**Inorganic**
Cooker	Scrubber with Chlorinated Solution (≤ 20 ppmv Cl^- Outlet Conc., ≥ 0.6 Sec. Retention Time and ≤ 200 °F Outlet Temp.) (1988)					
Digestor, Evaporator and Acidulation Tank	Afterburner (≥ 0.3 Sec. Retention Time at ≥ 1200 °F) (1990)				Natural Gas with Afterburner (≥ 0.3 Sec. Retention Time at ≥ 1200 °F) (1990)	
Dryer	Scrubber with Chlorinated Solution (≤ 20 ppmv Cl^- Outlet Conc., ≥ 0.6 Sec. Retention Time and ≤ 200 °F Outlet Temp.) (1990)				Natural Gas and Scrubber with Chlorinated Solution (≤ 20 ppmv Cl^- Outlet Conc., ≥ 0.6 Sec. Retention Time and ≤ 200 °F Outlet Temp.) (1990)	
Meal Handling[1]						
Rendering – Presses, Centrifuges, Separators, Tanks, Etc.	Water Condenser and Vent to Dryer Firebox (1988)					

1) At the date of the last revision for this category, there was no Achieved In Practice BACT Determination for this subcategory. Technologically Feasible options listed in historic South Coast AQMD BACT Guidelines for this subcategory require cost effective analyses before they can be listed in these current Guidelines.

* Means those facilities that are not major polluting facilities as defined by Rule 1302 - Definitions

BACT Guidelines - Part D 50 Fish Reduction

South Coast AQMD BACT clearinghouse
Section I – SCAMD LAER/BACT determinations, available at http://www.aqmd.gov/home/permits/bact/guidelines/i---scaqmd-laer-bact were reviewed. No relevant BACT guideline was found.

Section II- Other LAER/BACT determinations, available at http://www.aqmd.gov/home/permits/bact/guidelines/ii---other-laer-bact were reviewed. No relevant BACT guideline was found.

Section III- Other technologies BACT determinations, available at http://www.aqmd.gov/home/permits/bact/guidelines/iii---other-technologies were reviewed. No relevant BACT guideline was found.

Part D guideline available at http://www.aqmd.gov/docs/default-source/bact/bact-guidelines/bact-guidelines-2021-test/part-d---bact-guidelines-for-non-major-polluting-facilities.pdf were reviewed. Two BACT guidelines, one for rendering and other for fish reduction were located. These guidelines are shown under CARB database search.

Bay Area AQMD BACT clearinghouse
BAAQMD BACT guidelines at https://www.baaqmd.gov/permits/permitting-manuals/bact-tbact-workbook were reviewed. No relevant guideline was found.

Sacramento Metro AQMD BACT clearinghouse
Sac Metro AQMD BACT guidelines available in clearinghouse document (http://www.airquality.org/StationarySources/Documents/BACT%20Clearinghouse.pdf) were reviewed. No relevant guideline was found.

Santa Barbara County AQMD BACT clearinghouse
SBCAPCD BACT clearinghouse available at https://www.ourair.org/bact/ was reviewed. No relevant BACT guideline was found.

San Joaquin Valley APCD BACT clearinghouse
BACT guideline 8.3.2 does not include NOx emissions.

SIP Approved Rule Survey:

The following air District rules and regulations were reviewed:

- South Coast AQMD Rules
- Bay Area AQMD Rules
- Sacramento Metro AQMD Rules
- Santa Barbara County APCD Rules
- San Joaquin Valley APCD Rules

South Coast AQMD
Rule 415 – Odors from Rendering Facilities (November 3, 2017) was identified. This rule is not on the list of EPA's SIP approved rules. No further discussion is required.

Rule 1147 – NOx Reductions from Miscellaneous Sources (July 7, 2017) was identified. This rule is on the list of EPA's SIP approved rules.

Section (g)(3)(D) of this rule provides exemptions for afterburner or vapor incinerator with a District permit operating before December 5, 2008 that has an integrated thermal fluid heat exchanger that captures heat from the afterburner or vapor incinerator and an oven or furnace exhaust in order to reduce fuel consumption by an oven or the afterburner or vapor incinerator.

The RTO at Darling has an integrated thermal fluid heat exchanger that captures heat from the afterburner to reduce the fuel combustion. The RTO at the site has been operating before December 5, 2008. Further, Darling is not proposing any changes to the RTO burner system. Therefore, this unit is not subject to the NOx requirements in Rule 1147.

Bay Area AQMD
Regulation 7 – Odorous Substances (March 17, 1982) was identified. This rule is not on the list of EPA's SIP approved rules. No further discussion is required.

Regulation 12 – Miscellaneous Standards of Performance Rule 2 Rendering Plants. This rule is on the list of EPA's SIP approved rules. The rule does not contain any NOx standards. Therefore, no further discussion is required.

Sacramento Metro AQMD
Rule 410 – Reduction of Animal Matter was reviewed. This rule does not contain any NOx standards. Therefore, no further discussion is required.

Santa Barbara County APCD
Rule 314 – Reduction of Animal Matter (10/23/78) was identified. This rule does not contain any NOx standards. Therefore, no further discussion is required.

San Joaquin Valley APCD
Rule 4104 Reduction of Animal Matter (12/17/92) was identified. This rule dose not contain any NOx standards. Therefore, no further discussion is required.

Industry Survey

Since the RTO system (control equipment) generates collateral NOx, the District practice is to review technologies that can be utilized upstream or downstream of the RTO.

Generally, for rendering operations, aqueous scrubbers are preferred to remove amines, ammonia, and other nitrogen bearing compounds upstream of the RTO. This will help in reducing process NOx emissions that will likely form in the RTO. Use of PUC-quality natural gas in the RTO will also help to reduce NOx emissions.

Use of SCR downstream of the RTO is theoretically feasible; however, due to presence of sulfur compounds and particulate matter in the exhaust stream, the set-up would require additional sulfur and particulate matter removal equipment, which would be extremely challenging to design due to the variety of material rendered at a typical facility. Presuming the design challenges can be overcome, there will still be some sulfur and particulate matter that will bind to the SCR catalyst, which will reduce its conversion efficiency and useful life and require frequent cleaning and catalyst changeout. Therefore, use of SCR after the RTO is not a practically feasible solution to treat exhaust from rendering operations.

List of Control Options:

Based on the search of *BACT Clearinghouse Survey , SIP Approved Rule Survey and Industry Survey* the following emission control options were developed:

Pollutant	NOx (Achieved-in-Practice)	Source
NOx	Use of an aqueous scrubber system (or equivalent controls) to reduce reduce nitrogen compounds (measured in terms of ammonia) upstream of the thermal oxidizer to the maximum practically feasible extent; and use PUC-quality natural gas as a supplemental fuel in the regenerative thermal oxidizer (RTO)	Industry survey

*Due to variability in rendering feed stocks, it is not practically feasible to establish a single control efficiency standard for this category.

Step 2 - Eliminate Technologically Infeasible Options

There is no technologically infeasible option listed in Step 1. Therefore, no further discussion is required.

Step 3 - Rank Remaining Control Technologies by Control Effectiveness

Pollutant	Achieved in Practice	Technologically feasible	Alternate Basic Equipment
NOx	Use of an aqueous scrubber system (or equivalent controls) to reduce reduce nitrogen compounds (measured in terms of ammonia) upstream of the thermal oxidizer to the maximum practically feasible extent; and use PUC-quality natural gas as a supplemental fuel in the regenerative thermal oxidizer (RTO)	None	None

Step 4 - Cost Effectiveness Analysis

The control techniques listed in Step 3 are the minimum level of controls that will be required for the proposed operation. There are no other technologically feasible options listed in Step 3 that requires a cost-effectiveness analysis.

Step 5 - Select BACT

Generally, an animal rendering operation will only trigger BACT for NOx emissions if an RTO is used to control odors. In such cases, achieved in practice BACT for NOx emissions from an animal rendering operation is to reduce nitrogen compounds (measured in terms of ammonia) upstream of the thermal oxidizer using aqueous scrubber system (or equivalent controls) to the maximum practically feasible extent and use natural gas fuel in the RTO.

B. BACT analysis for SOx Emissions

BACT guideline 8.3.2 did not list techniques that would reduce SOx emissions from animal rendering operations. The following search has been conducted to identify the techniques that reduce SOx emissions from animal rendering operation.

Step 1 - Identify All Possible Control Technologies

BACT Clearinghouse Survey:

The following BACT clearinghouses were consulted:

- EPA RACT/BACT/LAER clearinghouse
- CARB BACT clearinghouse
- South Coast AQMD BACT clearinghouse
- Bay Area AQMD BACT clearinghouse
- Sacramento Metro AQMD BACT clearinghouse
- Santa Barbara AQMD BACT clearinghouse
- San Joaquin Valley APCD BACT clearinghouse

EPA RACT/BACT/LAER clearinghouse

The database (https://cfpub.epa.gov/rblc/index.cfm?action=Search.BasicSearch&lang=en) was searched using the following criteria:

Permit Date: 1/1/2011 to 9/13/2021
Process Type - “All Process Types”
Process Name Contains – rendering
Pollutant Name – All Pollutants

RBLC Search Results

List of Reports Help

No matching RBLC facilities found.

Criteria used for search

Permit Date Between 01/01/2011 And 09/13/2021
And Process Contains 'rendering'
For USA only.

No relevant facilities were found.

CARB BACT clearinghouse

The database (https://ww2.arb.ca.gov/our-work/programs/technology-clearinghouse/clearinghouse-tools/bact-guidelines-tool) was searched using "rendering" keyword. The following results were found:

BACT Guideline List

Data Last Updated 1/21/2021

Agency: (All)

Date Filter: 6/27/1991 – 12/22/2020

Search (Exact match to title, ID, or agency): rendering

Agency	District ID	Date	Title
San Jo..	8.3.2	2/21/1998	Animal Matter Rendering Plant
South Coast	n/a	10/20/2000	Fish Reduction, Cooker, Digestor Evaporator And Acidulation Tank, Dryer, Metal Handling, Rendering
			Rendering, Meal Grinding/Handling System, Processing Equipment, Tanks/Miscellaneous Equipment

South Coast AQMD BACT guidelines for "rendering" and "fish reduction" were located. The most up-to-date guideline were obtained from SCAQMD website (http://www.aqmd.gov/docs/default-source/bact/bact-guidelines/bact-guidelines-2021-test/part-d---bact-guidelines-for-non-major-polluting-facilities.pdf)

Rendering BACT guideline (10-20-2000):

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
Best Available Control Technology (BACT) Guidelines for Non-Major Polluting Facilities*

10-20-2000 Rev. 0

Equipment or Process: Rendering

	Criteria Pollutants					
Subcategory/ Rating/Size	**VOC**	**NOx**	**SOx**	**CO**	**PM_{10}**	**Inorganic**
Processing Equipment[1)]					Vent to Afterburner or Boiler Fire Box (≥ 0.3 sec. Retention Time at ≥ 1200 °F) (1988)	
Meal Grinding and Handling System					Enclosed Grinding and Screening Operation with Mechanical Conveyors Transporting Meal (1988)	
Tanks and Miscellaneous Equipment					Maintain Internal Temperature Below 140 °F (1988)	

1) Processing equipment includes crax pressing, filtering, centrifuging, evaporators, cookers, dryers, and grease and blood processing.

* Means those facilities that are not major polluting facilities as defined by Rule 1302 - Definitions

Fish Reduction BACT guideline (2-5-2021):

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
Best Available Control Technology (BACT) Guidelines for Non-Major Polluting Facilities*

10-20-2000 Rev. 0
2-1-2019 Rev. 1
2-5-2021 Rev. 2

Equipment or Process: Fish Reduction

	Criteria Pollutants					
Rating/Size	**VOC**	**NOx**	**SOx**	**CO**	**PM_{10}**	**Inorganic**
Cooker	Scrubber with Chlorinated Solution (≤ 20 ppmv Cl^- Outlet Conc., ≥ 0.6 Sec. Retention Time and ≤ 200 °F Outlet Temp.) (1988)					
Digestor, Evaporator and Acidulation Tank	Afterburner (≥ 0.3 Sec. Retention Time at ≥ 1200 °F) (1990)				Natural Gas with Afterburner (≥ 0.3 Sec. Retention Time at ≥ 1200 °F) (1990)	
Dryer	Scrubber with Chlorinated Solution (≤ 20 ppmv Cl^- Outlet Conc., ≥ 0.6 Sec. Retention Time and ≤ 200 °F Outlet Temp.) (1990)				Natural Gas and Scrubber with Chlorinated Solution (≤ 20 ppmv Cl^- Outlet Conc., ≥ 0.6 Sec. Retention Time and ≤ 200 °F Outlet Temp.) (1990)	
Meal Handling[1]						
Rendering – Presses, Centrifuges, Separators, Tanks, Etc.	Water Condenser and Vent to Dryer Firebox (1988)					

1) At the date of the last revision for this category, there was no Achieved In Practice BACT Determination for this subcategory. Technologically Feasible options listed in historic South Coast AQMD BACT Guidelines for this subcategory require cost effective analyses before they can be listed in these current Guidelines.

* Means those facilities that are not major polluting facilities as defined by Rule 1302 - Definitions

South Coast AQMD BACT clearinghouse
Section I – SCAMD LAER/BACT determinations, available at http://www.aqmd.gov/home/permits/bact/guidelines/i---scaqmd-laer-bact were reviewed. No relevant BACT guideline was found.

Section II- Other LAER/BACT determinations, available at http://www.aqmd.gov/home/permits/bact/guidelines/ii---other-laer-bact were reviewed. No relevant BACT guideline was found.

Section III- Other technologies BACT determinations, available at http://www.aqmd.gov/home/permits/bact/guidelines/iii---other-technologies were reviewed. No relevant BACT guideline was found.

Part D guideline available at http://www.aqmd.gov/docs/default-source/bact/bact-guidelines/bact-guidelines-2021-test/part-d---bact-guidelines-for-non-major-polluting-facilities.pdf were reviewed. Two BACT guidelines, one for rendering and other for fish reduction were located. These guidelines are shown under CARB database search.

Bay Area AQMD BACT clearinghouse
BAAQMD BACT guidelines at https://www.baaqmd.gov/permits/permitting-manuals/bact-tbact-workbook were reviewed. No relevant guideline was found.

Sacramento Metro AQMD BACT clearinghouse
Sac Metro AQMD BACT guidelines available in clearinghouse document (http://www.airquality.org/StationarySources/Documents/BACT%20Clearinghouse.pdf) were reviewed. No relevant guideline was found.

Santa Barbara County AQMD BACT clearinghouse
SBCAPCD BACT clearinghouse available at https://www.ourair.org/bact/ was reviewed. No relevant BACT guideline was found.

San Joaquin Valley APCD BACT clearinghouse
BACT guideline 8.3.2 does not include SOx emissions.

SIP Approved Rule Survey:

The following air District rules and regulations were reviewed:

- South Coast AQMD Rules
- Bay Area AQMD Rules
- Sacramento Metro AQMD Rules
- Santa Barbara County APCD Rules
- San Joaquin Valley APCD Rules

South Coast AQMD
Rule 415 – Odors from Rendering Facilities (November 3, 2017) was identified. This rule is not on the list of EPA's SIP approved rules. No further discussion is required.

Rule 1147 – NOx Reductions from Miscellaneous Sources (July 7, 2017) was identified. This rule is on the list of EPA's SIP approved rules. The rule does not have any standards on the SOx emissions.

Bay Area AQMD
Regulation 7 – Odorous Substances (March 17, 1982) was identified. This rule is not on the list of EPA's SIP approved rules. No further discussion is required.

Regulation 12 – Miscellaneous Standards of Performance Rule 2 Rendering Plants. This rule is on the list of EPA's SIP approved rules. The rule does not contain any SOx standards. Therefore, no further discussion is required.

Sacramento Metro AQMD
Rule 410 – Reduction of Animal Matter was reviewed. This rule does not contain any SOx standards. Therefore, no further discussion is required.

Santa Barbara County APCD
Rule 314 – Reduction of Animal Matter (10/23/78) was identified. This rule does not contain any SOx standards. Therefore, no further discussion is required.

San Joaquin Valley APCD
Rule 4104 Reduction of Animal Matter (12/17/92) was identified. This rule dose not contain any SOx standards. Therefore, no further discussion is required.

Industry Survey

Since the RTO system (control equipment) generates collateral SOx, the District practice is to review technologies that can be utilized upstream or downstream of the RTO.

Generally, for rendering operations, aqueous scrubbers are used to remove sulfur compounds prior to combustion in the RTO, such that less SOx forms in the RTO. It is generally not technically feasible to install a wet scrubber downstream of the RTO to further reduce the SOx emissions because the exhaust temperature from the RTO is too high.

List of Control Options:

Based on the search of *BACT Clearinghouse Survey , SIP Approved Rule Survey and Industry Survey* the following emission control options were developed:

Pollutant	Achieved in Practice	Technologically feasible	Alternate Basic Equipment
SOx	Use of an aqueous scrubber system (or equivalent controls) to reduce sulfur compounds (measured in terms of H2S) upstream of any other control devices	1. 98% control using wet scrubber (or equivalent control)	None

*Due to variability in rendering feed stocks, it is not practically feasible to establish a single control efficiency standard for this category.

Step 2 - Eliminate Technologically Infeasible Options

There is no technologically infeasible option listed in Step 1. Therefore, no further discussion is required.

Step 3 - Rank Remaining Control Technologies by Control Effectiveness

1. 98% control using wet scrubber (or equivalent control);

2. Reduce Use of an aqueous scrubber system (or equivalent controls) to reduce sulfur compounds (measured in terms of H2S) upstream of any other control devices

Step 4 - Cost Effectiveness Analysis

Option 1: 98% control using wet scrubber (or equivalent control)
This is a proactive BACT determination, so a cost effectiveness analysis is not required.

Option 2: Reduce sulfur compounds (measured in terms of H2S) by at least 70% upstream of the thermal oxidizer using aqueous scrubber system (or equivalent controls); and use natural gas fuel in thermal oxidizer
This option is the minimum level of achieved-in-practice control required for rendering operations. Thus, cost effectiveness analysis is not conducted for this option.

Step 5 - Select BACT

Achieved in practice BACT for SOx emissions from an animal rendering operation is to reduce sulfur compounds (measured in terms of hydrogen sulfide) upstream of the thermal oxidizer using aqueous scrubber system (or equivalent controls) to the maximum practically feasible extent and use natural gas fuel in the RTO.

C. BACT analysis for PM10 Emissions

BACT guideline 8.3.2 listed techniques that reduces PM10 emissions from animal rendering operations. These techniques were listed as technologically feasible controls, and appeared to be up-to-date based on the emission control techniques that are practically used at animal rendering operations:

Step 1: Identify All Possible Control Technologies

BACT guideline 8.3.2 identified the following technologically feasible controls:

1. Use of an odor scrubber with a particulate removal system that consists of a particulate scrubber, shell and tube condenser, a Venturi scrubber, a cyclone, an air cooled condenser, and a contact condenser or a combination thereof with a minimum overall control of 95%, or

2. Thermal oxidizer utilizing natural gas with a minimum chamber temperature of 1400°F and minimum retention time of 1.0 second with a particulate removal system that consists of a particulate scrubber, shell and tube condenser, a Venturi scrubber, a cyclone, an air cooled condenser, and a contact condenser or a combination thereof with a minimum overall control of 95%.

Step 2 - Eliminate Technologically Infeasible Options

There is no technologically infeasible option listed in Step 1. Therefore, no further discussion is required.

Step 3 - Rank Remaining Control Technologies by Control Effectiveness

1. Thermal oxidizer utilizing natural gas with a minimum chamber temperature of 1400°F and minimum retention time of 1.0 seconds with a particulate removal system that consists of a particulate scrubber, shell and tube condenser, a Venturi scrubber, a cyclone, an air cooled condenser, and a contact condenser or a combination thereof with a minimum overall control of 95%.

2. Use of an odor scrubber with a particulate removal system that consists of a particulate scrubber, shell and tube condenser, a Venturi scrubber, a cyclone, an air cooled condenser, and a contact condenser or a combination thereof with a minimum overall control of 95%

Step 4 - Cost Effectiveness Analysis

There is only one level of control listed. Therefore, a cost effectiveness analysis is not required.

Step 5 - Select BACT

Achieved in practive BACT for PM10 emissions from an animal rendering operation is 95% control using one or more of the following control technologies:

- Odor scrubber with a particulate removal system that consists of a particulate scrubber, shell and tube condenser, a Venturi scrubber, a cyclone, an air cooled condenser, and a contact condenser or a combination thereof, or

- Thermal oxidizer utilizing natural gas with a minimum chamber temperature of 1400°F and minimum retention time of 1.0 seconds with a particulate removal system that consists of a particulate scrubber, shell and tube condenser, a Venturi scrubber, a cyclone, an air cooled condenser, and a contact condenser or a combination thereof.

D. BACT analysis for VOC Emissions

BACT guideline 8.3.2 listed techniques that reduces VOC emissions from animal rendering operations. These techniques were listed as technologically feasible controls, and appeared to be up-to-date based on the emission control techniques that are practically used at animal rendering operations:

Step 1: Identify All Possible Control Technologies

BACT guideline 8.3.2 identified the following technologically feasible controls:

1. Use of an odor scrubbing system utilizing a scrubbing medium of chlorine dioxide in water with a minimum overall control of 95% or better; or

2. Thermal oxidizer utilizing natural gas with a minimum chamber temperature of 1400°F and minimum retention time of 1.0 second with a minimum overall control of 95%.

However, it is possible to use chemical reagents other than chlorine dioxide in a scrubber system to control odors and VOC emissions. Therefore, this flexibility will be reflected in the revised BACT requirements.

Step 2 - Eliminate Technologically Infeasible Options

There is no technologically infeasible option listed in Step 1. Therefore, no further discussion is required.

Step 3 - Rank Remaining Control Technologies by Control Effectiveness

1. Thermal oxidizer utilizing natural gas with a minimum chamber temperature of 1400°F and minimum retention time of 1.0 second with a minimum overall control of 95%.

2. Use of an odor scrubbing system utilizing a scrubbing medium with appropriate chemical reagent(s) with a minimum overall control of 95% or better

Step 4 - Cost Effectiveness Analysis

The achieved in practice level of control is the same for the options. Therefore, a cost effectiveness analysis is not required.

Step 5 - Select BACT

Achieved in practive BACT for VOC emissions from an animal rendering operation is 95% control using one or more of the following control technologies:

- Odor scrubbing system utilizing a scrubbing medium with appropriate chemical reagent(s), or

- Thermal oxidizer utilizing natural gas with a minimum chamber temperature of 1400°F and minimum retention time of 1.0 second.

IV. Recommendation

Upon approval, the attached guideline is recommended to be adopted into District's BACT Clearinghouse.

Appendices

Appendix A: Draft BACT Guideline
Appendix B: Existing BACT Guideline 8.3.2

Appendix A
Draft BACT Guideline

San Joaquin Valley
Unified Air Pollution Control District
Best Available Control Technology (BACT) Guideline 8.3.2*

Emissions Unit: Animal Rendering Operations
Industry Type: Animal Rendering
Equipment Rating: All
Last Update: December 7, 2022

Pollutant	Achieved-in-Practice or contained in SIP	Technologically Feasible	Alternate Basic Equipment
NOx	Use of an aqueous scrubber system (or equivalent controls) to reduce reduce nitrogen compounds (measured in terms of ammonia) upstream of the thermal oxidizer to the maximum practically feasible extent; and use PUC-quality natural gas as a supplemental fuel in the regenerative thermal oxidizer (RTO)	None	None
SOx	Use of an aqueous scrubber system (or equivalent controls) to reduce sulfur compounds (measured in terms of H2S) upstream of any other control devices	1. 98% control using wet scrubber (or equivalent control)	None
PM_{10}	95% control using one or more of the following control technologies: • Odor scrubber with a particulate removal system that consists of a particulate scrubber, shell and tube condenser, a Venturi scrubber, a cyclone, an air cooled condenser, and a contact condenser or a combination thereof, or • Thermal oxidizer utilizing natural gas with a minimum chamber temperature of 1400°F and minimum retention time of 1.0 seconds with a particulate removal system that consists of a particulate scrubber, shell and tube condenser, a Venturi scrubber, a cyclone, an air cooled condenser, and a contact condenser or a combination thereof.	None	None
VOC	95% control using one or more of the following control technologies: • Odor scrubbing system utilizing a scrubbing medium with appropriate chemical reagent(s), or • Thermal oxidizer utilizing natural gas with a minimum chamber temperature of 1400°F and minimum retention time of 1.0 second.	None	None

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

Appendix B
Existing BACT Guideline 8.3.2

San Joaquin Valley
Unified Air Pollution Control District

Best Available Control Technology (BACT) Guideline 8.3.2*

Last Update: 02/21/1998

Animal Matter Rendering Plant

Pollutant	Achieved in Practice or contained in the SIP	Technologically Feasible	Alternate Basic Equipment
VOC		Use of an odor scrubbing system utilizing a scrubbing medium of chlorine dioxide in water with a minimum overall control of 95% or better, Thermal oxidizer utilizing natural gas with a minimum chamber temperature of 1400°F and minimum retention time of 1.0 second with a minimum overall control of 95%.	
PM10		Use of an odor scrubber with a particulate removal system that consists of a particulate scrubber, shell and tube condenser, a Venturi scrubber, a cyclone, an air cooled condenser, and a contact condenser or a combination thereof with a minimum overall control of 95%, or Thermal oxidizer utilizing natural gas with a minimum chamber temperature of 1400°F and minimum retention time of 1.0 seconds with a particulate removal system that consists of a particulate scrubber, shell and tube condenser, a Venturi scrubber, a cyclone, an air cooled condenser, and a contact condenser or a combination thereof with a minimum overall control of 95%.	

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

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