



June 8, 2020

Mike Kalmink
Innovative Ag Services, LLC
1201 Delta View Rd, Ste 5
Hanford, CA 93230

Re: Notice of Preliminary Decision - Authority to Construct
Facility Number: S-6124
Project Number: S-1094097

Dear Mr. Kalmink:

Enclosed for your review and comment is the District's analysis of Innovative Ag Services, LLC's application, on behalf of West Wing Dairy, for an Authority to Construct for the modification of an existing dairy operation to increase the herd size from 1,800 milk cows, not to exceed a combined total of 2,030 mature cows (milk and dry), and 770 total support stock (heifers, calves, and bulls) to 2,800 milk cows, not to exceed a combined total of 3,225 mature cows (milk and dry), and 1,294 total support stock, at 20997 Road 180, Strathmore.

The notice of preliminary decision for this project has been posted on the District's website (www.valleyair.org). After addressing all comments made during the 30-day public notice period, the District intends to issue the Authority to Construct. Please submit your written comments on this project within the 30-day public comment period, as specified in the enclosed public notice.

Thank you for your cooperation in this matter. If you have any questions regarding this matter, please contact Mr. Jonah Aiyabei of Permit Services at (559) 230-5910.

Sincerely,



Arnaud Marjollet
Director of Permit Services

AM:jka

Enclosures

cc: Courtney Graham, CARB (w/ enclosure) via email

Samir Sheikh
Executive Director/Air Pollution Control Officer

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4800 Enterprise Way
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San Joaquin Valley Air Pollution Control District

Authority to Construct Application Review

Dairy Herd Expansion and Anaerobic Treatment of Liquid Manure

Facility Name:	West Wing Dairy	Date:	June 3, 2020
Mailing Address:	20997 Road 180 Strathmore, CA 93267	Engineer:	Jonah Aiyabei
		Lead Engineer:	Jerry Sandhu
Contact Person:	Mike Kalmink		
Telephone:	(559) 587-2800		
Application #s:	S-6124-1-3 through 4-3, and 12-1		
Project #:	S-1094097		
Deemed Complete:	February 11, 2020		

I. Proposal

West Wing Dairy has applied for Authority to Construct (ATC) permits to expand their dairy herd capacity from the currently permitted limit of 1,800 milk cows not to exceed a combined total of 2,030 mature cows (milk and dry) and 770 total support stock (heifers, calves, and bulls) to a proposed limit of 2,800 milk cows not to exceed a combined total of 3,225 mature cows (milk and dry) and 1,294 total support stock (heifers, calves, and bulls). The proposed changes do not include the construction of any new housing units or any modification of the existing housing units. In addition, the applicant proposes to address Best Available Control Technology (BACT) requirements by implementing anaerobic treatment of liquid manure using an existing 1,050' x 275' x 20' lagoon and replacing one Rule 4570 solid manure mitigation measure (to apply no solid manure with a moisture content of more than 50%) with one that meets the applicable BACT requirement (to incorporate all solid manure 2 hours of land application). The current liquid manure land application mitigation measure (not to allow manure to stand in the fields for more than 24 hours after irrigation) will also be replaced with a requirement to apply only manure that has been treated in the anaerobic treatment lagoon.

Pursuant to Rule 2201, Section 3.25, the proposed changes constitute a modification of the milking operation (S-6124-1), cow housing (S-6124-2), liquid manure handling (S-6124-3), solid manure handling (S-6124-4), and feed storage and handling (S-6124-12) permit units, due to an increases in production rates and/or changes in methods of operation of existing emissions units, which would necessitate changes in permit conditions.

The draft ATC permits for the proposed modifications are included in Appendix A. The Permits to Operate (PTOs) for the existing operation are included in Appendix B. A facility site plan showing the proposed modifications is included in Appendix C.

II. Applicable Rules

Rule 1070	Inspections (12/17/92)
Rule 2010	Permits Required (12/17/92)
Rule 2201	New and Modified Stationary Source Review Rule (8/15/19)

Rule 2410 Prevention of Significant Deterioration (6/16/11)
Rule 2520 Federally Mandated Operating Permits (8/15/19)
Rule 4001 New Source Performance Standards (4/14/99)
Rule 4002 National Emissions Standards for Hazardous Air Pollutants (5/20/04)
Rule 4101 Visible Emissions (2/17/05)
Rule 4102 Nuisance (12/17/92)
Rule 4550 Conservation Management Practices (8/19/04)
Rule 4570 Confined Animal Facilities (10/21/10)
CH&SC §41700 Health Risk Assessment
CH&SC §42301.6 School Notice
Public Resources Code 21000-21177: California Environmental Quality Act (CEQA)
California Code of Regulations, Title 14, Division 6, Chapter 3, Sections 15000-15387: CEQA Guidelines

III. Project Location

West Wing Dairy is located at 20997 Road 180 in Strathmore. The dairy site is not located within 1,000 feet of the outer boundaries of any K-12 schools. The public notification requirement of California Health and Safety Code §42301.6 is therefore not applicable to this project.

IV. Process Description

The primary function of West Wing Dairy is the production of dairy milk, which is used to make various food products, such as fluid milk,¹ butter, cheese, ice cream, and yogurt. Production of milk requires a herd of mature dairy cows that are lactating (milk cows). A cow's lactation cycle starts shortly after calving and lasts for approximately 12 months. Typically, a 10-month lactation period is followed by a 2-month non-lactation (dry cow) period, during which the cow prepares to calve again and begin a new lactation cycle. After the first few lactation cycles, the cow's milk yield is expected to decline steadily with each subsequent cycle.

Female calves are retained in the herd while the male calves are sold off for meat production or other purposes. The calves take approximately 15 to 24 months to reach reproductive maturity, at which point they enter the milk production stream as bred heifers. Thus, in addition to the mature cows (milk and dry), a typical dairy herd also includes a certain proportion of calves and heifers at various stages of development (support stock). Mature cows that are culled from the herd (primarily due to diminishing milk yield, but also due to injury, disease, or other reasons) are replaced by the bred heifers entering the milk production stream. The support stock may also include a certain number of mature bulls for breeding purposes, although this is not common due to the prevalent use of artificial insemination.

The primary functions involved in the day to day operation of a dairy include housing and feeding the herd, milking, and management of manure. These functions are described in more detail in the following sections:

Milking

Milking is a dairy's primary income generating activity. The lactating cows are milked two to four times per day. The milk is chilled and temporarily stored in onsite tanks until it is collected by

¹ Milk that has been processed in various ways (e.g. pasteurization, homogenization, fortification, etc.) and is intended to be consumed primarily as a beverage.

tanker truck for delivery to a creamery. A purpose-built structure known as the milking barn is used for milking and the associated onsite milk handling activities. The milking barn is located in proximity to, but separate from the lactating cow housing areas. It is designed to facilitate efficient in-and-out movement of groups of cows being milked; and also to allow workers access to individual cows during milking. The first part of the milking barn, known as the holding area, is an open-sided roofed space where cows that are ready for milking are temporarily confined as they enter the milking parlor. The milking occurs in the milking parlor within the barn. There are several different parlor designs, including flat, parallel, herringbone, and carousel. West Wing Dairy currently uses two 36-stall herringbone parlors.

Due to food safety regulations, high standards of hygiene must be observed in the milking parlor. The parlor floors are constructed of concrete, and are properly sloped to ensure effective drainage. Any manure that is deposited on the parlor floors during milking is promptly sprayed down with clean water and flushed into the drainage system, from where it is carried through pipes into the manure lagoons.

Cow Housing

All the cows at this dairy are housed in open corrals. An open corral is a large loose-dirt open-air space where cows are confined using fences. A corral is typically bordered along one side by a drive-through feed alley, which may or may not be paved. Feed bunks are located along the side of the drive-through alley. A stanchion fence separates the housing side of the corral from the feed alley and also facilitates the cows' orderly access to the feed (i.e. one cow per stanchion). The edge of the corral immediately opposite the feed bunks is often paved to facilitate effective removal of manure deposited during feeding, which is a significant amount of the total manure associated with corral housing. Manure from the paved lanes is removed by flushing with water. Manure from the unpaved surfaces of the corral is removed by scraping with a box-type scraper. Watering troughs are provided along the edges of the corral opposite the feed bunks, and can be accessed through the corral fencing. Shade structures are also provided within the corral to improve the cows' comfort during hot weather.

Detailed pre-project and post project housing arrangements are shown in Appendix E ('PM10 Mitigation Measures' sheet).

Liquid Manure Handling

Milk cows generate anywhere from 130 to 150 pounds of manure per day. The manure is deposited primarily in areas where the cows are housed and fed (cow housing), but a small amount is deposited in the milking barn and other transit areas. The manure is collected and managed in liquid and solid forms. Manure with a total solids content of 20% or higher usually can be handled as a solid, while manure with a total solids content of 10% or less can be handled as a liquid. .

The existing liquid manure handling system consists of one settling basin, one lagoon, and one storage pond².

² The current PTO lists two storage ponds. However, pursuant to District practice for liquid manure management systems, the first retention unit, after separation unit(s), is always designated as a lagoon.....

Solids Separation

Solids separation will be accomplished using a settling basin. Settling basins are earthen structures designed to separate solids from liquid manure by sedimentation. Liquid manure containing solids enters the basin from one end. As the inflow of manure slows down upon entering the basin, heavier solids settle out. Lighter solids are trapped as the manure slowly filters through the solid material already in the basin. The liquid portion of the manure gradually drains at the opposite end of the basin, where it discharges into a lagoon or storage pond. Solids remaining in the settling basin are left to dry and then excavated. The excavated solids are either applied to cropland or dried further and shipped offsite.

Anaerobic Treatment Lagoon

An anaerobic treatment lagoon is a waste treatment lagoon that is designed to facilitate the decomposition of manure by microbes in the absence of oxygen. This process of anaerobic decomposition results in the preferential conversion of organic compounds in the manure into methane, carbon dioxide, and water rather than intermediate metabolites (VOC). The Natural Resources Conservation Service (NRCS) California Field Office Technical Guide Conservation Practice Standard Code 359 specifies the following criteria for anaerobic treatment lagoons:

- 1) Minimum treatment volume - the minimum design volume must account for all potential sludge, treatment, precipitation, and runoff volumes;
- 2) Minimum hydraulic retention time - the retention time of the material in the lagoon must be adequate to provide environmentally safe utilization of waste;
- 3) Maximum volatile solids (VS) loading rate - the VS loading rate shall be based on maximum daily loading considering all waste sources that will be treated by the lagoon. The suggested loading rate for the San Joaquin Valley is 6.5 - 11 lb-VS/1000 ft³/day depending on the type of system and solids separation; and
- 4) Minimum operating depth of at least 6 feet - maximizing the depth of the lagoon has the following advantages: i) The surface area in contact with the atmosphere is minimized, which will reduce volatilization of air pollutants; ii) The smaller surface area reduces the effects of the environment on the lagoon, which provides a more stable and favorable environment for anaerobic bacteria; iii) There is better mixing of lagoon due to rising gas bubbles; and iv) A deeper lagoon requires less land for the required treatment volume.

West Wing Dairy has proposed to use an existing 1,050' x 275' x 20' lagoon for anaerobic treatment. In order to meet the required liquid manure storage capacity requirements established by the Regional Water Quality Control Board, the applicant proposes to draw effluent for crop irrigation purposes from the proposed treatment lagoon as well. However, a constant minimum liquid depth of 6 feet will be maintained in the lagoon at all times, consistent with the NRCS Code 359 minimum depth requirement as discussed above.

As shown in the design check in Appendix J, operating this lagoon with the proposed constant minimum depth will provide more than sufficient treatment volume for the facility's total liquid manure. The proposal therefore meets the anaerobic treatment criteria listed above.

Land Application

Treated liquid manure from the storage pond will be applied to cropland as fertilizer/irrigation water. The application is done through flood and furrow irrigation, at agronomic rates in conformance with a nutrient management plan approved by the Regional Water Quality Control Board.

Solid Manure Handling

Solid manure is stored in stockpiles until ready to be applied to cropland as fertilizer, or shipped offsite. When applied to land, solid manure will be promptly incorporated into the soil (within two hours of land application).

Feed Handling and Storage

The feed storage and handling area is used for the storage of feed ingredients and for the preparation of daily feed rations (known as 'total mixed rations', or TMR). Silage, the main ingredient in TMR, is stored in large elongated piles on concrete slabs. The required amount is extracted from one end of the pile, as needed. Other additive ingredients such as almond hulls, various grains, and cotton seed are stored in covered barns (commodity barns) to prevent damage from exposure to weather elements. Front-end loaders are used to retrieve the required proportions of the silage and additive ingredients and load them into a feed wagon with a built-in mixer. Once the silage and additive ingredients are thoroughly mixed, the feed wagon drives over to the cow housing areas to spread the TMR along the feed lanes.

V. Equipment Listing

Pre-Project Equipment Descriptions

- S-6124-1-4: 1,800 COW MILKING OPERATION WITH TWO DOUBLE 18 HERRINGBONE (72 STALLS) MILKING PARLORS
- S-6124-2-5: COW HOUSING - 1,800 MILK COWS NOT TO EXCEED A COMBINED TOTAL OF 2,030 MATURE COWS (MILK AND DRY); 770 SUPPORT STOCK (HEIFERS, CALVES AND BULLS)
- S-6124-3-4: LIQUID MANURE HANDLING SYSTEM CONSISTING OF ONE SETTLING BASIN; TWO STORAGE PONDS; MANURE IS LAND APPLIED THROUGH FLOOD AND FURROW IRRIGATION
- S-6124-4-4: SOLID MANURE HANDLING CONSISTING OF MANURE STOCK PILES; SOLID MANURE HAULED OFFSITE
- S-6124-12-2: FEED STORAGE AND HANDLING CONSISTING OF COMMODITY BARN(S) AND SILAGE PILE(S)

Proposed Modifications and ATC Equipment Descriptions

The applicant proposes to expand the dairy herd capacity from the currently permitted limit of 1,800 milk cows not to exceed a combined total of 2,030 mature cows (milk and dry) and 770

total support stock (heifers, calves, and bulls) to a proposed limit of 2,800 milk cows not to exceed a combined total of 3,225 mature cows (milk and dry) and 1,294 total support stock (heifers, calves, and bulls). The resulting increase in manure and feed throughput triggers BACT for liquid manure, solid manure, and total mixed ration feeding. To address BACT requirements for liquid and solid manure, the applicant proposes to implement anaerobic treatment using an existing 1,050' x 275' x 20' lagoon, and replace the current Rule 4570 mitigation measure for solid manure (i.e. not to apply solid manure with a moisture content of more than 50%) with incorporation within 2 hours of land application. The current liquid manure land application mitigation measure (not to allow manure to stand in the fields for more than 24 hours after irrigation) will also be replaced with a requirement to apply only manure that has been treated in the anaerobic treatment lagoon.

The cow housing permit unit will be administratively corrected to indicate that a 'FLUSH/SCRAPE' system is currently being used, as this is consistent with the existing use of a liquid manure management system.

The solid manure permit unit equipment description will be administratively corrected to indicate land application. The initial farm permit application (Project #S-1054087) stated that solid manure was being applied to land, but this was inadvertently omitted from the original equipment description. Rule 4570 conditions for land application were added in the subsequent permit modification (Project S-1065080) but the equipment description was still not corrected to match the permit conditions.

The feed storage and handling permit unit equipment description will also be administratively corrected to include total mixed ration feeding (TMR). This is a standard part of this permit unit for dairy operations. The pertinent information was included in past applications, but the appropriate description was inadvertently omitted from the equipment description.

- S-6124-1-3: MODIFICATION OF 1,800 COW MILKING OPERATION WITH TWO DOUBLE 18 HERRINGBONE (72 STALLS) MILKING PARLORS: INCREASE MAXIMUM NUMBER OF MILK COWS TO 2,800
- S-6124-2-3: MODIFICATION OF COW HOUSING - 1,800 MILK COWS NOT TO EXCEED A COMBINED TOTAL OF 2,030 MATURE COWS (MILK AND DRY); 770 SUPPORT STOCK (HEIFERS, CALVES, AND BULLS); WITH A FLUSH/SCRAPE SYSTEM: INCREASE MAXIMUM NUMBERS OF COWS TO 2,800 MILK COWS, NOT TO EXCEED A COMBINED TOTAL OF 3,225 MATURE COWS (MILK AND DRY), AND 1,294 TOTAL SUPPORT STOCK (HEIFERS, CALVES, AND BULLS)
- S-6124-3-3: MODIFICATION OF LIQUID MANURE HANDLING SYSTEM CONSISTING OF SETTLING BASIN(S) AND TWO STORAGE PONDS; MANURE IS LAND APPLIED THROUGH FLOOD AND FURROW IRRIGATION: ALLOW INCREASE IN THROUGHPUT DUE TO HERD EXPANSION, IMPLEMENT ANAEROBIC TREATMENT USING AN EXISTING 1,050' X 275' X 20' LAGOON, AND REPLACE ONE RULE 4570 MITIGATION MEASURE (NOT TO ALLOW MANURE TO STAND IN FIELDS FOR MORE THAN 24 HOURS AFTER IRRIGATION) WITH APPLICATION OF ONLY ANAEROBICALLY TREATED MANURE

S-6124-4-3: MODIFICATION OF SOLID MANURE HANDLING CONSISTING OF MANURE STOCK PILES; SOLID MANURE APPLICATION TO LAND; AND/OR HAULED OFFSITE: ALLOW INCREASE IN THROUGHPUT DUE TO HERD EXPANSION AND REPLACE THE CURRENT RULE 4570 MITIGATION MEASURE (NOT TO APPLY SOLID MANURE WITH A MOISTURE CONTENT OF MORE THAN 50%) WITH INCORPORATION WITHIN 2 HOURS OF LAND APPLICATION

S-6124-12-1: MODIFICATION OF FEED STORAGE AND HANDLING CONSISTING OF COMMODITY BARN(S), SILAGE PILE(S), AND TOTAL MIXED RATION FEEDING: ALLOW INCREASE IN THROUGHPUT DUE TO HERD EXPANSION

Post-Project Equipment Descriptions

S-6124-1-3: 2,800 COW MILKING OPERATION WITH TWO DOUBLE 18 HERRINGBONE (72 STALLS) MILKING PARLORS

S-6124-2-3: COW HOUSING - 2,800 MILK COWS NOT TO EXCEED A COMBINED TOTAL OF 3,225 MATURE COWS (MILK AND DRY); AND 1,294 SUPPORT STOCK (HEIFERS, CALVES, AND BULLS); WITH A FLUSH/SCRAPE SYSTEM

S-6124-3-3: LIQUID MANURE HANDLING SYSTEM CONSISTING OF SETTLING BASIN(S), ONE ANAEROBIC TREATMENT LAGOON (1,050' X 275' X 20') AND ONE STORAGE POND; MANURE IS LAND APPLIED THROUGH FLOOD AND FURROW IRRIGATION

S-6124-4-3: SOLID MANURE HANDLING CONSISTING OF MANURE STOCK PILES; SOLID MANURE APPLICATION TO LAND AND/OR HAULED OFFSITE

S-6124-12-1: FEED STORAGE AND HANDLING CONSISTING OF COMMODITY BARN(S), SILAGE PILE(S), AND TOTAL MIXED RATION FEEDING

VI. Emissions Control Technology Evaluation

Particulate matter (PM₁₀), volatile organic compounds (VOC), hydrogen sulfide (H₂S) and ammonia (NH₃) are the major pollutants of concern from dairy operations. PM₁₀ emissions are generated primarily from the action of cows' hooves on dust and dry manure, which is subsequently picked up by wind and entrained into the atmosphere. VOC emissions are generated from the ruminant digestive process (i.e. enteric emissions), decomposition and fermentation of feed, and decomposition of organic matter in manure. NH₃ and H₂S emissions are generated from microbial metabolization of nitrogen and sulfur compounds in manure. The quantity of these emissions depends directly on the herd size and profile.³

Various management practices are used to control emissions at this dairy. Some of these practices are discussed below:

Milking Parlors

This dairy uses a flush/spray system to wash out the manure from the milking parlors after each group of cows are milked. Regular flushing creates a moist environment that reduces PM₁₀

³ Herd size refers to the total number of cows, whereas profile refers to the specific categories (e.g. lactating, dry, heifer, calf) that constitute the herd.

emissions. In addition, flush water dissolves NH_3 as well as various water-soluble VOC in the manure, thereby stopping or decelerating the emission of these pollutants directly into the atmosphere. Both manure and dissolved pollutants are subsequently carried by the flush water into the lagoon for further treatment.

Cow Housing

Frequent Cleaning (Flushing/Scraping)

A flush system will be used to remove manure from the corral lanes and walkways at least once daily. Regular flushing creates a moist environment that reduces PM_{10} emissions. In addition, flush water dissolves NH_3 as well as various water-soluble VOC in the manure, thereby stopping or decelerating the emission of these pollutants directly into the atmosphere. Both manure and dissolved pollutants are subsequently carried by the flush water into the lagoon for further treatment.

Feeding Cows in Accordance with the NRC Guidelines

All cows will be fed in accordance with National Research Council (NRC) guidelines using routine nutritional analysis for rations. NRC guidelines are intended to optimize nutrient uptake by the cow, which not only increases feed efficiency but also minimizes the excretion of undigested protein and other nutrients in the manure. Since excess manure nutrients are the feedstock for the processes that result in NH_3 , H_2S and VOC emissions as manure decomposes, the reduction of nutrients in the manure is expected to reduce the emission of these pollutants.

Shade Structures and Frequent Corral Scraping

All the open corrals are equipped with shade structures. Providing shade for the cows reduces movement and unnecessary activity during hot weather, which reduces PM_{10} emissions. Frequent scraping of the corral surfaces reduces the amount of accumulated manure, which reduces VOC and ammonia emissions resulting from decomposition of this manure. This practice also provides a uniform surface that promotes aerobic conditions, thus further reducing emissions.

Liquid Manure Handling

Solids Separation

The liquid manure handling system is equipped settling basins for solids separation. Solids separation prevents excessive loading of solids into the treatment system, which could inhibit the microbial activity that is required for proper treatment.

Anaerobic Treatment

Primary treatment of all the facility's liquid manure will be accomplished using the proposed anaerobic treatment lagoon system. As shown in the design check in Appendix J, the facility's treatment system meets the specifications set forth in NRCS practice standard 359. A properly designed and operated anaerobic treatment lagoon system reduces VOC emissions by enhancing the conversion of organic compounds in the manure into methane, carbon dioxide, and water.

Liquid Manure Land Application

Liquid manure will be applied to cropland at agronomic rates, in compliance with the dairy's comprehensive nutrient management plan and the requirements of the Regional Water Quality Control Board. These practices are expected to reduce odors and result in faster uptake of nutrients by crops. When applied nutrients are optimally matched with the nutrient needs of developing crops, the excess nutrients that are associated with increased emissions and/or groundwater pollution are minimized.

Solid Manure Handling

Based on the information currently available, emissions from solid manure applied to cropland are expected to be low. However, to ensure that any possible emissions are minimized, the manure will be promptly incorporated into the soil after application. This will reduce any volatilization of gaseous pollutants, as the soil provides cover from wind and other weather elements that enhance volatilization. In addition, incorporation reduces emissions by biofilter effect, whereby the adsorption of NH_3 , VOC, and other compounds onto soil particles provides an opportunity for oxidation by the action of various microorganisms the soil.⁴

Feed Storage and Handling

All cows will be fed in accordance with National Research Council (NRC) guidelines using routine nutritional analysis for rations. NRC guidelines are intended to optimize nutrient uptake by the cow, which not only increases feed efficiency but also minimizes the excretion of undigested protein and other nutrients in the manure. Since excess manure nutrients are the feedstock for the processes that result in NH_3 , H_2S and VOC emissions as manure decomposes, the reduction of nutrients in the manure is expected to reduce the emission of these pollutants.

In addition, any refused feed will be removed from the feed lanes on a regular basis to minimize gaseous emissions from decomposition. Silage piles will be covered with plastic tarps to minimize volatilization of pollutants from the pile surfaces.

VII. General Calculations

A. Assumptions

- Potential to emit calculations will be based on the permitted limits for the different age categories of cows in the existing and proposed herds.
- Only non-fugitive emissions are considered when determining major source status. For this facility, the lagoons and emergency standby engine are the only sources of non-fugitive emissions.
- The conditions on the existing PTOs are based on the Rule 4570 Phase II mitigation measures originally proposed via application/project #S-1111269. The existing Rule 4570 Phase II data and mitigation measures will be used in the current evaluation, except where the applicant has proposed a specific change. Modifications to specific measures will be made, as necessary, to accommodate New Source Review requirements from the current project.

⁴ Page 9-38 of U.S. EPA's draft document entitled "Emissions From Animal Feeding Operations" (<http://www.epa.gov/ttn/chief/ap42/ch09/draft/draftanimalfeed.pdf>)

- All PM₁₀ emissions from the cows will be allocated to the cow housing permit unit (S-6124-2).
- All H₂S emissions will be allocated to the lagoon/storage pond under the liquid manure permit unit (S-6124-3).
- The PM₁₀ control efficiency for shade structures is from a District document titled "Dairy/Feedlot PM₁₀ Mitigation Practices and their Control Efficiencies."⁵
- The PM₁₀ emission factors are from a District document titled "Dairy and Feedlot PM₁₀ Emissions Factors,"⁶ which compiled data from studies performed by Texas A&M and ASAE, and a USDA/UC Davis report, quantifying dairy and feedlot emissions.
- The VOC emission factors for milk cows are from a District document titled "Air Pollution Control Officer's Revision to the Dairy VOC Emission Factors, February 2012."⁷ Volatile solids excretion ratios were used to derive the proportionate VOC emission factors for dry cows and support stock.
- The NH₃ emission factor for milk cows is based on California Air Resources Board's dairy cattle ammonia emission factor.⁸ Manure-based VOC emission ratios were used to apportion the NH₃ emission factor to the various emissions units. Further, nitrogen excretion ratios were used to derive the proportionate NH₃ emission factors for dry cows and support stock.
- VOC and NH₃ calculations for support stock (heifers and bulls) use worst-case emission factors for heifers.
- All the Rule 4570 mitigation measures evaluated are expected to result in VOC emission reductions. Where a specific control efficiency has not been determined, a conservative 10% control efficiency will be assumed, unless noted otherwise.
- Current District practice to streamline calculations for PM_{2.5} emissions is to assume PM_{2.5} emissions to be equal to PM₁₀ emissions. However, the District has been made aware of a number of scientific studies⁹ that have established more representative PM_{2.5}-to-PM₁₀ fractions from dairy operations. Data from a preliminary analysis of these studies indicate a range of percentages (from 8.6% to 26.7%) for the PM_{2.5}-to-PM₁₀ fraction, but a final PM_{2.5} fraction has not been determined. Since this additional evaluation is in progress and has not been finalized; for this specific project, the District will include an additional 19.5% margin of safety to the highest published value of 26.7%¹⁰ and use a conservative PM_{2.5} fraction of 31.9% PM_{2.5}-to-PM₁₀. Additional work must be completed to more closely

⁵ http://www.valleyair.org/busind/pto/dpag/Dairy_PM10_Control_Efficiencies.pdf

⁶ http://www.valleyair.org/busind/pto/dpag/FYI_%20Dairy_Feedlot_PM10_Emission_Factor.pdf

⁷ [http://www.valleyair.org/busind/pto/emission_factors/2012-Final-Dairy-EE-Report/FinalDairyEFReport\(2-23-12\).pdf](http://www.valleyair.org/busind/pto/emission_factors/2012-Final-Dairy-EE-Report/FinalDairyEFReport(2-23-12).pdf)

⁸ <http://www.arb.ca.gov/ei/areasrc/livestockemisfwp.pdf>

⁹ Including: (1) California Air Resources Board - Speciation Profiles Used in ARB Modeling (PMSIZE spreadsheet); (2) Winkel, A. et al (2015). Emissions of particulate matter from animal houses in the Netherlands. *Atmospheric Environment*, 111, pp.202-212.; (3) Joo, H.S., et al (2013). Particulate matter dynamics in naturally ventilated freestall dairy barns. *Atmospheric Environment*, 69, pp.182-190.; and (4) Marchant, C. C.; et al, (2011) "Estimation of Dairy Particulate Matter Emission Rates by LIDAR and Inverse Modeling". *Space Dynamics Lab Publications*. Paper 85.

¹⁰ The 26.7% fraction was derived from the Joo, H.S., et. al. (2013) study and the study was conducted in the State of Washington in the Pacific Northwest region of the U.S. While utilizing the highest published fraction may seem conservative, the study also states, "a comparison of PM emissions across different geographical and climate regions is, however, complicated because of the differences in environmental conditions, animal feed, feed and manure management, bedding material, amongst others."

analyze the results of these studies and determine a final PM_{2.5}-to-PM₁₀ fraction for district-wide usage.

B. Emission Factors

Detailed emission factors are listed in the emissions calculation spreadsheet in Appendix E ('Dairy Emission Factors' sheet).

C. Calculations

1. Pre-Project Potential to Emit (PE1)

The PE1 is based on the maximum permitted capacity for each age category of cows and the controls required and proposed by the applicant. All the dairy emission calculations are included in Appendix E. A summary of the PE1 is shown in the following table:

PE1 Summary								
Permit unit	PM ₁₀		VOC		NH ₃		H ₂ S	
	lb/day	lb/yr	lb/day	lb/yr	lb/day	lb/yr	lb/day	lb/yr
S-6124-1-4	0.0	0	2.0	720	0.7	246	0.0	0
S-6124-2-5	45.7	16,680	62.1	22,679	135.3	49,352	0.0	0
S-6124-3-4	0.0	0	15.0	5,465	44.0	16,062	1.1	397
S-6124-4-4	0.0	0	2.8	1,014	16.5	6,000	0.0	0
S-6124-12-2	0.0	0	84.6	30,899	0.0	0	0.0	0

2. Post-Project Potential to Emit (PE2)

The PE2 is based on the maximum permitted capacity for each age category of cows and the controls required and proposed by the applicant. All the dairy emission calculations are included in Appendix E. A summary of the PE2 is shown in the following table:

PE2 Summary								
Permit unit	PM ₁₀		VOC		NH ₃		H ₂ S	
	lb/day	lb/yr	lb/day	lb/yr	lb/day	lb/yr	lb/day	lb/yr
S-6124-1-3	0.0	0	3.1	1,120	1.0	383	0.0	0
S-6124-2-3	63.3	23,108	98.8	36,074	214.3	78,155	0.0	0
S-6124-3-3	0.0	0	14.3	5,213	45.0	16,430	1.1	397
S-6124-4-3	0.0	0	4.7	1,713	26.1	9,502	0.0	0
S-6124-12-1	0.0	0	122.5	44,731	0.0	0	0.0	0

3. Pre-Project Stationary Source Potential to Emit (SSPE1)

Pursuant to District Rule 2201, the SSPE1 is the sum of the Potential to Emit (PE) from all units with valid Authorities to Construct (ATC) or Permits to Operate (PTO) at the stationary source and the quantity of emission reduction credits (ERC) which have been banked since September 19, 1991 for actual emissions reductions (AER) that have

occurred at the source, and which have not been used on-site. This facility does not have any ERCs. The PE values for units S-6124-1 through S-6124-4 and S-6124-12 are calculated in Appendix E. The PE values for unit S-6124-11 are calculated in Appendix I. The SSPE1 is as summarized in the following table:

SSPE1 (lb/year)							
Permit unit	NO_x	SO_x	PM₁₀	CO	VOC	NH₃	H₂S
S-6124-1-4	0	0	0	0	720	246	0
S-6124-2-5	0	0	16,680	0	22,679	49,352	0
S-6124-3-4	0	0	0	0	5,465	16,062	397
S-6124-4-4	0	0	0	0	1,014	6,000	0
S-6124-11-0	661	0	31	201	75	0	0
S-6124-12-2	0	0	0	0	30,899	0	0
SSPE1	661	0	16,711	201	60,852	71,660	397

4. Post-Project Stationary Source Potential to Emit (SSPE2)

Pursuant to District Rule 2201, the SSPE2 is the sum of the PE from all units with valid ATCs or PTOs at the Stationary Source and the quantity of ERCs which have been banked since September 19, 1991 for AER that have occurred at the source, and which have not been used on-site. This facility does not have any ERCs. The PE values for units S-6124-1 through S-6124-4 and S-6124-12 are calculated in Appendix E. The PE values for unit S-6124-11 are calculated in Appendix I. The SSPE2 is as summarized in the following table:

SSPE2 (lb/year)							
Permit unit	NO_x	SO_x	PM₁₀	CO	VOC	NH₃	H₂S
S-6124-1-3	0	0	0	0	1,120	383	0
S-6124-2-3	0	0	23,108	0	36,074	78,155	0
S-6124-3-3	0	0	0	0	5,213	16,430	397
S-6124-4-3	0	0	0	0	1,713	9,502	0
S-6124-11-0	661	0	31	201	75	0	0
S-6124-12-1	0	0	0	0	44,731	0	0
SSPE2	661	0	23,139	201	88,926	104,470	397

5. Major Source Determination

Rule 2201 Major Source Determination

Pursuant to District Rule 2201, a major source is a stationary source with an SSPE2 equal to or exceeding one or more of the major source thresholds shown in Table 3-3. For the purposes of determining major source status the following shall not be included:

- Any ERCs associated with the stationary source
- Emissions from non-road engines (i.e. engines at a particular site at the facility for less than 12 months)
- Fugitive emissions, except for the source categories specified in 40 CFR 51.165

Agricultural operations do not belong to any of the source categories specified in 40 CFR 51.165. Since this facility is an agricultural operation, fugitive emissions shall not be included in determining whether it is a major stationary source.

40 CFR 71.2 defines fugitive emissions as “those emissions which could not reasonably pass through a stack, chimney, vent, or other functionally-equivalent opening.” In 2005, the California Air Pollution Control Officers Association (CAPCOA) issued guidance for estimating VOC emissions from dairy farms. This guidance determined that VOC emissions from the milking centers, cow housing areas, corrals, common manure storage areas, and land application of manure are considered fugitive since they are not physically contained and could not reasonably pass through a stack, chimney, vent, or other functionally-equivalent opening. The guidance also determined that VOC emissions from liquid manure lagoons and storage ponds are not considered fugitive because emission collection technologies for liquid manure systems exist. The District has researched this issue and concurs with the CAPCOA determinations, as discussed in more detail below:

Milking Parlor

The mechanical ventilation system could arguably be utilized to capture emissions from the milking parlor. In order achieve and maintain the negative pressure required for this purpose, the adjoining holding area would also need to be completely enclosed. However, enclosing the holding area is not practical due to the continuous movement of cows in and out of the barn throughout the day. In addition, the capital outlay required to enclose this large area would be prohibitive. The District therefore determines that emissions from the milking parlor cannot reasonably be captured, and are to be considered fugitive.

Cow Housing

Although there are smaller dairy farms that have enclosed housing barns, such barns are usually not fully enclosed and do not include any systems for the collection of emissions. In addition, the airflow requirements for dairy cows are extremely high, primarily for herd health reasons. Airflow requirements are expected to be even higher in places such as the San Joaquin Valley, where daytime temperatures can exceed 110 degrees for prolonged periods during the summer months. Given the high air flow rates that will be involved, collection and control of the exhaust from housing barns is not only impractical but also cost prohibitive. The District therefore determines that emissions from housing barns cannot reasonably be captured, and are to be considered fugitive.

Manure Storage Areas

Solid manure is typically stored in the housing areas, as mounds or piles in individual corrals or pens. Some manure may also be stored in piles outside the housing areas while awaiting land application, shipment offsite, or other uses. Thus, manure storage areas are widely distributed over the dairy site, making it impractical to capture emissions from any significant proportion of the solid manure. The District therefore determines that emissions from manure storage areas cannot reasonably be captured, and are to be considered fugitive.

Land Application

Since manure has to be applied over large expanses of cropland (hundreds or even thousands of acres), there is no practical method that can be used to capture the associated emissions. The District therefore determines that emissions from land application of manure cannot reasonably be captured, and are to be considered fugitive.

Feed Handling and Storage

Silage and total mixed rations (TMR) are the primary sources of emissions from feed storage and handling.

Silage is stored in several tarped/covered piles and/or plastic bags. One end/face of the pile/bag that is actively being used to prepare feed rations must remain open to allow extraction of the silage. A front-end loader is used to extract silage from the open face of the pile throughout the day as the feed rations for the various groups or categories of cows are prepared. A significant proportion of silage pile emissions are associated with this open face, which is exposed to the atmosphere and frequently disturbed during silage extraction. Due to the need to access the pile's open face throughout the day, it is not practical to enclose it or equip it with any kind of device or system that could be used to capture of emissions.

TMR is prepared by mixing silage with various additives such as seeds, grains, and molasses. Because the quality of silage degrades fairly rapidly upon exposure to air, TMR is prepared only when needed and promptly distributed to the feed lanes for consumption. Most of the TMR emissions are thus emitted from the feed lanes, which are located inside the housing barns, where the TMR will remain exposed to the air for at least several hours as the cows feed. As previously discussed, collection and control of emissions from housing barns is not only impractical but also cost prohibitive.

The District therefore determines that emissions from feed handling and storage cannot reasonably be captured, and are to be considered fugitive.

As previously stated, emissions from liquid manure lagoons and storage ponds have already been determined to be non-fugitive. The facility's non-fugitive stationary source potential emissions are summarized in the following tables:

Non-Fugitive SSPE1 (lb/year)						
Category	NO_x	SO_x	PM₁₀	CO	VOC	H₂S
S-6124-3-4 - Lagoon	0	0	0	0	2,631 ¹¹	397
S-6124-11-0 - IC Engine	661	0	31	201	75	0
Non-Fugitive SSPE1	661	0	31	201	2,706	397

¹¹ From Appendix E - 'Pre-Project Potential to Emit (PE1)' sheet

Non-Fugitive SSPE2 (lb/year)						
Category	NO _x	SO _x	PM ₁₀	CO	VOC	H ₂ S
S-6124-3-3 - Lagoon	0	0	0	0	2,497 ¹²	397
S-6124-11-0 - IC Engine	661	0	31	201	75	0
Non-Fugitive SSPE2	661	0	31	201	2,572	397

The Rule 2201 major source determination is summarized in the following table:

Rule 2201 Major Source Determination						
Category	NO _x	SO _x	PM ₁₀	PM _{2.5}	CO	VOC
SSPE1 (lb/yr)	661	0	31	31	201	2,706
SSPE2 (lb/yr)	661	0	31	31	201	2,572
Major source threshold (lb/yr)	20,000	140,000	140,000	140,000	200,000	20,000
Major Source? (Y/N)	N	N	N	N	N	N

Note: PM_{2.5} assumed to be equal to PM₁₀

As shown in the preceding table, the facility is not an existing major source and is not becoming a major source as a result of this project.

Rule 2410 Major Source Determination

In determining if a stationary source is a PSD major source, the following sources of emissions shall not be included:

- Emissions from non-road engines (i.e. engines at a particular site at the facility for less than 12 months)
- Fugitive emissions, except for the source categories specified in 40 CFR 52.21(b)(1)(iii)

Agricultural operations do not belong to any of the source categories specified in specified in 40 CFR 52.21(b)(1)(i). Since this facility is an agricultural operation, fugitive emissions shall not be included in determining whether it is a PSD major source; and the PSD major source threshold is 250 tons/yr (tpy) for any regulated NSR pollutant.

The non-fugitive stationary source emissions from the preceding section have been converted into tons.¹³ The PSD major source determination is summarized in the following table:

PSD Major Source Determination						
Category	NO ₂	VOC	SO ₂	CO	PM	PM ₁₀
Estimated facility PE before project increase (tpy)	0.3	1.4	0.0	0.1	0.0	0.0
PSD major source threshold (tpy)	250	250	250	250	250	250
PSD major source? (Y/N)	N	N	N	N	N	N

¹² From Appendix E - 'Post-Project Potential to Emit (PE2)' sheet

¹³ (lb/yr) / (2,000 lb/ton) = tons/yr (tpy).

As shown in the preceding table, the facility is not an existing major source for PSD for at least one pollutant. Therefore the facility is not an existing major source for PSD.

6. Baseline Emissions (BE)

The BE calculations are performed, pollutant by pollutant, for each emissions unit involved in the project. The BE are subsequently used to calculate the quarterly net emissions change (QNEC), and if applicable, to determine the amount of offsets required.

Pursuant to District Rule 2201, BE = PE1 for:

- Any unit located at a non-major source,
- Any highly-utilized emissions unit located at a major source,
- Any fully-offset emissions unit located at a major source, or
- Any clean emissions unit located at a major source.

Otherwise,

BE = historic actual emissions (HAE), calculated pursuant to District Rule 2201.

Since this facility is not a major source for any pollutants, BE = PE1, as summarized in the following table:

BE (lb/year)					
Permit Unit	PM ₁₀	PM _{2.5}	VOC	NH ₃	H ₂ S
S-6124-1-3	0	0	720	246	0
S-6124-2-3	16,680	5,321	22,679	49,352	0
S-6124-3-3	0	0	5,465	16,062	397
S-6124-4-3	0	0	1,014	6,000	0
S-6124-12-1	0	0	30,899	0	0

7. SB 288 Major Modification

SB 288 major modification is defined in 40 CFR Part 51.165 as "any physical change in or change in the method of operation of a major stationary source that would result in a significant net emissions increase of any pollutant subject to regulation under the Act."

Since this facility is not a major source for any of the pollutants addressed in this project, the project does not constitute an SB 288 major modification.

8. Federal Major Modification

District Rule 2201, Section 3.18, states that federal major modifications are the same as "Major Modification" as defined in 40 CFR 51.165 and part D of Title I of the CAA.

Since this facility is not a major source for any pollutant, this project does not constitute a federal major modification.

9. Rule 2410 – Prevention of Significant Deterioration (PSD) Applicability Determination

Rule 2410 applies to any pollutant regulated under the Clean Air Act, except those for which the District has been classified nonattainment. The pollutants which must be addressed in the PSD applicability determination for sources located in the San Joaquin Valley and which are involved in this project are:¹⁴

- PM
- PM₁₀
- Hydrogen sulfide (H₂S)
- Total reduced sulfur (including H₂S)
- VOC

Project Emissions Increase - New Major Source Determination

The post-project potentials to emit (PE) from all new and modified units are compared to the PSD major source thresholds to determine if the project constitutes a new major source subject to PSD requirements.

Agricultural operations do not belong to any of the source categories specified in specified in 40 CFR 52.21(b)(1)(i). Since this facility is an agricultural operation, fugitive emissions shall not be included in determining whether it is a PSD major source; and the PSD major source threshold is 250 tons/yr (tpy) for any regulated NSR pollutant.

The non-fugitive stationary source emissions from Section VII.C.5 have been converted into tons. The PSD applicability determination is summarized in the following table:

PSD Applicability Determination - New Major Source					
Category	PM	PM₁₀	H₂S	S	VOC
Total PE from new and modified units (tpy)	0.0	0.0	0.02	0.2	1.3
PSD major source threshold (tpy)	250	250	250	250	250
New PSD major source? (Y/N)	N	N	N	N	N

As shown in the table above, the PE for the proposed project, by itself, does not exceed any PSD major source threshold. Rule 2410 is therefore not applicable and no further analysis is required.

10. Quarterly Net Emissions Change (QNEC)

The QNEC is calculated solely to establish emissions that are used to complete the District's PAS database (emissions profile screen). Detailed QNEC calculations are included in Appendix K.

¹⁴ See 52.21(b)(23) - definition of significant

VIII. Compliance

Rule 1070 Inspections

This rule requires the District to perform inspections for the purpose of obtaining information necessary to determine whether air pollution sources are in compliance with applicable rules and regulations. The rule also authorizes the District to require record keeping, to make inspections and to conduct tests of air pollution sources. The following conditions will be placed on the ATC permits to ensure compliance:

- {3215} Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to enter the permittee's premises where a permitted source is located or emissions related activity is conducted, or where records must be kept under condition of the permit. [District Rule 1070]
- {3216} Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to have access to and copy, at reasonable times, any records that must be kept under the conditions of the permit. [District Rule 1070]

Rule 2010 Permits Required

The provisions of this rule apply to any person who plans to or does operate, construct, alter, or replace any source operation which may emit air contaminants or may reduce the emission of air contaminants.

Pursuant to Section 3.0, any person building, altering or replacing any operation, article, machine, equipment, or other contrivance, the use of which may cause the issuance of air contaminants or the use of which may eliminate or reduce or control the issuance of air contaminants, shall first obtain authorization for such construction from the APCO. An Authority to Construct shall remain in effect until the Permit to Operate the source operation for which the application was filed is granted or denied, or the application is canceled as described in Rule 2050 (Cancellation of Application).

Pursuant to Section 4.0, before any new or modified source operation described in Section 3.0, or any existing source operation so described may be operated, a written permit shall be obtained from the APCO. No Permit to Operate shall be granted either by the APCO or the Hearing Board for any source operation described in Section 3.0 constructed or installed without authorization as required by Section 3.0 until the information required is presented to the APCO and such source operation is altered, if necessary, and made to conform to the standards set forth in Rule 2070 (Standards for Granting Applications) and elsewhere in these rules and regulations.

The facility has obtained a Permit to Operate for the existing operation, and has submitted an Authority to Construct permit application for the proposed modifications. Continued compliance with the requirements of this rule is therefore expected.

Rule 2201 New and Modified Stationary Source Review Rule

A. Best Available Control Technology (BACT)

1. BACT Applicability

Pursuant to District Rule 2201, Section 4.1, BACT requirements are triggered on a pollutant-by-pollutant basis and on an emissions unit-by-emissions unit basis. Unless specifically exempted by Rule 2201, BACT shall be required for the following actions*:

- a. Any new emissions unit with a potential to emit (PE) exceeding two pounds per day (> 2 lb/day),
- b. The relocation from one stationary source to another of an existing emissions unit with a $PE > 2$ lb/day,
- c. Modifications to an existing emissions unit with a valid Permit to Operate resulting in an adjusted increase in permitted emissions (AIPE) > 2 lb/day, and/or
- d. Any new or modified emissions unit, in a stationary source project, which results in an SB 288 major modification or a federal major modification, as defined by the rule.

*Except for CO emissions from a new or modified emissions unit at a stationary source with an SSPE2 of less than 200,000 pounds per year of CO.

a. New emissions units – $PE > 2$ lb/day

As discussed in Section I above, there are no new emissions units associated with this project. BACT for new units with $PE > 2$ lb/day purposes is therefore not triggered.

b. Relocation of emissions units – $PE > 2$ lb/day

As discussed in Section I above, there are no emissions units being relocated from one stationary source to another. BACT for relocation of emissions units is therefore not triggered.

c. Modification of emissions units – $AIPE > 2$ lb/day

$$AIPE = PE2 - HAPE$$

Where,

AIPE = Adjusted Increase in Permitted Emissions, (lb/day)

PE2 = Post-Project Potential to Emit, (lb/day)

HAPE = Historically Adjusted Potential to Emit, (lb/day)

$$HAPE = PE1 \times (EF2/EF1)$$

Where,

PE1 = The emissions unit's PE prior to modification or relocation, (lb/day).

EF2 = The emissions unit's permitted emission factor for the pollutant after modification or relocation. If EF2 is greater than EF1 then EF2/EF1 shall be set to 1.

EF1 = The emissions unit's permitted emission factor for the pollutant before the modification or relocation.

$$\text{AIPE} = \text{PE2} - (\text{PE1} \times (\text{EF2} / \text{EF1}))$$

The AIPE calculations for all housing units are based on the worst-case emission rate scenarios. For instance, when calculating AIPE for PM₁₀ emissions from corrals, it is assumed that all corrals will be occupied by support stock (small or medium heifers), since this category of cows has the highest PM₁₀ emission rate. This ensures that BACT is addressed based on the worst-case scenario in order to provide the facility with a reasonable degree of operational flexibility and avoid any unnecessary permit conditions and restrictions.

Detailed AIPE calculations for each emissions unit are shown in Appendix F. The AIPE is greater than 2 lb/day, and therefore BACT is triggered, for the emissions units and pollutants summarized below:

S-6124-3-3: Liquid Manure Handling

Lagoons/Storage Ponds: VOC and NH₃
Land application: VOC and NH₃

S-6124-4-3: Solid Manure Handling

Storage: NH₃
Land application: NH₃

S-6124-12-1: Feed Storage and Handling

Total mixed ration (TMR) feeding: VOC

d. SB 288/Federal Major Modification

As discussed in Sections VII.C.7 and VII.C.8 of this evaluation, this project does not constitute an SB 288 and/or federal major modification. BACT is therefore not triggered under this category.

2. BACT Guidelines

BACT Guideline 5.8.6, applies to the lagoon/storage ponds in the liquid manure handling system. [Liquid Manure Handling – Lagoon/Storage Pond] (See Appendix G).

BACT Guideline 5.8.7, applies to the liquid/slurry land application in the liquid manure handling system. [Liquid Manure Handling – Liquid/Slurry Land Application] (See Appendix G).

BACT Guideline 5.8.8, applies to storage/separated solids piles in the solid manure handling system. [Solid Manure Handling – Storage/Separated Solids Piles] (See Appendix G).

BACT Guideline 5.8.9, applies to the land application in the solid manure handling system. [Solid Manure Handling – Land Application] (See Appendix G).

BACT Guideline 5.8.11, applies to the feed/TMR in the feed storage and handling operation. [Feed Storage and Handling – Feed/TMR] (See Appendix G).

3. Top-Down BACT Analysis

Per Permit Services policies and procedures for BACT, a top-down BACT analysis shall be performed as a part of the application review for each application subject to the BACT requirements pursuant to the District's NSR rule.

Pursuant to the attached top-down BACT analyses (Appendix H), BACT has been satisfied with the following:

Liquid Manure Handling

Lagoons/Storage Ponds:

VOC: Anaerobic treatment lagoon designed according to NRCS guidelines, and solids separation/removal system (mechanical separator(s) or settling basin(s)/weeping wall(s)).

NH₃: All animals fed in accordance with National Research Council (NRC) or other District-approved guidelines utilizing routine nutritional analysis for rations.

Land Application:

VOC: Irrigation of crops using liquid/slurry manure from a secondary lagoon/holding/storage pond preceded by an uncovered anaerobic treatment lagoon designed to meet Natural Resources Conservation Service (NRCS) standards.

NH₃: All animals fed in accordance with NRC or other District-approved guidelines.

Solid Manure Handling

Storage

NH₃: All animals fed in accordance with NRC or other District-approved guidelines.

Land Application

NH₃: Rapid incorporation of solid manure into the soil after land application, and all animals fed in accordance with NRC or other District-approved guidelines.

Feed Storage and Handling

Total mixed ration (TMR) feeding

VOC: District Rule 4570 measures.

B. Offsets

1. Offset Applicability

Pursuant to District Rule 2201, Section 4.5, offset requirements shall be triggered on a pollutant by pollutant basis and shall be required if the SSPE2 equals or exceeds the offset threshold levels in Table 4-1 of Rule 2201.

The SSPE2 is compared to the offset thresholds in the following table:

Offset Determination (lb/year)					
	NO _x	SO _x	PM ₁₀	CO	VOC
SSPE2	661	0	23,139	201	88,926
Offset Thresholds	20,000	54,750	29,200	200,000	20,000
Offsets triggered?	No	No	No	No	Yes

2. Quantity of Offsets Required

The SSPE for VOC emissions exceeds the offset threshold level. However, per Section 4.6.9 of Rule 2201, offsets are not required for agricultural sources unless they are a major source. As determined in Section VII.C.5 of this evaluation, this facility is not a major source for any pollutant. Offsets are therefore not required.

C. Public Notification

1. Applicability

Pursuant to District Rule 2201, Section 5.4, public noticing is required for:

- New major sources, federal major modifications, and SB 288 major modifications,
- Any new emissions unit with a potential to emit (PE) greater than 100 pounds during any one day (> 100 lb/day) for any one pollutant,
- Any project which results in the offset thresholds being surpassed,
- Any project with an SSPE of greater than 20,000 lb/year for any pollutant, and/or
- Any project which results in a Title V significant permit modification.

a. New Major Sources, Federal Major Modifications, and SB 288 Major Modifications

New major sources are new facilities, which are also major sources. Since this is not a new facility, public noticing is not required for this project for new major source purposes.

As demonstrated in Sections VII.C.7 and VII.C.8 of this evaluation, this project does not constitute an SB 288 or federal major modification. Public notice for SB 288 or federal major modification purposes is not therefore required.

b. PE > 100 lb/day

As shown in the calculations in Appendix E, this project does not include any new emissions units with a PE > 100 lb/day for any pollutant. Public notice is therefore not required under this category.

c. Offset Threshold

Public notification is required if the pre-project Stationary Source Potential to Emit (SSPE1) is increased to a level exceeding the offset threshold levels. The following table compares the SSPE1 with the SSPE2 in order to determine if any offset thresholds have been surpassed with this project:

Offset Thresholds				
Pollutant	SSPE1 (lb/year)	SSPE2 (lb/year)	Offset Threshold (lb/year)	Notice Required?
NO _x	661	661	20,000	No
SO _x	0	0	54,750	No
PM ₁₀	16,711	23,139	29,200	No
CO	201	201	200,000	No
VOC	60,852	88,926	20,000	No

As shown above, no offset thresholds are surpassed due to this project. Public notice for offset threshold purposes is therefore not required.

d. SSIPE > 20,000 lb/year

Public notification is required for any permitting action that results in a SSIPE of more than 20,000 lb/year of any affected pollutant. According to District policy, the SSIPE = SSPE2 – SSPE1.

The SSIPE is compared to the SSIPE public notice thresholds in the following table:

Public Notice - SSIPE					
Pollutant	SSPE2 (lb/year)	SSPE1 (lb/year)	SSIPE (lb/year)	Notice Threshold (lb/year)	Notice Required?
NO _x	661	661	0	20,000	No
SO _x	0	0	0	20,000	No
PM ₁₀	23,139	16,711	6,428	20,000	No
CO	201	201	0	20,000	No
VOC	88,926	60,852	28,074	20,000	Yes
NH ₃	104,470	71,660	32,810	20,000	Yes
H ₂ S	397	397	0	20,000	No

As demonstrated above, the SSIPEs for VOC and NH₃ are greater than 20,000 lb/year; therefore public noticing for SSIPE purposes is required.

e. Title V Significant Permit Modification

Since this facility does not have a Title V operating permit, this project cannot constitute a Title V significant permit modification. Public noticing is therefore not required under this category.

2. Public Notice Action

As discussed above, public noticing is required for this project for VOC and NH₃ emissions increases over 20,000 lb/year. Therefore, public notice documents will be submitted to the California Air Resources Board (CARB) and a public notice will be electronically published on the District's website prior to the issuance of the ATC for this equipment.

D. Daily Emissions Limits (DELs)

DELs and other enforceable conditions are required by Rule 2201 to restrict a unit's maximum daily emissions to a level at or below the emissions associated with the maximum design capacity. The DELs must be contained in the latest ATC, contained in or enforced by the latest PTO, and be enforceable, in a practicable manner, on a daily basis. DELs are also required to enforce the applicability of BACT.

Proposed DEL Conditions

Milking Operation

- {modified 4484} Permittee shall flush or hose down the milking parlor immediately prior to, immediately after, or during each milking. [District Rules 2201 and 4570]

Cow Housing

- {modified 4486} Permittee shall pave feedlanes, where present, for a width of at least 8 feet along the corral side of the feedlane fence for milk and dry cows and at least 6 feet along the corral side of the feedlane for heifers. [District Rules 2201 and 4570]
- {modified 4499} Permittee shall inspect water pipes and troughs and repair leaks at least once every seven (7) days. [District Rules 2201 and 4570]
- {modified 4501} Permittee shall clean manure from corrals at least four (4) times per year with at least sixty (60) days between each cleaning, or permittee shall clean corrals at least once between April and July and at least once between September and December. [District Rules 2201 and 4570]
- {modified 4554} Permittee shall implement at least one of the following corral mitigation measures: 1) slope the surface of the corrals at least 3% where the available space for each animal is 400 square feet or less and shall slope the surface of the corrals at least 1.5% where the available space for each animal is more than 400 square feet per animal; 2) maintain corrals to ensure proper drainage preventing water from standing more than forty-eight hours; or 3) harrow, rake, or scrape pens sufficiently to maintain a dry surface except during periods of rainy weather. [District Rules 2201 and 4570]

- {modified 4508} Permittee shall scrape, vacuum or flush concrete lanes in corrals at least once every day for mature cows and every seven (7) days for support stock. [District Rules 2201 and 4570]
- {modified 4513} Shade structures shall be installed in any of the following ways: 1) constructed with a light permeable roofing material; 2) uphill of any slope in the corral; 3) installed so that the structure has a North/South orientation. OR Permittee shall clean manure from under corral shades at least once every fourteen (14) days, when weather permits access into the corral. [District Rules 2201 and 4570]
- {modified 4518} Permittee shall manage corrals such that the manure depth in the corral does not exceed twelve (12) inches at any time or point, except for in-corral mounding. Manure depth may exceed 12 inches when corrals become inaccessible due to rain events. However, permittee must resume management of the manure depth of 12 inches or lower immediately upon the corral becoming accessible. [District Rules 2201 and 4570]
- Permittee shall scrape corral surfaces at least once every two weeks using a pull-type scraper during morning hours, except when prevented by wet conditions. [District Rule 2201]

Liquid Manure

- {modified 4454} Permittee shall feed all animals according to National Research Council (NRC) guidelines. [District Rule 2201]
- {modified 4538} Permittee shall remove solids with a solid separator system, prior to the manure entering the lagoon. [District Rules 2201 and 4570]
- All liquid manure shall be treated in an anaerobic treatment lagoon system that is designed and operated according to the Natural Resources Conservation Service (NRCS) Field Office Technical Guide No. 359. [District Rule 2201]
- The liquid depth in the anaerobic treatment lagoon shall be maintained at 6 feet, or greater, at all times. [District Rule 2201]
- Only liquid manure that has been treated in the anaerobic treatment lagoon system may be applied to land. [District Rules 2201 and 4570]

Solid Manure

- {modified 4454} Permittee shall feed all animals according to National Research Council (NRC) guidelines. [District Rule 2201]
- {modified 4529} Within seventy two (72) hours of removal of separated solids from the drying process, permittee shall either 1) remove separated solids from the facility, or 2) cover separated solids 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. [District Rules 2201 and 4570]

- {modified 4541} All solid manure shall be incorporated into the soil within two hours of land application. [District Rules 2201 and 4570]

Feed Storage and Handling

- {modified 4454} Permittee shall feed all animals according to National Research Council (NRC) guidelines. [District Rules 2201 and 4570]
- {modified 4456} Permittee shall push feed so that it is within three feet of feedlane fence within two hours of putting out the feed or use a feed trough or other feeding structure designed to maintain feed within reach of the animals. [District Rules 2201 and 4570]
- {modified 4458} Permittee shall begin feeding total mixed rations within two hours of grinding and mixing rations. [District Rules 2201 and 4570]
- {modified 4460} Permittee shall store grain in a weatherproof storage structure or under a weatherproof covering from October through May. [District Rules 2201 and 4570]
- {modified 4464} Permittee shall remove uneaten wet feed from feed bunks within twenty-four (24) hours after the end of a rain event. [District Rules 2201 and 4570]
- {modified 4468} For bagged silage/feedstuff, permittee shall utilize a sealed feed storage system (e.g. ag bag). [District Rules 2201 and 4570]
- {modified 4469} Permittee shall cover all silage piles, except for the area where feed is being removed from the pile, with a plastic tarp that is at least five (5) mils (0.005 inches) thick, multiple plastic tarps with a cumulative thickness of at least 5 mils (0.005 inches), or an oxygen barrier film covered with a UV resistant material. Silage piles shall be covered within seventy-two (72) hours of last delivery of material to the pile. Sheets of material used to cover silage shall overlap so that silage is not exposed where the sheets meet. [District Rules 2201 and 4570]
- {modified 4471} Permittee shall select and implement one of the following mitigation measures for building each silage pile at the facility: Option 1) build the silage pile such that the average bulk density is at least 44 lb/cu ft for corn silage and 40 lb/cu ft for other silage types, as measured in accordance with Section 7.11 of District Rule 4570; Option 2) Adjust filling parameters when creating the silage pile to achieve an average bulk density of at least 44 lb/cu ft for corn silage and at least 40 lb/cu ft for other silage types as determined using a District-approved spreadsheet; or Option 3) build silage piles using crops harvested with the applicable minimum moisture content, maximum Theoretical Length of Chop (TLC), and roller opening identified in District Rule 4570, Table 4.1, 1.d and manage silage material delivery such that the thickness of the layer of un-compacted material delivered on top of the pile is no more than six (6) inches. Records of the option chosen as a mitigation measure for building each silage pile shall be maintained. [District Rules 2201 and 4570]

- {modified 4474} For each silage pile that Option 3 (Moisture, TLC, Roller Opening, & Material Delivery) is chosen as a mitigation measure for building the pile, the permittee shall harvest corn used for the pile at an average moisture content of at least 65% and harvest other silage crops for the pile at an average moisture content of at least 60%. [District Rules 2201 and 4570]
- {modified 4476} For each silage pile that Option 3 (Moisture, TLC, Roller Opening, & Material Delivery) is chosen as a mitigation measure for building the pile, the permittee shall adjust setting of equipment used to harvest crops for the pile to incorporate the following parameters for Theoretical Length of Chop (TLC) and roller opening, as applicable: 1) Corn with no processing: TLC not exceeding 1/2 inch, 2) Processed Corn: TLC not exceeding 3/4 inch and roller opening of 1-4 mm, 3) Alfalfa/Grass: TLC not exceeding 1.0 inch, 4) Other silage crops: TLC not exceeding 1/2 inch. [District Rules 2201 and 4570]
- {modified 4478} For each silage pile that Option 3 (Moisture, TLC, Roller Opening, & Material Delivery) is chosen as a mitigation measure for building the pile, the permittee shall manage silage material delivery such that the thickness of the layer of un-compacted material delivered on top of the pile is no more than six (6) inches. [District Rules 2201 and 4570]
- {modified 4480} Permittee shall select and implement at least two of the following mitigation measures for management of silage piles at the facility: Option 1) manage silage piles such that only one silage pile has an uncovered face and the total exposed surface area is less than 2,150 square feet, or manage multiple uncovered silage piles such that the total exposed surface area of all uncovered silage piles is less than 4,300 square feet; Option 2) use a shaver/facer to remove silage from the silage pile, or shall use another method to maintain a smooth vertical surface on the working face of the silage pile; or Option 3) inoculate silage with homolactic lactic acid bacteria in accordance with manufacturer recommendations to achieve a concentration of at least 100,000 colony forming units per gram of wet forage, apply propionic acid, benzoic acid, sorbic acid, sodium benzoate, or potassium sorbate at the rate specified by the manufacturer to reduce yeast counts when forming silage piles, or apply other additives at rates that have been demonstrated to reduce alcohol concentrations in silage and/or VOC emissions from silage and have been approved by the District and EPA. Records of the options chosen for managing each silage pile shall be maintained. [District Rules 2201 and 4570]

E. Compliance Assurance

1. Source Testing

Pursuant to District Policy APR 1705, Source Testing Frequency, source testing is not required for the proposed project.

2. Monitoring

No monitoring is required to demonstrate compliance with Rule 2201.

3. Recordkeeping

Recordkeeping is required to demonstrate compliance with the offset, public notification, and DEL requirements of Rule 2201. The following conditions will be placed on the ATC permits to enforce the applicable recordkeeping requirements:

Milking Operation

- {modified 4485} Permittee shall provide verification that the milking parlor is flushed or hosed down immediately prior to, immediately after, or during each milking. [District Rules 2201 and 4570]
- {modified 4453} Permittee shall keep and maintain all records for a minimum of five (5) years and shall make records available to the APCO and EPA upon request. [District Rules 2201 and 4570]

Cow Housing

- {modified 4500} Permittee shall maintain records demonstrating that water pipes and troughs are inspected and leaks are repaired at least once every seven (7) days. [District Rules 2201 and 4570]
- {modified 4502} Permittee shall demonstrate that manure from corrals are cleaned at least four (4) times per year with at least sixty (60) days between each cleaning or demonstrate that corrals are cleaned at least once between April and July and at least once between September and December. [District Rules 2201 and 4570]
- {modified 4555} Permittee shall either 1) maintain sufficient records to demonstrate that corrals are maintained to ensure proper drainage preventing water from standing for more than forty-eight hours or 2) maintain records of dates pens are groomed (i.e., harrowed, raked, or scraped, etc.). [District Rules 2201 and 4570]
- {modified 4556} Permittee shall maintain records demonstrating that concrete lanes in corrals are scraped, vacuumed, or flushed at least once every day for mature cows and at least once every seven (7) days for support stock. [District Rules 2201 and 4570]
- {modified 4516} If permittee has selected to comply using shades constructed with a light permeable roofing material, then permittee shall maintain records, such as design specifications, demonstrating that the shade structures are equipped with such roofing material or if Permittee has selected to comply by cleaning the manure from under the corral shades, then Permittee shall maintain records demonstrating that manure is cleaned from under the shades at least once every fourteen (14) days, as long as weather permits access to corrals. [District Rules 2201 and 4570]
- Permittee shall maintain sufficient records to demonstrate that corral surfaces are scraped at least once every two weeks using a pull-type scraper during morning hours, except when prevented by wet conditions. [District Rule 2201]
- {modified 4519} Permittee shall measure and document the depth of manure in the corrals at least once every ninety (90) days. [District Rules 2201 and 4570]

- {modified 4449} Permittee shall maintain a record of the number of animals of each species and production group at the facility and shall maintain quarterly records of any changes to this information. [District Rules 2201 and 4570]
- {modified 4453} Permittee shall keep and maintain all records for a minimum of five (5) years and shall make records available to the APCO and EPA upon request. [District Rules 2201 and 4570]

Liquid Manure

- {modified 4455} Permittee shall maintain records of feed content, formulation, and quantity of feed additive utilized, to demonstrate compliance with National Research Council (NRC) guidelines. Records such as feed company guaranteed analyses (feed tags), ration sheets, or feed purchase records may be used to meet this requirement. [District Rule 2201]
- Permittee shall maintain design specifications, calculations, and records, including minimum treatment volume (MTV) and hydraulic retention time (HRT) calculations, and liquid depth records, demonstrating that the anaerobic treatment lagoon system meets the requirements listed in the NRCS Field Office Technical Guide No. 359. [District Rule 2201]
- Permittee shall maintain records to demonstrate that only liquid manure that has been treated in the anaerobic treatment lagoon system is applied to land. [District Rules 2201 and 4570]
- {modified 4453} Permittee shall keep and maintain all records for a minimum of five (5) years and shall make records available to the APCO and EPA upon request. [District Rules 4570]

Solid Manure

- {modified 4455} Permittee shall maintain records of feed content, formulation, and quantity of feed additive utilized, to demonstrate compliance with National Research Council (NRC) guidelines. Records such as feed company guaranteed analyses (feed tags), ration sheets, or feed purchase records may be used to meet this requirement. [District Rule 2201]
- {modified 4530} Permittee shall keep records of dates when separated solids are removed from the facility or permittee shall maintain records to demonstrate that separated solids piles outside the pens are covered with a weatherproof covering from October through May. [District Rules 2201 and 4570]
- {modified 4531} Permittee shall maintain records, such as manufacturer warranties or other documentation, demonstrating that the weatherproof covering over separated solids are installed, used, and maintained in accordance with manufacturer recommendations and applicable standards listed in NRCS Field Office Technical Guide Code 313 or 367, or any other applicable standard approved by the APCO, ARB, and EPA. [District Rules 2201 and 4570]

- {modified 4542} Permittee shall maintain records to demonstrate that all solid manure has been incorporated into the soil within two hours of land application. [District Rules 2201 and 4570]
- {modified 4453} Permittee shall keep and maintain all records for a minimum of five (5) years and shall make records available to the APCO and EPA upon request. [District Rules 2201 and 4570]

Feed Storage and Handling

- {modified 4455} Permittee shall maintain records of feed content, formulation, and quantity of feed additive utilized, to demonstrate compliance with National Research Council (NRC) guidelines. Records such as feed company guaranteed analyses (feed tags), ration sheets, or feed purchase records may be used to meet this requirement. [District Rules 2201 and 4570]
- {modified 4457} Permittee shall maintain an operating plan/record that requires feed to be pushed within three feet of feedlane fence within two hours of putting out the feed, or use of a feed trough or other structure designed to maintain feed within reach of the animals. [District Rules 2201 and 4570]
- {modified 4459} Permittee shall maintain an operating plan/record of when feeding of total mixed rations began within two hours of grinding and mixing rations. [District Rules 2201 and 4570]
- {modified 4461} Permittee shall maintain records demonstrating grain is/was stored in a weatherproof storage structure or under a weatherproof covering from October through May. [District Rules 2201 and 4570]
- {modified 4465} Permittee shall maintain records demonstrating that uneaten wet feed was removed from feed bunks within twenty-four (24) hours after the end of a rain event. [District Rules 2201 and 4570]
- {modified 4470} Permittee shall maintain records of the thickness and type of cover used to cover each silage pile. Permittee shall also maintain records of the date of the last delivery of material to each silage pile and the date each pile is covered. [District Rules 2201 and 4570]
- {modified 4472} For each silage pile that Option 1 (Measured Bulk Density) is chosen as a mitigation measure for building the pile, records of the measured bulk density shall be maintained. [District Rules 2201 and 4570]
- {modified 4473} For each silage pile that Option 2 (Bulk Density Determined by Spreadsheet) is chosen as a mitigation measure for building the pile, records of the filling parameters entered into the District-approved spreadsheet to determine the bulk density shall be maintained. [District Rules 2201 and 4570]
- {modified 4475} For each silage pile that Option 3 (Moisture, TLC, Roller Opening, & Material Delivery) is chosen as a mitigation measure for building the pile, records of the average percent moisture of crops harvested for silage shall be maintained. [District Rules 2201 and 4570]

- {modified 4477} For each silage pile that Option 3 (Moisture, TLC, Roller Opening, & Material Delivery) is chosen as a mitigation measure for building the pile, records that equipment used to harvest crops for the pile was set to the required TLC and roller opening for the type of crop harvested shall be maintained. [District Rules 2201 and 4570]
- {modified 4479} For each silage pile that Option 3 (Moisture, TLC, Roller Opening, & Material Delivery) is chosen as a mitigation measure for building the pile, the permittee shall maintain a plan that requires that the thickness of the layer of un-compacted material delivered on top of the pile is no more than six (6) inches. [District Rules 2201 and 4570]
- {modified 4481} If Option 1 (Limiting Exposed Area of Silage) is chosen as a mitigation measure for managing silage piles, the permittee shall calculate and record the maximum (largest part of pile) total exposed area of each silage pile. Records of the maximum calculated area shall be maintained. [District Rules 2201 and 4570]
- {modified 4482} For each silage pile that Option 2 (Shaver/Facer or Smooth Face) is chosen as a mitigation measure for managing the pile, the permittee shall maintain records that a shaver/facer was used to remove silage from the pile or shall visually inspect the pile at least daily to verify that the working face was smooth and maintain records of the visual inspections. [District Rules 2201 and 4570]
- {modified 4483} For each silage pile that Option 3 (Silage Additives) is chosen as a mitigation measure for managing the pile, records shall be maintained of the type additive (e.g. inoculants, preservative, other District & EPA-approved additive), the quantity of the additive applied to the pile, and a copy of the manufacturer's instructions for application of the additive. [District Rules 2201 and 4570]
- {modified 4453} Permittee shall keep and maintain all records for a minimum of five (5) years and shall make records available to the APCO and EPA upon request. [District Rules 2201 and 4570]

4. Reporting

No reporting is required for the proposed project.

F. Ambient Air Quality Analysis (AAQA)

An AAQA shall be conducted for the purpose of determining whether a new or modified Stationary Source will cause or make worse a violation of an air quality standard. The District's Technical Services Division conducted the required analysis. Refer to Appendix D of this document for the AAQA summary sheet.

The proposed location is in an attainment area for NO_x, CO, and SO_x. As shown by the AAQA summary sheet the proposed equipment will not cause a violation of an air quality standard for NO_x, CO, or SO_x.

The proposed location is in a non-attainment area for the state's PM₁₀ as well as federal and state PM_{2.5} thresholds. As shown by the AAQA summary sheet the proposed equipment will not cause a violation of an air quality standard for PM₁₀ and PM_{2.5}.

Rule 2410 Prevention of Significant Deterioration

As shown in Section VII.C.9 of this evaluation, the proposed project does not result in a new PSD major source or PSD major modification. The project is therefore not subject to the requirements of this rule.

Rule 2520 Federally Mandated Operating Permits

As shown in Section VII.C.5 of this evaluation, this facility is not a major source. The facility is therefore not subject to the requirements of this rule.

Rule 4001 New Source Performance Standards (NSPS)

This rule incorporates NSPS from Part 60, Chapter 1, Title 40, Code of Federal Regulations (CFR); and applies to all new sources of air pollution and modifications of existing sources of air pollution listed in 40 CFR Part 60. However, no subparts of 40 CFR Part 60 apply to confined animal operations.

Rule 4002 National Emission Standards for Hazardous Air Pollutants (NESHAPs)

This rule incorporates NESHAPs from Part 61, Chapter I, Subchapter C, Title 40, CFR and the NESHAPs from Part 63, Chapter I, Subchapter C, Title 40, CFR; and applies to all sources of hazardous air pollution listed in 40 CFR Part 61 or 40 CFR Part 63. However, no subparts of 40 CFR Part 61 or 40 CFR Part 63 apply to confined animal operations.

Rule 4101 Visible Emissions

Pursuant to Section 4.12, the requirements of this rule do not apply to emissions subject to or specifically exempt from Regulation VIII (Fugitive PM₁₀ Prohibitions).

Pursuant to Rule 8011, Section 4.4, on-field agricultural sources are exempt from the requirements of Regulation VIII.

The proposed project involves only on-field agricultural sources and is therefore exempt from the requirements of Rule 4101.

Rule 4102 Nuisance

This rule prohibits the discharge of air contaminants which could cause injury, detriment, nuisance or annoyance to the public. According to the District's records, there have been no public nuisance complaints or violations associated with the operations of this facility.

Since the proposed modifications do not fundamentally alter the nature of the facility's operations, continued compliance with the requirements of this rule is expected.

California Health & Safety Code §41700 Health Risk Assessment

District Policy APR 1905, Risk Management Policy for Permitting New and Modified Sources, requires that for an increase in emissions associated with a proposed new source or

modification, the District shall perform an analysis to determine the possible impact to the nearest resident or worksite.

An HRA is not required for a project with a total facility prioritization score of less than one. According to the Risk Management Review (RMR) summary in Appendix D of this evaluation, the proposed project's total prioritization score is greater than one. An HRA was therefore required to determine the short-term acute and long-term chronic exposure risk.

The cancer risk for the proposed project is summarized in the following table:

HRA Summary		
Permit Unit	Cancer Risk	T-BACT Required?
S-6124-1-3	5.22E-08	No
S-6124-2-3	8.73E-06	No ¹⁵
S-6124-3-3	N/A	No
S-6124-4-3	N/A	No
S-6124-12-1	N/A	No

T-BACT

BACT for toxic emission control (T-BACT) is required if the cancer risk exceeds one in one million. As demonstrated above, T-BACT is not required for this project because the HRA indicates that the risk is not above the District's thresholds for triggering T-BACT requirements; therefore, compliance with the District's Risk Management Policy is expected.

District policy APR 1905 also specifies that the increase in emissions associated with a proposed new source or modification not have acute or chronic indices, or a cancer risk greater than the District's significance levels (i.e. acute and/or chronic indices greater than 1 and a cancer risk greater than 20 in a million). As outlined in the RMR summary in Appendix D, the risk increases for the proposed project were determined to be less than significant.

Rule 4550 Conservation Management Practices

This rule applies to agricultural operation sites located within the San Joaquin Valley air basin. The purpose of the rule is to limit fugitive dust emissions from agricultural operation sites. Pursuant to Section 5.1, effective on and after July 1, 2004, an owner/operator shall implement the applicable CMPs selected pursuant to Section 6.2 for each agricultural operation site.

Pursuant to Section 5.2, an owner/operator shall prepare and submit a CMP application for each agricultural operation site to the APCO for approval.

West Wing Dairy received District approval for its current CMP plan in 2012. The proposed project does not involve any changes or modifications to the CMP plan. Continued compliance with the requirements of this rule is therefore expected.

¹⁵ T-BACT is triggered on a unit by unit basis, and no individual housing unit exceeds the 1.00E-06 threshold.

Rule 4570 Confined Animal Facilities (CAF)

This rule applies to CAF operations located within the San Joaquin Valley air basin. The purpose of the rule is to limit VOC emissions through the implementation of various mitigation measures for each emissions unit.

The facility was issued ATC permits to implement the requirements of this rule under project # S-1111269. The existing Rule 4570 Phase II mitigation measures will be used in the current evaluation, except where the applicant has proposed a specific change. Modifications to specific measures will be made, as necessary, to accommodate New Source Review requirements from the current project.

The proposed permit conditions are summarized as follows:

General Conditions

- {4452} If a licensed veterinarian or a certified nutritionist determines that any VOC mitigation measure will be required to be suspended as a detriment to animal health or necessary for the animal to molt, the owners/operators must notify the District in writing within forty-eight (48) hours of the determination including the duration and the specific health condition requiring the mitigation measure to be suspended. If the situation is expected to exist longer than a thirty-day (30) period, the permittee shall submit a new emission mitigation plan designating a mitigation measure to be implemented in lieu of the suspended mitigation measure. [District Rule 4570]
- {modified 4453} Permittee shall keep and maintain all records for a minimum of five (5) years and shall make records available to the APCO and EPA upon request. [District Rules 2201 and 4570]

Milking Parlor

- {modified 4484} Permittee shall flush or hose down the milking parlor immediately prior to, immediately after, or during each milking. [District Rules 2201 and 4570]
- {modified 4485} Permittee shall provide verification that the milking parlor is flushed or hosed down immediately prior to, immediately after, or during each milking. [District Rules 2201 and 4570]

Cow Housing

- {modified 4486} Permittee shall pave feedlanes, where present, for a width of at least 8 feet along the corral side of the feedlane fence for milk and dry cows and at least 6 feet along the corral side of the feedlane for heifers. [District Rules 2201 and 4570]
- {modified 4499} Permittee shall inspect water pipes and troughs and repair leaks at least once every seven (7) days. [District Rules 2201 and 4570]
- {modified 4500} Permittee shall maintain records demonstrating that water pipes and troughs are inspected and leaks are repaired at least once every seven (7) days. [District Rules 2201 and 4570]

- {modified 4501} Permittee shall clean manure from corrals at least four (4) times per year with at least sixty (60) days between each cleaning, or permittee shall clean corrals at least once between April and July and at least once between September and December. [District Rules 2201 and 4570]
- {modified 4502} Permittee shall demonstrate that manure from corrals are cleaned at least four (4) times per year with at least sixty (60) days between each cleaning or demonstrate that corrals are cleaned at least once between April and July and at least once between September and December. [District Rules 2201 and 4570]
- {modified 4554} Permittee shall implement at least one of the following corral mitigation measures: 1) slope the surface of the corrals at least 3% where the available space for each animal is 400 square feet or less and shall slope the surface of the corrals at least 1.5% where the available space for each animal is more than 400 square feet per animal; 2) maintain corrals to ensure proper drainage preventing water from standing more than forty-eight hours; or 3) harrow, rake, or scrape pens sufficiently to maintain a dry surface except during periods of rainy weather. [District Rules 2201 and 4570]
- {modified 4555} Permittee shall either 1) maintain sufficient records to demonstrate that corrals are maintained to ensure proper drainage preventing water from standing for more than forty-eight hours or 2) maintain records of dates pens are groomed (i.e., harrowed, raked, or scraped, etc.). [District Rules 2201 and 4570]
- {modified 4508} Permittee shall scrape, vacuum or flush concrete lanes in corrals at least once every day for mature cows and every seven (7) days for support stock. [District Rules 2201 and 4570]
- {modified 4556} Permittee shall maintain records demonstrating that concrete lanes in corrals are scraped, vacuumed, or flushed at least once every day for mature cows and at least once every seven (7) days for support stock. [District Rules 2201 and 4570]
- {modified 4513} Shade structures shall be installed in any of the following ways: 1) constructed with a light permeable roofing material; 2) uphill of any slope in the corral; 3) installed so that the structure has a North/South orientation. OR Permittee shall clean manure from under corral shades at least once every fourteen (14) days, when weather permits access into the corral. [District Rules 2201 and 4570]
- {modified 4516} If permittee has selected to comply using shades constructed with a light permeable roofing material, then permittee shall maintain records, such as design specifications, demonstrating that the shade structures are equipped with such roofing material or if Permittee has selected to comply by cleaning the manure from under the corral shades, then Permittee shall maintain records demonstrating that manure is cleaned from under the shades at least once every fourteen (14) days, as long as weather permits access to corrals. [District Rules 2201 and 4570]
- {modified 4518} Permittee shall manage corrals such that the manure depth in the corral does not exceed twelve (12) inches at any time or point, except for in-corral mounding. Manure depth may exceed 12 inches when corrals become inaccessible due to rain events. However, permittee must resume management of the manure depth of 12 inches or lower immediately upon the corral becoming accessible. [District Rules 2201 and 4570]

- {modified 4519} Permittee shall measure and document the depth of manure in the corrals at least once every ninety (90) days. [District Rules 2201 and 4570]
- {modified 4449} Permittee shall maintain a record of the number of animals of each species and production group at the facility and shall maintain quarterly records of any changes to this information. [District Rules 2201 and 4570]

Liquid Manure

The applicant has proposed to replace one existing mitigation measure with one that meets the applicable BACT requirement.

The following changes will be changed:

Current Measure and Permit Conditions to Be Removed

Allow liquid manure to stand in the fields for no more than twenty-four (24) hours after irrigation.

- Permittee shall not allow liquid manure to stand in the fields for more than twenty-four (24) hours after irrigation. [District Rules 2201 and 4570]
- Permittee shall maintain records to demonstrate liquid manure did not stand in the fields for more than twenty-four (24) hours after irrigation. [District Rules 2201 and 4570]

Proposed Replacement Measure and Permit Conditions

Only apply liquid manure that has been treated with an anaerobic or aerobic treatment lagoon, aerobic lagoon, or digester system.

- Only liquid manure that has been treated in an anaerobic treatment lagoon system that is designed and operated according to the NRCS Field Office Technical Guide No. 359 may be applied to land. [District Rules 2201 and 4570]
- Permittee shall maintain records to demonstrate that only liquid manure that has been treated in an anaerobic treatment lagoon system that is designed and operated according to the NRCS Field Office Technical Guide No. 359 is applied to land. [District Rules 2201 and 4570]

The following permit condition will remain unchanged:

- {modified 4538} Permittee shall remove solids with a solid separator system, prior to the manure entering the lagoon. [District Rules 2201 and 4570]

Solid Manure

The applicant has proposed to replace one existing mitigation measure with one that meets the applicable BACT requirement.

The following changes will be changed:

Current Measure and Permit Conditions to Be Removed

Apply no solid manure with a moisture content of more than 50%.

- {4545} Permittee shall not apply solid manure with a moisture content of more than 50%. [District Rule 4570]
- {4546} Permittee shall maintain records of the moisture content of the solid manure each time solid manure is land applied. [District Rule 4570]
- {4547} Moisture content shall be determined using test Methods for the examination of compost and Composting (TMECC) Method 3.09 or any other alternative test method approved by the APCO, ARB, and EPA. [District Rule 4570]

Proposed Replacement Measure and Permit Conditions

Incorporate all solid manure within seventy-two (72) hours of land application.

- {modified 4541} All solid manure shall be incorporated into the soil within two hours of land application. [District Rules 2201 and 4570]
- {modified 4542} Permittee shall maintain records to demonstrate that all solid manure has been incorporated into the soil within two hours of land application. [District Rules 2201 and 4570]

The following permit conditions will remain unchanged:

- {modified 4529} Within seventy two (72) hours of removal of separated solids from the drying process, permittee shall either 1) remove separated solids from the facility, or 2) cover separated solids 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. [District Rules 2201 and 4570]
- {modified 4530} Permittee shall keep records of dates when separated solids are removed from the facility or permittee shall maintain records to demonstrate that separated solids piles outside the pens are covered with a weatherproof covering from October through May. [District Rules 2201 and 4570]
- {modified 4531} Permittee shall maintain records, such as manufacturer warranties or other documentation, demonstrating that the weatherproof covering over separated solids are installed, used, and maintained in accordance with manufacturer recommendations and applicable standards listed in NRCS Field Office Technical Guide Code 313 or 367, or any other applicable standard approved by the APCO, ARB, and EPA. [District Rules 2201 and 4570]

Feed Storage and Handling

- {modified 4454} Permittee shall feed all animals according to National Research Council (NRC) guidelines. [District Rules 2201 and 4570]
- {modified 4455} Permittee shall maintain records of feed content, formulation, and quantity of feed additive utilized, to demonstrate compliance with National Research Council (NRC) guidelines. Records such as feed company guaranteed analyses (feed tags), ration sheets, or feed purchase records may be used to meet this requirement. [District Rules 2201 and 4570]
- {modified 4456} Permittee shall push feed so that it is within three feet of feedlane fence within two hours of putting out the feed or use a feed trough or other feeding structure designed to maintain feed within reach of the animals. [District Rules 2201 and 4570]
- {modified 4457} Permittee shall maintain an operating plan/record that requires feed to be pushed within three feet of feedlane fence within two hours of putting out the feed, or use of a feed trough or other structure designed to maintain feed within reach of the animals. [District Rules 2201 and 4570]
- {modified 4458} Permittee shall begin feeding total mixed rations within two hours of grinding and mixing rations. [District Rules 2201 and 4570]
- {modified 4459} Permittee shall maintain an operating plan/record of when feeding of total mixed rations began within two hours of grinding and mixing rations. [District Rules 2201 and 4570]
- {modified 4460} Permittee shall store grain in a weatherproof storage structure or under a weatherproof covering from October through May. [District Rules 2201 and 4570]
- {modified 4461} Permittee shall maintain records demonstrating grain is/was stored in a weatherproof storage structure or under a weatherproof covering from October through May. [District Rules 2201 and 4570]
- {modified 4464} Permittee shall remove uneaten wet feed from feed bunks within twenty-four (24) hours after the end of a rain event. [District Rules 2201 and 4570]
- {modified 4465} Permittee shall maintain records demonstrating that uneaten wet feed was removed from feed bunks within twenty-four (24) hours after the end of a rain event. [District Rules 2201 and 4570]
- {modified 4468} For bagged silage/feedstuff, permittee shall utilize a sealed feed storage system (e.g., ag bag). [District Rules 2201 and 4570]
- {modified 4469} Permittee shall cover all silage piles, except for the area where feed is being removed from the pile, with a plastic tarp that is at least five (5) mils (0.005 inches) thick, multiple plastic tarps with a cumulative thickness of at least 5 mils (0.005 inches), or an oxygen barrier film covered with a UV resistant material. Silage piles shall be covered within seventy-two (72) hours of last delivery of material to the pile. Sheets of material used to cover silage shall overlap so that silage is not exposed where the sheets meet. [District Rules 2201 and 4570]

- {modified 4470} Permittee shall maintain records of the thickness and type of cover used to cover each silage pile. Permittee shall also maintain records of the date of the last delivery of material to each silage pile and the date each pile is covered. [District Rules 2201 and 4570]
- {modified 4471} Permittee shall select and implement one of the following mitigation measures for building each silage pile at the facility: Option 1) build the silage pile such that the average bulk density is at least 44 lb/cu ft for corn silage and 40 lb/cu ft for other silage types, as measured in accordance with Section 7.11 of District Rule 4570; Option 2) Adjust filling parameters when creating the silage pile to achieve an average bulk density of at least 44 lb/cu ft for corn silage and at least 40 lb/cu ft for other silage types as determined using a District-approved spreadsheet; or Option 3) build silage piles using crops harvested with the applicable minimum moisture content, maximum Theoretical Length of Chop (TLC), and roller opening identified in District Rule 4570, Table 4.1, 1.d and manage silage material delivery such that the thickness of the layer of un-compacted material delivered on top of the pile is no more than six (6) inches. Records of the option chosen as a mitigation measure for building each silage pile shall be maintained. [District Rules 2201 and 4570]
- {modified 4472} For each silage pile that Option 1 (Measured Bulk Density) is chosen as a mitigation measure for building the pile, records of the measured bulk density shall be maintained. [District Rules 2201 and 4570]
- {modified 4473} For each silage pile that Option 2 (Bulk Density Determined by Spreadsheet) is chosen as a mitigation measure for building the pile, records of the filling parameters entered into the District-approved spreadsheet to determine the bulk density shall be maintained. [District Rules 2201 and 4570]
- {modified 4474} For each silage pile that Option 3 (Moisture, TLC, Roller Opening, & Material Delivery) is chosen as a mitigation measure for building the pile, the permittee shall harvest corn used for the pile at an average moisture content of at least 65% and harvest other silage crops for the pile at an average moisture content of at least 60%. [District Rules 2201 and 4570]
- {modified 4475} For each silage pile that Option 3 (Moisture, TLC, Roller Opening, & Material Delivery) is chosen as a mitigation measure for building the pile, records of the average percent moisture of crops harvested for silage shall be maintained. [District Rules 2201 and 4570]
- {modified 4476} For each silage pile that Option 3 (Moisture, TLC, Roller Opening, & Material Delivery) is chosen as a mitigation measure for building the pile, the permittee shall adjust setting of equipment used to harvest crops for the pile to incorporate the following parameters for Theoretical Length of Chop (TLC) and roller opening, as applicable: 1) Corn with no processing: TLC not exceeding 1/2 inch, 2) Processed Corn: TLC not exceeding 3/4 inch and roller opening of 1-4 mm, 3) Alfalfa/Grass: TLC not exceeding 1.0 inch, 4) Other silage crops: TLC not exceeding 1/2 inch. [District Rules 2201 and 4570]

- {modified 4477} For each silage pile that Option 3 (Moisture, TLC, Roller Opening, & Material Delivery) is chosen as a mitigation measure for building the pile, records that equipment used to harvest crops for the pile was set to the required TLC and roller opening for the type of crop harvested shall be maintained. [District Rules 2201 and 4570]
- {modified 4478} For each silage pile that Option 3 (Moisture, TLC, Roller Opening, & Material Delivery) is chosen as a mitigation measure for building the pile, the permittee shall manage silage material delivery such that the thickness of the layer of un-compacted material delivered on top of the pile is no more than six (6) inches. [District Rules 2201 and 4570]
- {modified 4479} For each silage pile that Option 3 (Moisture, TLC, Roller Opening, & Material Delivery) is chosen as a mitigation measure for building the pile, the permittee shall maintain a plan that requires that the thickness of the layer of un-compacted material delivered on top of the pile is no more than six (6) inches. [District Rules 2201 and 4570]
- {modified 4480} Permittee shall select and implement at least two of the following mitigation measures for management of silage piles at the facility: Option 1) manage silage piles such that only one silage pile has an uncovered face and the total exposed surface area is less than 2,150 square feet, or manage multiple uncovered silage piles such that the total exposed surface area of all uncovered silage piles is less than 4,300 square feet; Option 2) use a shaver/facer to remove silage from the silage pile, or shall use another method to maintain a smooth vertical surface on the working face of the silage pile; or Option 3) inoculate silage with homolactic lactic acid bacteria in accordance with manufacturer recommendations to achieve a concentration of at least 100,000 colony forming units per gram of wet forage, apply propionic acid, benzoic acid, sorbic acid, sodium benzoate, or potassium sorbate at the rate specified by the manufacturer to reduce yeast counts when forming silage piles, or apply other additives at rates that have been demonstrated to reduce alcohol concentrations in silage and/or VOC emissions from silage and have been approved by the District and EPA. Records of the options chosen for managing each silage pile shall be maintained. [District Rules 2201 and 4570]
- {modified 4481} If Option 1 (Limiting Exposed Area of Silage) is chosen as a mitigation measure for managing silage piles, the permittee shall calculate and record the maximum (largest part of pile) total exposed area of each silage pile. Records of the maximum calculated area shall be maintained. [District Rules 2201 and 4570]
- {modified 4482} For each silage pile that Option 2 (Shaver/Facer or Smooth Face) is chosen as a mitigation measure for building the pile, the permittee shall maintain records that a shaver/facer was used to remove silage from the pile or shall visually inspect the pile at least daily to verify that the working face was smooth and maintain records of the visual inspections. [District Rules 2201 and 4570]
- {modified 4483} For each silage pile that Option 3 (Silage Additives) is chosen as a mitigation measure for building the pile, records shall be maintained of the type additive (e.g. inoculants, preservative, other District & EPA-approved additive), the quantity of the additive applied to the pile, and a copy of the manufacturer's instructions for application of the additive. [District Rules 2201 and 4570]

According to the District's inspection records, this facility has been operating in compliance with Rule 4570 requirements. Since the proposed modifications do not fundamentally alter the nature of the facility's operations, continued compliance with the requirements of this rule is expected.

California Health & Safety Code §42301.6 School Notice

The District has verified that the proposed project site is not located within 1,000 feet of the outer boundaries of any K-12 schools. A school notice pursuant to California Health and Safety Code §42301.6 is therefore not required.

California Environmental Quality Act (CEQA)

CEQA requires each public agency to adopt objectives, criteria, and specific procedures consistent with CEQA statutes and guidelines for administering its responsibilities under CEQA, including the orderly evaluation of projects and preparation of environmental documents. The District adopted its environmental review guidelines (ERG) in 2001. The basic purposes of CEQA are to:

- Inform governmental decision-makers and the public about the potential, significant environmental effects of proposed activities;
- Identify the ways that environmental damage can be avoided or significantly reduced;
- Prevent significant, avoidable damage to the environment by requiring changes in projects through the use of alternatives or mitigation measures when the governmental agency finds the changes to be feasible; and
- Disclose to the public the reasons why a governmental agency approved the project in the manner the agency chose if significant environmental effects are involved.

Greenhouse Gas (GHG) Significance Determination

It is determined that another agency has prepared an environmental review document for the project. The District is a Responsible Agency for the project because of its discretionary approval power over the project via its Permits Rule (Rule 2010) and New Source Review Rule (Rule 2201), (CEQA Guidelines §15381). As a Responsible Agency, the District is limited to mitigating or avoiding impacts for which it has statutory authority. The District does not have statutory authority for regulating greenhouse gas emissions. The District has determined that the applicant is responsible for implementing greenhouse gas mitigation measures, if any, imposed by the Lead Agency.

District CEQA Findings

The County of Tulare (County) is the public agency having principal responsibility for approving the Project. As such, the County served as the Lead Agency for the Project. The County determined the project to be exempt from CEQA according to CEQA Guidelines §15301 (Existing Facilities). Consistent with CEQA Guidelines §15062, a Notice of Exemption was prepared and adopted by the County.

The District is a Responsible Agency for the project because of its discretionary approval power over the project via its Permits Rule (Rule 2010) and New Source Review Rule (Rule 2201), (CEQA Guidelines §15381).

The District's engineering evaluation of the project (this document) demonstrates that compliance with District rules and permit conditions would reduce Stationary Source emissions from the project to levels below the District's thresholds of significance for criteria pollutants. Thus, the District concludes that through a combination of project design elements and permit conditions, project specific stationary source emissions will be less than significant. The District does not have authority over any of the other project impacts and has, therefore, determined that no additional findings are required (CEQA Guidelines §15096(h)).

Indemnification Agreement/Letter of Credit Determination

According to District Policy APR 2010 (CEQA Implementation Policy), when the District is the Lead or Responsible Agency for CEQA purposes, an indemnification agreement and/or a letter of credit may be required. The decision to require an indemnity agreement and/or a letter of credit is based on a case-by-case analysis of a particular project's potential for litigation risk, which in turn may be based on a project's potential to generate public concern, its potential for significant impacts, and the project proponent's ability to pay for the costs of litigation without a letter of credit, among other factors.

Although the project is located at a potential facility of public concern (Dairy), the criteria pollutant emissions and toxic air contaminant emissions associated with the proposed project are not significant. Therefore, an Indemnification Agreement and/or a Letter of Credit will not be required for this project in the absence of expressed public concern.

IX. Recommendation

Compliance with all the applicable rules and regulations is expected. Pending a successful NSR public noticing period, issue ATC permits S-6124-1-3 through 4-3, and 12-1, subject to the permit conditions shown on the drafts in Appendix A.

X. Billing Information

Annual Permit Fees			
Permit Number	Fee Schedule	Fee Description	Annual Fee
S-6124-1-3	3020-06	Milking Operation	\$128
S-6124-2-3	3020-06	Cow Housing	\$128
S-6124-3-3	3020-06	Liquid Manure Management	\$128
S-6124-4-3	3020-06	Solid Manure Management	\$128
S-6124-12-1	3020-06	Feed Storage and Handling	\$128

XI. Appendices

- A: Draft ATC Permits
- B: Current PTOs
- C: Facility Site Plan
- D: RMR and AAQA Summary
- E: Dairy Emissions Calculations
- F: BACT Calculations
- G: BACT Guidelines

H: BACT Analyses
I: PE Calculations for Permit Unit S-6124-11-0
J: Anaerobic Treatment Lagoon Design Check
K: QNEC

Appendix A

Draft ATC Permits

San Joaquin Valley
Air Pollution Control District

AUTHORITY TO CONSTRUCT

ISSUANCE DATE: DRAFT

PERMIT NO: S-6124-1-3

LEGAL OWNER OR OPERATOR: WEST WING DAIRY
MAILING ADDRESS: 20997 ROAD 180
STRATHMORE, CA 93267

LOCATION: 20997 ROAD 180
STRATHMORE, CA 93267

EQUIPMENT DESCRIPTION:

MODIFICATION OF 1,800 COW MILKING OPERATION WITH TWO DOUBLE 18 HERRINGBONE (72 STALLS) MILKING PARLORS: INCREASE MAXIMUM NUMBER OF MILK COWS TO 2,800

CONDITIONS

1. {3215} Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to enter the permittee's premises where a permitted source is located or emissions related activity is conducted, or where records must be kept under condition of the permit. [District Rule 1070]
2. {3216} Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to have access to and copy, at reasonable times, any records that must be kept under the conditions of the permit. [District Rule 1070]
3. {3658} This permit does not authorize the violation of any conditions established for this facility in the Conditional Use Permit (CUP), Special Use Permit (SUP), Site Approval, Site Plan Review (SPR), or other approval documents issued by a local, state, or federal agency. [Public Resources Code 21000-21177: California Environmental Quality Act]
4. {4452} If a licensed veterinarian or a certified nutritionist determines that any VOC mitigation measure will be required to be suspended as a detriment to animal health or necessary for the animal to molt, the owners/operators must notify the District in writing within forty-eight (48) hours of the determination including the duration and the specific health condition requiring the mitigation measure to be suspended. If the situation is expected to exist longer than a thirty-day (30) period, the owner/operator shall submit a new emission mitigation plan designating a mitigation measure to be implemented in lieu of the suspended mitigation measure. [District Rule 4570]

CONDITIONS CONTINUE ON NEXT PAGE

YOU MUST NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (661) 392-5500 WHEN CONSTRUCTION IS COMPLETED AND PRIOR TO OPERATING THE EQUIPMENT OR MODIFICATIONS AUTHORIZED BY THIS AUTHORITY TO CONSTRUCT. This is NOT a PERMIT TO OPERATE. Approval or denial of a PERMIT TO OPERATE will be made after an inspection to verify that the equipment has been constructed in accordance with the approved plans, specifications and conditions of this Authority to Construct, and to determine if the equipment can be operated in compliance with all Rules and Regulations of the San Joaquin Valley Unified Air Pollution Control District. Unless construction has commenced pursuant to Rule 2050, this Authority to Construct shall expire and application shall be cancelled two years from the date of issuance. The applicant is responsible for complying with all laws, ordinances and regulations of all other governmental agencies which may pertain to the above equipment.

Samir Sheikh, Executive Director / APCO

Arnaud Marjollet, Director of Permit Services

S-6124-1-3 : Jun 3 2020 5:08PM -- AIYABEJ : Joint Inspection NOT Required

5. Permittee shall flush or hose milk parlor immediately prior to, immediately after, or during each milking. [District Rules 2201 and 4570]
6. Permittee shall provide verification that milk parlors are flushed or hosed prior to, immediately after, or during each milking. [District Rules 2201 and 4570]
7. Permittee shall keep and maintain all records for a minimum of five (5) years and shall make records available to the APCO and EPA upon request. [District Rules 2201 and 4570]

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San Joaquin Valley
Air Pollution Control District

AUTHORITY TO CONSTRUCT

ISSUANCE DATE: DRAFT

PERMIT NO: S-6124-2-3

LEGAL OWNER OR OPERATOR: WEST WING DAIRY
MAILING ADDRESS: 20997 ROAD 180
STRATHMORE, CA 93267

LOCATION: 20997 ROAD 180
STRATHMORE, CA 93267

EQUIPMENT DESCRIPTION:

MODIFICATION OF COW HOUSING - 1,800 MILK COWS NOT TO EXCEED A COMBINED TOTAL OF 2,030 MATURE COWS (MILK AND DRY); 770 SUPPORT STOCK (HEIFERS, CALVES, AND BULLS); WITH A FLUSH/SCRAPE SYSTEM: INCREASE MAXIMUM NUMBERS OF COWS TO 2,800 MILK COWS, NOT TO EXCEED A COMBINED TOTAL OF 3,225 MATURE COWS (MILK AND DRY), AND 1,294 TOTAL SUPPORT STOCK (HEIFERS, CALVES, AND BULLS)

CONDITIONS

1. {3215} Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to enter the permittee's premises where a permitted source is located or emissions related activity is conducted, or where records must be kept under condition of the permit. [District Rule 1070]
2. {3216} Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to have access to and copy, at reasonable times, any records that must be kept under the conditions of the permit. [District Rule 1070]
3. {3658} This permit does not authorize the violation of any conditions established for this facility in the Conditional Use Permit (CUP), Special Use Permit (SUP), Site Approval, Site Plan Review (SPR), or other approval documents issued by a local, state, or federal agency. [Public Resources Code 21000-21177: California Environmental Quality Act]
4. {4452} If a licensed veterinarian or a certified nutritionist determines that any VOC mitigation measure will be required to be suspended as a detriment to animal health or necessary for the animal to molt, the owners/operators must notify the District in writing within forty-eight (48) hours of the determination including the duration and the specific health condition requiring the mitigation measure to be suspended. If the situation is expected to exist longer than a thirty-day (30) period, the owner/operator shall submit a new emission mitigation plan designating a mitigation measure to be implemented in lieu of the suspended mitigation measure. [District Rule 4570]

CONDITIONS CONTINUE ON NEXT PAGE

YOU MUST NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (661) 392-5500 WHEN CONSTRUCTION IS COMPLETED AND PRIOR TO OPERATING THE EQUIPMENT OR MODIFICATIONS AUTHORIZED BY THIS AUTHORITY TO CONSTRUCT. This is NOT a PERMIT TO OPERATE. Approval or denial of a PERMIT TO OPERATE will be made after an inspection to verify that the equipment has been constructed in accordance with the approved plans, specifications and conditions of this Authority to Construct, and to determine if the equipment can be operated in compliance with all Rules and Regulations of the San Joaquin Valley Unified Air Pollution Control District. Unless construction has commenced pursuant to Rule 2050, this Authority to Construct shall expire and application shall be cancelled two years from the date of issuance. The applicant is responsible for complying with all laws, ordinances and regulations of all other governmental agencies which may pertain to the above equipment.

Samir Sheikh, Executive Director / APCO

Arnaud Marjollet, Director of Permit Services

S-6124-2-3 : Jun 3 2020 5:08PM -- AIYABEJ : Joint Inspection NOT Required

5. Permittee shall pave feedlanes, where present, for a width of at least 8 feet along the corral side of the feedlane fence for milk and dry cows and at least 6 feet along the corral side of the feedlane for heifers. [District Rules 2201 and 4570]
6. Permittee shall inspect water pipes and troughs and repair leaks at least once every seven (7) days. [District Rules 2201 and 4570]
7. Permittee shall maintain records demonstrating that water pipes and troughs are inspected and leaks are repaired at least once every seven (7) days. [District Rules 2201 and 4570]
8. Permittee shall clean manure from corrals at least four (4) times per year with at least sixty (60) days between each cleaning, or permittee shall clean corrals at least once between April and July and at least once between September and December. [District Rules 2201 and 4570]
9. Permittee shall demonstrate that manure from corrals are cleaned at least four (4) times per year with at least sixty (60) days between each cleaning or demonstrate that corrals are cleaned at least once between April and July and at least once between September and December. [District Rules 2201 and 4570]
10. Permittee shall implement at least one of the following corral mitigation measures: 1) slope the surface of the corrals at least 3% where the available space for each animal is 400 square feet or less and shall slope the surface of the corrals at least 1.5% where the available space for each animal is more than 400 square feet per animal; 2) maintain corrals to ensure proper drainage preventing water from standing more than forty-eight hours; or 3) harrow, rake, or scrape pens sufficiently to maintain a dry surface except during periods of rainy weather. [District Rules 2201 and 4570]
11. Permittee shall either 1) maintain sufficient records to demonstrate that corrals are maintained to ensure proper drainage preventing water from standing for more than forty-eight hours or 2) maintain records of dates pens are groomed (i.e., harrowed, raked, or scraped, etc.). [District Rules 2201 and 4570]
12. Permittee shall scrape corral surfaces at least once every two weeks using a pull-type scraper during morning hours, except when prevented by wet conditions. [District Rule 2201]
13. Permittee shall maintain sufficient records to demonstrate that corral surfaces are scraped at least once every two weeks using a pull-type scraper during morning hours, except when prevented by wet conditions. [District Rule 2201]
14. Permittee shall scrape, vacuum or flush concrete lanes in corrals at least once every day for mature cows and every seven (7) days for support stock. [District Rules 2201 and 4570]
15. Permittee shall maintain records demonstrating that concrete lanes in corrals are scraped, vacuumed, or flushed at least once every day for mature cows and at least once every seven (7) days for support stock. [District Rules 2201 and 4570]
16. Shade structures shall be installed in any of the following ways: 1) constructed with a light permeable roofing material; 2) uphill of any slope in the corral; 3) installed so that the structure has a North/South orientation. OR Permittee shall clean manure from under corral shades at least once every fourteen (14) days, when weather permits access into the corral. [District Rules 2201 and 4570]
17. If permittee has selected to comply using shades constructed with a light permeable roofing material, then permittee shall maintain records, such as design specifications, demonstrating that the shade structures are equipped with such roofing material or if Permittee has selected to comply by cleaning the manure from under the corral shades, then Permittee shall maintain records demonstrating that manure is cleaned from under the shades at least once every fourteen (14) days, as long as weather permits access to corrals. [District Rules 2201 and 4570]
18. Permittee shall manage corrals such that the manure depth in the corral does not exceed twelve (12) inches at any time or point, except for in-corral mounding. Manure depth may exceed 12 inches when corrals become inaccessible due to rain events. However, permittee must resume management of the manure depth of 12 inches or lower immediately upon the corral becoming accessible. [District Rules 2201 and 4570]
19. Permittee shall measure and document the depth of manure in the corrals at least once every ninety (90) days. [District Rules 2201 and 4570]
20. Permittee shall maintain a record of the number of animals of each species and production group at the facility and shall maintain quarterly records of any changes to this information. [District Rules 2201 and 4570]

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CONDITIONS CONTINUE ON NEXT PAGE

21. Permittee shall keep and maintain all records for a minimum of five (5) years and shall make records available to the APCO and EPA upon request. [District Rules 2201 and 4570]

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San Joaquin Valley
Air Pollution Control District

AUTHORITY TO CONSTRUCT

ISSUANCE DATE: DRAFT

PERMIT NO: S-6124-3-3

LEGAL OWNER OR OPERATOR: WEST WING DAIRY
MAILING ADDRESS: 20997 ROAD 180
STRATHMORE, CA 93267

LOCATION: 20997 ROAD 180
STRATHMORE, CA 93267

EQUIPMENT DESCRIPTION:

MODIFICATION OF LIQUID MANURE HANDLING SYSTEM CONSISTING OF SETTLING BASIN(S) AND TWO STORAGE PONDS; MANURE IS LAND APPLIED THROUGH FLOOD AND FURROW IRRIGATION; ALLOW INCREASE IN THROUGHPUT DUE TO HERD EXPANSION, IMPLEMENT ANAEROBIC TREATMENT USING AN EXISTING 1,050' X 275' X 20' LAGOON, AND REPLACE ONE RULE 4570 MITIGATION MEASURE (NOT TO ALLOW MANURE TO STAND IN FIELDS FOR MORE THAN 24 HOURS AFTER IRRIGATION) WITH APPLICATION OF ONLY ANAEROBICALLY TREATED MANURE

CONDITIONS

1. {3215} Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to enter the permittee's premises where a permitted source is located or emissions related activity is conducted, or where records must be kept under condition of the permit. [District Rule 1070]
2. {3216} Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to have access to and copy, at reasonable times, any records that must be kept under the conditions of the permit. [District Rule 1070]
3. {3658} This permit does not authorize the violation of any conditions established for this facility in the Conditional Use Permit (CUP), Special Use Permit (SUP), Site Approval, Site Plan Review (SPR), or other approval documents issued by a local, state, or federal agency. [Public Resources Code 21000-21177: California Environmental Quality Act]

CONDITIONS CONTINUE ON NEXT PAGE

YOU MUST NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (661) 392-5500 WHEN CONSTRUCTION IS COMPLETED AND PRIOR TO OPERATING THE EQUIPMENT OR MODIFICATIONS AUTHORIZED BY THIS AUTHORITY TO CONSTRUCT. This is NOT a PERMIT TO OPERATE. Approval or denial of a PERMIT TO OPERATE will be made after an inspection to verify that the equipment has been constructed in accordance with the approved plans, specifications and conditions of this Authority to Construct, and to determine if the equipment can be operated in compliance with all Rules and Regulations of the San Joaquin Valley Unified Air Pollution Control District. Unless construction has commenced pursuant to Rule 2050, this Authority to Construct shall expire and application shall be cancelled two years from the date of issuance. The applicant is responsible for complying with all laws, ordinances and regulations of all other governmental agencies which may pertain to the above equipment.

Samir Sheikh, Executive Director / APCO

Arnaud Marjollet, Director of Permit Services

S-6124-3-3 : Jun 3 2020 5:08PM -- AIYABEJJ : Joint Inspection NOT Required

Southern Regional Office • 34946 Flyover Court • Bakersfield, CA 93308 • (661) 392-5500 • Fax (661) 392-5585

4. {4452} If a licensed veterinarian or a certified nutritionist determines that any VOC mitigation measure will be required to be suspended as a detriment to animal health or necessary for the animal to molt, the owners/operators must notify the District in writing within forty-eight (48) hours of the determination including the duration and the specific health condition requiring the mitigation measure to be suspended. If the situation is expected to exist longer than a thirty-day (30) period, the owner/operator shall submit a new emission mitigation plan designating a mitigation measure to be implemented in lieu of the suspended mitigation measure. [District Rule 4570]
5. Permittee shall feed all animals according to National Research Council (NRC) guidelines. [District Rule 2201]
6. Permittee shall maintain records of feed content, formulation, and quantity of feed additive utilized, to demonstrate compliance with National Research Council (NRC) guidelines. Records such as feed company guaranteed analyses (feed tags), ration sheets, or feed purchase records may be used to meet this requirement. [District Rule 2201]
7. Permittee shall remove solids with a solid separator system, prior to the manure entering the lagoon. [District Rules 2201 and 4570]
8. All liquid manure shall be treated in an anaerobic treatment lagoon system that is designed and operated according to the Natural Resources Conservation Service (NRCS) Field Office Technical Guide No. 359. [District Rule 2201]
9. The liquid depth in the anaerobic treatment lagoon shall be maintained at 6 feet, or greater, at all times. [District Rule 2201]
10. Permittee shall maintain design specifications, calculations, and records, including minimum treatment volume (MTV) and hydraulic retention time (HRT) calculations, and liquid depth records, demonstrating that the anaerobic treatment lagoon system meets the requirements listed in the NRCS Field Office Technical Guide No. 359. [District Rule 2201]
11. Only liquid manure that has been treated in the anaerobic treatment lagoon system may be applied to land. [District Rules 2201 and 4570]
12. Permittee shall maintain records to demonstrate that only liquid manure that has been treated in the anaerobic treatment lagoon system is applied to land. [District Rules 2201 and 4570]
13. Permittee shall keep and maintain all records for a minimum of five (5) years and shall make records available to the APCO and EPA upon request. [District Rules 2201 and 4570]

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San Joaquin Valley
Air Pollution Control District

AUTHORITY TO CONSTRUCT

PERMIT NO: S-6124-4-3

ISSUANCE DATE: DRAFT

LEGAL OWNER OR OPERATOR: WEST WING DAIRY
MAILING ADDRESS: 20997 ROAD 180
STRATHMORE, CA 93267

LOCATION: 20997 ROAD 180
STRATHMORE, CA 93267

EQUIPMENT DESCRIPTION:

MODIFICATION OF SOLID MANURE HANDLING CONSISTING OF MANURE STOCK PILES; SOLID MANURE APPLICATION TO LAND; AND/OR HAULED OFFSITE: ALLOW INCREASE IN THROUGHPUT DUE TO HERD EXPANSION AND REPLACE THE CURRENT RULE 4570 MITIGATION MEASURE (NOT TO APPLY SOLID MANURE WITH A MOISTURE CONTENT OF MORE THAN 50%) WITH INCORPORATION WITHIN 2 HOURS OF LAND APPLICATION

CONDITIONS

1. {3215} Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to enter the permittee's premises where a permitted source is located or emissions related activity is conducted, or where records must be kept under condition of the permit. [District Rule 1070]
2. {3216} Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to have access to and copy, at reasonable times, any records that must be kept under the conditions of the permit. [District Rule 1070]
3. {3658} This permit does not authorize the violation of any conditions established for this facility in the Conditional Use Permit (CUP), Special Use Permit (SUP), Site Approval, Site Plan Review (SPR), or other approval documents issued by a local, state, or federal agency. [Public Resources Code 21000-21177: California Environmental Quality Act]

CONDITIONS CONTINUE ON NEXT PAGE

YOU MUST NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (661) 392-5500 WHEN CONSTRUCTION IS COMPLETED AND PRIOR TO OPERATING THE EQUIPMENT OR MODIFICATIONS AUTHORIZED BY THIS AUTHORITY TO CONSTRUCT. This is NOT a PERMIT TO OPERATE. Approval or denial of a PERMIT TO OPERATE will be made after an inspection to verify that the equipment has been constructed in accordance with the approved plans, specifications and conditions of this Authority to Construct, and to determine if the equipment can be operated in compliance with all Rules and Regulations of the San Joaquin Valley Unified Air Pollution Control District. Unless construction has commenced pursuant to Rule 2050, this Authority to Construct shall expire and application shall be cancelled two years from the date of issuance. The applicant is responsible for complying with all laws, ordinances and regulations of all other governmental agencies which may pertain to the above equipment.

Samir Sheikh, Executive Director / APCO

Arnaud Marjollet, Director of Permit Services

S-6124-4-3 : Jun 3 2020 5:08PM -- AIYABEJJ : Joint Inspection NOT Required

4. {4452} If a licensed veterinarian or a certified nutritionist determines that any VOC mitigation measure will be required to be suspended as a detriment to animal health or necessary for the animal to molt, the owners/operators must notify the District in writing within forty-eight (48) hours of the determination including the duration and the specific health condition requiring the mitigation measure to be suspended. If the situation is expected to exist longer than a thirty-day (30) period, the owner/operator shall submit a new emission mitigation plan designating a mitigation measure to be implemented in lieu of the suspended mitigation measure. [District Rule 4570]
5. Permittee shall feed all animals according to National Research Council (NRC) guidelines. [District Rule 2201]
6. Permittee shall maintain records of feed content, formulation, and quantity of feed additive utilized, to demonstrate compliance with National Research Council (NRC) guidelines. Records such as feed company guaranteed analyses (feed tags), ration sheets, or feed purchase records may be used to meet this requirement. [District Rule 2201]
7. Within seventy two (72) hours of removal of separated solids from the drying process, permittee shall either 1) remove separated solids from the facility, or 2) cover separated solids 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. [District Rules 2201 and 4570]
8. Permittee shall keep records of dates when separated solids are removed from the facility or permittee shall maintain records to demonstrate that separated solids piles outside the pens are covered with a weatherproof covering from October through May. [District Rules 2201 and 4570]
9. Permittee shall maintain records, such as manufacturer warranties or other documentation, demonstrating that the weatherproof covering over separated solids are installed, used, and maintained in accordance with manufacturer recommendations and applicable standards listed in NRCS Field Office Technical Guide Code 313 or 367, or any other applicable standard approved by the APCO, ARB, and EPA. [District Rules 2201 and 4570]
10. All solid manure shall be incorporated into the soil within two hours of land application. [District Rules 2201 and 4570]
11. Permittee shall maintain records to demonstrate that all solid manure has been incorporated into the soil within two hours of land application. [District Rules 2201 and 4570]
12. Permittee shall keep and maintain all records for a minimum of five (5) years and shall make records available to the APCO and EPA upon request. [District Rules 2201 and 4570]

DRAFT

San Joaquin Valley
Air Pollution Control District

AUTHORITY TO CONSTRUCT

ISSUANCE DATE: DRAFT

PERMIT NO: S-6124-12-1

LEGAL OWNER OR OPERATOR: WEST WING DAIRY
MAILING ADDRESS: 20997 ROAD 180
STRATHMORE, CA 93267

LOCATION: 20997 ROAD 180
STRATHMORE, CA 93267

EQUIPMENT DESCRIPTION:

MODIFICATION OF FEED STORAGE AND HANDLING CONSISTING OF COMMODITY BARN(S), SILAGE PILE(S), AND TOTAL MIXED RATION FEEDING: ALLOW INCREASE IN THROUGHPUT DUE TO HERD EXPANSION

CONDITIONS

1. {3215} Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to enter the permittee's premises where a permitted source is located or emissions related activity is conducted, or where records must be kept under condition of the permit. [District Rule 1070]
2. {3216} Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to have access to and copy, at reasonable times, any records that must be kept under the conditions of the permit. [District Rule 1070]
3. {3658} This permit does not authorize the violation of any conditions established for this facility in the Conditional Use Permit (CUP), Special Use Permit (SUP), Site Approval, Site Plan Review (SPR), or other approval documents issued by a local, state, or federal agency. [Public Resources Code 21000-21177: California Environmental Quality Act]
4. {4452} If a licensed veterinarian or a certified nutritionist determines that any VOC mitigation measure will be required to be suspended as a detriment to animal health or necessary for the animal to molt, the owners/operators must notify the District in writing within forty-eight (48) hours of the determination including the duration and the specific health condition requiring the mitigation measure to be suspended. If the situation is expected to exist longer than a thirty-day (30) period, the owner/operator shall submit a new emission mitigation plan designating a mitigation measure to be implemented in lieu of the suspended mitigation measure. [District Rule 4570]

CONDITIONS CONTINUE ON NEXT PAGE

YOU MUST NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (661) 392-5500 WHEN CONSTRUCTION IS COMPLETED AND PRIOR TO OPERATING THE EQUIPMENT OR MODIFICATIONS AUTHORIZED BY THIS AUTHORITY TO CONSTRUCT. This is NOT a PERMIT TO OPERATE. Approval or denial of a PERMIT TO OPERATE will be made after an inspection to verify that the equipment has been constructed in accordance with the approved plans, specifications and conditions of this Authority to Construct, and to determine if the equipment can be operated in compliance with all Rules and Regulations of the San Joaquin Valley Unified Air Pollution Control District. Unless construction has commenced pursuant to Rule 2050, this Authority to Construct shall expire and application shall be cancelled two years from the date of issuance. The applicant is responsible for complying with all laws, ordinances and regulations of all other governmental agencies which may pertain to the above equipment.

Samir Sheikh, Executive Director / APCO

Arnaud Marjollet, Director of Permit Services

S-6124-12-1 : Jun 3 2020 5:08PM -- AIYABEIJ : Joint Inspection NOT Required

5. Permittee shall feed all animals according to National Research Council (NRC) guidelines. [District Rules 2201 and 4570]
6. Permittee shall maintain records of feed content, formulation, and quantity of feed additive utilized, to demonstrate compliance with National Research Council (NRC) guidelines. Records such as feed company guaranteed analyses (feed tags), ration sheets, or feed purchase records may be used to meet this requirement. [District Rules 2201 and 4570]
7. Permittee shall push feed so that it is within three feet of feedlane fence within two hours of putting out the feed or use a feed trough or other feeding structure designed to maintain feed within reach of the animals. [District Rules 2201 and 4570]
8. Permittee shall maintain an operating plan or record that requires feed to be pushed within three feet of feedlane fence within two hours of putting out the feed, or use of a feed trough or other structure designed to maintain feed within reach of the animals. [District Rules 2201 and 4570]
9. Permittee shall begin feeding total mixed rations within two hours of grinding and mixing rations. [District Rules 2201 and 4570]
10. Permittee shall maintain an operating plan or record of when feeding of total mixed rations began within two hours of grinding and mixing rations. [District Rules 2201 and 4570]
11. Permittee shall store grain in a weatherproof storage structure or under a weatherproof covering from October through May. [District Rules 2201 and 4570]
12. Permittee shall maintain records demonstrating grain is/was stored in a weatherproof storage structure or under a weatherproof covering from October through May. [District Rules 2201 and 4570]
13. Permittee shall remove uneaten wet feed from feed bunks within twenty-four (24) hours after the end of a rain event. [District Rules 2201 and 4570]
14. Permittee shall maintain records demonstrating that uneaten wet feed was removed from feed bunks within twenty-four (24) hours after the end of a rain event. [District Rules 2201 and 4570]
15. For bagged silage/feedstuff, permittee shall utilize a sealed feed storage system (e.g., ag bag). [District Rules 2201 and 4570]
16. Permittee shall cover all silage piles, except for the area where feed is being removed from the pile, with a plastic tarp that is at least five (5) mils (0.005 inches) thick, multiple plastic tarps with a cumulative thickness of at least 5 mils (0.005 inches), or an oxygen barrier film covered with a UV resistant material. Silage piles shall be covered within seventy-two (72) hours of last delivery of material to the pile. Sheets of material used to cover silage shall overlap so that silage is not exposed where the sheets meet. [District Rules 2201 and 4570]
17. Permittee shall maintain records of the thickness and type of cover used to cover each silage pile. Permittee shall also maintain records of the date of the last delivery of material to each silage pile and the date each pile is covered. [District Rules 2201 and 4570]
18. Permittee shall select and implement one of the following mitigation measures for building each silage pile at the facility: Option 1) build the silage pile such that the average bulk density is at least 44 lb/cu ft for corn silage and 40 lb/cu ft for other silage types, as measured in accordance with Section 7.11 of District Rule 4570; Option 2) Adjust filling parameters when creating the silage pile to achieve an average bulk density of at least 44 lb/cu ft for corn silage and at least 40 lb/cu ft for other silage types as determined using a District-approved spreadsheet; or Option 3) build silage piles using crops harvested with the applicable minimum moisture content, maximum Theoretical Length of Chop (TLC), and roller opening identified in District Rule 4570, Table 4.1, 1.d and manage silage material delivery such that the thickness of the layer of un-compacted material delivered on top of the pile is no more than six (6) inches. Records of the option chosen as a mitigation measure for building each silage pile shall be maintained. [District Rules 2201 and 4570]
19. For each silage pile that Option 1 (Measured Bulk Density) is chosen as a mitigation measure for building the pile, records of the measured bulk density shall be maintained. [District Rules 2201 and 4570]

20. For each silage pile that Option 2 (Bulk Density Determined by Spreadsheet) is chosen as a mitigation measure for building the pile, records of the filling parameters entered into the District-approved spreadsheet to determine the bulk density shall be maintained. [District Rules 2201 and 4570]
21. For each silage pile that Option 3 (Moisture, TLC, Roller Opening, & Material Delivery) is chosen as a mitigation measure for building the pile, the permittee shall harvest corn used for the pile at an average moisture content of at least 65% and harvest other silage crops for the pile at an average moisture content of at least 60%. [District Rules 2201 and 4570]
22. For each silage pile that Option 3 (Moisture, TLC, Roller Opening, & Material Delivery) is chosen as a mitigation measure for building the pile, records of the average percent moisture of crops harvested for silage shall be maintained. [District Rules 2201 and 4570]
23. For each silage pile that Option 3 (Moisture, TLC, Roller Opening, & Material Delivery) is chosen as a mitigation measure for building the pile, the permittee shall adjust setting of equipment used to harvest crops for the pile to incorporate the following parameters for Theoretical Length of Chop (TLC) and roller opening, as applicable: 1) Corn with no processing: TLC not exceeding 1/2 inch, 2) Processed Corn: TLC not exceeding 3/4 inch and roller opening of 1-4 mm, 3) Alfalfa/Grass: TLC not exceeding 1.0 inch, 4) Other silage crops: TLC not exceeding 1/2 inch. [District Rules 2201 and 4570]
24. For each silage pile that Option 3 (Moisture, TLC, Roller Opening, & Material Delivery) is chosen as a mitigation measure for building the pile, records that equipment used to harvest crops for the pile was set to the required TLC and roller opening for the type of crop harvested shall be maintained. [District Rules 2201 and 4570]
25. For each silage pile that Option 3 (Moisture, TLC, Roller Opening, & Material Delivery) is chosen as a mitigation measure for building the pile, the permittee shall manage silage material delivery such that the thickness of the layer of un-compacted material delivered on top of the pile is no more than six (6) inches. [District Rules 2201 and 4570]
26. For each silage pile that Option 3 (Moisture, TLC, Roller Opening, & Material Delivery) is chosen as a mitigation measure for building the pile, the permittee shall maintain a plan that requires that the thickness of the layer of un-compacted material delivered on top of the pile is no more than six (6) inches. [District Rules 2201 and 4570]
27. Permittee shall select and implement at least two of the following mitigation measures for management of silage piles at the facility: Option 1) manage silage piles such that only one silage pile has an uncovered face and the total exposed surface area is less than 2,150 square feet, or manage multiple uncovered silage piles such that the total exposed surface area of all uncovered silage piles is less than 4,300 square feet; Option 2) use a shaver/facer to remove silage from the silage pile, or shall use another method to maintain a smooth vertical surface on the working face of the silage pile; or Option 3) inoculate silage with homolactic lactic acid bacteria in accordance with manufacturer recommendations to achieve a concentration of at least 100,000 colony forming units per gram of wet forage, apply propionic acid, benzoic acid, sorbic acid, sodium benzoate, or potassium sorbate at the rate specified by the manufacturer to reduce yeast counts when forming silage piles, or apply other additives at rates that have been demonstrated to reduce alcohol concentrations in silage and/or VOC emissions from silage and have been approved by the District and EPA. Records of the options chosen for managing each silage pile shall be maintained. [District Rules 2201 and 4570]
28. If Option 1 (Limiting Exposed Area of Silage) is chosen as a mitigation measure for managing silage piles, the permittee shall calculate and record the maximum (largest part of pile) total exposed area of each silage pile. Records of the maximum calculated area shall be maintained. [District Rules 2201 and 4570]
29. For each silage pile that Option 2 (Shaver/Facer or Smooth Face) is chosen as a mitigation measure for managing the pile, the permittee shall maintain records that a shaver/facer was used to remove silage from the pile or shall visually inspect the pile at least daily to verify that the working face was smooth and maintain records of the visual inspections. [District Rules 2201 and 4570]
30. For each silage pile that Option 3 (Silage Additives) is chosen as a mitigation measure for managing the pile, records shall be maintained of the type additive (e.g. inoculants, preservative, other District & EPA-approved additive), the quantity of the additive applied to the pile, and a copy of the manufacturers instructions for application of the additive. [District Rules 2201 and 4570]
31. Permittee shall keep and maintain all records for a minimum of five (5) years and shall make records available to the APCO and EPA upon request. [District Rules 2201 and 4570]

Appendix B

Current PTOs

San Joaquin Valley Air Pollution Control District

PERMIT UNIT: S-6124-1-4

EXPIRATION DATE: 12/31/2020

EQUIPMENT DESCRIPTION:

1,800 COW MILKING OPERATION WITH TWO DOUBLE 18 HERRINGBONE (72 STALLS) MILKING PARLORS

PERMIT UNIT REQUIREMENTS

1. Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to enter the permittee's premises where a permitted source is located or emissions related activity is conducted, or where records must be kept under condition of the permit. [District Rule 1070]
2. Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to have access to and copy, at reasonable times, any records that must be kept under the conditions of the permit. [District Rule 1070]
3. This permit does not authorize the violation of any conditions established for this facility in the Conditional Use Permit (CUP), Special Use Permit (SUP), Site Approval, Site Plan Review (SPR), or other approval documents issued by a local, state, or federal agency. [Public Resources Code 21000-21177: California Environmental Quality Act]
4. If a licensed veterinarian or a certified nutritionist determines that any VOC mitigation measure will be required to be suspended as a detriment to animal health or necessary for the animal to molt, the owners/operators must notify the District in writing within forty-eight (48) hours of the determination including the duration and the specific health condition requiring the mitigation measure to be suspended. If the situation is expected to exist longer than a thirty-day (30) period, the owner/operator shall submit a new emission mitigation plan designating a mitigation measure to be implemented in lieu of the suspended mitigation measure. [District Rule 4570]
5. Permittee shall flush or hose milk parlor immediately prior to, immediately after, or during each milking. [District Rule 4570]
6. Permittee shall provide verification that milk parlors are flushed or hosed prior to, immediately after, or during each milking. [District Rule 4570]
7. Permittee shall keep and maintain all records for a minimum of five (5) years and shall make records available to the APCO and EPA upon request. [District Rule 4570]

These terms and conditions are part of the Facility-wide Permit to Operate.

San Joaquin Valley Air Pollution Control District

PERMIT UNIT: S-6124-2-5

EXPIRATION DATE: 12/31/2020

EQUIPMENT DESCRIPTION:

COW HOUSING - 1,800 MILK COWS NOT TO EXCEED A COMBINED TOTAL OF 2,030 MATURE COWS (MILK AND DRY); 770 SUPPORT STOCK (HEIFERS, CALVES AND BULLS)

PERMIT UNIT REQUIREMENTS

1. Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to enter the permittee's premises where a permitted source is located or emissions related activity is conducted, or where records must be kept under condition of the permit. [District Rule 1070]
2. Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to have access to and copy, at reasonable times, any records that must be kept under the conditions of the permit. [District Rule 1070]
3. This permit does not authorize the violation of any conditions established for this facility in the Conditional Use Permit (CUP), Special Use Permit (SUP), Site Approval, Site Plan Review (SPR), or other approval documents issued by a local, state, or federal agency. [Public Resources Code 21000-21177: California Environmental Quality Act]
4. If a licensed veterinarian or a certified nutritionist determines that any VOC mitigation measure will be required to be suspended as a detriment to animal health or necessary for the animal to molt, the owners/operators must notify the District in writing within forty-eight (48) hours of the determination including the duration and the specific health condition requiring the mitigation measure to be suspended. If the situation is expected to exist longer than a thirty-day (30) period, the owner/operator shall submit a new emission mitigation plan designating a mitigation measure to be implemented in lieu of the suspended mitigation measure. [District Rule 4570]
5. Permittee shall pave feedlanes, where present, for a width of at least 8 feet along the corral side of the feedlane fence for milk and dry cows and at least 6 feet along the corral side of the feedlane for heifers. [District Rule 4570]
6. Permittee shall inspect water pipes and troughs and repair leaks at least once every seven (7) days. [District Rule 4570]
7. Permittee shall maintain records demonstrating that water pipes and troughs are inspected and leaks are repaired at least once every seven (7) days. [District Rule 4570]
8. Permittee shall clean manure from corrals at least four (4) times per year with at least sixty (60) days between each cleaning, or permittee shall clean corrals at least once between April and July and at least once between September and December. [District Rule 4570]
9. Permittee shall demonstrate that manure from corrals are cleaned at least four (4) times per year with at least sixty (60) days between each cleaning or demonstrate that corrals are cleaned at least once between April and July and at least once between September and December. [District Rule 4570]
10. Permittee shall implement at least one of the following corral mitigation measures: 1) slope the surface of the corrals at least 3% where the available space for each animal is 400 square feet or less and shall slope the surface of the corrals at least 1.5% where the available space for each animal is more than 400 square feet per animal; 2) maintain corrals to ensure proper drainage preventing water from standing more than forty-eight hours; or 3) harrow, rake, or scrape pens sufficiently to maintain a dry surface except during periods of rainy weather. [District Rule 4570]

PERMIT UNIT REQUIREMENTS CONTINUE ON NEXT PAGE

These terms and conditions are part of the Facility-wide Permit to Operate.

11. Permittee shall either 1) maintain sufficient records to demonstrate that corrals are maintained to ensure proper drainage preventing water from standing for more than forty-eight hours or 2) maintain records of dates pens are groomed (i.e., harrowed, raked, or scraped, etc.). [District Rule 4570]
12. Permittee shall scrape, vacuum or flush concrete lanes in corrals at least once every day for mature cows and every seven (7) days for support stock. [District Rule 4570]
13. Permittee shall maintain records demonstrating that concrete lanes in corrals are scraped, vacuumed, or flushed at least once every day for mature cows and at least once every seven (7) days for support stock. [District Rule 4570]
14. Permittee shall manage corrals such that the manure depth in the corral does not exceed twelve (12) inches at any time or point, except for in-corral mounding. Manure depth may exceed 12 inches when corrals become inaccessible due to rain events. However, permittee must resume management of the manure depth of 12 inches or lower immediately upon the corral becoming accessible. [District Rule 4570]
15. Permittee shall measure and document the depth of manure in the corrals at least once every ninety (90) days. [District Rule 4570]
16. Permittee shall maintain a record of the number of animals of each species and production group at the facility and shall maintain quarterly records of any changes to this information. [District Rule 4570]
17. Permittee shall keep and maintain all records for a minimum of five (5) years and shall make records available to the APCO and EPA upon request. [District Rule 4570]

These terms and conditions are part of the Facility-wide Permit to Operate.

San Joaquin Valley Air Pollution Control District

PERMIT UNIT: S-6124-3-4

EXPIRATION DATE: 12/31/2020

EQUIPMENT DESCRIPTION:

LIQUID MANURE HANDLING SYSTEM CONSISTING OF ONE SETTLING BASIN; TWO STORAGE PONDS; MANURE IS LAND APPLIED THROUGH FLOOD AND FURROW IRRIGATION

PERMIT UNIT REQUIREMENTS

1. Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to enter the permittee's premises where a permitted source is located or emissions related activity is conducted, or where records must be kept under condition of the permit. [District Rule 1070]
2. Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to have access to and copy, at reasonable times, any records that must be kept under the conditions of the permit. [District Rule 1070]
3. This permit does not authorize the violation of any conditions established for this facility in the Conditional Use Permit (CUP), Special Use Permit (SUP), Site Approval, Site Plan Review (SPR), or other approval documents issued by a local, state, or federal agency. [Public Resources Code 21000-21177: California Environmental Quality Act]
4. If a licensed veterinarian or a certified nutritionist determines that any VOC mitigation measure will be required to be suspended as a detriment to animal health or necessary for the animal to molt, the owners/operators must notify the District in writing within forty-eight (48) hours of the determination including the duration and the specific health condition requiring the mitigation measure to be suspended. If the situation is expected to exist longer than a thirty-day (30) period, the owner/operator shall submit a new emission mitigation plan designating a mitigation measure to be implemented in lieu of the suspended mitigation measure. [District Rule 4570]
5. Permittee shall remove solids with a solid separator system, prior to the manure entering the lagoon. [District Rule 4570]
6. Permittee shall not allow liquid manure to stand in the fields for more than twenty-four (24) hours after irrigation. [District Rule 4570]
7. Permittee shall maintain records to demonstrate liquid manure did not stand in the fields for more than twenty-four (24) hours after irrigation. [District Rule 4570]
8. Permittee shall keep and maintain all records for a minimum of five (5) years and shall make records available to the APCO and EPA upon request. [District Rule 4570]

These terms and conditions are part of the Facility-wide Permit to Operate.

San Joaquin Valley Air Pollution Control District

PERMIT UNIT: S-6124-4-4

EXPIRATION DATE: 12/31/2020

EQUIPMENT DESCRIPTION:

SOLID MANURE HANDLING CONSISTING OF MANURE STOCK PILES; SOLID MANURE HAULED OFFSITE

PERMIT UNIT REQUIREMENTS

1. Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to enter the permittee's premises where a permitted source is located or emissions related activity is conducted, or where records must be kept under condition of the permit. [District Rule 1070]
2. Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to have access to and copy, at reasonable times, any records that must be kept under the conditions of the permit. [District Rule 1070]
3. This permit does not authorize the violation of any conditions established for this facility in the Conditional Use Permit (CUP), Special Use Permit (SUP), Site Approval, Site Plan Review (SPR), or other approval documents issued by a local, state, or federal agency. [Public Resources Code 21000-21177: California Environmental Quality Act]
4. If a licensed veterinarian or a certified nutritionist determines that any VOC mitigation measure will be required to be suspended as a detriment to animal health or necessary for the animal to molt, the owners/operators must notify the District in writing within forty-eight (48) hours of the determination including the duration and the specific health condition requiring the mitigation measure to be suspended. If the situation is expected to exist longer than a thirty-day (30) period, the owner/operator shall submit a new emission mitigation plan designating a mitigation measure to be implemented in lieu of the suspended mitigation measure. [District Rule 4570]
5. Within seventy two (72) hours of removal of separated solids from the drying process, permittee shall either 1) remove separated solids from the facility, or 2) cover separated solids 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. [District Rule 4570]
6. Permittee shall keep records of dates when separated solids are removed from the facility or permittee shall maintain records to demonstrate that separated solids piles outside the pens are covered with a weatherproof covering from October through May. [District Rule 4570]
7. Permittee shall maintain records, such as manufacturer warranties or other documentation, demonstrating that the weatherproof covering over separated solids are installed, used, and maintained in accordance with manufacturer recommendations and applicable standards listed in NRCS Field Office Technical Guide Code 313 or 367, or any other applicable standard approved by the APCO, ARB, and EPA. [District Rule 4570]
8. Permittee shall not apply solid manure with a moisture content of more than 50%. [District Rule 4570]
9. Permittee shall maintain records of the moisture content of the solid manure each time solid manure is land applied. [District Rule 4570]
10. Moisture content shall be determined using test Methods for the examination of compost and Composting (TMECC) Method 3.09 or any other alternative test method approved by the APCO, ARB, and EPA. [District Rule 4570]
11. Permittee shall keep and maintain all records for a minimum of five (5) years and shall make records available to the APCO and EPA upon request. [District Rule 4570]

These terms and conditions are part of the Facility-wide Permit to Operate.

San Joaquin Valley Air Pollution Control District

PERMIT UNIT: S-6124-12-2

EXPIRATION DATE: 12/31/2020

EQUIPMENT DESCRIPTION:

FEED STORAGE AND HANDLING CONSISTING OF COMMODITY BARN(S) AND SILAGE PILE(S)

PERMIT UNIT REQUIREMENTS

1. Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to enter the permittee's premises where a permitted source is located or emissions related activity is conducted, or where records must be kept under condition of the permit. [District Rule 1070]
2. Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to have access to and copy, at reasonable times, any records that must be kept under the conditions of the permit. [District Rule 1070]
3. This permit does not authorize the violation of any conditions established for this facility in the Conditional Use Permit (CUP), Special Use Permit (SUP), Site Approval, Site Plan Review (SPR), or other approval documents issued by a local, state, or federal agency. [Public Resources Code 21000-21177: California Environmental Quality Act]
4. If a licensed veterinarian or a certified nutritionist determines that any VOC mitigation measure will be required to be suspended as a detriment to animal health or necessary for the animal to molt, the owners/operators must notify the District in writing within forty-eight (48) hours of the determination including the duration and the specific health condition requiring the mitigation measure to be suspended. If the situation is expected to exist longer than a thirty-day (30) period, the owner/operator shall submit a new emission mitigation plan designating a mitigation measure to be implemented in lieu of the suspended mitigation measure. [District Rule 4570]
5. Permittee shall feed all animals according to National Research Council (NRC) guidelines. [District Rule 4570]
6. Permittee shall maintain records of feed content, formulation, and quantity of feed additive utilized, to demonstrate compliance with National Research Council (NRC) guidelines. Records such as feed company guaranteed analyses (feed tags), ration sheets, or feed purchase records may be used to meet this requirement. [District Rule 4570]
7. Permittee shall push feed so that it is within three feet of feedlane fence within two hours of putting out the feed or use a feed trough or other feeding structure designed to maintain feed within reach of the animals. [District Rule 4570]
8. Permittee shall maintain an operating plan or record that requires feed to be pushed within three feet of feedlane fence within two hours of putting out the feed, or use of a feed trough or other structure designed to maintain feed within reach of the animals. [District Rule 4570]
9. Permittee shall begin feeding total mixed rations within two hours of grinding and mixing rations. [District Rule 4570]
10. Permittee shall maintain an operating plan or record of when feeding of total mixed rations began within two hours of grinding and mixing rations. [District Rule 4570]
11. Permittee shall store grain in a weatherproof storage structure or under a weatherproof covering from October through May. [District Rule 4570]
12. Permittee shall maintain records demonstrating grain is/was stored in a weatherproof storage structure or under a weatherproof covering from October through May. [District Rule 4570]

PERMIT UNIT REQUIREMENTS CONTINUE ON NEXT PAGE

These terms and conditions are part of the Facility-wide Permit to Operate.

13. Permittee shall remove uneaten wet feed from feed bunks within twenty-four (24) hours after the end of a rain event. [District Rule 4570]
14. Permittee shall maintain records demonstrating that uneaten wet feed was removed from feed bunks within twenty-four (24) hours after the end of a rain event. [District Rule 4570]
15. For bagged silage/feedstuff, permittee shall utilize a sealed feed storage system (e.g., ag bag). [District Rule 4570]
16. Permittee shall cover all silage piles, except for the area where feed is being removed from the pile, with a plastic tarp that is at least five (5) mils (0.005 inches) thick, multiple plastic tarps with a cumulative thickness of at least 5 mils (0.005 inches), or an oxygen barrier film covered with a UV resistant material. Silage piles shall be covered within seventy-two (72) hours of last delivery of material to the pile. Sheets of material used to cover silage shall overlap so that silage is not exposed where the sheets meet. [District Rule 4570]
17. Permittee shall maintain records of the thickness and type of cover used to cover each silage pile. Permittee shall also maintain records of the date of the last delivery of material to each silage pile and the date each pile is covered. [District Rule 4570]
18. Permittee shall select and implement one of the following mitigation measures for building each silage pile at the facility: Option 1) build the silage pile such that the average bulk density is at least 44 lb/cu ft for corn silage and 40 lb/cu ft for other silage types, as measured in accordance with Section 7.11 of District Rule 4570; Option 2) Adjust filling parameters when creating the silage pile to achieve an average bulk density of at least 44 lb/cu ft for corn silage and at least 40 lb/cu ft for other silage types as determined using a District-approved spreadsheet; or Option 3) build silage piles using crops harvested with the applicable minimum moisture content, maximum Theoretical Length of Chop (TLC), and roller opening identified in District Rule 4570, Table 4.1, 1.d and manage silage material delivery such that the thickness of the layer of un-compacted material delivered on top of the pile is no more than six (6) inches. Records of the option chosen as a mitigation measure for building each silage pile shall be maintained. [District Rule 4570]
19. For each silage pile that Option 1 (Measured Bulk Density) is chosen as a mitigation measure for building the pile, records of the measured bulk density shall be maintained. [District Rule 4570]
20. For each silage pile that Option 2 (Bulk Density Determined by Spreadsheet) is chosen as a mitigation measure for building the pile, records of the filling parameters entered into the District-approved spreadsheet to determine the bulk density shall be maintained. [District Rule 4570]
21. For each silage pile that Option 3 (Moisture, TLC, Roller Opening, & Material Delivery) is chosen as a mitigation measure for building the pile, the permittee shall harvest corn used for the pile at an average moisture content of at least 65% and harvest other silage crops for the pile at an average moisture content of at least 60%. [District Rule 4570]
22. For each silage pile that Option 3 (Moisture, TLC, Roller Opening, & Material Delivery) is chosen as a mitigation measure for building the pile, records of the average percent moisture of crops harvested for silage shall be maintained. [District Rule 4570]
23. For each silage pile that Option 3 (Moisture, TLC, Roller Opening, & Material Delivery) is chosen as a mitigation measure for building the pile, the permittee shall adjust setting of equipment used to harvest crops for the pile to incorporate the following parameters for Theoretical Length of Chop (TLC) and roller opening, as applicable: 1) Corn with no processing: TLC not exceeding 1/2 inch, 2) Processed Corn: TLC not exceeding 3/4 inch and roller opening of 1-4 mm, 3) Alfalfa/Grass: TLC not exceeding 1.0 inch, 4) Other silage crops: TLC not exceeding 1/2 inch. [District Rule 4570]
24. For each silage pile that Option 3 (Moisture, TLC, Roller Opening, & Material Delivery) is chosen as a mitigation measure for building the pile, records that equipment used to harvest crops for the pile was set to the required TLC and roller opening for the type of crop harvested shall be maintained. [District Rule 4570]
25. For each silage pile that Option 3 (Moisture, TLC, Roller Opening, & Material Delivery) is chosen as a mitigation measure for building the pile, the permittee shall manage silage material delivery such that the thickness of the layer of un-compacted material delivered on top of the pile is no more than six (6) inches. [District Rule 4570]

PERMIT UNIT REQUIREMENTS CONTINUE ON NEXT PAGE

These terms and conditions are part of the Facility-wide Permit to Operate.

26. For each silage pile that Option 3 (Moisture, TLC, Roller Opening, & Material Delivery) is chosen as a mitigation measure for building the pile, the permittee shall maintain a plan that requires that the thickness of the layer of un-compacted material delivered on top of the pile is no more than six (6) inches. [District Rule 4570]
27. Permittee shall select and implement at least two of the following mitigation measures for management of silage piles at the facility: Option 1) manage silage piles such that only one silage pile has an uncovered face and the total exposed surface area is less than 2,150 square feet, or manage multiple uncovered silage piles such that the total exposed surface area of all uncovered silage piles is less than 4,300 square feet; Option 2) use a shaver/facer to remove silage from the silage pile, or shall use another method to maintain a smooth vertical surface on the working face of the silage pile; or Option 3) inoculate silage with homolactic lactic acid bacteria in accordance with manufacturer recommendations to achieve a concentration of at least 100,000 colony forming units per gram of wet forage, apply propionic acid, benzoic acid, sorbic acid, sodium benzoate, or potassium sorbate at the rate specified by the manufacturer to reduce yeast counts when forming silage piles, or apply other additives at rates that have been demonstrated to reduce alcohol concentrations in silage and/or VOC emissions from silage and have been approved by the District and EPA. Records of the options chosen for managing each silage pile shall be maintained. [District Rule 4570]
28. If Option 1 (Limiting Exposed Area of Silage) is chosen as a mitigation measure for managing silage piles, the permittee shall calculate and record the maximum (largest part of pile) total exposed area of each silage pile. Records of the maximum calculated area shall be maintained. [District Rule 4570]
29. For each silage pile that Option 2 (Shaver/Facer or Smooth Face) is chosen as a mitigation measure for managing the pile, the permittee shall maintain records that a shaver/facer was used to remove silage from the pile or shall visually inspect the pile at least daily to verify that the working face was smooth and maintain records of the visual inspections. [District Rule 4570]
30. For each silage pile that Option 3 (Silage Additives) is chosen as a mitigation measure for managing the pile, records shall be maintained of the type additive (e.g. inoculants, preservative, other District & EPA-approved additive), the quantity of the additive applied to the pile, and a copy of the manufacturers instructions for application of the additive. [District Rule 4570]
31. Permittee shall keep and maintain all records for a minimum of five (5) years and shall make records available to the APCO and EPA upon request. [District Rule 4570]

These terms and conditions are part of the Facility-wide Permit to Operate.

Appendix C

Facility Site Plan





Appendix D

RMR and AAQA Summary

San Joaquin Valley Air Pollution Control District Risk Management Review and Ambient Air Quality Analysis

To: Jonah Aiyabei – Permit Services
From: Kyle Melching – Technical Services
Date: June 4, 2020
Facility Name: WEST WING DAIRY
Location: 20997 ROAD 180, STRATHMORE
Application #(s): S-6124-1-3, -2-3, -3-3, -4-3, -12-1
Project #: S-1094097

Summary

RMR

Units	Prioritization Score	Acute Hazard Index	Chronic Hazard Index	Maximum Individual Cancer Risk	T-BACT Required	Special Permit Requirements
1	0.90	0.00	0.00	5.22E-08	No	No
2	38.70	0.12	0.22	8.73E-06	No ¹	No
3	0.00	0.00	0.00	N/A ³	No	No
4	0.00	0.00	0.00	N/A ³	No	No
12	N/A ²	N/A ²	N/A ²	N/A ²	N/A ²	N/A ²
Project Totals	39.60	0.12	0.22	8.78E-06		
Facility Totals	39.60	0.13	0.22	8.78E-06		

Notes:

1. TBACT is determined on a corral by corral basis.
2. There is no risk associated with Unit 12 as the District does not have an approved toxic speciation profile for dairy feed and storage handling operations.
3. Cancer risk not calculated for Units 3 and 4 since there is no risk factor or the risk factor is so low that it has been determined to be insignificant for these units.

AAQA

Pollutant	Air Quality Standard (State/Federal)				
	1 Hour	3 Hours	8 Hours	24 Hours	Annual
PM10				Pass	Pass
PM2.5				Pass	Pass

To ensure that human health risks will not exceed District allowable levels; the following shall be included as requirements for:

Unit # Device 1, 2, 3, 4, and 12:

1. No special requirements.

Project Description

Technical Services received a request on March 24, 2020 to perform a Risk Management Review (RMR) and Ambient Air Quality Analysis (AAQA) for the following:

- *Unit -1-3: MODIFICATION OF 1,800 COW MILKING OPERATION WITH TWO DOUBLE 18 HERRINGBONE (72 STALLS) MILKING PARLORS: INCREASE MAXIMUM NUMBER OF MILK COWS TO 2,800*
- *Unit -2-3: MODIFICATION OF COW HOUSING - 1,800 MILK COWS NOT TO EXCEED A COMBINED TOTAL OF 2,030 MATURE COWS (MILK AND DRY); 770 SUPPORT STOCK (HEIFERS, CALVES, AND BULLS): INCREASE MAXIMUM NUMBERS OF COWS TO 2,800 MILK COWS, NOT TO EXCEED A COMBINED TOTAL OF 3,225 MATURE COWS (MILK AND DRY), AND 1,294 TOTAL SUPPORT STOCK (HEIFERS, CALVES, AND BULLS)*
- *Unit -3-3: MODIFICATION OF LIQUID MANURE HANDLING SYSTEM CONSISTING OF ONE SETTLING BASIN; TWO STORAGE PONDS; MANURE IS LAND APPLIED THROUGH FLOOD AND FURROW IRRIGATION: ALLOW INCREASE IN THROUGHPUT DUE TO HERD EXPANSION, IMPLEMENT ANAEROBIC TREATMENT USING AN EXISTING 1,050' X 275' X 20' LAGOON, AND REPLACE ONE RULE 4570 MITIGATION MEASURE (NOT TO ALLOW MANURE TO STAND IN FIELDS FOR MORE THAN 24 HOURS AFTER IRRIGATION) WITH APPLICATION OF ONLY ANAEROBICALLY TREATED MANURE*
- *Unit -4-3: MODIFICATION OF SOLID MANURE HANDLING CONSISTING OF MANURE STOCK PILES; SOLID MANURE APPLICATION TO LAND; AND/OR HAULED OFFSITE: ALLOW INCREASE IN THROUGHPUT DUE TO HERD EXPANSION AND REPLACE THE CURRENT RULE 4570 MITIGATION MEASURE (I.E. NOT TO APPLY SOLID MANURE WITH A MOISTURE CONTENT OF MORE THAN 50%) WITH INCORPORATION WITHIN 2 HOURS OF LAND APPLICATION*
- *Unit -12-1: MODIFICATION OF FEED STORAGE AND HANDLING CONSISTING OF COMMODITY BARN(S), SILAGE PILE(S), AND TOTAL MIXED RATION FEEDING: ALLOW INCREASE IN THROUGHPUT DUE TO HERD EXPANSION*

RMR Report

Analysis

The District performed an analysis pursuant to the District's Risk Management Policy for Permitting New and Modified Sources (APR 1905, May 28, 2015) to determine the possible cancer and non-cancer health impact to the nearest resident or worksite. This policy requires that an assessment be performed on a unit by unit basis, project basis, and on a facility-wide basis. If a preliminary prioritization analysis demonstrates that:

- *A unit's prioritization score is less than the District's significance threshold and;*
- *The project's prioritization score is less than the District's significance threshold and;*
- *The facility's total prioritization score is less than the District's significance threshold*

Then, generally no further analysis is required.

The District's significant prioritization score threshold is defined as being equal to or greater than 1.0. If a preliminary analysis demonstrates that either the unit(s) or the project's or the facility's total prioritization score is greater than the District threshold, a screening or a refined assessment is required

If a refined assessment is greater than one in a million but less than 20 in one million for carcinogenic impacts (Cancer Risk) and less than 1.0 for the Acute and Chronic hazard indices (Non-Carcinogenic) on a unit by unit basis, project basis and on a facility-wide basis the proposed application is considered less than significant. For unit's that exceed a cancer risk of 1 in one million, Toxic Best Available Control Technology (TBACT) must be implemented.

Toxic emissions for this project were calculated using the following methods:

- *Toxic emissions for the Cow Housing, Lagoons, and Milk Parlor were calculated using emission factors derived from the District's evaluation of dairy research studies conducted by California colleges and universities. PM based toxic emissions for the Cow Housing were calculated using*

emission factors generated from using the worst case composite of the 1997 EPA speciation of Kern County feedlot soil. PM₁₀ and PM_{2.5} Emissions for the AAQA were calculated and provided by the processing engineer.

These emissions were input into the San Joaquin Valley APCD's Hazard Assessment and Reporting Program (SHARP). In accordance with the District's Risk Management Policy, risks from the proposed unit's toxic emissions were prioritized using the procedure in the 2016 CAPCOA Facility Prioritization Guidelines. The prioritization score for this proposed facility was greater than 1.0 (see RMR Summary Table). Therefore, a refined health risk assessment was required.

The AERMOD model was used, with the parameters outlined below and meteorological data for 2007-2010 from Visalia (rural dispersion coefficient selected) to determine the dispersion factors (i.e., the predicted concentration or X divided by the normalized source strength or Q) for a receptor grid. These dispersion factors were input into the SHARP Program, which then used the Air Dispersion Modeling and Risk Tool (ADMRT) of the Hot Spots Analysis and Reporting Program Version 2 (HARP 2) to calculate the chronic and acute hazard indices and the carcinogenic risk for the project.

The following parameters were used for the review:

Housing Unit	Cow Category		Increases/Changes						
	Pre-Project	Post-Project	# of Cows	VOC (lb/hr)	VOC (lb/yr)	NH ₃ (lb/hr)	NH ₃ (lb/yr)	PM ₁₀ (lb/hr)	PM ₁₀ (lb/yr)
1 through 10	milk		950	1.09	9519.00	2.53	22127.00	0.28	2479.00
11	support stock		140	0.07	608.00	0.10	856.00	0.09	962.00
12	support stock	dry	97	0.08	715.00	0.22	1874.00	0.00	0.00
13 through 16	support stock		512	0.25	2222.00	0.36	3134.00	0.30	3467.00
17	milk		5	0.00	50.00	0.02	117.00	0.00	0.00
18	milk		5	0.00	50.00	0.01	117.00	0.00	9.00
19	dry	milk	10	0.03	231.00	0.07	578.00	0.00	19.00
20 and 21	dry		0	0.00	0.00	0.00	0.00	0.00	0.00
22	dry		0	0.00	0.00	0.00	0.00	0.00	0.00

Polygon Area Source Parameters				
Unit ID	Unit Description	Release Height (m)	No. Vertices	Area (m ²)
1	Milk Parlor 1	1.00	5	1064
2	CH4	1.00	4	9266
2	11	1.00	4	8836
2	18	1.00	4	93
2	19	1.00	4	329
2	CH1	1.00	4	9259
2	CH3	1.00	4	9505
2	13 through 16	1.00	4	72253
2	CH5	1.00	4	8572
2	CH6	1.00	4	8224
2	CH7	1.00	4	10348
2	CH8	1.00	4	9985
2	CH9	1.00	4	9721
2	CH10	1.00	4	9456
2	13 through 16	1.00	4	9018
2	13 through 16	1.00	4	9074
2	13 through 16	1.00	4	77603
2	CH2	1.00	4	8237
3	Lagoon 3	0.00	5	2673
3	Lagoon 2	0.00	4	5234
3	Lagoon 1	0.00	4	25647
4	Solid Manure Storage	3.00	6	37415
4	Solid Manure Land Application	0.00	60	6473330

AAQA Report

AAQA. In addition to the RMR, Technical Services performed modeling for the criteria pollutant PM₁₀ and PM_{2.5} using AERMOD. The results from the Criteria Pollutant Modeling are as follows:

PM₁₀ Pollutant Modeling Results*

Values are in µg/m³

Category	24 Hours	Annual
Net Value	7.81	1.65
Interim Significance Level	10.4 ¹	2.08 ¹
Result	Pass	Pass

¹The District has decided on an interim basis to use a SIL threshold for fugitive dust sources of 10.4 µg/m³ for the 24-hour average concentration and 2.08 µg/m³ for the annual concentration.

PM_{2.5} Pollutant Modeling Results*

Values are in µg/m³

Category	24 Hours	Annual
Net Value	2.49	0.53
Interim Significance Level	2.5 ¹	0.63 ¹
Result	Pass	Pass

¹The District has decided on an interim basis to use a SIL threshold for fugitive dust sources of 2.5 µg/m³ for the 24-hour average concentration and 0.63 µg/m³ for the annual concentration. PM_{2.5} was modeled at a ratio of 31.9% of PM₁₀ per the processing engineer.

Conclusion

RMR

The cumulative acute and chronic indices for this facility, including this project, are below 1.0; and the cumulative cancer risk for this facility, including this project, is less than 20 in a million. In addition, the cancer risk for each unit in this project is less than 1.0 in a million. **In accordance with the District's Risk Management Policy, the project is approved without Toxic Best Available Control Technology (T-BACT).**

These conclusions are based on the data provided by the applicant and the project engineer. Therefore, this analysis is valid only as long as the proposed data and parameters do not change.

AAQA

The ambient air quality impacts from PM₁₀ emissions at the proposed dairy (modification) (does not) exceed the District's 24-hour or Annual interim threshold for fugitive dust sources.

Attachments

- A. Modeling request from the project engineer
- B. Additional information from the applicant/project engineer
- C. Prioritization score w/ toxic emissions summary
- D. Facility Summary

APPENDIX E

Dairy Emissions Calculations

Pre-Project Facility Information

- Does this facility house Holstein or Jersey cows?
Most facilities house Holstein cows unless explicitly stated on the PTO or application.
- Does the facility have an anaerobic treatment lagoon?
- Does the facility land apply liquid manure?
Answering "yes" assumes worst case.
- Does the facility land apply solid manure?
Answering "yes" assumes worst case.
- Is any scraped manure sent to a lagoon/storage pond?
Answering "yes" assumes worst case.

Pre-Project Herd Size						
Herd	Flushed Freestalls	Scraped Freestalls	Flushed Corrals	Scraped Corrals	Total # of Animals	
Milk Cows			1,800		1,800	
Dry Cows			230		230	
Support Stock (Heifers, Calves, and Bulls)			770		770	
Large Heifers					0	
Medium Heifers					0	
Small Heifers					0	
Bulls					0	
	Calf Hutches				Calf Corrals	
	Aboveground Flushed	Aboveground Scraped	On-Ground Flushed	On-Ground Scraped	Flushed	Scraped
Calves						
						0

Total Herd Summary	
Total Milk Cows	1,800
Total Mature Cows	2,030
Support Stock (Heifers, Calves, and Bulls)	770
Total Calves	0
Total Dairy Head	2,800

Pre-Project Silage Information			
Feed Type	Max # Open Piles	Max Height (ft)	Max Width (ft)
Corn	1	20	120
Alfalfa			
Wheat	1	20	100

Post-Project Facility Information

- Does this facility house Holstein or Jersey cows?
Most facilities house Holstein cows unless explicitly stated on the PTO or application.
- Does the facility have an anaerobic treatment lagoon?
- Does the facility land apply liquid manure?
Answering "yes" assumes worst case.
- Does the facility land apply solid manure?
Answering "yes" assumes worst case.
- Is any scraped manure sent to a lagoon/storage pond?
Answering "yes" assumes worst case.
- Does this project result in an increase or relocation of uncovered surface area for any lagoon/storage pond?

Post-Project Herd Size							
Herd	Flushed Freestalls	Scraped Freestalls	Flushed Corrals	Scraped Corrals	Total # of Animals		
Milk Cows			2,800		2,800		
Dry Cows			425		425		
Support Stock (Heifers, Calves, and Bulls)			1,294		1,294		
Large Heifers					0		
Medium Heifers					0		
Small Heifers					0		
Bulls					0		
	Calf Hutches				Calf Corrals		Total # of Calves
	Aboveground Flushed	Aboveground Scraped	On-Ground Flushed	On-Ground Scraped	Flushed	Scraped	
Calves							0

Total Herd Summary	
Total Milk Cows	2,800
Total Mature Cows	3,225
Support Stock (Heifers, Calves, and Bulls)	1,294
Total Calves	0
Total Dairy Head	4,519

Post-Project Silage Information			
Feed Type	Max # Open Piles	Max Height (ft)	Max Width (ft)
Corn	1	20	120
Alfalfa			
Wheat	1	20	100

VOC Mitigation Measures and Control Efficiencies

Milking Parlor				
Measure Proposed?		Mitigation Measure(s) per Emissions Point	VOC Control Efficiency (%)	
Pre-Project	Post-Project		Pre-Project	Post-Project
		Enteric Emissions Mitigations		
☒	☒	(D) Feed according to NRC guidelines	10%	10%
Total Control Efficiency			10%	10%
		Milking Parlor Floor Mitigations		
☒	☒	(D) Feed according to NRC guidelines	10%	10%
☒	☒	(D) Flush or hose milk parlor immediately prior to, immediately after, or during each milking. <i>Note: If selected for dairies > 999 milk cows, control efficiency is already included in EF.</i>	0%	0%
Total Control Efficiency			10%	10%

Cow Housing				
Measure Proposed?		Mitigation Measure(s) per Emissions Point	VOC Control Efficiency (%)	
Pre-Project	Post-Project		Pre-Project	Post-Project
		Enteric Emissions Mitigations		
☒	☒	Feed according to NRC guidelines	10%	10%
Total Control Efficiency			10%	10%
		Corrals/Pens Mitigations		
☒	☒	Feed according to NRC guidelines	10%	10%
☒	☒	Inspect water pipes and troughs and repair leaks at least once every seven days. <i>Note: If selected for dairies > 999 milk cows, CE is already included in EF.</i>	0%	0%
☒	☒	Dairies: Clean manure from corrals at least four times per year with at least 60 days between cleaning, or clean corrals at least once between April and July and at least once between September and December. <i>Note: If selected for dairies > 999 milk cows, CE is already included in EF. Note: No additional control given for increased cleaning frequency (e.g. BACT requirement).</i> Heifer/Calf Ranches: Scrape corrals twice a year with at least 90 days between cleanings, excluding in-corral mounds. <i>Note: No additional control given for increased cleaning frequency (e.g. BACT requirement).</i>	0%	0%
☒	☒	Scrape, vacuum, or flush concrete lanes in corrals at least once every day for mature cows and every seven days for support stock, or clean concrete lanes such that the depth of manure does not exceed 12 inches at any point or time. <i>Note: No additional control given for increased cleaning frequency (e.g. BACT requirement).</i>	10%	10%
☒	☒	Implement one of the following: 1) slope the surface of the corrals at least 3% where the available space for each animal is 400 sq ft or less and slope the surface of the corrals at least 1.5% where the available space for each animal is more than 400 sq ft; 2) maintain corrals to ensure proper drainage preventing water from standing more than 48 hrs; 3) harrow, rake, or scrape pens sufficiently to maintain a dry surface. <i>Note: If selected for dairies > 999 milk cows, CE already included in EF.</i>	0%	0%
☐	☐	Install shade structures such that they are constructed with a light permeable roofing material. <i>Note: If selected for dairies > 999 milk cows, the control efficiency will be 5% since the EF used includes a partial control for this measure.</i>	5%	5%
☒	☒	Install all shade structures uphill of any slope in the corral. <i>Note: If selected for dairies > 999 milk cows, the control efficiency will be 5% since the EF used includes a partial control for this measure.</i>		
☐	☐	Clean manure from under corral shades at least once every 14 days, when weather permits access into corral. <i>Note: If selected for dairies > 999 milk cows, the control efficiency will be 5% since the EF used includes a partial control for this measure.</i>		
☒	☒	Install shade structure so that the structure has a North/South orientation. <i>Note: If selected for dairies > 999 milk cows, the control efficiency will be 5% since the EF used includes a partial control for this measure.</i>	0%	0%
☒	☒	Manage corrals such that the manure depth in the corral does not exceed 12 inches at any time or point, except for in-corral mounding. Manure depth may exceed 12 inches when corrals become inaccessible due to rain events. The manure facility must resume management of the manure depth of 12 inches or lower immediately upon the corral becoming accessible. <i>Note: If selected for dairies > 999 milk cows, control efficiency is already included in EF.</i>		
☐	☐	Knockdown fence line manure build-up prior to it exceeding a height of 12 inches at any time or point. Manure depth may exceed 12 inches when corrals become inaccessible due to rain events. The facility must resume management of the manure depth of 12 inches or lower immediately upon the corral becoming accessible.		
☐	☐	Use lime or a similar absorbent material in the corral according to the manufacturer's recommendation to minimize moisture in the corrals.	0%	0%
☐	☐	Apply thymol to the corral soil in accordance with the manufacturer's recommendation.	0%	0%
Total Control Efficiency			23.05%	23.05%
		Bedding Mitigations		
☒	☒	Feed according to NRC guidelines	10%	10%

☐	☐	Use non-manure-based bedding and non-separated solids based bedding for at least 90% of the bedding material, by weight, for freestalls (e.g. rubber mats, almond shells, sand, or waterbeds).	0%	0%
☐	☐	For a large dairy (1,000 milk cows or larger) or a heifer/calf ranch - Remove manure that is not dry from individual cow freestall beds or rake, harrow, scrape, or grade freestall bedding at least once every 7 days.	0%	0%
☐	☐	(D) For a medium dairy only (500 to 999 milk cows) - Remove manure that is not dry from individual cow freestall beds or rake, harrow, scrape, or grade freestall bedding at least once every 14 days.	0%	0%
Total Control Efficiency			10.00%	10.00%
Lanes Mitigations				
☒	☒	Feed according to NRC guidelines	10%	10%
☒	☒	Pave feedlanes, where present, for a width of at least 8 feet along the corral side of the feedlane fence for milk and dry cows and at least 6 feet along the corral side of the feedlane for heifers. Note: No control efficiency at this time.	0%	0%
☐	☐	Dairies: Flush, scrape, or vacuum freestall flush lanes immediately prior to or after, or during each milking; or flush or scrape freestall flush lanes at least 3 times per day. Heifer/Calf Ranches: Vacuum, scrape, or flush freestalls at least once every seven days.	0%	0%
☐	☐	(D) Have no animals in exercise pens or corrals at any time.	0%	0%
Total Control Efficiency			10.00%	10.00%

Liquid Manure Handling				
Measure Proposed?		Mitigation Measure(s) per Emissions Point	VOC Control Efficiency (%)	
Pre-Project	Post-Project		Pre-Project	Post-Project
		Lagoons/Storage Ponds Mitigations		
☒	☒	Feed according to NRC guidelines	10%	10%
☐	☐	Use phototropic lagoon	0%	0%
☐	☒	Use an anaerobic treatment lagoon designed according to NRCS Guideline No. 359, or aerobic treatment lagoon, or mechanically aerated lagoon, or covered lagoon digester vented to a control device with minimum 95% control	0%	40%
☒	☒	Remove solids from the waste system with a solid separator system, prior to the waste entering the lagoon. Note: If selected for dairies > 999 milk cows, control efficiency is already included in EF.	0%	0%
☐	☐	Maintain lagoon pH between 6.5 and 7.5	0%	0%
Total Control Efficiency			10.00%	46.00%
		Liquid Manure Land Application Mitigations		
☒	☒	Feed according to NRC guidelines	10%	10%
☐	☒	Only apply liquid manure that has been treated with an anaerobic or aerobic treatment lagoon, aerobic lagoon, or digester system	0%	40%
☒	☐	Allow liquid manure to stand in the fields for no more than 24 hours after irrigation. Note: If selected for dairies > 999 milk cows, control efficiency is already included in EF.	0%	0%
☐	☐	Apply liquid/slurry manure via injection with drag hose or similar apparatus	0%	0%
Total Control Efficiency			10.00%	46.00%

Solid Manure Handling				
Measure Proposed?		Mitigation Measure(s) per Emissions Point	VOC Control Efficiency (%)	
Pre-Project	Post-Project		Pre-Project	Post-Project
		Solid Manure Storage Mitigations		
☒	☒	Feed according to NRC guidelines	10%	10%
☐	☐	LARGE CAFO ONLY: Within 72 hours of removal from housing, either a) remove dry manure from the facility, or b) cover dry manure outside the housing with a weatherproof covering from October through May, except for times when wind events remove the covering, not to exceed 24 hours per event.	0%	0%
Total Control Efficiency			10.00%	10.00%
		Separated Solids Piles Mitigations		
☒	☒	Feed according to NRC guidelines	10%	10%
☒	☒	LARGE CAFO ONLY: Within 72 hours of removal from the drying process, either a) remove separated solids from the facility, or b) cover separated solids outside the housing with a weatherproof covering from October through May, except for times when wind events remove the covering, not to exceed 24 hours per event.	10%	10%
Total Control Efficiency			19.00%	19.00%
		Solid Manure Land Application Mitigations		
☒	☒	Feed according to NRC guidelines	10%	10%
☐	☒	Incorporate all solid manure within 72 hours of land application. Note: If selected for dairies > 999 milk cows, control efficiency is already included in EF. Note: No additional control given for rapid manure incorporation (e.g. BACT requirement).	0%	0%
☐	☐	Only apply solid manure that has been treated with an anaerobic treatment lagoon, aerobic lagoon or digester system.	0%	0%
☒	☐	Apply no solid manure with a moisture content of more than 50%	10%	0%
Total Control Efficiency			19.00%	10.00%

Silage and TMR				
Measure Proposed?		Mitigation Measure(s) per Emissions Point	VOC Control Efficiency (%)	
Pre-Project	Post-Project		Pre-Project	Post-Project
		Corn/Alfalfa/Wheat Silage Mitigations		
		1. Utilize a sealed feed storage system (e.g. Ag-Bag) for bagged silage, or		

☒	☒	2. Cover the surface of silage piles, except for the area where feed is being removed from the pile, with a plastic tarp that is at least 5 mils thick (0.005 inches), multiple plastic tarps with a cumulative thickness of at least 5 mils (0.005 inches), or an oxygen barrier film covered with a UV resistant material within 72 hours of last delivery of material to the pile, and implement one of the following: a) build silage piles such that the average bulk density is at least 44 lb/cu-ft for corn silage and 40 lb/cu-ft for other silage types, as measured in accordance with Section 7.10 of Rule 4570, b) when creating a silage pile, adjust filling parameters to assure a calculated average bulk density of at least 44 lb/cu-ft for corn silage and at least 40 lb/cu-ft for other silage types, using a spreadsheet approved by the District, c) harvest silage crop at > or = 65% moisture for corn; and >= 60% moisture for alfalfa/grass and other silage crops; manage silage material delivery such that no more than 6 inches of materials are uncompacted on top of the pile; and incorporate the applicable Theoretical Length of Chop (TLC) and roller opening for the crop being harvested. <u>For dairies</u> - implement <u>two</u> of the following: <u>For heifer/calf ranches</u> - implement <u>one</u> of the following: <u>Manage Exposed Silage.</u> a) manage silage piles such that only one silage pile has an uncovered face and the uncovered face has a total exposed surface area of less than 2,150 sq. ft., or b) manage multiple uncovered silage piles such that the total exposed surface area of all silage piles is less than 4,300 sq ft. <u>Maintain Silage Working Face.</u> a) use a shaver/facer to remove silage from the silage pile, or b) maintain a smooth vertical surface on the working face of the silage pile <u>Silage Additive:</u> a) inoculate silage with homolactic acid bacteria in accordance with manufacturer recommendations to achieve a concentration of at least 100,000 colony forming units per gram of wet forage or apply propionic acid, benzoic acid, sorbic acid, sodium benzoate, or potassium sorbate at a rate specified by the manufacturer to reduce yeast counts when forming silage pile; or b) apply other additives at specified rates that have been demonstrated to reduce alcohol concentrations in silage and/or VOC emissions from silage and have been approved by the District and EPA.	39.0%	39.0%
Total Control Efficiency*			39.00%	39.00%

*Assumes 25% control for density mitigation measures and 10% each for the two optional measures, resulting in an overall control of 39%. The same conservative control efficiency will be applied to the sealed feed storage system (Ag-Bag).

		TMR Mitigations		
☒	☒	(D) Push feed so that it is within 3 feet of feedlane fence within 2 hrs of putting out the feed or use a feed trough or other feeding structure designed to maintain feed within reach of the cows.	10%	10%
☒	☒	(D) Begin feeding total mixed rations within 2 hrs of grinding and mixing rations. <i>Note: If selected for dairies > 999 milk cows, control efficiency already included in EF.</i>	0%	0%
☐	☐	Feed steam-flaked, dry rolled, cracked or ground corn or other ground cereal grains.	0%	0%
☒	☒	Remove uneaten wet feed from feed bunks within 24 hrs after then end of a rain event.	10%	10%
☐	☐	(D) For total mixed rations that contain at least 30% by weight of silage, feed animals total mixed rations that contain at least 45% moisture.	0%	0%
☐	☐	Feed according to NRC guidelines. <i>Note: If selected for dairies, control efficiency already included in EF.</i>	0%	0%
Total Control Efficiency			19.00%	19.00%

Ammonia Mitigation Measures and Control Efficiencies

Milking Parlor				
Measure Proposed?		Mitigation Measure(s) per Emissions Point	NH3 Control Efficiency (%)	
Pre-Project	Post-Project		Pre-Project	Post-Project
		Milking Parlor Floor Mitigations		
☒	☒	Feed according to NRC guidelines	28%	28%
Total Control Efficiency			28%	28%

Cow Housing				
Measure Proposed?		Mitigation Measure(s) per Emissions Point	NH3 Control Efficiency (%)	
Pre-Project	Post-Project		Pre-Project	Post-Project
		Corrals/Pens Mitigations		
☒	☒	Feed according to NRC guidelines	28%	28%
☒	☒	Clean manure from corrals at least four times per year with at least 60 days between cleaning, or clean corrals at least once between April and July and at least once between September and December. OR Use lime or a similar absorbent material in the corral according to the manufacturer's recommendation to minimize moisture in the corrals. OR Apply thymol to the corral soil in accordance with the manufacturer's recommendation.	50%	50%
Total Control Efficiency			64%	64%
		Bedding Mitigations		
☒	☒	Feed according to NRC guidelines	28%	28%
☐	☐	Use non-manure-based bedding and non-separated solids based bedding for at least 90% of the bedding material, by weight, for freestalls (e.g. rubber mats, almond shells, sand, or waterbeds). OR For a large dairy only (1,000 milk cows or larger) - Remove manure that is not dry from individual cow freestall beds or rake, harrow, scrape, or grade freestall bedding at least once every 7 days. OR For a medium dairy only (500 to 999 milk cows) - Remove manure that is not dry from individual cow freestall beds or rake, harrow, scrape, or grade freestall bedding at least once every 14 days.	0.0%	0.0%
Total Control Efficiency			28.00%	28.00%
		Lanes Mitigations		
☒	☒	Feed according to NRC guidelines	28%	28%
Total Control Efficiency			28%	28%

Liquid Manure Handling				
Measure Proposed?		Mitigation Measure(s) per Emissions Point	NH3 Control Efficiency (%)	
Pre-Project	Post-Project		Pre-Project	Post-Project
		Lagoons/Storage Ponds Mitigations		
☒	☒	Feed according to NRC guidelines	28%	28%
☒	☒	Use phototropic lagoon OR Remove solids from the waste system with a solid separator system, prior to the waste entering the lagoon.	80%	80%
Total Control Efficiency			85.6%	85.6%
		Liquid Manure Land Application Mitigations		
☒	☒	Feed according to NRC guidelines	28%	28%
☐	☒	Only apply liquid manure that has been treated with an anaerobic treatment lagoon	0%	42%
Total Control Efficiency			28.00%	58.24%

Solid Manure Handling				
Measure Proposed?		Mitigation Measure(s) per Emissions Point	NH3 Control Efficiency (%)	
Pre-Project	Post-Project		Pre-Project	Post-Project
		Solid Manure Land Application Mitigations		
☒	☒	Feed according to NRC guidelines	28%	28%
☐	☐	Incorporate all solid manure within 72 hours of land application. AND Only apply solid manure that has been treated with an anaerobic treatment lagoon, aerobic lagoon or digester system. AND Apply no solid manure with a moisture content of more than 50%	0%	0%
Total Control Efficiency			28.00%	28.00%

Dairy Emission Factors

			lb/hd-yr Dairy Emissions Factors for Holstein Cows																											
			Milk Cows				Dry Cows				Large Heifers (15 to 24 months)				Medium Heifers (7 to 14 months)				Small Heifers (3 to 6 months)				Calves (0 - 3 months)				Bulls			
			Uncontrolled		Controlled		Uncontrolled		Controlled		Uncontrolled		Controlled		Uncontrolled		Controlled		Uncontrolled		Controlled		Uncontrolled		Controlled		Uncontrolled		Controlled	
			<1000 milk cows	≥1000 milk cows	EF1	EF2	<1000 milk cows	≥1000 milk cows	EF1	EF2	<1000 milk cows	≥1000 milk cows	EF1	EF2	<1000 milk cows	≥1000 milk cows	EF1	EF2	<1000 milk cows	≥1000 milk cows	EF1	EF2	<1000 milk cows	≥1000 milk cows	EF1	EF2	<1000 milk cows	≥1000 milk cows	EF1	EF2
Milking Parlor	VOC	Enteric Emissions in Milking Parlors	0.43	0.41	0.37	0.37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
		Milking Parlor Floor	0.04	0.03	0.03	0.03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
		Total	0.47	0.44	0.40	0.40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
		NH3	Total	0.19	0.19	0.14	0.14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cow Housing	VOC	Enteric Emissions in Cow Housing	3.89	3.69	3.32	3.32	2.33	2.23	2.01	2.01	1.81	1.71	1.54	1.54	1.23	1.17	1.05	1.05	0.69	0.65	0.58	0.58	0.32	0.31	0.28	0.28	1.10	1.04	0.94	0.94
		Corrals/Pens	10.00	6.60	5.08	5.08	5.40	3.59	2.76	2.76	4.20	2.76	2.12	2.12	2.85	1.88	1.45	1.45	1.60	1.04	0.80	0.80	0.75	0.50	0.39	0.39	2.55	1.67	1.29	1.29
		Bedding	1.05	1.00	0.90	0.90	0.57	0.54	0.49	0.49	0.44	0.42	0.38	0.38	0.30	0.28	0.26	0.26	0.17	0.16	0.14	0.14	0.08	0.08	0.07	0.07	0.27	0.25	0.23	0.23
		Lanes	0.84	0.80	0.72	0.72	0.45	0.44	0.39	0.39	0.35	0.33	0.30	0.30	0.24	0.23	0.21	0.21	0.13	0.13	0.11	0.11	0.06	0.06	0.05	0.05	0.21	0.20	0.18	0.18
		Total	15.78	12.09	10.02	10.02	8.75	6.80	5.65	5.65	6.81	5.22	4.34	4.34	4.62	3.56	2.96	2.96	2.59	1.98	1.64	1.64	1.22	0.95	0.79	0.79	4.13	3.16	2.63	2.63
	NH3	Enteric Emissions in Cow Housing	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Corrals/Pens	41.90	41.90	15.08	15.08	21.20	21.20	7.63	7.63	11.00	11.00	3.96	3.96	7.90	7.90	2.84	2.84	6.00	6.00	2.16	2.16	1.80	1.80	0.65	0.65	15.30	15.30	5.51	5.51
		Bedding	6.30	6.30	4.54	4.54	3.20	3.20	2.30	2.30	1.70	1.70	1.22	1.22	1.20	1.20	0.86	0.86	0.90	0.90	0.65	0.65	0.30	0.30	0.22	0.22	2.30	2.30	1.66	1.66
		Lanes	5.10	5.10	3.67	3.67	2.60	2.60	1.87	1.87	1.30	1.30	0.94	0.94	1.00	1.00	0.72	0.72	0.70	0.70	0.50	0.50	0.20	0.20	0.14	0.14	1.90	1.90	1.37	1.37
		Total	53.30	53.30	23.29	23.29	27.00	27.00	11.81	11.81	14.00	14.00	6.12	6.12	10.10	10.10	4.43	4.43	7.60	7.60	3.31	3.31	2.30	2.30	1.01	1.01	19.50	19.50	8.53	8.53
Liquid Manure Handling	VOC	Lagoons/Storage Ponds	1.52	1.30	1.17	0.70	0.82	0.71	0.64	0.38	0.64	0.54	0.49	0.29	0.43	0.37	0.33	0.20	0.24	0.21	0.19	0.11	0.11	0.10	0.09	0.05	0.40	0.33	0.30	0.18
		Liquid Manure Land Application	1.64	1.40	1.26	0.76	0.89	0.76	0.69	0.41	0.69	0.58	0.53	0.32	0.47	0.40	0.36	0.22	0.26	0.22	0.20	0.12	0.12	0.11	0.10	0.06	0.42	0.35	0.32	0.19
		Total	3.16	2.70	2.43	1.46	1.71	1.47	1.33	0.79	1.33	1.13	1.02	0.61	0.90	0.77	0.69	0.42	0.51	0.43	0.38	0.23	0.24	0.21	0.18	0.11	0.82	0.68	0.61	0.37
	NH3	Lagoons/Storage Ponds	8.20	8.20	1.18	1.18	4.20	4.20	0.60	0.60	2.20	2.20	0.32	0.32	1.50	1.50	0.22	0.22	1.20	1.20	0.17	0.17	0.35	0.35	0.05	0.05	3.00	3.00	0.43	0.43
		Liquid Manure Land Application	8.90	8.90	6.41	3.72	4.50	4.50	3.24	1.88	2.30	2.30	1.66	0.96	1.70	1.70	1.22	0.71	1.30	1.30	0.94	0.54	0.37	0.37	0.27	0.15	3.23	3.23	2.33	1.35
		Total	17.10	17.10	7.59	4.90	8.70	8.70	3.84	2.48	4.50	4.50	1.97	1.28	3.20	3.20	1.44	0.93	2.50	2.50	1.11	0.72	0.72	0.72	0.32	0.20	6.23	6.23	2.76	1.78
Solid Manure Handling	VOC	Solid Manure Storage	0.16	0.15	0.14	0.14	0.09	0.08	0.07	0.07	0.07	0.06	0.06	0.06	0.05	0.04	0.04	0.04	0.03	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.04	0.04	0.04	0.04
		Separated Solids Piles	0.06	0.06	0.05	0.05	0.03	0.03	0.03	0.03	0.03	0.03	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.02	0.02	0.02	0.02	
		Solid Manure Land Application	0.39	0.33	0.27	0.30	0.21	0.18	0.15	0.16	0.16	0.14	0.11	0.12	0.11	0.09	0.08	0.08	0.06	0.05	0.04	0.05	0.03	0.03	0.02	0.02	0.10	0.08	0.06	0.07
		Total	0.61	0.54	0.45	0.48	0.33	0.29	0.25	0.26	0.26	0.23	0.19	0.20	0.17	0.15	0.13	0.14	0.10	0.09	0.07	0.08	0.05	0.04	0.03	0.04	0.16	0.14	0.12	0.12
	NH3	Solid Manure Storage	0.95	0.95	0.95	0.95	0.48	0.48	0.48	0.48	0.25	0.25	0.25	0.25	0.18	0.18	0.18	0.18	0.13	0.13	0.13	0.13	0.04	0.04	0.04	0.04	0.35	0.35	0.35	0.35
		Separated Solids Piles	0.38	0.38	0.38	0.38	0.19	0.19	0.19	0.19	0.10	0.10	0.10	0.10	0.07	0.07	0.07	0.07	0.05	0.05	0.05	0.05	0.02	0.02	0.02	0.02	0.14	0.14	0.14	0.14
		Solid Manure Land Application	2.09	2.09	1.50	1.50	1.06	1.06	0.76	0.76	0.55	0.55	0.40	0.40	0.39	0.39	0.28	0.28	0.30	0.30	0.22	0.22	0.09	0.09	0.06	0.06	0.76	0.76	0.55	0.55
Total	3.42	3.42	2.83	2.83	1.73	1.73	1.43	1.43	0.90	0.90	0.75	0.75	0.64	0.64	0.53	0.53	0.48	0.48	0.40	0.40	0.15	0.15	0.12	0.12	1.25	1.25	1.04	1.04		

Silage and TMR (Total Mixed Ration) Emissions (ug/m^2-min)					
		Silage Type	Uncontrolled	EF1	EF2
Feed Storage and Handling	VOC	Corn Silage	34,681	21,155	21,155
		Alfalfa Silage	17,458	10,649	10,649
		Wheat Silage	43,844	26,745	26,745
		TMR	13,056	10,575	10,575

Assumptions: 1) Each silage pile is completely covered except for the front face and 2) Rations are fed within 48 hours.

PM ₁₀ Emission Factors (lb/hd-yr)		
Type of Cow	Dairy EF	Source
Cows in Freestalls	1.37	Based on a Summer 2003 study by Texas A&M ASAE at a West Texas Dairy
Milk/Dry in Loafing Barns	2.73	SJVAPCD
Heifers/Bulls in Loafing Barns	5.28	SJVAPCD
Calves in Loafing Barns	0.69	SJVAPCD
Milk/Dry in Corrals	5.46	Based on a Summer 2003 study by Texas A&M ASAE at a West Texas Dairy
Support Stock (Heifers/Bulls) in Open Corrals	10.55	Based on a USDA/UC Davis report quantifying dairy and feedlot emissions in Tulare & Kern Counties (April '01)
Large Heifers in Open Corrals	8.01	SJVAPCD
Calf (under 3 mo.) open corrals	1.37	SJVAPCD
Calf on-ground hutches	0.343	SJVAPCD
Calf above-ground flushed	0.069	SJVAPCD
Calf above-ground scraped	0.206	SJVAPCD

The controlled PM₁₀ EF will be calculated based on the specific PM₁₀ mitigation measures, if any, for each freestall, corral, or calf hutch area. See the PM Mitigation Measures for calculations.

Control Measure	PM10 Control Efficiency
Shaded corrals (milk and dry cows)	16.7%
Shaded corrals (heifers and bulls)	8.3%
Downwind shelterbelts	12.5%
Upwind shelterbelts	10%
Freestall with no exercise pens and non-manure based bedding	90%
Freestall with no exercise pens and manure based bedding	80%
Fibrous layer in dusty areas (i.e. hay, etc.)	10%
Bi-weekly corral/exercise pen scraping and/or manure removal using a pull type manure harvesting equipment in morning hours when moisture in air except during periods of rainy weather	15%
Sprinkling of open corrals/exercise pens	12.5%
Feeding young stock (heifers and calves) near dusk	10%

Pre-Project PM10 Mitigation Measures

[illegible]

[illegible]

Post-Project PM10 Mitigation Measures

Post-Project PM10 Mitigation Measures															
Housing Name(s) #(s)	or	Type of Housing	Type of cow	Total # of cows in Each Housing Structure(s)	Maximum Design Capacity of Each Structure	# of Combined Housing Structures in row	Shaded Corrals	Downwind Shelterbelts	Upwind Shelterbelts	No exercise pens, non-manure bedding	No exercise pens, manure bedding	Fibrous layer	Bi-weekly scraping Corrals/Pens	Sprinkling Corrals/Pens	Feed Young Stock Near Dusk
1		1 - 10	open corral	milk cows	270	270	10	☐	☐	☐	☐	☐	☐	☐	☐
2		11	open corral	support stock	270	270	1	☐	☐	☐	☐	☐	☐	☐	☐
3		12	open corral	dry cows	225	225	1	☐	☐	☐	☐	☐	☐	☐	☐
4		13 - 16	open corral	support stock	256	256	4	☐	☐	☐	☐	☐	☐	☐	☐
5		17	open corral	milk cows	40	40	1	☐	☐	☐	☐	☐	☐	☐	☐
6		18	open corral	milk cows	20	20	1	☐	☐	☐	☐	☐	☐	☐	☐
7		19	open corral	milk cows	40	40	1	☐	☐	☐	☐	☐	☐	☐	☐
8		20 & 21	open corral	dry cows	75	75	2	☐	☐	☐	☐	☐	☐	☐	☐
9		22	open corral	dry cows	50	50	1	☐	☐	☐	☐	☐	☐	☐	☐
10							☐	☐	☐	☐	☐	☐	☐	☐	☐
11							☐	☐	☐	☐	☐	☐	☐	☐	☐
12							☐	☐	☐	☐	☐	☐	☐	☐	☐
13							☐	☐	☐	☐	☐	☐	☐	☐	☐
14							☐	☐	☐	☐	☐	☐	☐	☐	☐
15							☐	☐	☐	☐	☐	☐	☐	☐	☐
16							☐	☐	☐	☐	☐	☐	☐	☐	☐
17							☐	☐	☐	☐	☐	☐	☐	☐	☐
18							☐	☐	☐	☐	☐	☐	☐	☐	☐
19							☐	☐	☐	☐	☐	☐	☐	☐	☐
20							☐	☐	☐	☐	☐	☐	☐	☐	☐
21							☐	☐	☐	☐	☐	☐	☐	☐	☐
22							☐	☐	☐	☐	☐	☐	☐	☐	☐
23							☐	☐	☐	☐	☐	☐	☐	☐	☐
24							☐	☐	☐	☐	☐	☐	☐	☐	☐
25							☐	☐	☐	☐	☐	☐	☐	☐	☐
26							☐	☐	☐	☐	☐	☐	☐	☐	☐
27							☐	☐	☐	☐	☐	☐	☐	☐	☐
28							☐	☐	☐	☐	☐	☐	☐	☐	☐
29							☐	☐	☐	☐	☐	☐	☐	☐	☐
30							☐	☐	☐	☐	☐	☐	☐	☐	☐
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37							☐	☐	☐	☐	☐	☐	☐	☐	☐
38							☐	☐	☐	☐	☐	☐	☐	☐	☐
39							☐	☐	☐	☐	☐	☐	☐	☐	☐
40							☐	☐	☐	☐	☐	☐	☐	☐	☐
Post-Project PM10 Mitigation Measures for New Housing Units at an Expanding Dairy															
Housing Name(s) #(s)	or	Type of Housing	Type of cow	Total # of cows in Each Housing Structure(s)	Maximum Design Capacity of Each Structure	# of Combined Housing Structures in row	Shaded Corrals	Downwind Shelterbelts	Upwind Shelterbelts	No exercise pens, non-manure bedding	No exercise pens, manure bedding	Fibrous layer	Bi-weekly scraping Corrals/Pens	Sprinkling Corrals/Pens	Feed Young Stock Near Dusk
1							☐	☐	☐	☐	☐	☐	☐	☐	☐
2							☐	☐	☐	☐	☐	☐	☐	☐	☐
3							☐	☐	☐	☐	☐	☐	☐	☐	☐
4							☐	☐	☐	☐	☐	☐	☐	☐	☐
5							☐	☐	☐	☐	☐	☐	☐	☐	☐
6							☐	☐	☐	☐	☐	☐	☐	☐	☐
7							☐	☐	☐	☐	☐	☐	☐	☐	☐
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9							☐	☐	☐	☐	☐	☐	☐	☐	☐
10							☐	☐	☐	☐	☐	☐	☐	☐	☐
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12							☐	☐	☐	☐	☐	☐	☐	☐	☐
13							☐	☐	☐	☐	☐	☐	☐	☐	☐
14							☐	☐	☐	☐	☐	☐	☐	☐	☐
Post-Project Total # of Cows				4,519											

Post-Project PM10 Control Efficiencies and Emission Factors

	Housing Name(s) #(s)	or	Type of Housing	Type of cow	Total # of cows in Each Housing Structure(s)	Maximum Design Capacity of Each Structure	Uncontrolled EF (lb/hd-yr)	Shaded Corrals	Downwind Shelterbelts	Upwind Shelterbelts	No exercise pens, non-manure bedding	No exercise pens, manure bedding	Fibrous layer	Bi-weekly scraping Corrals/Pens	Sprinkling Corrals/Pens	Feed Young Stock Near Dusk	Controlled EF (lb/hd-yr)
1	1 - 10		open corral	milk cows	270	270	5.460	16.7%						15%			3.87
2	11		open corral	support stock	270	270	10.550	8.3%						15%			8.22
3	12		open corral	dry cows	225	225	5.460	16.7%						15%			3.87
4	13 - 16		open corral	support stock	256	256	10.550	8.3%						15%			8.22
5	17		open corral	milk cows	40	40	5.460	16.7%						15%			3.87
6	18		open corral	milk cows	20	20	5.460	16.7%						15%			3.87
7	19		open corral	milk cows	40	40	5.460	16.7%						15%			3.87
8	20 & 21		open corral	dry cows	75	75	5.460	16.7%						15%			3.87
9	22		open corral	dry cows	50	50	5.460	16.7%						15%			3.87
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Post-Project PM10 Control Efficiencies and Emission Factors for New Housing Emissions Units

	Housing Name(s) #(s)	or	Type of Housing	Type of cow	Total # of cows in Each Housing Structure(s)	Maximum Design Capacity of Each Structure	Uncontrolled EF (lb/hd-yr)	Shaded Corrals	Downwind Shelterbelts	Upwind Shelterbelts	No exercise pens, non-manure bedding	No exercise pens, manure bedding	Fibrous layer	Bi-weekly scraping Corrals/Pens	Sprinkling Corrals/Pens	Feed Young Stock Near Dusk	Controlled EF (lb/hd-yr)
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Pre-Project Potential to Emit - Cow Housing

Pre-Project Potential to Emit - Cow Housing												
	Housing Name(s) or #s	Type of Cow	# of Cows	Controlled VOC EF (lb/hd-yr)	Controlled NH3 EF (lb/hd-yr)	Controlled PM10 EF (lb/hd-yr)	VOC (lb/day)	VOC (lb/yr)	NH3 (lb/day)	NH3 (lb/yr)	PM10 (lb/day)	PM10 (lb/yr)
1	1 - 10	milk cows	1,750	10.02	23.29	4.55	48.0	17,535	111.7	40,761	21.8	7,959
2	11	support stock	130	4.34	6.12	9.67	1.5	564	2.2	796	3.4	1,258
3	12	support stock	128	4.34	6.12	9.67	1.5	556	2.1	783	3.4	1,238
4	13 - 16	support stock	512	4.34	6.12	9.67	6.1	2,222	8.6	3,133	13.6	4,953
5	17	milk cows	35	10.02	23.29	4.55	1.0	351	2.2	815	0.4	159
6	18	milk cows	15	10.02	23.29	4.55	0.4	150	1.0	349	0.2	68
7	19	dry cows	30	5.65	11.81	4.55	0.5	170	1.0	354	0.4	136
8	20 & 21	dry cows	150	5.65	11.81	4.55	2.3	848	4.9	1,771	1.9	682
9	22	dry cows	50	5.65	11.81	4.55	0.8	283	1.6	590	0.6	227
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40												
Pre-Project Total # of Cows			2,800				62.1	22,679	135.3	49,352	45.7	16,680

*Multiple emissions units (freestalls, corrals, calf hutch areas, etc.) are combined in these rows.

Pre-Project Totals						
Total # of Cows	VOC (lb/day)	VOC (lb/yr)	NH3 (lb/day)	NH3 (lb/yr)	PM10 (lb/day)	PM10 (lb/yr)
2,800	62.1	22,679	135.3	49,352	45.7	16,680

Calculations:

Annual PE 1 for each pollutant (lb/yr) = Controlled EF (lb/hd-yr) x # of cows (hd)

Daily PE1 for each pollutant (lb/day) = [Controlled EF (lb/hd-yr) x # of cows (hd)] ÷ 365 (day/yr)

Post-Project Potential to Emit - Cow Housing

Post-Project Potential to Emit - Cow Housing												
	Housing Name(s) or #s	Type of Cow	# of Cows	Controlled VOC EF (lb/hd-yr)	Controlled NH3 EF (lb/hd-yr)	Controlled PM10 EF (lb/hd-yr)	VOC (lb/day)	VOC (lb/yr)	NH3 (lb/day)	NH3 (lb/yr)	PM10 (lb/day)	PM10 (lb/yr)
1	1 - 10	milk cows	2,700	10.02	23.29	3.87	74.1	27,054	172.3	62,888	28.6	10,438
2	11	support stock	270	4.34	6.12	8.22	3.2	1,172	4.5	1,652	6.1	2,220
3	12	dry cows	225	5.65	11.81	3.87	3.5	1,271	7.3	2,657	2.4	870
4	13 - 16	support stock	1,024	4.34	6.12	8.22	12.2	4,444	17.2	6,267	23.1	8,420
5	17	milk cows	40	10.02	23.29	3.87	1.1	401	2.6	932	0.4	155
6	18	milk cows	20	10.02	23.29	3.87	0.5	200	1.3	466	0.2	77
7	19	milk cows	40	10.02	23.29	3.87	1.1	401	2.6	932	0.4	155
8	20 & 21	dry cows	150	5.65	11.81	3.87	2.3	848	4.9	1,771	1.6	580
9	22	dry cows	50	5.65	11.81	3.87	0.8	283	1.6	590	0.5	193
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Post-Project # of Cows (non-expansion)			4,519				98.8	36,074	214.3	78,155	63.3	23,108

*Multiple emissions units (freestalls, corrals, calf hutch areas, etc.) are combined in these rows.

Post-Project Potential to Emit - Cow Housing: New Housing Units at an Expanding Dairy												
	Housing Name(s) or #s	Type of Cow	# of Cows	Controlled VOC EF (lb/hd-yr)	Controlled NH3 EF (lb/hd-yr)	Controlled PM10 EF (lb/hd-yr)	VOC (lb/day)	VOC (lb/yr)	NH3 (lb/day)	NH3 (lb/yr)	PM10 (lb/day)	PM10 (lb/yr)
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13												
14												
Total # of Cows From Expansion			0				0.0	0	0.0	0	0.0	0

*Multiple emissions units (freestalls, corrals, calf hutch areas, etc.) are combined in these rows.

Post-Project Totals						
Total # of Cows	VOC (lb/day)	VOC (lb/yr)	NH3 (lb/day)	NH3 (lb/yr)	PM10 (lb/day)	PM10 (lb/yr)
4,519	98.8	36,074	214.3	78,155	63.3	23,108

Calculations:

Annual PE 2 for each pollutant (lb/yr) = Controlled EF (lb/hd-yr) x # of cows (hd)

Daily PE2 for each pollutant (lb/day) = [Controlled EF (lb/hd-yr) x # of cows (hd)] ÷ 365 (day/yr)

Pre-Project Potential to Emit (PE1)

Pre-Project Herd Size						
Herd	Flushed Freestalls	Scraped Freestalls	Flushed Corrals	Scraped Corrals	Total # of Animals	
Milk Cows	0	0	1,800	0	1,800	
Dry Cows	0	0	230	0	230	
Support Stock (Heifers, Calves and Bulls)	0	0	770	0	770	
Large Heifers	0	0	0	0	0	
Medium Heifers	0	0	0	0	0	
Small Heifers	0	0	0	0	0	
Bulls	0	0	0	0	0	
	Calf Hutches				Calf Corrals	
	Aboveground Flushed	Aboveground Scraped	On-Ground Flushed	On-Ground Scraped	Flushed	Scraped
Calves	0	0	0	0	0	0
Total # of Calves						

Silage Information				
Feed Type	Maximum # Open Piles	Maximum Height (ft)	Maximum Width (ft)	Open Face Area (ft^2)
Corn	1	20	120	1,768
Alfalfa	0	0	0	
Wheat	1	20	100	1,514

Milking Parlor				
Cow	VOC		NH3	
	lb/day	lb/yr	lb/day	lb/yr
Milk Cows	2.0	720	0.7	246

Cow Housing					
Cow	VOC		NH3		PM10
	lb/day	lb/yr	lb/day	lb/yr	lb/day
Total	62.1	22,679	135.3	49,352	45.7

Liquid Manure Handling					
Cow	VOC		NH3		H2S*
	lb/day	lb/yr	lb/day	lb/yr	lb/day
Milk Cows	12.0	4,374	37.4	13,662	0.9
Dry Cows	0.8	306	2.4	883	0.1
Support Stock (Heifers, Calves and Bulls)	2.2	785	4.2	1,517	0.1
Large Heifers	0.0	0	0.0	0	0
Medium Heifers	0.0	0	0.0	0	0
Small Heifers	0.0	0	0.0	0	0
Calves	0.0	0	0.0	0	0
Bulls	0.0	0	0.0	0	0
Total	15.0	5,465	44.0	16,062	1.1

Solid Manure Handling				
Cow	VOC		NH3	
	lb/day	lb/yr	lb/day	lb/yr
Milk Cows	2.2	810	14.0	5,094
Dry Cows	0.2	58	0.9	329
Support Stock (Heifers, Calves and Bulls)	0.4	146	1.6	578
Large Heifers	0.0	0	0.0	0
Medium Heifers	0.0	0	0.0	0
Small Heifers	0.0	0	0.0	0
Calves	0.0	0	0.0	0
Bulls	0.0	0	0.0	0
Total	2.8	1,014	16.5	6,000

Feed Handling and Storage		
	Daily PE (lb-VOC/day)	Annual PE (lb-VOC/yr)
Corn Emissions	11.0	4,019
Alfalfa Emissions	0.0	0
Wheat Emissions	11.9	4,350
TMR	61.7	22,530
Total	84.6	30,899

Total Daily Pre-Project Potential to Emit (lb/day)							
Permit	NOx	SOx	PM10	CO	VOC	NH3	H2S
Milking Parlor	0.0	0.0	0.0	0.0	2.0	0.7	0.0
Cow Housing	0.0	0.0	45.7	0.0	62.1	135.3	0.0
Liquid Manure	0.0	0.0	0.0	0.0	15.0	44.0	1.1
Solid Manure	0.0	0.0	0.0	0.0	2.8	16.5	0.0
Feed Handling	0.0	0.0	0.0	0.0	84.6	0.0	0.0
Total	0.0	0.0	45.7	0.0	166.5	196.5	1.1

Total Annual Pre-Project Potential to Emit (lb/yr)							
Permit	NOx	SOx	PM10	CO	VOC	NH3	H2S
Milking Parlor	0	0	0	0	720	246	0
Cow Housing	0	0	16,680	0	22,679	49,352	0
Liquid Manure	0	0	0	0	5,465	16,062	397
Solid Manure	0	0	0	0	1,014	6,000	0
Feed Handling	0	0	0	0	30,899	0	0
Total	0	0	16,680	0	60,777	71,661	397

Calculations for milking parlor:

Annual PE = (# milk cows) x (EF1 lb-pollutant/hd-yr)

Daily PE = (Annual PE lb/yr) ÷ (365 day/yr)

Calculations for cow housing:

See detailed calculations under Cow Housing Calculations worksheet.

Calculations for liquid manure and solid manure handling:

Annual PE = [(# milk cows) x (EF1 lb-pollutant/hd-yr)] + [(# dry cows) x (EF1 lb-pollutant/hd-yr)] + [(# large heifers) x (EF1 lb-pollutant/hd-yr)] + [(# medium heifers) x (EF1 lb-pollutant/hd-yr)] + [(# small heifers) x (EF1 lb-pollutant/hd-yr)] + [(# calves) x (EF1 lb-pollutant/hd-yr)] + [(# bulls) x (EF1 lb-pollutant/hd-yr)]

Daily PE = (Annual PE lb/yr) ÷ (365 day/yr)

The H2S emission factor is assumed to be 10% of the NH3 lagoon/storage pond(s) emission factor, for each respective herd size.

Calculations for silage emissions:

Annual PE = (EF1) x (area ft²) x (0.0929 m²/ft²) x (8,760 hr/yr) x (60 min/hr) x 2.20E-9 lb/μg

Daily PE = (Annual PE lb/yr) ÷ (365 day/yr)

Calculation for TMR emissions:

Annual PE = (# cows) x (EF1) x (0.658 m²) x (525,600 min/yr) x (2.20E-9 lb/μg)

Daily PE = (Annual PE lb/yr) ÷ (365 day/yr)

Notes are not included in TMR calculation.

*Since there will be no change to the lagoons/storage ponds surface area, no change in H2S emissions is expected. Therefore, it will be assumed that PE1 for H2S emissions is equal to PE2 for H2S emissions.

Major Source Emissions (lb/yr)					
Permit	NOx	SOx	PM10	CO	VOC
Milk Parlor	0	0	0	0	0
Cow Housing	0	0	0	0	0
Liquid Manure	0	0	0	0	2,631
Solid Manure	0	0	0	0	0
Feed Handling	0	0	0	0	0
Total	0	0	0	0	2,631

Post-Project Potential to Emit (PE2)

Post-Project Herd Size							
Herd	Flushed Freestalls	Scraped Freestalls	Flushed Corrals	Scraped Corrals	Total # of Animals		
Milk Cows	0	0	2,800	0	2,800		
Dry Cows	0	0	425	0	425		
Support Stock (Heifers, Calves, and Bulls)	0	0	1,294	0	1,294		
Large Heifers	0	0	0	0	0		
Medium Heifers	0	0	0	0	0		
Small Heifers	0	0	0	0	0		
Bulls	0	0	0	0	0		
	Calf Hutches				Calf Corrals		Total # of Calves
	Aboveground Flushed	Aboveground Scraped	On-Ground Flushed	On-Ground Scraped	Flushed	Scraped	
Calves	0	0	0	0	0	0	0

Silage Information				
Feed Type	Maximum # Open Piles	Maximum Height (ft)	Maximum Width (ft)	Open Face Area (ft*2)
Corn	1	20	120	1,768
Alfalfa	0	0	0	
Wheat	1	20	100	1,514

Milking Parlor				
Cow		VOC		NH3
Milk Cows	lb/day	lb/yr	lb/day	lb/yr
Total	3.1	1,120	1.0	383

Cow Housing					
	VOC		NH3		PM10
	lb/day	lb/yr	lb/day	lb/yr	lb/day
Total	98.8	36,074	214	78,155	63

Liquid Manure Handling					
Cow	VOC		NH3		H2S
	lb/day	lb/yr	lb/day	lb/yr	lb/day
Milk Cows	11.2	4,088	37.6	13,720	0.9
Dry Cows	0.9	336	2.9	1,054	0.1
Support Stock (Heifers, Calves, and Bulls)	2.2	789	4.5	1,656	0.1
Large Heifers	0.0	0	0.0	0	0
Medium Heifers	0.0	0	0.0	0	0
Small Heifers	0.0	0	0.0	0	0
Calves	0.0	0	0.0	0	0
Bulls	0.0	0	0.0	0	0
Total	14.3	5,213	45.0	16,430	1.1

Solid Manure Handling				
Cow	VOC		NH3	
	lb/day	lb/yr	lb/day	lb/yr
Milk Cows	3.7	1,344	21.7	7,924
Dry Cows	0.3	111	1.7	608
Support Stock (Heifers, Calves, and Bulls)	0.7	259	2.7	971
Large Heifers	0.0	0	0.0	0
Medium Heifers	0.0	0	0.0	0
Small Heifers	0.0	0	0.0	0
Calves	0.0	0	0.0	0
Bulls	0.0	0	0.0	0
Total	4.7	1,713	26.1	9,502

Feed Handling and Storage		
	Daily PE (lb-VOC/day)	Annual PE (lb-VOC/yr)
Corn Emissions	11.0	4,019
Alfalfa Emissions	0.0	0
Wheat Emissions	11.9	4,350
TMR	99.6	36,361
Total	122.5	44,731

Total Daily Post-Project Potential to Emit (lb/day)							
Permit	NOx	SOx	PM10	CO	VOC	NH3	H2S
Milking Parlor	0.0	0.0	0.0	0.0	3.1	1.0	0.0
Cow Housing	0.0	0.0	63.3	0.0	98.8	214.3	0.0
Liquid Manure	0.0	0.0	0.0	0.0	14.3	45.0	1.1
Solid Manure	0.0	0.0	0.0	0.0	4.7	26.1	0.0
Feed Handling	0.0	0.0	0.0	0.0	122.5	0.0	0.0
Total	0.0	0.0	63.3	0.0	243.4	286.4	1.1

Total Annual Post-Project Potential to Emit (lb/yr)							
Permit	NOx	SOx	PM10	CO	VOC	NH3	H2S
Milking Parlor	0	0	0	0	1,120	383	0
Cow Housing	0	0	23,108	0	36,074	78,155	0
Liquid Manure	0	0	0	0	5,213	16,430	397
Solid Manure	0	0	0	0	1,713	9,502	0
Feed Handling	0	0	0	0	44,731	0	0
Total	0	0	23,108	0	88,851	104,471	397

Calculations for milking parlor:

Annual PE = (# milk cows) x (EF2 lb-pollutant/hd-yr)

Daily PE = (Annual PE lb/yr) ÷ (365 day/yr)

Calculations for cow housing:

See detailed calculations under Cow Housing Calculations worksheet.

Calculations for liquid manure and solid manure handling:

Annual PE = [(# milk cows) x (EF1 lb-pollutant/hd-yr)] + [(# dry cows) x (EF2 lb-pollutant/hd-yr)] + [(# large heifers) x (EF2 lb-pollutant/hd-yr)] + [(# medium heifers) x (EF2 lb-pollutant/hd-yr)] + [(# small heifers) x (EF2 lb-pollutant/hd-yr)] + [(# calves) x (EF2 lb-pollutant/hd-yr)] + [(# bulls) x (EF2 lb-pollutant/hd-yr)]

Daily PE = (Annual PE lb/yr) ÷ (365 day/yr)

The H2S emission factor is assumed to be 10% of the NH3 lagoon/storage pond(s) emission factor, for each respective herd size.

Calculations for silage emissions:

Annual PE = (EF2) x (area ft²) x (0.0929 m²/ft²) x (8,760 hr/yr) x (60 min/hr) x 2.20E-9 lb/μg

Daily PE = (Annual PE lb/yr) ÷ (365 day/yr)

Calculation for TMR emissions:

Annual PE = (# cows) x (EF2) x (0.658 m²) x (525,600 min/yr) x (2.20E-9 lb/μg)

Daily PE = (Annual PE lb/yr) ÷ (365 day/yr)

Calves are not included in TMR calculation.

Major Source Emissions (lb/yr)					
Permit	NOx	SOx	PM10	CO	VOC
Milk Parlor	0	0	0	0	0
Cow Housing	0	0	0	0	0
Liquid Manure	0	0	0	0	2,497
Solid Manure	0	0	0	0	0
Feed Handling	0	0	0	0	0
Total	0	0	0	0	2,497

Increase in Emissions

SSiPE (lb/yr)							
	NOx	SOx	PM10	CO	VOC	NH3	H2S
Milking Parlor	0	0	0	0	400	137	0
Cow Housing	0	0	6,428	0	13,395	28,803	0
Liquid Manure	0	0	0	0	-252	368	0
Solid Manure	0	0	0	0	700	3,502	0
Feed Handling	0	0	0	0	13,832	0	0
Total	0	0	6,428	0	28,074	32,810	0

Total Daily Change in Emissions (lb/day)							
	NOx	SOx	PM10	CO	VOC	NH3	H2S
Milking Parlor	0.0	0.0	0.0	0.0	1.1	0.3	0.0
Cow Housing	0.0	0.0	17.6	0.0	36.7	79.0	0.0
Liquid Manure	0.0	0.0	0.0	0.0	-0.7	1.0	0.0
Solid Manure	0.0	0.0	0.0	0.0	1.9	9.6	0.0
Feed Handling	0.0	0.0	0.0	0.0	37.9	0.0	0.0
Total	0.0	0.0	17.6	0.0	76.9	89.9	0.0

Total Annual Change in Non-Fugitive Emissions (Major Source Emissions) (lb/yr)							
	NOx	SOx	PM10	CO	VOC	NH3	H2S
Milking Parlor	0	0	0	0	0	0	0
Cow Housing	0	0	0	0	0	0	0
Liquid Manure	0	0	0	0	-134	0	0
Solid Manure	0	0	0	0	0	0	0
Feed Handling	0	0	0	0	0	0	0
Total	0	0	0	0	-134	0	0

APPENDIX F

BACT Calculations

Pre-Project Worst Case BACT Calculations - Cow Housing

This table uses the worst case emission factor for each cow type and the maximum design capacity of the housing unit. This should only be used for BACT calculation purposes.

Worst-Case Pre-Project Potential to Emit - Cow Housing										
Housing Name(s) or #s	Type of Cow	Capacity per housing unit	Controlled VOC EF (lb/nd-yr)	Controlled NH3 EF (lb/nd-yr)	Controlled PM10 EF (lb/nd-yr)	VOC (lb/day)	VOC (lb/yr)	NH3 (lb/yr)	NH3 (lb/yr)	PM10 (lb/yr)
1	1 - 10	mb cows	270	10.02	22.25	0.22	7.8	2,705	11.2	6,359
2	11	supper/milk cows	270	10.02	22.25	0.22	7.8	2,705	11.2	6,359
3	12	supper/milk cows	270	10.02	22.25	0.22	7.8	2,705	11.2	6,359
4	13 - 16	supper/milk cows	270	10.02	22.25	0.22	7.8	2,705	11.2	6,359
5	17	mb cows	40	10.02	22.25	0.22	1.1	401	2.8	1,017
6	18	mb cows	20	10.02	22.25	0.22	0.5	200	1.4	509
7	19	mb cows	40	10.02	22.25	0.22	1.1	401	2.8	1,017
8	20 & 21	dry cows	75	10.02	22.25	0.22	2.5	752	4.6	1,517
9	22	dry cows	50	10.02	22.25	0.22	1.6	501	3.2	1,015
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36										
37										
38										
39										
40										
						34.2	12,465	79.6	29,024	12,015

*Multiple emissions units (feedlot, control, calf finish areas, etc.) are combined in these rows. BACT application has been calculated for each emissions unit in this row.

Pre-Project Totals					Calculations
VOC (lb/day)	VOC (lb/yr)	NH3 (lb/day)	NH3 (lb/yr)	PM10 (lb/day)	PM10 (lb/yr)
34.2	12,465	79.6	29,024	12.0	12,015

Annual PE 1 for each pollutant (lb/yr) = Controlled EF (lb/nd-yr) x # of cows (nd)
Daily PE2 for each pollutant (lb/day) = Controlled EF (lb/nd-yr) x # of cows (nd) x 365 (day/yr)

Post-Project Worst Case BACT Calculations - Existing Cow Housing

This table uses the worst case emission factor for each cow type and the maximum design capacity of the housing unit. This should only be used for BACT calculation purposes.

Post-Project Worst Case BACT Calculations - Existing Cow Housing										
Housing Name(s) or #s	Type of Cow	Capacity per housing unit	Controlled VOC EF (lb/nd-yr)	Controlled NH3 EF (lb/nd-yr)	Controlled PM10 EF (lb/nd-yr)	VOC (lb/day)	VOC (lb/yr)	NH3 (lb/yr)	NH3 (lb/yr)	PM10 (lb/yr)
1	1 - 10	mb cows	270	10.02	22.25	0.22	7.8	2,705	11.2	6,359
2	11	supper/milk cows	270	10.02	22.25	0.22	7.8	2,705	11.2	6,359
3	12	dry cows	270	10.02	22.25	0.22	6.2	2,255	14.4	5,291
4	13 - 16	supper/milk cows	270	10.02	22.25	0.22	7.8	2,705	11.2	6,359
5	17	mb cows	40	10.02	22.25	0.22	1.1	401	2.8	1,017
6	18	mb cows	20	10.02	22.25	0.22	0.5	200	1.4	509
7	19	mb cows	40	10.02	22.25	0.22	1.1	401	2.8	1,017
8	20 & 21	dry cows	75	10.02	22.25	0.22	2.5	752	4.6	1,517
9	22	dry cows	50	10.02	22.25	0.22	1.6	501	3.2	1,015
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31										
32										
33										
34										
35										
36										
37										
38										
39										
40										
						34.2	12,465	79.6	29,024	12,015

*Multiple emissions units (feedlot, control, calf finish areas, etc.) are combined in these rows. BACT application has been calculated for each emissions unit in this row.

Calculations				
Annual PE 2 for each pollutant (lb/yr) = Controlled EF (lb/nd-yr) x # of cows (nd)				
Daily PE2 for each pollutant (lb/day) = Controlled EF (lb/nd-yr) x # of cows (nd) x 365 (day/yr)				

Post-Project Worst Case BACT Calculations - New Cow Housing

This table uses the worst case emission factor for each cow type and the maximum design capacity of the housing unit. This should only be used for BACT calculation purposes.

Post-Project Potential to Emit - Cow Housing: New Freestalls at Existing Dairy										
Housing Name(s) or #s	Type of Cow	Capacity per housing unit	Controlled VOC EF (lb/nd-yr)	Controlled NH3 EF (lb/nd-yr)	Controlled PM10 EF (lb/nd-yr)	VOC (lb/day)	VOC (lb/yr)	NH3 (lb/yr)	NH3 (lb/yr)	PM10 (lb/yr)
1										
2										
3										
4										
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30										
31										
32										
33										
34										
35										
36										
37										
38										
39										
40										
						0.0	0	0.0	0	0

*Multiple emissions units (feedlot, control, calf finish areas, etc.) are combined in these rows. BACT application has been calculated for each emissions unit in this row.

Post-Project Totals					Calculations
VOC (lb/day)	VOC (lb/yr)	NH3 (lb/day)	NH3 (lb/yr)	PM10 (lb/day)	PM10 (lb/yr)
34.2	12,465	79.6	29,024	12.0	12,015

Annual PE 2 for each pollutant (lb/yr) = Controlled EF (lb/nd-yr) x # of cows (nd)
Daily PE2 for each pollutant (lb/day) = Controlled EF (lb/nd-yr) x # of cows (nd) x 365 (day/yr)

BACT Applicability

Milking Parlor					
VOC Emissions					
	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
Milk Cows	3.1	2.0	0.40	0.40	1.1
Total					1.1
NH3 Emissions					
	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
Milk Cows	1.0	0.7	0.14	0.14	0.3
Total					0.3

Cow Housing					
See detailed cow housing AIPE calculations on the BACT Calcs page.					

Liquid Manure Handling					
VOC Emissions - Lagoon/Storage Pond(s)					
	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
Milk Cows	5.4	5.8	0.70	1.17	1.9
Dry Cows	0.4	0.4	0.38	0.64	0.2
Support Stock (Heifers, Calves, and Bulls)	1.0	1.0	0.29	0.49	0.4
Large Heifers	0.0	0.0	0.29	0.49	0.0
Medium Heifers	0.0	0.0	0.20	0.33	0.0
Small Heifers	0.0	0.0	0.11	0.19	0.0
Calves	0.0	0.0	0.05	0.09	0.0
Bulls	0.0	0.0	0.18	0.30	0.0
BACT triggered for VOC for Lagoon/Storage Ponds					Total 2.5
VOC Emissions - Land Application					
	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
Milk Cows	5.8	6.2	0.76	1.26	2.1
Dry Cows	0.5	0.4	0.41	0.69	0.3
Support Stock (Heifers, Calves, and Bulls)	1.1	1.1	0.32	0.53	0.4
Large Heifers	0.0	0.0	0.32	0.53	0.0
Medium Heifers	0.0	0.0	0.22	0.36	0.0
Small Heifers	0.0	0.0	0.12	0.20	0.0
Calves	0.0	0.0	0.06	0.10	0.0
Bulls	0.0	0.0	0.19	0.32	0.0
BACT triggered for VOC for Liquid Manure Land Application					Total 2.8
NH3 Emissions - Lagoon/Storage Pond(s)					
	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
Milk Cows	9.1	5.8	1.18	1.18	3.3
Dry Cows	0.7	0.4	0.60	0.60	0.3
Support Stock (Heifers, Calves, and Bulls)	1.1	0.7	0.32	0.32	0.4
Large Heifers	0.0	0.0	0.32	0.32	0.0
Medium Heifers	0.0	0.0	0.22	0.22	0.0
Small Heifers	0.0	0.0	0.17	0.17	0.0
Calves	0.0	0.0	0.05	0.05	0.0
Bulls	0.0	0.0	0.43	0.43	0.0
BACT triggered for NH3 for Lagoon/Storage Ponds					Total 4.0
NH3 Emissions - Land Application					
	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
Milk Cows	28.5	31.6	3.72	6.41	10.2
Dry Cows	2.2	2.0	1.88	3.24	1.0
Support Stock (Heifers, Calves, and Bulls)	3.4	3.5	0.96	1.66	1.4
Large Heifers	0.0	0.0	0.96	1.66	0.0
Medium Heifers	0.0	0.0	0.71	1.22	0.0
Small Heifers	0.0	0.0	0.54	0.94	0.0
Calves	0.0	0.0	0.15	0.27	0.0
Bulls	0.0	0.0	1.35	2.33	0.0
BACT triggered for NH3 for Liquid Manure Land Application					Total 12.6
H2S Emissions - Lagoon/Storage Pond(s)					
	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
Milk Cows	0.9	0.9	0.12	0.12	0.0
Dry Cows	0.1	0.1	0.06	0.06	0.0
Support Stock (Heifers, Calves, and Bulls)	0.1	0.1	0.03	0.03	0.0
Large Heifers	0.0	0.0	0.03	0.03	0.0
Medium Heifers	0.0	0.0	0.02	0.02	0.0
Small Heifers	0.0	0.0	0.02	0.02	0.0
Calves	0.0	0.0	0.01	0.01	0.0
Bulls	0.0	0.0	0.04	0.04	0.0
Total					0.0

Solid Manure Handling					
VOC Emissions - Solid Manure Storage/Separated Solids Piles					
	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
Milk Cows	1.4	0.9	0.18	0.18	0.5
Dry Cows	0.1	0.1	0.10	0.10	0.0
Support Stock (Heifers, Calves, and Bulls)	0.3	0.2	0.10	0.08	0.1
Large Heifers	0.0	0.0	0.08	0.08	0.0
Medium Heifers	0.0	0.0	0.05	0.05	0.0
Small Heifers	0.0	0.0	0.03	0.03	0.0
Calves	0.0	0.0	0.01	0.01	0.0
Bulls	0.0	0.0	0.05	0.05	0.0
Total					0.6
VOC Emissions - Land Application					
	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
Milk Cows	2.3	1.3	0.30	0.27	1.0
Dry Cows	0.2	0.1	0.16	0.15	0.1
Support Stock (Heifers, Calves, and Bulls)	0.4	0.2	0.12	0.11	0.2
Large Heifers	0.0	0.0	0.12	0.11	0.0
Medium Heifers	0.0	0.0	0.08	0.08	0.0
Small Heifers	0.0	0.0	0.05	0.04	0.0
Calves	0.0	0.0	0.02	0.02	0.0
Bulls	0.0	0.0	0.07	0.06	0.0
Total					1.3
NH3 Emissions - Solid Manure Storage/Separated Solids Piles					
	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
Milk Cows	10.2	6.6	1.33	1.33	3.6
Dry Cows	0.8	0.4	0.67	0.67	0.4
Support Stock (Heifers, Calves, and Bulls)	1.2	0.7	0.35	0.35	0.5
Large Heifers	0.0	0.0	0.35	0.35	0.0
Medium Heifers	0.0	0.0	0.25	0.25	0.0
Small Heifers	0.0	0.0	0.18	0.18	0.0
Calves	0.0	0.0	0.06	0.06	0.0
Bulls	0.0	0.0	0.49	0.49	0.0
BACT triggered for NH3 for Solid Manure Storage					Total 4.5
NH3 Emissions - Land Application					
	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
Milk Cows	11.5	7.4	1.50	1.50	4.1
Dry Cows	0.9	0.5	0.76	0.76	0.4
Support Stock (Heifers, Calves, and Bulls)	1.4	0.8	0.40	0.40	0.6
Large Heifers	0.0	0.0	0.40	0.40	0.0
Medium Heifers	0.0	0.0	0.28	0.28	0.0
Small Heifers	0.0	0.0	0.22	0.22	0.0
Calves	0.0	0.0	0.06	0.06	0.0
Bulls	0.0	0.0	0.55	0.55	0.0
BACT triggered for NH3 for Solid Manure Land Application					Total 5.1

Feed Storage and Handling					
VOC Emissions - Silage					
	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
Corn Silage	11.0	11.0	21,155	21,155	0.0
Alfalfa Silage	0.0	0.0	10,649	10,649	0.0
Wheat Silage	11.9	11.9	26,745	26,745	0.0
Total					0.0
VOC Emissions - TMR					
	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
TMR	99.6	61.7	10,575	10,575	37.9
BACT triggered for VOC for TMR					Total 37.9

APPENDIX G

BACT Guidelines

Best Available Control Technology (BACT) Guideline 5.8.6
Last Update: 12/18/2013

Liquid Manure Handling - Lagoon/Storage Pond

Pollutant	Achieved in Practice or in the SIP	Technologically Feasible	Alternate Basic Equipment
VOC	Anaerobic treatment lagoon designed according to NRCS Guideline, and solids removal/separation system (mechanical separator(s) or settling basin(s)/weeping wall(s))	1) Aerobic treatment lagoon or mechanically aerated lagoon; 2) Covered lagoon digester vented to a control device with minimum 95% control	
NH3	All animals fed in accordance with NRCS or other District-approved guidelines		

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. For background information, see Permit Specific BACT Determinations on [Details Page](#).

Best Available Control Technology (BACT) Guideline 5.8.7
Last Update: 12/18/2013

Liquid Manure Handling - Liquid/Slurry Land Application

Pollutant	Achieved in Practice or in the SIP	Technologically Feasible	Alternate Basic Equipment
VOC	Irrigation of crops using liquid/slurry manure from the secondary lagoon/holding/storage pond preceded by an uncovered anaerobic treatment lagoon designed to meet Natural Resources Conservation Service (NRCS) standards	1) Irrigation of crops using liquid manure from an aerobic treatment lagoon or mechanically aerated lagoon (95% VOC control efficiency) 2) Irrigation of crops using liquid manure from a holding/storage pond after being treated in a covered lagoon/digester (80% VOC control efficiency)	
NH3	All animals fed in accordance with NRCS or other District-approved guidelines		

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. For background information, see Permit Specific BACT Determinations on [Details Page](#).

Best Available Control Technology (BACT) Guideline 5.8.8
Last Update: 12/18/2013

Solid Manure Handling - Storage/Separated Solids Piles

Pollutant	Achieved in Practice or in the SIP	Technologically Feasible	Alternate Basic Equipment
NH3	All animals fed in accordance with NRCS or other District- approved guidelines		

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. For background information, see Permit Specific BACT Determinations on [Details Page](#).

Best Available Control Technology (BACT) Guideline 5.8.9
Last Update: 12/18/2013

Solid Manure Handling - Land Application

Pollutant	Achieved in Practice or in the SIP	Technologically Feasible	Alternate Basic Equipment
VOC	Rapid incorporation of solid manure into the soil after land application	1a) Land Application of Solid Manure Processed by Either an Open or Enclosed Negatively-Aerated Static Pile (ASP) Vented to a biofilter (or equivalent) = 80% destruction efficiency With Rapid Incorporation of the Manure Into the Soil After Land Application; 1b) Land Application of Solid Manure Processed by In-Vessel/Enclosed Negatively-Aerated Static Piles vented to biofilter = 80% destruction efficiency; 2) Land Application of Solid Manure Processed by Open Negatively-Aerated Static Piles vented to biofilter = 80% destruction efficiency; 3) Land Application of Solid Manure Processed by an Open Negatively-Aerated Static Piles (ASP) (With Thick Layer of Bulking Agent or Equivalent) With Rapid Incorporation of the Manure Into the Soil After Land Application	

Pollutant	Achieved in Practice or in the SIP	Technologically Feasible	Alternate Basic Equipment
NH3	Rapid incorporation of solid manure into the soil after land application, and all animals fed in accordance with NRCS or other District-approved guidelines		

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. For background information, see Permit Specific BACT Determinations on [Details Page](#).

Best Available Control Technology (BACT) Guideline 5.8.11
Last Update: 12/18/2013

Feed Storage and Handling - Feed/TMR

Pollutant	Achieved in Practice or in the SIP	Technologically Feasible	Alternate Basic Equipment
VOC	District Rule 4570 Measures for Feed/TMR		

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. For background information, see Permit Specific BACT Determinations on [Details Page](#).

APPENDIX H

BACT Analyses

BACT ANALYSES

I. Top-Down BACT Analysis for the Liquid Manure Handling System - Lagoon & Storage Pond

1. VOC Emissions

a. Step 1 - Identify all control technologies

The following options were identified as possible controls for VOC emissions from the lagoons & storage ponds:

- 1) Aerobic treatment lagoon or mechanically aerated lagoon
- 2) Covered lagoon digester vented to a control device with minimum 95% control
- 3) Anaerobic treatment lagoon designed according to NRCS guidelines, and solids removal/separation system (mechanical separator(s) or settling basin(s)/weeping wall(s))

Description of Control Technologies

1) Aerobic Treatment Lagoon or Mechanically Aerated Lagoon

An aerobic lagoon is a waste treatment lagoon that is designed to facilitate the decomposition of wastewater by microbes in the presence of oxygen (O_2). The process of aerobic decomposition results in the conversion of organic compounds in the wastewater into carbon dioxide (CO_2), and (H_2O), nitrates, sulfates, and inert biomass (sludge). This process is sometimes referred to as nitrification (especially when discussing NH_3 transformation). Complete aerobic decomposition (100% aeration) removes nearly all malodors and also virtually eliminates VOC, H_2S , and NH_3 emissions.

In completely aerated lagoons, sufficient oxygen must be provided to sustain the aerobic microorganisms. NRCS Practice Standard Code 359 specifies that naturally aerobic lagoons have a minimum surface area determined by regional climate and daily Biological Oxygen Demand (BOD_5) and requires naturally aerobic lagoons to have a maximum depth no greater than five feet. For mechanically aerated lagoons, NRCS Practice Standard Code 359 specifies that the aeration equipment shall provide a minimum of 1 pound of oxygen for each pound of daily BOD_5 loading. The mechanical aerators that provide the required oxygen may float on the lagoon surface or be submerged in the lagoon. Aeration can also be performed by injection of tiny air bubbles into the lagoon water, mixing of the lagoon water, or spraying of the water into the air. According to Dr. Ruihong Zhang, a researcher at the University of California, Davis, at least 95% VOC control can be achieved if the dissolved oxygen (DO) concentration of the liquid manure is 2.0 mg/L or more. However, the DO concentrations achieved in mechanically aerated lagoons treating manure are typically much less than this and the control efficiencies will therefore be lower.

2) Covered Lagoon Digester

Covered treatment lagoons are one type of anaerobic digester. An anaerobic digester is an enclosed basin or tank that is designed to facilitate the decomposition of wastewater by microbes in the absence of oxygen. The process of anaerobic decomposition results in the preferential conversion of organic compounds in the wastewater into methane (CH_4), carbon dioxide (CO_2), and water rather than intermediate metabolites (VOC). The gas generated by this process is known as biogas, waste gas or digester gas. In addition to methane and carbon dioxide, biogas also contains small amounts of Nitrogen (N_2), Oxygen (O_2), Hydrogen Sulfide (H_2S), and Ammonia (NH_3). Biogas will also include trace amounts of various Volatile Organic Compounds (VOCs) that remain from incomplete digestion of the volatile solids in the incoming wastewater. The small amounts of undigested solids that remain after digestion are removed from the digester as sludge. Because biogas is mostly composed of methane, the main component of natural gas, the gas produced in the digester can be cleaned to remove H_2S and other impurities and used as fuel. The captured biogas can be combusted in a flare or may be sent to a boiler or internal combustion engine, where the gas can be used to generate useful heat or electrical energy.

As stated above, the gas generated in the covered lagoon anaerobic digester can be captured and then sent to a suitable combustion device. During combustion, gaseous hydrocarbons are oxidized to form CO_2 and water. The VOC emitted from the liquid manure in the covered lagoon can be reduced by 95% with the use of an appropriate combustion device. Therefore, installation of the digester will lower the total VOC emitted from the liquid manure handling system. Although the control efficiency of the gas captured from the primary lagoon is expected to be 95% or more, the overall control efficiency is expected to be less, since some VOC will also be emitted from the storage pond and as fugitive emissions. For this analysis, the overall control efficiency is assumed to be 80% of the emissions that would have been emitted from the lagoon system.

3) Anaerobic Treatment Lagoon and Solids Removal/Separation System

An anaerobic treatment lagoon is a waste treatment lagoon that is designed to facilitate the decomposition of manure by microbes in the absence of oxygen. The process of anaerobic decomposition results in the preferential conversion of organic compounds in the wastewater into methane (CH_4), carbon dioxide (CO_2), and water rather than intermediate metabolites (VOC). The Natural Resources Conservation Service (NRCS) Field Office Technical Guide No. 359, Waste Treatment Lagoon, for California specifies the following criteria for the design of anaerobic treatment lagoons:

- Required volume - the minimum design volume should account for all potential sludge, treatment, precipitation, and runoff volumes.
- Treatment period - retention time of the material in the lagoon shall be the time required to provide environmentally safe utilization of waste. The minimum hydraulic retention time for a covered lagoon in the San Joaquin Valley is about 38 days.

- Waste loading shall be based on the maximum daily loading considering all waste sources that will be treated by the lagoon. The loading rate is typically based on volatile solids (VS) loading per unit of volume. The suggested loading rate for the San Joaquin Valley is 6.5-11 lb-VS/1000 ft³/day depending on separation and type of system.
- The operating depth of the lagoon shall be 6 feet or greater. Maximizing the depth of the lagoon minimizes the surface area, which in turn minimizes the cover size and cost. Increasing the lagoon depth has the following advantages:
 - Minimizes surface area in contact with the atmosphere, thus reducing surface available to convection, evaporation
 - Smaller surface areas provide a more favorable and stable environment for methane bacteria
 - Better mixing of lagoon due to rising gas bubbles
 - Requires less land
 - More efficient for mechanical mixing

The lagoon design shall also consider location, soils and foundation, erosion, and depth to groundwater as required by the regional water control board.

The NRCS guideline suggests that this system consist of two cells, a treatment lagoon (primary lagoon) and a storage pond (secondary lagoon). The first stage of the lagoon system is the biological treatment stage and is designed with a constant liquid level to stabilize the anaerobic digestion. The effluent from the first stage overflows into a second lagoon designed for liquid storage capacity. Effluent from the second lagoon is used in the flush lanes and for the irrigation of cropland. The secondary (overflow) lagoon acts as the storage pond, which can be emptied when necessary. However, a single lagoon can also be considered an anaerobic treatment lagoon as long as all the criteria are met and the liquid manure is not drawn down below the minimum required depth at any time.

A properly designed anaerobic treatment lagoon will reduce the volatile solids (VS) by at least 50%. This will reduce the biological oxygen demand (BOD) and increase the efficiency at which organic compounds are converted into methane and carbon dioxide rather than VOC. Although the VS reduction is expected to be at least 50%, a conservative control efficiency of 40% will be assumed, until better data becomes available.

Solids Removal/Separation – Settling Basin(s)

Settling basins are used to remove solids from the liquid/slurry stream. A 50% solid removal efficiency is used as a general rule of thumb. Although the separation efficiency can be improved by better separations systems, it does not necessarily result in an increase in VOC emission reduction. The type of solids removed are generally non-digestible (lignins, cellulose, etc.) materials that do not easily degrade in the lagoons. The amount of volatile solids that ends up in the lagoon will most likely not change even when there is an increase in the solid removal efficiency. In addition, there is no data that link higher solids removal efficiencies with an increase in VOC emission reductions.

b. Step 2 - Eliminate technologically infeasible options

There are no technologically infeasible options to eliminate from step 1.

c. Step 3 - Rank remaining options by control effectiveness

The remaining options are ranked below according to their control effectiveness:

- 1) Aerobic treatment lagoon or mechanically aerated lagoon (95% control efficiency)
- 2) Covered lagoon digester vented to a control device (80% control efficiency)
- 3) Anaerobic treatment lagoon designed to meet Natural Resources Conservation Service (NRCS) standards (40% control efficiency)
- 4) Solids Removal/Separation

d. Step 4 - Cost Effectiveness Analysis

Aerobic Treatment Lagoon or Mechanically Aerated Lagoon

Aerobic Treatment Lagoon

NRCS Practice Standard Code 359 requires that naturally aerobic lagoons be designed to have a minimum treatment surface area as determined on the basis of daily BOD₅ loading per unit of lagoon surface. The standard specifies that the maximum loading rate of naturally aerobic lagoons shall not exceed the loading rate indicated by the NRCS Agricultural Waste Management Field Handbook (AWMFH) or the maximum loading rate according to state regulatory requirements, whichever is more stringent. According to Figure 10-30 of the August 2009 version of the AWMFH, the maximum aerobic lagoon loading rate for the San Joaquin Valley is 45 - 55 lb-BOD₅/acre-day. According to Table 4-5 of the March 2008 AWMFH, the total manure produced by a milk cow (1,000-lb animal unit) in a day has a BOD₅ of 2.1 lb-/day. Assuming that at least 48% of the manure will be flushed into the lagoon system, the minimum lagoon surface area required for a naturally aerobic lagoon treating manure from 2,800 milk cows in the San Joaquin Valley can be calculated as follows:

$$\begin{aligned}\text{BOD}_5 \text{ loading (lb/day)} &= 2,800 \text{ milk cows} \times 2.1 \text{ lb-BOD}_5/\text{cow-day} \times 0.48 \\ &= 2,822 \text{ lb-BOD}_5/\text{day}\end{aligned}$$

$$\begin{aligned}\text{Minimum Surface Area (acres)} &= 2,822 \text{ lb-BOD}_5/\text{day} \div 55 \text{ lb-BOD}_5/\text{acre-day} \\ &= 51 \text{ acres}\end{aligned}$$

As shown above, the minimum surface area required for a naturally aerobic lagoon to treat manure from the proposed number of milk cows is 51 acres. This does not include the additional surface area that would be required to treat manure from support stock. Based on the space requirements alone it is clear that this option cannot reasonably be required and no further analysis is needed.

Mechanically Aerated Lagoon

As discussed above, the very large space requirements for naturally aerobic lagoons cause this option to be infeasible for most confined animal facilities. Mechanically aerating a lagoon can achieve some of the benefits of a naturally aerobic lagoon without the large space requirements. However, the costs of energy for complete aeration have also caused this option to be infeasible. The amount of energy required for aeration is based on the amount of volatile solids that must be treated; thus, this cost will be directly proportional to the number of cows. The following analysis will determine the cost of emission reductions that can be achieved from a mechanically aerated lagoon treating manure from the proposed milk cow herd.

Biological Oxygen Demand (BOD₅)

In order to effectively calculate the cost of this control option, the energy requirement for complete aeration must be determined. It should be noted that approximately 1.5 to 2.5 pounds of oxygen is required to digest 1 pound of Biological Oxygen Demand (BOD₅) with additional oxygen required for conversion of ammonia to nitrate (nitrification). It is generally accepted that at least twice the BOD should be provided for complete aeration. According to Dr. Ruihong Zhang of the University of California, Davis, 2.4 lb (1.1 kg) of oxygen per cow must be provided each day for removal of BOD and an additional 3 lb (1.4 kg) per cow for oxidation of 70% of the nitrogen.

Generally, an aerobic lagoon is required to be designed and operated in accordance with NRCS Practice Standard Code 359. NRCS Practice Standard Code 359 requires that mechanically aerated lagoons use aeration equipment that provides a minimum of one pound of oxygen for each pound of daily BOD₅ loading. As previously discussed, the total daily manure produced by a milk cow has a BOD₅ of 2.1 lb/day and a lagoon handling flushed manure from 2,800 milk cows will have a loading rate of approximately 2,822 lb-BOD₅/day (1,280 kg-BOD₅/day).

Energy Requirement

Based on the data gathered in a UC Davis study on aerator performance for wastewater lagoons, aeration efficiencies for mechanical aerators ranged from 0.10 to 0.68 kg of oxygen provided per kW-hr of energy utilized. The most efficient aerator tested that had been installed in dairy lagoons had an aeration efficiency of 0.49 kg-O₂/kW-hr. These efficiency tests were performed in clean water and lower aeration efficiencies are expected in liquid manure because of the significant amount of solids that it contains. The yearly energy requirement for a mechanically aerated lagoon system treating flushed manure from 2,800 milk cows is calculated as follows:

$$1,280 \text{ kg-BOD}_5/\text{day} \div (0.68 \text{ kg-O}_2/\text{kW-hr}) \times (365 \text{ days/year}) = 687,059 \text{ kW-hr/year.}$$

Cost of Electricity

The cost of electricity will be based upon the 2019 average price for industrial electricity in California, as taken from the Energy Information Administration (EIA) website:¹⁶

$$\text{Average cost of electricity} = \$0.1352/\text{kW-hr}$$

The electricity cost for complete aeration is calculated as follows:

$$687,059 \text{ kW-hr/year} \times \$0.1352/\text{kW-hr} = \$92,890/\text{year}$$

VOC Emissions Reductions

It will be conservatively assumed that a mechanically aerated lagoon providing 1 lb of oxygen for every 1 lb of BOD₅ loading will control 90% of the VOC emissions from the lagoon/storage pond. However, as noted above, it is generally accepted that the oxygen provided should be twice the BOD₅ loading rate for complete aeration. Thus, the actual control from providing 1 lb of oxygen for every 1 lb of BOD₅ loading is probably in the 50% range.

The annual VOC emissions reductions are calculated as follows:

$$\begin{aligned} & [\text{Number of cows}] \times [\text{Lagoon/Storage Pond VOC EF (lb/cow-year)}] \times [\text{Complete Aeration Control Efficiency for Lagoon/Storage Pond}] \\ &= 2,800 \text{ cows} \times 1.30 \text{ lb-VOC/cow-yr} \times 90\% \text{ control} \\ &= 3,276 \text{ lb-VOC/yr} \end{aligned}$$

Cost of Reductions

$$\begin{aligned} \text{Cost of reductions} &= (\$92,890/\text{year}) / [(3,276 \text{ lb-VOC/year})(1 \text{ ton}/2,000 \text{ lb})] \\ &= \$56,709/\text{ton} \end{aligned}$$

As shown in the preceding section, based on the cost of electricity alone, the cost of the VOC reductions for this control option is greater than the \$17,500/ton cost effectiveness threshold specified by the District's BACT policy. This control option is therefore not cost effective and will not be required.

Covered Lagoon Digester

Capital Cost for Installation

The capital cost estimates for installation of a covered lagoon digester are based on information from the United States EPA AgSTAR publication "Anaerobic Digestion Capital Costs for Dairy Farms" (May 2010)¹⁷ and the California Energy Commission (CEC) Public Interest Energy Research (PIER) Program Dairy Methane Digester System Program

¹⁶ http://www.eia.gov/electricity/monthly/epm_table_grapher.cfm?t=epmt_5_06_b

¹⁷ "Anaerobic Digestion Capital Costs for Dairy Farms" (May 2010), EPA AgSTAR http://www.epa.gov/agstar/pdf/digester_cost_fs.pdf

Evaluation Report (Feb 2009).¹⁸ The formula in the AgSTAR publication results in a capital cost of \$1,032 per cow. This estimate excludes costs of solids separation after digestion, hydrogen sulfide removal, and utility charges including line upgrades and interconnection costs and fees. Based on information from installations in California, the CEC PIER Dairy Methane Digester Program Evaluation Report gives an average cost of \$585 per cow for installation of covered lagoon anaerobic digesters (see Table 9 - Total Project Costs and Cost per Cow and per kW).

For the purposes of this analysis, an average of these cost values (i.e. capital cost of \$808.50/cow) will be used. Thus, the installation capital cost for the proposed herd of 2,800 milk cows is at least \$2,263,800 (\$808.50/cow x 2,800 cows).

Pursuant to the District's BACT policy, the equivalent annual cost will be calculated using the capital recovery equation, as shown below:

$$A = P \frac{i(1+i)^n}{(1+i)^n - 1}$$

Where:

A = Equivalent annual capital cost of the control equipment

P = Present value of the control equipment, including installation cost

i = Interest rate (assumed to be 10%)

n = Equipment life (assumed to be 10 years)

$$\begin{aligned} A &= [\$2,263,800 \times 0.1(1.1)^{10}] / [(1.1)^{10} - 1] \\ &= \$368,423/\text{year} \end{aligned}$$

Potential Production of Electricity

It may be possible to offset some of the installation costs of a covered lagoon anaerobic digester with revenue from generation of electricity. Based on the information given in the CEC PIER Dairy Methane Digester Program Evaluation Report, Table 7 – Actual Generation per Cow Comparisons, California dairies that used a covered lagoon digester to produce electricity generated between 429.1 and 1,031.8 kW-hr/yr per lactating cow with an overall per facility average generation rate of 670.3 kW-hr/yr per lactating cow. This average annual generation rate is actually higher than all the facilities included in the average except one that had a very high generation rate. In addition, this average may overestimate the per-cow generation potential because the contributions of support stock to the digesters were not accounted for. However, for more conservative calculations, this average will be used to calculate the potential annual savings in electricity costs.

¹⁸ "Dairy Power Production Program – Dairy Methane System Program Evaluation Report" (February 2009). Western United Resource Development, Inc. prepared for the California Energy Commission (CEC) Public Interest Energy Research Program. (CEC-500-2009-009) <http://www.energy.ca.gov/2009publications/CEC-500-2009-009/CEC-500-2009-009.PDF>

The potential quantity of electricity produced is calculated as follows:

$$\begin{aligned}\text{Electrical Produced} &= 670.3 \text{ kW-hr}/(\text{milk cow-yr}) \times 2,800 \text{ milk cows} \\ &= 1,876,840 \text{ kW-hr/yr}\end{aligned}$$

Potential Cost Savings from Production of Electricity

The value of electricity generated will be calculated using the previously cited EIA rate of \$0.1352/kW-hr.

$$\begin{aligned}\text{Potential Cost Savings} &= 1,876,840 \text{ kW-hr/yr} \times \$0.1352/\text{kW-hr} \\ &= \$253,749/\text{yr}\end{aligned}$$

The annualized capital cost less the potential savings from electricity produced is \$114,674 (\$368,423 - \$253,749).

VOC Emissions Reductions

The annual VOC emissions reductions are calculated as follows:

$$[\text{Number of cows}] \times [\text{Lagoon/Storage Pond VOC EF (lb/cow-year)}] \times [\text{Covered Lagoon Digester Efficiency for Lagoon/Storage Pond}]$$

$$\begin{aligned}2,800 \text{ cows} \times 1.30 \text{ lb-VOC/cow-yr} \times 80\% \text{ control} \\ = 2,912 \text{ lb-VOC/yr}\end{aligned}$$

Cost of Reductions

$$\begin{aligned}\text{Cost of reductions} &= (\$114,674/\text{year})/[(2,912 \text{ lb-VOC/year})(1 \text{ ton}/2,000 \text{ lb})] \\ &= \$78,760/\text{ton}\end{aligned}$$

As shown above, based the installation cost alone, after offsetting this cost by potential savings from electricity produced, the cost of the VOC reductions for this control option is greater than the \$17,500/ton cost effectiveness threshold specified by the District's BACT policy. This control option is therefore not cost effective and will not be required.

Anaerobic Treatment Lagoon and Solids Removal/Separation System

The applicant has proposed these options. In addition, these options are achieved in practice. Cost effectiveness analyses are therefore not required.

e. Step 5 - Select BACT

The applicant has proposed an anaerobic treatment lagoon system designed according to NRCS guidelines, and a solids removal/separation system (settling basin(s)). The proposal satisfies BACT for this category.

2. NH₃ Emissions

a. Step 1 - Identify all control technologies

The following option was identified as a possible control for NH₃ emissions from the lagoons & storage ponds:

- 1) All animals fed in accordance with NRC or other District-approved guidelines.

Description of Control Technology

- 1) All animals fed in accordance with NRC or other District-approved guidelines

Nutritional management of dairy feed is routinely practiced to improve milk production and herd health. The potential for ammonia emissions can be reduced by reducing the amount of undigested nitrogen compounds in the manure. The level of microbial action in the manure corresponds to the level of organic nitrogen content in the manure; the lower the level of nitrogen the lower the level of microbial action and the lower the production of ammonia and VOCs.

A diet that is formulated to feed proper amounts of ruminantly degradable protein will result in improved nitrogen utilization by the animal and corresponding reduction in urea and organic nitrogen content of the manure, which will reduce the production of VOCs and ammonia. The latest National Research Council (NRC) guidelines for the selection of an optimal bovine diet should be followed to the maximum extent possible. The diet recommendations made in this publication seek to achieve the maximum uptake of protein by the animal and the minimum carryover of nitrogen into the manure, which will reduce ammonia emissions from the liquid manure in the lagoon and storage pond.

b. Step 2 - Eliminate technologically infeasible options

The option listed in Step 1 above is technologically feasible.

c. Step 3 - Rank remaining options by control effectiveness

The remaining option is listed below:

- 1) All animals fed in accordance with NRC or other District-approved guidelines.

d. Step 4 - Cost Effectiveness Analysis

The applicant has proposed this option. In addition, this option is achieved in practice. A cost effectiveness analysis is therefore not required.

e. Step 5 - Select BACT

The applicant has proposed to feed all animals in accordance with NRC or other District-approved guidelines. The proposal satisfies BACT for this category.

II. Top-Down BACT Analysis for the Liquid Manure Handling System – Liquid Manure Land Application

1. VOC Emissions

a. Step 1 - Identify all control technologies

The following options were identified as possible controls for VOC emissions from land application of manure:

- 1) Irrigation of crops using liquid manure from an aerobic treatment lagoon or mechanically aerated lagoon
- 2) Irrigation of crops using liquid manure from a holding/storage pond after being treated in a covered lagoon/digester
- 3) Irrigation of crops using liquid/slurry manure from the secondary lagoon/holding/storage pond preceded by an uncovered anaerobic treatment lagoon designed to meet Natural Resources Conservation Service (NRCS) standards

Description of Control Technologies

- 1) Irrigation of crops using liquid/slurry manure from an aerobic treatment lagoon or mechanically aerated lagoon

An aerobic lagoon is a waste treatment lagoon that is designed to facilitate the decomposition of wastewater by microbes in the presence of oxygen (O_2). The process of aerobic decomposition results in the conversion of organic compounds in the wastewater into carbon dioxide (CO_2), and (H_2O), nitrates, sulfates, and inert biomass (sludge). This process is sometimes referred to as nitrification (especially when discussing NH_3 transformation). Complete aerobic decomposition (100% aeration) removes nearly all malodors and also virtually eliminates VOC, H_2S , and NH_3 emissions.

In completely aerated lagoons, sufficient oxygen must be provided to sustain the aerobic microorganisms. NRCS Practice Standard Code 359 specifies that naturally aerobic lagoons have a minimum surface area determined by regional climate and daily Biological Oxygen Demand (BOD_5) and requires naturally aerobic lagoons to have a maximum depth no greater than five feet. For mechanically aerated lagoons, NRCS Practice Standard Code 359 specifies that the aeration equipment shall provide a minimum of 1 pound of oxygen for each pound of daily BOD_5 loading. The mechanical aerators that provide the required oxygen may float on the lagoon surface or be submerged in the lagoon. Aeration can also be performed by injection of tiny air bubbles into the lagoon water, mixing of the lagoon water, or spraying of the water into the air. According to Dr. Ruihong Zhang, a researcher at the University of California, Davis, at least 95% VOC control can be achieved if the dissolved oxygen (DO) concentration of the liquid manure is 2.0 mg/L or more. However, the DO concentrations achieved in mechanically aerated lagoons treating manure are typically much less than this and the control efficiencies will therefore be lower.

2) Irrigation of crops using liquid/slurry manure from a holding/storage pond after being treated in a covered lagoon/digester

This practice would only allow the irrigation of liquid manure to cropland from the secondary lagoon after proper treatment has taken place in a covered lagoon/anaerobic digester. Covered treatment lagoons are one type of anaerobic digester. An anaerobic digester is an enclosed basin or tank that is designed to facilitate the decomposition of wastewater by microbes in the absence of oxygen. The process of anaerobic decomposition results in the preferential conversion of organic compounds in the wastewater into methane (CH_4), carbon dioxide (CO_2), and water rather than intermediate metabolites (VOC). The gas generated by this process is known as biogas, waste gas or digester gas. In addition to methane and carbon dioxide, biogas also contains small amounts of Nitrogen (N_2), Oxygen (O_2), Hydrogen Sulfide (H_2S), and Ammonia (NH_3). Biogas will also include trace amounts of various VOC that remain from incomplete digestion of the volatile solids in the incoming wastewater. The small amounts of undigested solids are removed from the digester as sludge.

Assumptions:

- 80% of the Volatile Solids (VS) can be removed from the covered anaerobic digestion process.
- 20% of the remaining VS will be assumed to be in the manure during land application. This will be considered worst-case because further digestion of the VS is likely to occur in the secondary lagoon.
- As a worst-case scenario, it will be assumed that all remaining VS will be emitted as VOC during land application.

Since 80% of the VS is removed or digested in the covered lagoon and the remaining VS have been assumed to be emitted as VOC, a control efficiency of 80% can be used for land application of liquid manure from a holding/storage pond after treatment in a covered lagoon.

3) Irrigation of crops using liquid/slurry manure from the secondary lagoon/holding/storage pond where preceded by an uncovered anaerobic treatment lagoon designed to meet Natural Resources Conservation Service (NRCS) standards

This practice would only allow the irrigation of liquid manure to cropland from the secondary lagoon after going through a treatment phase in an anaerobic treatment lagoon, or the primary lagoon.

An anaerobic treatment lagoon is a waste treatment lagoon that is designed to facilitate the decomposition of manure by microbes in the absence of oxygen. The process of anaerobic decomposition results in the preferential conversion of organic compounds in the wastewater into methane (CH_4), carbon dioxide (CO_2), and water rather than intermediate metabolites (VOC).

The NRCS Field Office Technical Guide No. 359, Waste Treatment Lagoon, for California specifies the following criteria for anaerobic treatment lagoons:

- Required volume - the minimum design volume should account for all potential sludge, treatment, precipitation, and runoff volumes.
- Treatment period - retention time of the material in the lagoon shall be the time required to provide environmentally safe utilization of waste. The minimum hydraulic retention time for a covered lagoon in the San Joaquin Valley is about 38 days.
- Waste loading shall be based on the maximum daily loading considering all waste sources that will be treated by the lagoon. The loading rate is typically based on volatile solids (VS) loading per unit of volume. The suggested loading rate for the San Joaquin Valley is 6.5-11 lb-VS/1000 ft³/day depending on separation and type of system.
- The operating depth of the lagoon shall be 6 feet or greater. Maximizing the depth of the lagoon minimizes the surface area, which in turn minimizes the cover size and cost. Increasing the lagoon depth has the following advantages:
 - Minimizes surface area in contact with the atmosphere, thus reducing surface available to convection, evaporation
 - Smaller surface areas provide a more favorable and stable environment for methane bacteria
 - Better mixing of lagoon due to rising gas bubbles
 - Requires less land
 - More efficient for mechanical mixing

The lagoon design shall also consider location, soils and foundation, erosion, and depth to groundwater as required by the regional water control board.

The NRCS guideline suggests that this system consist of two cells, a treatment lagoon (primary lagoon) and a storage pond (secondary lagoon). The first stage of the lagoon system is the biological treatment stage and is designed with a constant liquid level to stabilize the anaerobic digestion. The effluent from the first stage overflows into a second lagoon designed for liquid storage capacity. Effluent from the second lagoon is used in the flush lanes and for the irrigation of cropland. The secondary (overflow) lagoon acts as the storage pond, which can be emptied when necessary. However, a single lagoon can also be considered an anaerobic treatment lagoon as long as all the criteria are met and the liquid manure is not drawn down below the minimum required depth at any time.

A properly designed anaerobic treatment lagoon will reduce the volatile solids (VS) by at least 50%. This will reduce the biological oxygen demand (BOD) and increase the efficiency at which organic compounds are converted into methane and carbon dioxide rather than VOC. Since 50% of the VS in the liquid manure will have been removed or digested in the lagoon, there will be less VS remaining in the effluent to decompose into

VOC. Although, the VS reduction will be at least 50%, a conservative control efficiency of 40% will be applied to irrigation from a storage pond after an anaerobic treatment lagoon.

b. Step 2 - Eliminate technologically infeasible options

There are no technologically infeasible options to eliminate from step 1.

c. Step 3 - Rank remaining options by control effectiveness

The remaining options are ranked below according to their control effectiveness:

- 1) Irrigation of crops using liquid/slurry manure from an aerobic treatment lagoon or mechanically aerated lagoon (95% control efficiency)
- 2) Irrigation of crops using liquid/slurry manure from a holding/storage pond after being treated in a covered lagoon/digester (80% control efficiency)
- 3) Irrigation of crops using liquid/slurry manure from the secondary lagoon/holding/storage pond where preceded by an uncovered anaerobic treatment lagoon designed to meet Natural Resources Conservation Service (NRCS) standards (40% control efficiency)

d. Step 4 - Cost Effectiveness Analysis

Irrigation of crops using liquid/slurry manure from an aerobic treatment lagoon or mechanically aerated lagoon

The cost effectiveness analysis performed in the previous section (BACT analysis for VOC emissions from the lagoons/storage ponds) demonstrated that, based on the space requirements alone, aerobic treatment cannot reasonably be required for this project. The previous analysis also demonstrated that mechanically aerated lagoons are not cost effective. Since the emission rate from land application of manure (1.40 lb/cow-yr) is not significantly different from the emission rate from lagoons/storage ponds (1.30 lb/cow-yr), no significant change from the previous cost effectiveness determination can be expected.

Irrigation of crops using liquid/slurry manure from a holding/storage pond after being treated in a covered lagoon digester

The cost effectiveness analysis performed in the previous section (BACT analysis for VOC emissions from the lagoons/storage ponds) demonstrated that a covered lagoon digester is not cost effective. Since the emission rate from land application of manure (1.40 lb/cow-yr) is not significantly different from the emission rate from lagoons/storage ponds (1.30 lb/cow-yr), no significant change from the previous cost effectiveness determination can be expected.

Irrigation of crops using liquid/slurry manure from the secondary lagoon/holding/storage pond where preceded by an uncovered anaerobic treatment lagoon designed to meet Natural Resources Conservation Service (NRCS) standards

The applicant has proposed this option. In addition, this option is achieved in practice. A cost effectiveness analysis is therefore not required.

e. Step 5 - Select BACT

The applicant has proposed irrigation of crops using liquid/slurry manure from the secondary lagoon/holding/storage pond preceded by an uncovered anaerobic treatment system designed to meet Natural Resources Conservation Service (NRCS) standards. The proposal satisfies BACT for this category.

2. NH₃ Emissions

a. Step 1 - Identify all control technologies

The following option has been identified as a possible control option for NH₃ emissions from land application of liquid manure:

- 1) All animals fed in accordance with NRC or other District-approved guidelines.

Description of Control Technology

- 1) All animals fed in accordance with NRC or other District-approved guidelines

Nutritional management of dairy feed is routinely practiced to improve milk production and herd health. The potential for ammonia emissions can be reduced by reducing the amount of undigested nitrogen compounds in the manure. The level of microbial action in the manure corresponds to the level of organic nitrogen content in the manure; the lower the level of nitrogen the lower the level of microbial action and the lower the production of ammonia and VOCs.

A diet that is formulated to feed proper amounts of ruminantly degradable protein will result in improved nitrogen utilization by the animal and corresponding reduction in urea and organic nitrogen content of the manure, which will reduce the production of VOCs and ammonia. The latest National Research Council (NRC) guidelines for the selection of an optimal bovine diet should be followed to the maximum extent possible. The diet recommendations made in this publication seek to achieve the maximum uptake of protein by the animal and the minimum carryover of nitrogen into the manure, which will reduce ammonia emissions from liquid manure applied to cropland.

b. Step 2 - Eliminate technologically infeasible options

The option listed in Step 1 above is technologically feasible.

c. Step 3 - Rank remaining options by control effectiveness

The remaining option is listed below:

- 1) All animals fed in accordance with NRC or other District-approved guidelines.

d. Step 4 - Cost Effectiveness Analysis

The applicant has proposed this option. In addition, this option is achieved in practice. A cost effectiveness analysis is therefore not required.

e. Step 5 - Select BACT

The applicant has proposed to feed all animals in accordance with NRC or other District-approved guidelines. The proposal satisfies BACT for this category.

III. Top-Down BACT Analysis for the Solid Manure Handling Operation – Storage

NH₃ Emissions

a. Step 1 - Identify all control technologies

The following options were identified as possible controls for NH₃ emissions from solid manure storage:

- 1) All Animals Fed in Accordance With National Research Council (NRC) or other District-Approved Guidelines.

Description of Control Technologies

1) All Animals fed in accordance with National Research Council (NRC) or other District-approved Guidelines

Nutritional management of dairy feed is routinely practiced to improve milk production and herd health. The potential for ammonia emissions can be reduced by reducing the amount of undigested nitrogen compounds in the manure. The level of microbial action in the manure corresponds to the level of organic nitrogen content in the manure; the lower the level of nitrogen the lower the level of microbial action and the lower the production of ammonia and VOCs.

A diet that is formulated to feed proper amounts of ruminantly degradable protein will result in improved nitrogen utilization by the animal and corresponding reduction in urea and organic nitrogen content of the manure, which will reduce the production of VOCs and ammonia. The latest National Research Council (NRC) guidelines for the selection of an optimal bovine diet should be followed to the maximum extent possible. The diet recommendations made in this publication seek to achieve the maximum uptake of protein by the animal and the minimum carryover of nitrogen into the manure, which will reduce ammonia emissions from solid manure.

b. Step 2 - Eliminate technologically infeasible options

There are no technologically infeasible options to eliminate from step 1.

c. Step 3 - Rank remaining options by control effectiveness

After eliminating the technologically infeasible options, the remaining options are ranked according to their control efficiency.

- 1) All animals Fed in Accordance With National Research Council (NRC) or Other District-Approved Guidelines.

d. Step 4 - Cost Effectiveness Analysis

The applicant has proposed the only option listed; therefore a cost effectiveness analysis is not required.

e. Step 5 - Select BACT

The applicant has proposed to feed all animals in accordance with NRC or other District-approved guidelines. The proposal satisfies BACT for this category.

IV. Top-Down BACT Analysis for the Solid Manure Handling Operation – Land Application

NH₃ Emissions

a. Step 1 - Identify all control technologies

The following options were identified as possible controls for NH₃ emissions from solid manure land application:

- 1) Rapid incorporation of solid manure into the soil after land application, and All Animals Fed in Accordance With National Research Council (NRC) or Other District-Approved Guidelines.

Description of Control Technologies

1) **Rapid Incorporation of Solid Manure into the Soil After Land Application**

Various types of spreading techniques, such as box spreaders, flail type spreaders, side discharge spreaders, and spinner spreaders, are used to apply solid manure to cropland. Regardless of which technique is used, this practice requires the immediate incorporation of the manure into the soil, reducing emissions and surface run-off while minimizing the loss of nitrogen into the atmosphere. Based on a study by a local Valley dairy, there is a great potential of reducing emissions by incorporating slurry manure rapidly into the soil. A similar reduction may be obtained by the rapid incorporation of solid manure. This

technology is expected to yield a NH₃ control efficiency ranging from 49% to upwards of 98%.¹⁹

2) All Animals fed in accordance with National Research Council (NRC) or other District-approved Guidelines

Nutritional management of dairy feed is routinely practiced to improve milk production and herd health. The potential for ammonia emissions can be reduced by reducing the amount of undigested nitrogen compounds in the manure. The level of microbial action in the manure corresponds to the level of organic nitrogen content in the manure; the lower the level of nitrogen the lower the level of microbial action and the lower the production of ammonia and VOCs.

A diet that is formulated to feed proper amounts of ruminantly degradable protein will result in improved nitrogen utilization by the animal and corresponding reduction in urea and organic nitrogen content of the manure, which will reduce the production of VOCs and ammonia. The latest National Research Council (NRC) guidelines for the selection of an optimal bovine diet should be followed to the maximum extent possible. The diet recommendations made in this publication seek to achieve the maximum uptake of protein by the animal and the minimum carryover of nitrogen into the manure, which will reduce ammonia emissions from solid manure.

b. Step 2 - Eliminate technologically infeasible options

There are no technologically infeasible options to eliminate from step 1.

c. Step 3 - Rank remaining options by control effectiveness

- 1) Rapid Incorporation of Solid Manure into the Soil After Land Application; and All animals Fed in Accordance With National Research Council (NRC) or Other District-Approved Guidelines.

d. Step 4 - Cost Effectiveness Analysis

Rapid Incorporation of Solid Manure into the Soil After Land Application; and All animals Fed in Accordance With National Research Council (NRC) or Other District-Approved Guidelines.

Since this option is achieved in practice, a cost effective analysis is not required.

e. Step 5 - Select BACT

The remaining option not eliminated in Step 4 is selected as BACT. Therefore, BACT for this category is rapid incorporation of solid manure into the soil after land application; and

¹⁹ Page 81 of "Recommendations to the San Joaquin Valley Air Pollution Control Officer Regarding Best Available Control Technology for Dairies in the San Joaquin Valley" January 31, 2006
(http://www.valleyair.org/busind/pto/dpag/dpag_idx.htm).

all animals fed in accordance with National Research Council (NRC) or other District-approved guidelines.

V. Top-Down BACT Analysis for Feed Storage and Handling – Total Mixed Ration (TMR) Feeding

VOC Emissions

a. Step 1 - Identify all control technologies

The following option has been identified as a possible control for VOC emissions from TMR feeding:

- 1) District Rule 4570 Measures for Feed/TMR.

Description of Control Technology

District Rule 4570 Measures for Feed/TMR

District Rule 4570 requires the implementation of various management practices to reduce VOC emissions from TMR. These practices include pushing feed so that it is within three feet of feedlane fence within two hours of putting out the feed or use a feed trough or other feeding structure designed to maintain feed within reach of the animals, so the area of the feed is minimized and the feed can be consumed by the cows in a shorter time period instead of continuing to emit VOCs; beginning feeding total mixed rations within two hours of grinding and mixing rations, reducing the time that fresh feed emits VOCs; storing grain in a weatherproof storage structure or under a weatherproof covering from October through May; feeding steam-flaked, dry rolled, cracked or ground corn or other ground cereal grains; removal of uneaten wet feed from feeding areas; and preparing TMR with a minimum moisture content, which reduces VOC since most of the compounds emitted are highly soluble in water.

b. Step 2 - Eliminate technologically infeasible options

The option identified in step 1 is technologically feasible.

c. Step 3 - Rank remaining options by control effectiveness

Only one option was previously identified in step 1:

- 1) District Rule 4570 Measures for Feed/TMR.

d. Step 4 - Cost Effectiveness Analysis

District Rule 4570 Measures for Feed/TMR

Since this option is achieved in practice, a cost effective analysis is not required.

e. Step 5 - Select BACT

The applicant has proposed to implement District Rule 4570 measures. The proposal satisfies BACT for this category.

The remaining option not eliminated in Step 4 is selected as BACT. Therefore, BACT for this category is District Rule 4570 measures for feed/TMR.

APPENDIX I

PE Calculations for Permit Unit S-6124-11-0

Permit Unit S-6124-11-0

Equipment Description

310 BHP CATERPILLAR MODEL 3406 DIESEL-FIRED EMERGENCY STANDBY IC ENGINE POWERING AN ELECTRICAL GENERATOR

Emission Factors

No emission factor data for this engine were found. The following emission factors for similar units will be used:

Emission Factors for Uncontrolled Tier 0 Engines		
Pollutant	g/bhp-hr	Source
NO _x	10.00	Carl Moyer Program
SO _x	0.0051	Mass Balance Equation Below
PM ₁₀	0.475	Carl Moyer Program
CO	3.04	AP-42 (10/96) Table 3.3-1
VOC	1.14	AP-42 (10/96) Table 3.3-1

The SO_x emission factor is calculated as follows:

$$\frac{0.000015 \text{ lb} - S}{\text{lb} - \text{fuel}} \times \frac{7.1 \text{ lb} - \text{fuel}}{\text{gallon}} \times \frac{2 \text{ lb} - SO_2}{1 \text{ lb} - S} \times \frac{1 \text{ gal}}{137,000 \text{ Btu}} \times \frac{1 \text{ bhp input}}{0.35 \text{ bhp out}} \times \frac{2,542.5 \text{ Btu}}{\text{bhp} - \text{hr}} \times \frac{453.6 \text{ g}}{\text{lb}} = 0.0051 \frac{\text{g} - SO_x}{\text{bhp} - \text{hr}}$$

For diesel-fired emergency standby engines, the annual PE for each pollutant is calculated using the following equation:

$$\text{Annual PE} = \text{Emission Factor (g/bhp-hr)} \times \text{Engine Rating (bhp)} \times \text{Operating Hours (hrs/yr)} \div 453.6 \text{ g/lb}$$

Based on the current permit requirements and the emission factors above, the PE calculations are summarized in the following tables:

Annual PE Summary for Unit S-6124-11-0								
NO _x	10.00	(g/hp-hr) x	300	(hp) x	100	(hr/yr) ÷ 453.6 (g/lb) =	661	(lb/yr)
SO _x	0.0051	(g/hp-hr) x	300	(hp) x	100	(hr/yr) ÷ 453.6 (g/lb) =	0	(lb/yr)
PM ₁₀	0.475	(g/hp-hr) x	300	(hp) x	100	(hr/yr) ÷ 453.6 (g/lb) =	31	(lb/yr)
CO	3.04	(g/hp-hr) x	300	(hp) x	100	(hr/yr) ÷ 453.6 (g/lb) =	201	(lb/yr)
VOC	1.14	(g/hp-hr) x	300	(hp) x	100	(hr/yr) ÷ 453.6 (g/lb) =	75	(lb/yr)

APPENDIX J

Anaerobic Treatment Lagoon Design Check

Lagoon Design Check in Accordance with NRCS Guideline #359

Proposed Lagoon Volume

$$\text{Volume of treatment lagoon} = (L \times W \times D) - (S \times D^2) \times (W + L) + (4 \times S^2 \times D^3 \div 3)$$

Primary Treatment Lagoon Dimensions

Length	1046	ft
Width	271	ft
Depth	6	ft
Slope	1	ft

(Subtract 2 feet from the actual lagoon depth for run-off or miscellaneous water.)

Primary Lagoon Volume	1,653,672 ft ³
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INSTRUCTIONS

* only input yellow fields

- Step 1** Enter primary lagoon dimensions on this sheet
- Step 2** Go to "Net Volatile Solids Loading" sheet and enter number of animals flushing manure to lagoon
- Step 3** Adjust % in flush and separation as necessary (see notes on sheet)
- Step 4** Go to "Minimum Treatment Volume"
- Step 5** Minimum treatment volume should be less than lagoon volume to be considered anaerobic treatment lagoon
- Step 6** Go to "Hydraulic Retention Time"
- Step 7** Adjust fresh water as applicable
- Step 8** Hydraulic retention time should be greater than 34 days to be considered anaerobic treatment lagoon.

Lagoon Design Check in Accordance with NRCS Guideline #359

Net Volatile Solids loading Calculation

Net Volatile Solids (VS) Loading of Treatment Lagoons									
Breed: Holstein Type of Cow	Number of Animals	x	VS Excreted[1] (lb/day)	x	% Manure in Flush[2]	x	(1 - % VS Removed in Separation[3])	=	Net VS Loading (lb/day)
Milk Cows	2,800	x	17	x	48%	x	50%	=	11,424
Dry Cow	425	x	9.2	x	48%	x	50%	=	938
Heifer (15 to 24 months)	1,294	x	7.1	x	48%	x	50%	=	2,205
Heifer (7 to 14 months)	0	x	4.9	x	48%	x	50%	=	0
Heifer (3 to 6 months)	0	x	2.7	x	48%	x	50%	=	0
Calf (under 3 months)	0	x	1.0	x	100%	x	50%	=	0
Bulls	0	x	9.2	x	48%	x	50%	=	0
Total for Dairy									14,567

[1] The Volatile Solids (VS) excretion rates for Holstein cattle are based on Table 1.b – Section 3 of ASAE D384.2 (March 2005). VS excretion rates for milk cows, dry cows, & heifers 15-24 months were taken directly from the table. The VS excretion rate for heifers 3-6 months was estimated based on total solids excretion. The VS excretion rate for heifers 7-14 months was estimated as the average of heifers 15-24 months and heifers 3-6 months. The table did not give values for total solids or volatile solids excreted by baby calves. The VS excretion rate for baby calves was estimated based on an estimated dry matter intake (DMI) of 1.7% of body weight and the ratio of DMI to VS excretion for 150 kg calves. The VS excretion rate for mature bulls was assumed to be similar to dry cows.

[2] The % manure was taken from Table 3-1 of the California Regional Water Quality Control Board Document “Managing Dairy Manure in the Central Valley of California”, UC Davis, June 2005. This document estimated that 21-48% of the manure in open corral dairies is handled as a liquid. Therefore, as a worst case assumption, 48% will be used for all cows housed in open corrals with flush lanes. The document also estimates a range of 42-100% manure handled as a liquid in the freestalls. For freestalls without exercise pens, 100% of manure as a liquid in the flush will be used; for freestalls with exercise pens, the average of the range $((100+42)/2 = 71\%)$ will be used. (<http://groundwater.ucdavis.edu/Publications/uc-committee-of-experts-final-report%202006.pdf>) Saudi style/loafing barns are hybrids between freestalls and open corrals, the percentage of manure collected on the concrete feed lanes will be averaged between the values from the cows housed in freestall barns and open corrals. Therefore the % of manure deposited on the concrete lanes is equal to 60% $[(71+48)/2]$.

[3] Chastain, J.P., Vanotti, M. B., and Wingfield, M. M., Effectiveness of Liquid-Solid Separation For Treatment of Flushed Dairy Manure: A Case Study, Applied Engineering in Agriculture, Vol 17(3): 343-354 - This document outlines a VS removal rate of 50.1% to 70% depending on the type of separation system used, however to be conservative, a 50% VS removal will be used for all systems.

Lagoon Design Check in Accordance with NRCS Guideline #359

Minimum Treatment Volume Calculation

$$MTV = TVS/VSLR$$

Where:

MTV = Minimum Treatment Volume (ft³)

TVS = daily Total Volatile solids Loading (lb/day) = 0.011 lb/ft³-day

VSLR = Volatile Solids Loading Rate (lb/1000 ft³-day)

Minimum Treatment Volume in Primary Lagoon					
Breed: Holstein	Net VS Loading (lb/day)		VSLR (lb/ft ³ -day)[1]		MTV (ft ³)
Type of Cow					
Milk Cows	11,424	÷	0.011	=	1,038,545
Dry Cow	938	÷	0.011	=	85,309
Heifer (15 to 24 months)	2,205	÷	0.011	=	200,452
Heifer (7 to 14 months)	0	÷	0.011	=	0
Heifer (3 to 6 months)	0	÷	0.011	=	0
Calf (under 3 months)	0	÷	0.011	=	0
Bulls	0	÷	0.011	=	0
Total for Dairy					1,324,307

[1] VSLR for an anaerobic treatment lagoon in San Joaquin Valley would be 6.5 lb VS/1000 ft³-day to 11 lb VS/1000 ft³-day according to the NRCS and USDA AWTFH. Based on phone conversation with Matt Summers (USDA) on July 14, 2006, he suggested that the 11 lb VS/1000 ft³-day

Lagoon Design Check in Accordance with NRCS Guideline #359

Sludge Accumulation Volume

The sludge accumulation volume accounts for the solids contained in the manure that cannot be fully digested by bacteria and that gradually settle to the bottom of the lagoon as sludge. The sludge accumulation volume for lagoon systems without solids separation can be calculated from the USDA Field Handbook. However, there are no accepted guidelines for calculating the sludge accumulation volume for lagoon systems with solids separation, but many designers of digester expect it to be minimal.

This facility has an efficient solids separation system consisting prior to the anaerobic treatment lagoon system. The separation system will remove a large portion of the fibers, lignin, cellulose, and other fibrous materials from the manure. These are the materials that would otherwise cause sludge accumulation from the lack of digestion in a lagoon or digester. Because fibrous materials and other solids will not enter the lagoon system, the sludge accumulation volume required will be minimized and can be considered negligible.

Nevertheless, the primary lagoon will have sufficient space remaining for sludge accumulation, as shown by the following calculation:

$$\text{SAV} = \text{VPL} - \text{MTV}$$

Where:

SAV = Sludge Accumulation Volume (ft³)

VPL = total Volume of Primary Lagoon (ft³)

MTV = Minimum Treatment Volume (ft³)

$$\text{SAV} = \text{VPL} - \text{MTV}$$

$$\text{SAV} = 1,653,672 - 1,324,307 = 329,365 \text{ (ft}^3\text{)}$$

Lagoon Design Check in Accordance with NRCS Guideline #359

Hydraulic Retention Time (HRT) Calculation

The anaerobic treatment lagoon and covered lagoon anaerobic digester must be designed to provide sufficient Hydraulic Retention Time (HRT) to adequately treat the waste entering the lagoon and to allow environmentally safe utilization of this waste. The NRCS Technical Guide Code 365 – Anaerobic Digester – Ambient Temperature specifies a minimum HRT 38 days in the San Joaquin Valley.

The Hydraulic Retention Time (HRT) is calculated as follows:

$$\text{HRT} = \text{MTV}/\text{HFR}$$

where:

HFR = Hydraulic flow rate (1000ft³/day)

HRT = Hydraulic Retention Time (day)

The Hydraulic Flow Rate is Calculated below

Type	# of cows	Amount of Manure*				HFR	
Milk Cows	2,800	x	2.40	ft ³	=	6,720	ft ³ /day
Dry Cows	425	x	1.30	ft ³	=	553	ft ³ /day
Heifers (15-24 mo)	1,294	x	0.78	ft ³	=	1,009	ft ³ /day
Heifers (7-14 mo)	0	x	0.78	ft ³	=	-	ft ³ /day
Heifers (3-6 mo)	0	x	0.30	ft ³	=	-	ft ³ /day
Calves	0	x	0.15	ft ³	=	-	ft ³ /day
Bulls	0	x	1.30	ft ³	=	-	ft ³ /day
Total	4,519					8,282	ft ³ /day
Fresh water per milk cow used in flush at milk parlor		50	gal/day				

*Table 1.b - Section 3 of ASAE D384.2 (March 2005). The calf manure was estimated to be 1/2 of the calf number found in the table, since the average weight of these calves is approx. 1/2 of the calves identified in the table.

Lagoon Design Check in Accordance with NRCS Guideline #359 Cont.

Formula:

Gallon	#	x	ft3	+	ft3
Milk Cow*Day	Milk Cows		gallon		day

Total HFR:



50 gal	2800 milk cows	x	ft3	+	8,282	ft3
milk cow * day			7.48 gal			day
				=	26,998.4	ft3/day

Formula:

MTV (ft3)	/	(day)	=
		HFR (ft3)	

HRT:



1,324,307 ft3	day	=	49.0513153	days
	26,998.4 ft3			

APPENDIX K

QNEC

Quarterly Net Emissions Change (QNEC)

The Quarterly Net Emissions Change is used to complete the emission profile screen for the District's PAS database. The QNEC shall be calculated as follows:

QNEC = PE2 - PE1, where:

- QNEC = Quarterly Net Emissions Change for each emissions unit, lb/qtr
- PE2 = Post-Project Potential to Emit for each emissions unit, lb/qtr
- PE1 = Pre-Project Potential to Emit for each emissions unit, lb/qtr

The quarterly PE values are calculated as follows: PE (lb/yr) ÷ 4 (qtr/yr)

Using the annual PE2 and PE1 values previously calculated, the QNEC (lb/qtr) for each permit unit is shown below:

Milking Parlor						
	NOx	SOx	PM10	CO	VOC	NH3
Annual PE2 (lb/yr)	0	0	0	0	1,120	383
Daily PE2 (lb/day)	0.0	0.0	0.0	0.0	3.1	1.0
Quarterly Net Emissions Change (lb/qtr)						
1:	0.0	0.0	0.0	0.0	100.00	34.20
2:	0.0	0.0	0.0	0.0	100.00	34.20
3:	0.0	0.0	0.0	0.0	100.00	34.20
4:	0.0	0.0	0.0	0.0	100.00	34.20

Cow Housing						
	NOx	SOx	PM10	CO	VOC	NH3
Annual PE2 (lb/yr)	0	0	23,108	0	36,074	78,155
Daily PE2 (lb/day)	0.0	0.0	63.3	0.0	98.8	214.3
Quarterly Net Emissions Change (lb/qtr)						
1:	0.0	0.0	1,607.00	0.0	3,348.75	7,200.75
2:	0.0	0.0	1,607.00	0.0	3,348.75	7,200.75
3:	0.0	0.0	1,607.00	0.0	3,348.75	7,200.75
4:	0.0	0.0	1,607.00	0.0	3,348.75	7,200.75

Liquid Manure Handling							
	NOx	SOx	PM10	CO	VOC	NH3	H2S
Annual PE2 (lb/yr)	0	0	0	0	5,213	16,430	397
Daily PE2 (lb/day)	0.0	0.0	0.0	0.0	14.3	45.0	1.1
Quarterly Net Emissions Change (lb/qtr)							
1:	0.0	0.0	0.0	0.0	-63.00	92.06	0.0
2:	0.0	0.0	0.0	0.0	-63.00	92.06	0.0
3:	0.0	0.0	0.0	0.0	-63.00	92.06	0.0
4:	0.0	0.0	0.0	0.0	63.00	92.06	0.0

Solid Manure Handling						
	NOx	SOx	PM10	CO	VOC	NH3
Annual PE2 (lb/yr)	0	0	0	0	1,713	9,502
Daily PE2 (lb/day)	0.0	0.0	0.0	0.0	4.7	26.1
Quarterly Net Emissions Change (lb/qtr)						
1:	0.0	0.0	0.0	0.0	174.75	875.46
2:	0.0	0.0	0.0	0.0	174.75	875.46
3:	0.0	0.0	0.0	0.0	174.75	875.46
4:	0.0	0.0	0.0	0.0	174.75	875.46

Feed Storage and Handling						
	NOx	SOx	PM10	CO	VOC	NH3
Annual PE2 (lb/yr)	0	0	0	0	44,731	0
Daily PE2 (lb/day)	0.0	0.0	0.0	0.0	122.5	0.0
Quarterly Net Emissions Change (lb/qtr)						
1:	0.0	0.0	0.0	0.0	3,458.00	0.0
2:	0.0	0.0	0.0	0.0	3,458.00	0.0
3:	0.0	0.0	0.0	0.0	3,458.00	0.0
4:	0.0	0.0	0.0	0.0	3,458.00	0.0