



MAR 24 2017

Larry Matos
Larry Matos Dairy
5460 Oak Rd
Merced, CA 95341

Re: Notice of Preliminary Decision - Authority to Construct
Facility Number: N-8481
Project Number: N-1160118

Dear Mr. Matos:

Enclosed for your review and comment is the District's analysis of Larry Matos Dairy's application for an Authority to Construct for the increase of the permitted herd size at the existing dairy from 1,380 Jersey milk cows (3,180 total head) to 2,100 Jersey milk cows (5,100 total head), the construction of two new freestall barns, and the relocation of heifers from corrals to freestall barns, at 100 S Quinley Ave, Merced, CA.

The notice of preliminary decision for this project will be published approximately three days from the date of this letter. 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. Ramon Norman of Permit Services at (559) 230-5909.

Sincerely,



Arnaud Marjollet
Director of Permit Services

AM:rn

Enclosures

cc: Tung Le, CARB (w/ enclosure) via email

Seyed Sadredin

Executive Director/Air Pollution Control Officer

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San Joaquin Valley Air Pollution Control District

Authority to Construct Application Review

Increase Permitted Herd Size and Move Heifers to another Part of Dairy

Facility Name: Larry Matos Date: March 22, 2017
Mailing Address: 5460 Oak Rd Engineer: Ramon Norman
Merced, CA 95341 Lead Engineer: Jerry Sandhu
Applicant: Larry Matos
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Application #(s): N-8481-1-2, -2-2, -3-1, -4-1, & -5-1
Project #: N-1160118
Deemed Complete: August 17, 2016

I. Proposal

Larry Matos has requested Authority to Construct (ATC) permits to increase the permitted herd size at their existing 1,380 Jersey milk cow (3,180 total head) dairy operation to 2,100 Jersey milk cows (5,100 total head). (See Appendix A for current dairy Permits to Operate). This project will modify the District permits for the dairy operation to increase the permitted herd size to match the number of animal units allowed at the site by the recently amended Merced County Conditional Use Permit (CUP 12-014) (See Appendix B for Merced County Planning Commission Minutes for approval of Merced County CUP 12-014). The proposed project will include the construction of two new freestall barns (proposed Freestall Barns D and E) on the east side of S Quinley Ave in Merced County. As part of the project, Larry Matos is also proposing to relocate heifers that are currently kept in corrals that Larry Matos has been leasing on the west side of S Quinley Ave to one of the new freestall barns that will be constructed on the east side of S Quinley Ave. After relocation of the heifers, the corrals located on the west side of S Quinley Ave that Larry Matos has been leasing will no longer be used by the dairy. (See Appendix C for a copy of the proposed dairy site plan.)

The dairy is currently permitted for the following herd size: 1,380 milk cows, not to exceed a combined total of 1,680 mature cows (milk and dry); and 1,500 support stock (heifers, calves, and bulls). After approval of this project to increase the permitted herd size, the dairy will be permitted for the following herd composition: 2,100 milk cows, not to exceed a combined total of 2,500 mature cows (milk and dry); and 2,600 support stock (heifers, calves, and bulls). Although this dairy will usually send calves offsite to be raised, to give the dairy greater flexibility, calves will continue to be listed under support stock on the proposed permits issued under this project. The Environmental Impact Report (EIR) prepared for the Matos Dairy

Expansion Project (Merced County CUP 12-014)¹ indicates that the proposed herd size is allowed at this site by Merced County.

Pursuant to District Rule 2201, the proposed project constitutes a modification that will require ATC permits for each of the following permit units: Milking Operation (N-8481-1) including a double-24 parallel milking parlor with 48 stalls; Cow Housing Permit (N-8481-2) including three freestall barns flushed lanes and open corrals; Liquid Manure Handling System (N-8481-3) including settling basins and a storage pond; Solid Manure Handling System (N-8481-4) consisting of manure stockpiles with solid manure applied to land and/or hauled offsite; and Feed Storage and Handling Permit (N-8481-5) including commodity barns and covered silage piles. ATC permits are required for these units because the increase in herd size will result in an increase in production that will require a change in permit conditions, include construction and/or modification of emission units for the cow housing permit, and because the project results in an overall increase in the stationary source potential to emit for volatile organic compounds (VOC) and ammonia (NH₃) at the dairy.

The project triggers the public notice requirements of District Rule 2201. Therefore, the preliminary decision for the project will be submitted to the California Air Resources Board (ARB), a public notice will be published in a local newspaper of general circulation in the county of the project, and a 30-day public comment period will be completed prior to issuance of the ATCs.

II. Applicable Rules

Rule 2010	Permits Required (12/17/92)
Rule 2201	New and Modified Stationary Source Review Rule (2/18/16)
Rule 2410	Prevention of Significant Deterioration (6/16/11)
Rule 2520	Federally Mandated Operating Permits (6/21/01)
Rule 2550	Federally Mandated Preconstruction Review for Major Sources of Air Toxics (6/18/98)
Rule 4101	Visible Emissions (2/17/05)
Rule 4102	Nuisance (12/17/92)
Rule 4550	Conservation Management Practices (CMP) (8/19/04)
Rule 4570	Confined Animal Facilities (CAF) (10/21/10)
CH&SC 41700	Health Risk Assessment
CH&SC 42301.6	School Notice
Senate Bill 700 (SB 700)	
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

The facility is located at 100 S Quinley Ave, Merced, CA, on the east side of S Quinley Avenue and south of Bailey Avenue, approximately three miles south of the City of Atwater in Merced

¹ Final EIR prepared for the Matos Dairy Expansion Project (Merced County CUP 12-014) available at: https://www.co.merced.ca.us/pdfs/env_docs/eir/MatosDairyExpansion_feir.pdf

County (APN 059-190-001). The facility is not located within 1,000 feet of the outer boundary of a K-12 school. Therefore, the public notification requirement of California Health and Safety Code 42301.6 is not applicable to this project.

IV. Process Description

The primary function of Larry Matos Dairy is the production of milk, which is used to make products for human consumption. Production of milk requires a herd of mature dairy cows that are lactating. In order to produce milk, the cows must be bred and give birth. The gestation period for a cow is 9 months, and dairy cows are bred again 4 months after calving. Thus, a mature dairy cow produces a calf every 12 to 14 months, which is why there are usually different ages and types of cows at most dairies. As mentioned above, the calves at this dairy will usually be sent offsite to be raised rather than kept onsite.

The Holstein milk cows at a dairy usually generate anywhere from 130 to 150 pounds of manure per day. This dairy is stocked with Jersey cows, which are smaller than Holstein cows (approximately 1,000 lb. for a mature Jersey cow vs. 1,400 lb. for a mature Holstein cow) and therefore produce less manure. Manure accumulates in confinement areas such as barns, open corrals (dry lots), and the milking center. Manure is primarily deposited in areas where the herd is fed and given water. How the manure is collected, stored and treated depends directly on the manure management techniques used at a particular dairy.

Dairy manure is collected and managed as a liquid, a semi-solid or slurry, and a solid. Manure with a total solids or dry matter 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.

Cow Housing

All of the milk cows and dry cows at this dairy are housed in freestall barns with flushed lanes. In a freestall barn, the cows are grouped in large pens with free access to feed bunks, water, and stalls for resting. A standard freestall barn design has a feed alley in the center of the barn separating two feed bunks on each side. The flush system is used to remove manure from the freestall lanes and walkways. As discussed above, the project will include the construction of two new freestall barns (proposed Freestall Barns D and E) on the east side of S Quinley Ave. Freestall Barn D is proposed for construction directly east of the existing milk barn and Freestall Barn E is proposed for construction directly east of existing Freestall Barn A and north of the feed equipment and storage area. (See Appendix C for proposed dairy site plan.)

The heifers at this dairy are currently housed in open corrals with flushed lanes. An open corral is a large open area where cows are confined with unlimited access to feed and water. As discussed above, after completion of the project, the heifers at the dairy will be relocated from the corrals that Larry Matos has been leasing on the west side of S Quinley Ave to freestall barns located on the east side of S Quinley Ave and the corrals that Larry Matos has been leasing on the west side of S Quinley Ave leased will no longer be used by the dairy.

Special Needs Housing

The special needs area serves the gestating cows at the dairy or any cows that are in need of medical condition. This area acts as a veterinary space. It is also the area in which cows are given special attention as they progress from dry cow, a mature cow that is gestating and not lactating, to maternity, to milking status or until their health improves. The applicant indicates that existing Freestall Barn A and will be used to house up to 400 dry cows 500 special needs heifers and Proposed Freestall Barn E will also be used to house special needs heifers.

Milking Parlor

The milking parlor is a separate building, apart from the lactating cow confinement. The milking parlor is designed to facilitate changing the groups of cows milked and to allow workers access to the cows during milking. A holding area confines the cows that are ready for milking. The holding area is covered with open sides and is part of the milking parlor, which in turn, is located in the immediate vicinity of the cow housing.

The dairy includes one existing double-24 parallel milking parlor with 48 milking stalls. The lactating cows are milked two times per day in the milking parlor. The milking parlor has concrete floors sloped to a drain. Manure that is excreted in the milking parlor will be sprayed or flushed into the drain using fresh water after each milking. The effluent from the milking parlor will be carried through pipes to the liquid manure handling system.

Liquid Manure Handling System

The liquid manure handling system for the dairy will include the following components:

- Two settling basins
- One 642 ft x 150 ft x 22 ft single cell anaerobic treatment lagoon with a side slope of 1.2

Settling Basins

The liquid manure from the flushed lanes will flow to one of the existing settling basins for solids separation prior to entering the lagoon system. Settling basins are structures designed to separate solids from liquid manure by sedimentation. The inflow of manure is restricted to allow some of the solids to settle out. A settling basin may achieve a solids removal rate of 40-70%. The liquids from the settling basins will gradually drain to the treatment lagoon. Solids remaining in settling basins are left to dry and then are removed. Solids separation reduces the land area required when designing a liquid manure treatment system since the volume to be treated is less. The dairy currently includes two settling located near the lagoon. The separated solids will either be applied to cropland or stored for use as fertilizer or bedding in the freestalls.

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 (VOCs). The

National Resource Conservation Service (NRCS) California Field Office Technical Guide Code 359 - Waste Treatment Lagoon specifies the following criteria for anaerobic treatment lagoons:

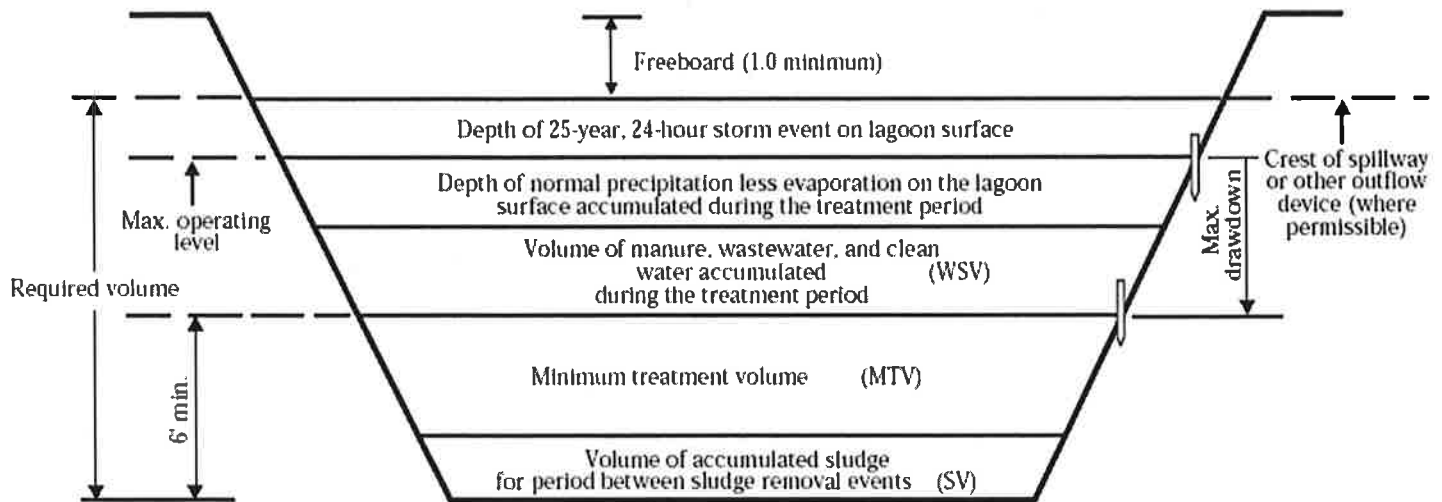
- 1) Minimum treatment volume - The minimum design volume must account for all potential sludge, treatment, precipitation, and runoff volumes;
- 2) Minimum hydraulic retention time – The retention time of the material in the lagoon must be adequate to provide environmentally safe utilization of waste;
- 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 12 feet - Maximizing the depth of the lagoon has the following advantages: 1) The surface area in contact with the atmosphere is minimized, which will reduce volatilization of air pollutants; 2) The smaller surface area reduces the effects of the environment on the lagoon, which provides a more stable and favorable environment for anaerobic bacteria; 3) There is better mixing of lagoon due to rising gas bubbles; 4) and A deeper lagoon requires less land for the required treatment volume.

The use of an anaerobic treatment lagoon is usually required to satisfy Best Available Control Technology (BACT) for VOC emissions from liquid manure storage and land application at dairies. For this project, the applicant has proposed to utilize an anaerobic treatment lagoon, which will result in potentials to emit for VOC from both the lagoon/storage pond and liquid manure land application that will not exceed 2.0 lb/day; however, the BACT threshold for VOC from both the lagoon/storage pond and liquid manure land application would have been exceeded and BACT would have been required if the anaerobic treatment lagoon had not been proposed. Use of an anaerobic treatment lagoon is also required as BACT for toxic emission control (T-BACT) for the liquid manure handling system, as discussed below in the results of the Health Risk Assessment (HRA) for the project.

The dairy currently includes one storage pond. The dimensions of the existing storage pond are 642 ft x 150 ft x 22 ft and the slope (run/rise) of the storage pond is 1.2. For the project, the applicant has proposed to operate the existing storage pond as a single-cell anaerobic treatment lagoon designed in accordance with the specifications set forth in NRCS practice standard 359. Proper operation of a single-cell anaerobic treatment lagoon requires that the minimum treatment volume, which depends on the volatile solids loading rate, be maintained in the lower portion of the lagoon to ensure that there is a stable bacterial population to promote more efficient anaerobic digestion. The lower portion of the lagoon must also maintain sufficient volume for sludge accumulation. The upper portion of the lagoon is designed to store liquid manure and irrigation water used to dilute waste prior to application to cropland. The upper portion of the lagoon must have sufficient volume to hold all of the following: all manure and wastewater accumulated at the dairy for a period of 120 days; normal precipitation and any drainage to the lagoon system minus evaporation from the surface of lagoons; and precipitation during a 25 year, 24 hour storm event.

The liquid level of the anaerobic treatment lagoon can fluctuate. However, the liquid level should never fall below the minimum depth established for the lagoon that maintains the minimum treatment and sludge accumulation volumes. This level is the level of maximum

drawdown and markers should be placed in the lagoon so that the lagoon will not be pumped below this level. All of the liquid manure at the dairy will be sent to the anaerobic treatment lagoon. The liquid manure from the anaerobic treatment lagoon will be used to irrigate crops.



Manure Stock Piles (Storage)

The solid manure stockpiled at this dairy will include the scraped manure from the surface of the corrals and any scraped manure removed from the corral lanes. The scraped solid manure will be immediately incorporated into the dairy's cropland or will be dried and stored for use as fertilizer.

V. Equipment Listing

N-8481-1

Pre-Project Equipment Description:

N-8481-1-1: 1,380 COW MILKING OPERATION WITH ONE DOUBLE 24 PARALLEL (48 STALLS) MILKING PARLOR

Proposed Modification:

Increase the number of milking cows to 2,100

N-8481-1-2: MODIFICATION OF 1,380 COW MILKING OPERATION WITH ONE DOUBLE 24 PARALLEL (48 STALLS) MILKING PARLOR: INCREASE MILK COWS TO 2,100

Post Project Equipment Description:

N-8481-1-2: 2,100 JERSEY COW MILKING OPERATION WITH ONE DOUBLE 24 PARALLEL (48 STALLS) MILKING PARLOR

N-8481-2

Pre-Project Equipment Description:

N-8481-2-1: COW HOUSING - 1,380 MILK COWS NOT TO EXCEED A COMBINED TOTAL OF 1,680 MATURE COWS (MILK AND DRY COWS); 1,500 TOTAL SUPPORT STOCK (HEIFERS, CALVES, AND BULLS); AND 3 FREESTALLS WITH FLUSH SYSTEM

Proposed Modification:

Increase herd size to 2,100 milk cows, not to exceed a combined total of 2,500 mature cows (milk and dry); and 2,600 support stock (heifers, calves, and bulls); construct two new freestall barns, and relocate heifers from the corrals that Larry Matos has been leasing on the west side of S Quinley Ave to freestall barns located on the east side of S Quinley Ave

N-8481-2-2: MODIFICATION OF COW HOUSING - 1,380 MILK COWS NOT TO EXCEED A COMBINED TOTAL OF 1,680 MATURE COWS (MILK AND DRY COWS); 1,500 TOTAL SUPPORT STOCK (HEIFERS, CALVES, AND BULLS); AND 3 FREESTALLS WITH FLUSH/SCRAPE SYSTEM: INCREASE HERD SIZE TO 2,100 JERSEY MILK COWS NOT TO EXCEED A COMBINED TOTAL OF 2,500 MATURE COWS (MILK AND DRY COWS), AND 2,600 SUPPORT STOCK (HEIFERS, CALVES, AND BULLS); CONSTRUCT TWO NEW FREESTALL BARN (ONE IN EXISTING EXERCISE PENS AND ONE ON CLEARED CROPLAND); AND RELOCATE HEIFERS FROM CORRALS ON WEST OF S QUINLEY AVE TO FREESTALLS ON EAST SIDE OF S QUINLEY AVE

Post Project Equipment Description:

N-8481-2-2: JERSEY COW HOUSING - 2,100 MILK COWS NOT TO EXCEED A COMBINED TOTAL OF 2,500 MATURE COWS (MILK AND DRY COWS), AND 2,600 SUPPORT STOCK (HEIFERS, CALVES, AND BULLS); AND 5 FREESTALLS WITH FLUSH/SCRAPE SYSTEM

N-8481-3

Pre-Project Equipment Description:

N-8481-3-0: LIQUID MANURE HANDLING SYSTEM CONSISTING OF TWO SETTLING BASINS; ONE STORAGE POND; MANURE LAND APPLIED THROUGH FLOOD IRRIGATION AND FURROW IRRIGATION

Proposed Modification:

Modify liquid manure management for increase in herd size and convert existing storage pond to a single-cell anaerobic treatment lagoon

N-8481-3-1: MODIFICATION OF LIQUID MANURE HANDLING SYSTEM CONSISTING OF SETTLING BASIN(S); ONE STORAGE POND; MANURE LAND APPLIED THROUGH FLOOD IRRIGATION AND FURROW IRRIGATION: ALLOW FOR INCREASE IN LIQUID MANURE DUE TO INCREASE IN HERD SIZE AUTHORIZED BY ATC N-8481-2-2; AND CONVERT EXISTING STORAGE POND TO A SINGLE-CELL ANAEROBIC TREATMENT LAGOON (642' X 150' X 22')

Post Project Equipment Description:

N-8481-3-1: LIQUID MANURE HANDLING SYSTEM CONSISTING OF SETTLING BASIN(S); ONE SINGLE-CELL ANAEROBIC TREATMENT LAGOON (642' x 150' x 22'); MANURE LAND APPLIED THROUGH FLOOD IRRIGATION AND FURROW IRRIGATION

N-8481-4

Pre-Project Equipment Description:

N-8481-4-0: SOLID MANURE HANDLING CONSISTING OF COVERED MANURE STOCK PILES; SOLID MANURE APPLICATION TO LAND AND/OR HAULED OFFSITE

Proposed Modification:

Modify solid manure management for increase in herd size

N-8481-4-1: MODIFICATION OF SOLID MANURE HANDLING CONSISTING OF MANURE STOCK PILES; SOLID MANURE APPLICATION TO LAND AND/OR HAULED OFFSITE: ALLOW FOR INCREASE IN SOLID MANURE DUE TO INCREASE IN HERD SIZE AUTHORIZED BY ATC N-8481-2-2

Post Project Equipment Description:

N-8481-4-1: SOLID MANURE HANDLING CONSISTING OF MANURE STOCK PILES; SOLID MANURE APPLICATION TO LAND AND/OR HAULED OFFSITE

N-8481-5

Pre-Project Equipment Description:

N-8481-5-0: FEED STORAGE AND HANDLING CONSISTING OF COVERED FEED STORAGE OR COMMODITY BARN AND SILAGE PILES

Proposed Modification:

Modify feed handling for increase in herd size

N-8481-5-1: MODIFICATION OF FEED STORAGE AND HANDLING CONSISTING OF COVERED FEED STORAGE OR COMMODITY BARN(S), SILAGE PILES, AND TOTAL MIXED RATION FEEDING: ALLOW FOR INCREASE IN FEED DUE TO INCREASE IN HERD SIZE AUTHORIZED BY ATC N-8481-2-2

Post Project Equipment Description:

N-8481-5-1: FEED STORAGE AND HANDLING CONSISTING OF COVERED FEED STORAGE OR COMMODITY BARN(S), SILAGE PILES, AND TOTAL MIXED RATION FEEDING

VI. Emission Control Technology Evaluation

Particulate Matter (PM), Volatile Organic Compounds (VOCs), and Ammonia (NH₃) are the major pollutants of concern from dairy operations. Hydrogen sulfide (H₂S) is also emitted from anaerobic processes on dairies. Gaseous pollutant emissions at a dairy result from the ruminant digestive processes (enteric emissions), the decomposition and fermentation of feed, and also from the decomposition of organic material in dairy manure. Volatile Organic Compounds are formed as intermediate metabolites when organic matter in manure degrades. Ammonia volatilization is the result of the microbial decomposition of nitrogenous compounds in manure. Hydrogen sulfide and other reduced sulfur compounds are produced when sulfur-containing compounds in manure decompose anaerobically. The quantity of enteric emissions depends directly on the number and types of cows. The quantity of emissions from manure decomposition depends on the amount of manure generated, which also depends on the number and types of cows. Therefore, the total herd size and composition is the critical factor in quantifying emissions from a dairy. Various management practices will be used to control emissions at this dairy. Examples of some of these practices are discussed below:

Milking Parlor (N-8481-1):

This dairy uses a flush/spray system to wash out the manure from the milking parlor after each group of cows is milked. Since the milking parlor is constantly flushed, there will be no particulate matter emissions from the milking parlor. Manure, which is a source of VOC emissions, is removed from the milking parlor many times a day by flushing after each milking. Because of ammonia's high affinity for and solubility in water, volatilization of ammonia from the milking parlor will also be reduced by flushing after each milking. Flushing the milking parlor after each milking will also reduce anaerobic decomposition of manure on the milking parlor floor thereby eliminating the potential for H₂S emissions from the milking parlor floor.

Cow Housing (N-8481-2)

After completion of the project, all of the cattle (milk cows, dry cows, heifers, calves, and bulls) at Larry Matos Dairy will be housed in freestall barns with flushed lanes. Practices that will be utilized to reduce emissions at the dairy include: frequent flushing of lanes, scraping of exercise pens, and feeding animals in accordance with NRC guidelines. These practices are discussed further below.

Freestall Barns

Housing cattle in freestall barns greatly reduces PM emissions because the cows will be on a paved surface rather than on dry dirt. Additionally, flushing of the freestall lanes creates a moist environment, which further decreases particulate matter emissions.

Scraping of Exercise Pens

The surfaces of the freestall exercise pens will be scraped in the morning hours every two weeks except during wet conditions. Frequent scraping of the freestall exercise pens will reduce the amount of dry manure on the surfaces that may be pulverized by the cows' hooves and emitted as PM₁₀. This practice will also reduce the chance of anaerobic conditions developing in the manure pack of the freestall exercise pen surface, potentially reducing VOC emissions.

Frequent Flushing of Lanes

Manure, which is a source of emissions, will be removed from the freestall barn lanes by flushing. When a flush system is used, a large proportion of the VOCs emitted from fresh cow manure will dissolve in the flush water and will not be emitted from the cow housing permit unit. Because of ammonia's high affinity for and solubility in water, flushing the lanes and walkways will also reduce volatilization of ammonia from the manure deposited in the lanes of freestall barns and open corrals. For the proposed new freestall barns (Proposed Freestall Barns D and E) that will be subject to BACT for VOC and NH₃ emissions, the lanes and walkways for the mature cows (lactating and dry cows) will be required to be flushed at least four times per day and the lanes and walkways for the heifers will be required to be flushed at least once per day.

Liquid Manure Handling System (N-8481-3)

All emissions from the liquid manure handling system are the result of manure decomposition.

Anaerobic Treatment Lagoon

As stated above, the liquid manure handling system at Larry Matos Dairy includes an existing storage pond that will be modified to operate as a single-cell anaerobic treatment lagoon designed in accordance with the specifications set forth in NRCS practice standard 359. A properly designed and operated anaerobic treatment lagoon system will reduce VOC emissions because the organic compounds in the manure will be mostly converted into methane, carbon dioxide, and water rather than a significant amount of VOCs. An anaerobic treatment lagoon also has an air pollution benefit over a system with only a storage pond. Odorous emissions are reduced with an anaerobic treatment lagoon since the lagoon has a constant treatment volume, which promotes more efficient anaerobic digestion. The proposed anaerobic treatment lagoon system meets the appropriate design requirements (see anaerobic treatment lagoon design check in Appendix D).

Solids Separation

The liquid manure handling system at Larry Matos Dairy includes two settling basins for solids separation. Solids separation prevents excessive loading of volatile solids in lagoon treatment systems. Excessive loading of volatile solids in lagoons inhibits the activity of the methanogenic bacteria and leads to increased rates of volatile solids production. When the activity of the methanogenic bacteria is not inhibited, most of the VOCs are metabolized to simpler compounds, and the potential for VOC emissions is reduced.

Liquid Manure Land Application

Liquid manure from the storage pond will be applied through flood and furrow irrigation. The dairy will apply liquid manure to cropland at agronomic rates. Liquid manure will be applied in thin layers and will be blended with irrigation water in compliance with the dairy's comprehensive nutrient management plan and the requirements of the Regional Water Quality Control Board. These practices will reduce odors and result in faster uptake of nutrients, including organic nitrogen, which can emit VOCs and ammonia during decomposition, and ammonium nitrogen, which is readily lost to the atmosphere as gaseous ammonia.

Solid Manure Handling (N-8481-4)

Rapid Incorporation of Solid Manure Applied to Land:

Based on the information currently available, emissions from solid manure applied to cropland are small in comparison to other sources. However, to ensure that any possible emissions are minimized, this dairy will be required to incorporate solid manure applied to cropland immediately (within two hours) after application. Immediate incorporation of the manure into the soil will reduce any volatilization of gaseous pollutants, including VOC and NH_3 . Reduction in gaseous emissions is achieved by minimizing the amount of time that the manure is exposed to the atmosphere. Once manure has been incorporated into the soil, VOCs, NH_3 , and any H_2S are absorbed onto particles of soil providing the opportunity for microbes in the soil to oxidize these compounds into carbon dioxide, water, nitrates, and sulfates.²

Feed Handling and Storage (N-8481-5)

Feeding Animals in Accordance with the NRC Guidelines

All animals housed at the dairy will be fed in accordance with National Research Council (NRC) guidelines using routine nutritional analysis for rations. Feeding the cows in accordance with NRC guidelines minimizes undigested protein and other undigested nutrients in the manure, which would emit VOCs, NH_3 , and H_2S upon decomposition.

² Page 9-38 of U.S. EPA's Draft Document Emissions From Animal Feeding Operations (<http://www.epa.gov/ttn/chief/ap42/ch09/draft/draftanimalfeed.pdf>)

Silage Pile Management

The feed storage system at Larry Matos Dairy includes one corn silage pile (150 feet wide by 14 feet high), one wheat/oat/winter grain silage pile (150 feet wide by 14 feet high), and one Sudan grass silage pile (150 feet wide by 14 feet high). The proposed emission reduction measures for feed handling and storage include best management practices such as minimizing the surface area of silage exposed to the atmosphere. This can be done by covering the silage pile securely with a tarp and removing feed only from a small area of the pile (face of pile).

VII. General Calculations

A. Assumptions

- Potential to Emit for the dairy will be based on the maximum design capacity of the number and types of cows at the dairy.
- Only emissions from lagoon/storage pond and IC engines at the dairy will be used to determine if the facility is a major source since these units are considered the only source of non-fugitive emissions at the dairy.
- Potential to Emit for the 85 bhp IC engine powering an agricultural irrigation pump (Permit #N-8481-6-0) is taken from Project N-1104467 and is based on 2,000 hours of operation per year.
- Potential to Emit for the 237 bhp emergency standby IC engine (Permit #N-8481-8-0) is taken from Project N-1133675 and is based on 100 hours of operation per year.
- Based on the information provided by the applicant for pre-project emission calculations, all of the milk cows and dry cows at Larry Matos Dairy will be assumed to be housed in freestall barns with flushed lanes and all remaining support stock (heifers) at the dairy are assumed to be housed in open corrals with flushed lanes.
- The applicant indicates that after completion of the project, all animals at the dairy (milk cows, dry cows, heifers, and bulls) will be housed in five freestall barns, which will house the following maximum number of animals: Freestall Barn A/Special Needs Barn: 400 dry cows and 550 Heifers; Freestall Barn B: 900 milk cows; Freestall Barn C: 500 milk cows; Proposed Freestall Barn D: 700 milk cows; and Proposed Freestall Barn E: 1,950 heifers. Additionally, 100 bulls will be housed in the freestall barns (approximately 30 in Freestall Barn B, 15 in Freestall Barn C, 25 in Proposed Freestall Barn D, and 30 in Proposed Freestall Barn E).
- All PM₁₀ emissions from the dairy cattle operations will be allocated to the cow housing permit unit (N-8481-2).
- The PM₁₀ emission factors for the dairy animals are based on a District document entitled "Dairy and Feedlot PM₁₀ Emissions Factors", which compiled data from studies performed by Texas A & M ASAE and a USDA/UC Davis report quantifying dairy and feedlot emissions.
- The PM₁₀ control efficiencies are based on the SJVAPCD memo – *Dairy and Feedlot PM₁₀ Mitigation Practices and their Control Efficiencies*.

- Because of the moisture content of the separated solids, PM₁₀ emissions from solid manure handling are considered negligible.
- Because H₂S is produced as a result of the decomposition of sulfur compounds under anaerobic conditions and the lagoons and storage ponds will be the primary source of H₂S emissions at a dairy, all H₂S emissions from the dairy will be allocated to the lagoon/storage pond of the liquid manure handling permit unit (N-8481-3).
- The VOC emission factors for milk cows used in this evaluation are from the "APCO's Revision to the Dairy VOC Emission Factor", dated January 2010. The VOC emission factors for the other dairy animals were developed by taking the ratio of volatile solids excreted by the different types of cattle to the milk cow and multiplying it by the milk cow VOC emission factor.
- The NH₃ emission factor for milk cows is based on the dairy cattle NH₃ emission factor used by the California Air Resources Board (ARB). The NH₃ emission factors for the other dairy animals were developed by taking the ratio of nitrogen excreted by the different types of cattle to the milk cow and multiplying it by the milk cow NH₃ emission factor.
- The District Dairy VOC and NH₃ emission factors were originally based on Holstein cattle. The cattle at Larry Matos Dairy are Jersey cattle. Jersey cattle are smaller than Holstein cows (approximately 1,000 lb. for a mature Jersey cow vs. 1,400 lb. for a mature Holstein cow), consume less feed, and produce less manure. Therefore, the enteric emissions (VOC) and emissions of gaseous pollutants from manure (e.g. VOC, NH₃, and H₂S) will be adjusted by a factor of 71% to account for the smaller size and reduced manure production of Jersey cattle.
- For BACT analysis purposes, the following units are considered separate emission units at dairy: 1) Milking Operation – each milking parlor; 2) Cow Housing – a) each individual freestall barn, b) each individual corral, and c) each calf hutch area (i.e. each fenced off or designated housing area); 3) Liquid Manure Handling: a) lagoon(s)/storage pond(s) and b) liquid manure land application; 4) Solid Manure Handling: a) solid manure storage and b) solid manure land application; 5) Feed Storage and Handling: a) each type of silage pile and b) total mixed ration (TMR).
- Flushing or hosing down the milking parlor immediately prior to, immediately after, or during each milking has the potential of reducing a significant amount of emissions since many of the compounds emitted from the fresh manure, such as alcohols (ethanol and methanol) and many Volatile Fatty Acids (VFAs), are highly soluble in water and the fresh excreted manure is almost immediately flushed out of the milk barn. However, no control efficiency will be evaluated for this practice because it was already being implemented on the dairies that were studied to develop the baseline emission factor.
- For the proposed new freestall barns (proposed Freestall Barns D and E), which will be subject to BACT for VOC and NH₃, Larry Matos Dairy will flush the lanes for mature cows at least four times a day and will flush the lanes for heifers at least once per day. Frequent flushing or scraping of the lanes is expected to reduce emissions since manure degradation and decomposition in the feed lanes is reduced. Increasing the frequency of the flush will remove manure, which is a source of VOC emissions. Many of the compounds emitted from the fresh manure, such as alcohols (ethanol and

methanol) and many Volatile Fatty Acids (VFAs), are highly soluble in water. The control efficiency for this practice will conservatively be estimated as 10% until better information becomes available. This control efficiency only applies to the manure and does not apply to the enteric emissions generated from the cows themselves.

- An anaerobic treatment lagoon designed in accordance with the NRCS Guideline (359) has the potential of reducing significant amount of emissions, since the system is designed to promote the conversion of Volatile Solids (VS) into methane by methanogenic bacteria. Although VOC emission reductions are expected to be high, to be conservative, a control efficiency of 40% will be applied to this mitigation measure for both the lagoon(s) and land application until better data becomes available.
- Many of the mitigation measures required are also expected to reduce ammonia emissions; however, due to limited data, potential reductions in ammonia emissions will only be quantified for select mitigation measures in this evaluation.
- The potential to emit for PM_{2.5} from cattle operations is assumed to be 15% of the potential to emit for PM₁₀. A PM_{2.5} to PM₁₀ ratio of 0.15 for agricultural livestock is given in the US EPA current methods used to estimate emissions - *Procedures Document for National Emission Inventory, Criteria Air Pollutants 1985 – 1999* (2001)³ and is more conservative than the 0.114 PM_{2.5} to PM₁₀ ratio given for livestock dust in the California ARB emissions inventory document *Updating the ARB PM2.5 Size Speciation Profiles for Fugitive Dust Sources* (August 2006).⁴
- The potential to emit for non-fugitive PM_{2.5} (e.g. from combustion sources) is assumed to be equal to the potential to emit for PM₁₀.

B. Emission Factors

PM₁₀, VOC, and NH₃ Emission Factors for Dairy Permits (N-8481-1, -2, -3, -4, & -5)

The dairy emissions calculation spreadsheet in Appendix E lists the PM₁₀, VOC, and NH₃ emission factors for the animals at the dairy and the VOC emissions from silage and feed at the dairy. These emission factors and the control efficiencies for the applicable management practices implemented at this dairy will be used to calculate the pre and post-project PM₁₀, VOC, and NH₃ emissions from the animals at the dairy.

As stated above, the PM₁₀ emission factors for the dairy animals are based on a District document entitled “Dairy and Feedlot PM₁₀ Emissions Factors,” which compiled data from studies performed by Texas A & M ASAE and a USDA/UC Davis report quantifying dairy and feedlot emissions.

As stated above, the VOC emission factors for milk cows used in this evaluation are based on the “APCO’s Revision to the Dairy VOC Emission Factor,” dated January 2010. The

³ U.S. Environmental Protection Agency (US EPA). (2001) Procedures Document for National Emission Inventory, Criteria Air Pollutants 1985 - 1999. EPA-454/R-01-006. <https://www.epa.gov/air-emissions-inventories/trends-procedural-documentation>

⁴ California Air Resources Board (ARB). (2006) Updating the ARB PM2.5 Size Speciation Profiles for Fugitive Dust Sources. <https://www.arb.ca.gov/ei/areasrc/fullpdf/2006pm2.5profiles.pdf>

VOC emission factors for the other dairy animals were developed by taking the ratio of volatile solids excreted by the different types of cattle to the milk cow and multiplying it by the milk cow VOC emission factor.

As stated above, the NH_3 emission factor for milk cows is based on the dairy cattle NH_3 emission factor used by the California Air Resources Board (ARB). The NH_3 emission factors for the other dairy animals were developed by taking the ratio of nitrogen excreted by the different types of cattle to the milk cow and multiplying it by the milk cow NH_3 emission factor.

As stated above, the District dairy emission factors for enteric emissions (VOC) and emissions of gaseous pollutants from manure (e.g. VOC, NH_3 , and H_2S), which were originally based on Holstein cattle, will be adjusted by a factor of 71% to account for the smaller size and reduced manure production of Jersey cattle.

Hydrogen Sulfide (H_2S)

H_2S is produced as a result of the decomposition of sulfur compounds under anaerobic conditions. Therefore, the lagoons and storage ponds will be the primary source of H_2S emissions at a dairy. The H_2S emissions rate from lagoons and storage ponds is strongly influenced by the amount of exposed surface area and environmental conditions (e.g. wind, temperature, pH). For this evaluation, annual H_2S emissions will be conservatively estimated as 10% of the average annual post-project NH_3 emissions from the lagoon/storage pond. This is because both nitrogen and sulfur compounds excreted by cattle are primarily ingested as components of amino acids and tend to occur in set ratios. Studies have also indicated that the average ammonia emissions from lagoons and ponds treating or storing liquid manure are generally more than ten times greater than the H_2S emissions.⁵

C. Calculations

1. Pre-Project Potential to Emit (PE1)

Pre-Project Potential to Emit (PE1) for the dairy will be calculated below based on the maximum design capacity for each type of cow and the pre-project emission control practices in use at the dairy.

Emission calculations for this project are included in the dairy emissions calculation spreadsheet in Appendix E. PE1 for each dairy permit unit is shown in the tables below.

⁵ For examples see: 1.) L. Y. Zhao, M. Darr, X. Wang, R. Manuzon, M. Brugger, E. Imerman, G. Arnold, H. Keener, A. J. Heber, Temporal variations in gas and odor emissions from a dairy manure storage pond, Proceedings of the 6th International Dairy Housing Conference 2007 St. Joseph, MIASABEASABE Paper No. 701P0507e. 2.) Ron E. Sheffield and Bruce Louks, Diurnal Variations of Ammonia and Hydrogen Sulfide Flux from a Dairy Manure Storage Pond in Idaho. 3) Blunden, J., and V. P. Aneja, 2008, "Characterizing ammonia and hydrogen sulfide emissions from a swine waste treatment lagoon in North Carolina", *Atmospheric Environment*, vol. 42, No. 14, pp. 3277-3290]

Milking Operation (N-8481-1)

PE1 for N-8481-1-1		
Pollutant	Daily Emissions (lb/day)	Annual Emissions (lb/year)
NO _x	0	0
SO _x	0	0
PM ₁₀	0	0
CO	0	0
VOC	1.1	386
NH ₃	0.4	138

Cow Housing (N-8481-2)

PE1 for N-8481-2-1		
Pollutant	Daily Emissions (lb/day)	Annual Emissions (lb/year)
NO _x	0	0
SO _x	0	0
PM ₁₀	49.7	18,127
CO	0	0
VOC	41.0	14,978
NH ₃	143.8	52,481

Liquid Manure Handling System (N-8481-3: Lagoon/Storage Pond & Liquid Manure Land Application)

Lagoon/Storage Pond

PE1 for N-8481-3-0: Lagoon/Storage Pond		
Pollutant	Daily Emissions (lb/day)	Annual Emissions (lb/year)
NO _x	0	0
SO _x	0	0
PM ₁₀	0	0
CO	0	0
VOC	4.9	1,805
NH ₃	22.2	8,107
H ₂ S	3.4	1,259

Liquid Manure Land Application

PE1 for N-8481-3-0: Liquid Manure Land Application		
Pollutant	Daily Emissions (lb/day)	Annual Emissions (lb/year)
NO _x	0	0
SO _x	0	0
PM ₁₀	0	0
CO	0	0
VOC	5.3	1,931
NH ₃	23.9	8,739

Total PE1 from the Liquid Manure Handling System (N-8481-3-0):

Total PE1 for N-8481-3-0						
Pollutant	Lagoon Emissions (lb/year)	+	Land Application (lb/year)	=	Total from Liquid Manure Handling	
					Annual Emissions (lb/year)	Daily Emissions (lb/day)
VOC	1,805	+	1,931	=	3,736	10.2
NH ₃	8,107	+	8,739	=	16,846	46.2
H ₂ S	1,259	+	0	=	1,259	3.4

Solid Manure Handling System (N-8481-4)

Solid Manure Storage and Piles

PE1 for N-8481-4-0: Solid Manure Storage		
Pollutant	Daily Emissions (lb/day)	Annual Emissions (lb/year)
NO _x	0	0
SO _x	0	0
PM ₁₀	0	0
CO	0	0
VOC	0.8	275
NH ₃	5.0	1,818

Solid Manure Land Application

PE1 for N-8481-4-0: Solid Manure Land Application		
Pollutant	Daily Emissions (lb/day)	Annual Emissions (lb/year)
NO _x	0	0
SO _x	0	0
PM ₁₀	0	0
CO	0	0
VOC	1.1	413
NH ₃	5.6	2,057

Total PE1 from the Solid Manure Handling System (N-8481-4-0):

Total PE1 for N-8481-4-0						
Pollutant	Manure Storage (lb/year)	+	Land Application (lb/year)	=	Total from Solid Manure Handling	
					Annual Emissions (lb/year)	Daily Emissions (lb/day)
VOC	275	+	413	=	688	1.9
NH ₃	1,818	+	2,057	=	3,875	10.6

Feed Storage and Handling (N-8481-5)

Total PE1 for VOC from N-8481-5-0		
Unit	Daily VOC Emissions (lb/day)	Annual VOC Emissions (lb/year)
Corn Silage Pile(s)	8.8	3,210
Alfalfa Silage Pile(s)	0.0	0
Wheat, Oat/Winter Forage, & Other Silage Pile(s)	22.2	8,116
Total Mixed Ration (TMR)	70.1	25,587
Total Feed VOC Emissions	101.1	36,913

2. Post Project Potential to Emit (PE2)

Post-Project Potential to Emit (PE2) for the dairy will be calculated below based on the maximum design capacity for each type of cow and the post-project emission control practices in use at the dairy.

Emission calculations for this project are included in the dairy emissions calculation spreadsheet in Appendix E. PE2 for each dairy permit unit is shown in the tables below.

Milking Operation (N-8481-1)

PE2 for N-8481-1-2		
Pollutant	Daily Emissions (lb/day)	Annual Emissions (lb/year)
NO _x	0	0
SO _x	0	0
PM ₁₀	0	0
CO	0	0
VOC	1.6	588
NH ₃	0.6	210

Cow Housing (N-8481-2)

PE2 for N-8481-2-2		
Pollutant	Daily Emissions (lb/day)	Annual Emissions (lb/year)
NO _x	0	0
SO _x	0	0
PM ₁₀	17.6	6,434
CO	0	0
VOC	71.9	26,247
NH ₃	222.9	81,353

Liquid Manure Handling System (N-8481-3: Lagoon/Storage Pond & Liquid Manure Land Application)

Lagoon/Storage Pond

PE2 for N-8481-3-1: Lagoon/Storage Pond		
Pollutant	Daily Emissions (lb/day)	Annual Emissions (lb/year)
NO _x	0	0
SO _x	0	0
PM ₁₀	0	0
CO	0	0
VOC	4.7	1,704
NH ₃	34.4	12,571
H ₂ S	3.4	1,259

Liquid Manure Land Application

PE2 for N-8481-3-1: Liquid Manure Land Application		
Pollutant	Daily Emissions (lb/day)	Annual Emissions (lb/year)
NO _x	0	0
SO _x	0	0
PM ₁₀	0	0
CO	0	0
VOC	5.0	1,822
NH ₃	37.1	13,543

Total PE2 from the Liquid Manure Handling System (N-8481-3-1):

Total PE2 for N-8481-3-1						
Pollutant	Lagoon Emissions (lb/year)	+	Land Application (lb/year)	=	Total from Liquid Manure Handling	
					Annual Emissions (lb/year)	Daily Emissions (lb/day)
VOC	1,704	+	1,822	=	3,526	9.7
NH ₃	12,571	+	13,543	=	26,114	71.5
H ₂ S	1,259	+	0	=	1,259	3.4

Solid Manure Handling System (N-8481-4)

Solid Manure Storage and Piles

PE2 for N-8481-4-1: Solid Manure Storage		
Pollutant	Daily Emissions (lb/day)	Annual Emissions (lb/year)
NO _x	0	0
SO _x	0	0
PM ₁₀	0	0
CO	0	0
VOC	1.2	431
NH ₃	7.7	2,818

Solid Manure Land Application

PE2 for N-8481-4-1: Solid Manure Land Application		
Pollutant	Daily Emissions (lb/day)	Annual Emissions (lb/year)
NO _x	0	0
SO _x	0	0
PM ₁₀	0	0
CO	0	0
VOC	1.8	647
NH ₃	8.7	3,189

Total PE2 from the Solid Manure Handling System (N-8481-4-1):

Total PE2 for N-8481-4-1						
Pollutant	Manure Storage (lb/year)	+	Land Application (lb/year)	=	Total from Solid Manure Handling	
					Annual Emissions (lb/year)	Daily Emissions (lb/day)
VOC	431	+	647	=	1,078	3.0
NH ₃	2,818	+	3,189	=	6,007	16.5

Feed Storage and Handling (N-8481-5)

Total PE2 for VOC from N-8481-5-1		
Unit	Daily VOC Emissions (lb/day)	Annual VOC Emissions (lb/year)
Corn Silage Pile(s)	8.8	3,210
Alfalfa Silage Pile(s)	0.0	0
Wheat, Oat/Winter Forage, & Other Silage Pile(s)	22.2	8,116
Total Mixed Ration (TMR)	112.4	41,036
Total Feed VOC Emissions	143.4	52,362

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

Pursuant to District Rule 2201, the SSPE1 is 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.

SSPE1 (lb/year)							
Permit Unit	NO _x	SO _x	PM ₁₀	CO	VOC	NH ₃	H ₂ S
N-8481-1-1 (Milking Operation)	0	0	0	0	386	138	0
N-8481-2-1 (Cow Housing)	0	0	18,127	0	14,978	52,481	0
N-8481-3-0 (Liquid Manure Handling)	0	0	0	0	3,736	16,846	1,259
N-8481-4-0 (Solid Manure Handling)	0	0	0	0	688	3,875	0
N-8481-5-0 (Feed Storage & Handling)	0	0	0	0	36,913	0	0
N-8481-6-0 (85 bhp Ag. Irrigation Engine)	1,724	2	56	974	75	0	0
N-8481-8-0 (287 bhp Emergency Engine)	148	0	5	47	5	0	0
SSPE1	1,872	2	18,188	1,021	56,781	73,340	1,259

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

Pursuant to District Rule 2201, the SSPE2 is 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.

SSPE2 (lb/year)							
Permit Unit	NO _x	SO _x	PM ₁₀	CO	VOC	NH ₃	H ₂ S
N-8481-1-2 (Milking Operation)	0	0	0	0	588	210	0
N-8481-2-2 (Cow Housing)	0	0	6,434	0	26,247	81,353	0
N-8481-3-1 (Liquid Manure Handling)	0	0	0	0	3,526	26,114	1,259
N-8481-4-1 (Solid Manure Handling)	0	0	0	0	1,078	6,007	0
N-8481-5-1 (Feed Storage & Handling)	0	0	0	0	52,362	0	0
N-8481-6-0 (85 bhp Ag. Irrigation Engine)	1,724	2	56	974	75	0	0
N-8481-8-0 (287 bhp Emergency Engine)	148	0	5	47	5	0	0
SSPE2	1,872	2	6,495	1,021	83,881	113,684	1,259

5. Major Source Determination

Rule 2201 Major Source Determination:

Pursuant to District Rule 2201, a Major Source is a stationary source with a SSPE2 equal to or exceeding one or more of the following threshold values. 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 IC engines (i.e. IC engines at a particular site at the facility for less than 12 months)
- Fugitive emissions, except for the specific source categories specified in 40 CFR 70.2

As mentioned above and pursuant to District Rule 2201, fugitive emissions are not counted when determining if a facility is a major source unless the facility belongs to one of the specific source categories identified in the major source definition in 40 CFR Part 70.2, or when determining if a stationary source is a major air toxics source. 40 CFR 70.2 (Definitions, Major Source (2)) states the following:

(2) A major stationary source of air pollutants, as defined in section 302 of the Act, that directly emits, or has the potential to emit, 100 tpy or more of any air pollutant subject to regulation (including any major source of fugitive emissions of any such pollutant, as determined by rule by the Administrator). The fugitive emissions of a stationary source shall not be considered in determining whether it is a major stationary source for the purposes of section 302(j) of the Act, unless the source belongs to one of the following categories of stationary source: (i) Coal cleaning plants (with thermal dryers); (ii) Kraft pulp mills; (iii) Portland cement plants; (iv) Primary zinc smelters; (v) Iron and steel mills; (vi) Primary aluminum ore reduction plants; (vii) Primary copper smelters; (viii) Municipal incinerators capable of charging more than 250 tons of refuse per day; (ix) Hydrofluoric, sulfuric, or nitric acid plants; (x) Petroleum refineries; (xi) Lime plants; (xii) Phosphate rock processing plants; (xiii) Coke oven batteries; (xiv) Sulfur recovery plants; (xv) Carbon black plants (furnace process); (xvi) Primary lead smelters; (xvii) Fuel conversion plants; (xviii) Sintering plants; (xix) Secondary metal production plants; (xx) Chemical process plants—The term chemical processing plant shall not include ethanol production facilities that produce ethanol by natural fermentation included in NAICS codes 325193 or 312140; (xxi) Fossil-fuel boilers (or combination thereof) totaling more than 250 million British thermal units per hour heat input; (xxii) Petroleum storage and transfer units with a total storage capacity exceeding 300,000 barrels; (xxiii) Taconite ore processing plants; (xxiv) Glass fiber processing plants; (xxv) Charcoal production plants; (xxvi) Fossil-fuel-fired steam electric plants of more than 250 million British thermal units per hour heat input; or (xxvii) Any other stationary source category, which as of August 7, 1980 is being regulated under section 111 or 112 of the Act.

Because agricultural operations do not fall under any of the specific source categories listed above, fugitive emissions are not counted when determining if an agricultural operation is a major source. 40 CFR 70.2 defines fugitive emissions as “those

emissions which could not reasonably pass through a stack, chimney, vent, or other functionally-equivalent opening.”

Since emissions at the dairy facility are not actually collected, a determination of whether emissions could be reasonably collected must be made by the permitting authority. The California Air Pollution Control Association (CAPCOA) prepared guidance in 2005 for estimating potential to emit of VOC from dairy farms. The guidance states that *“VOC emissions from the milking centers, cow housing areas, corrals, common manure storage areas, and land application of manure are not physically contained and could not reasonably pass through a stack, chimney, vent, or other functionally-equivalent opening. No collection technologies currently exist for VOC emissions from these emissions units. Therefore, the VOC emissions from these sources are considered fugitive.”* The guidance also concludes that, because VOC collection technologies do exist for liquid waste systems at dairies, *“... the VOC emissions from waste lagoons and storage ponds are considered non-fugitive.”* The District has researched this issue and concurs with the CAPCOA assessment. Therefore, the emissions from the milking operation, cow housing units, solid manure storage areas, land application, and feed storage and handling are considered fugitive. The District has determined that control technology to capture emissions from lagoons (biogas collection systems, for instance) is in use and these emissions can be reasonably collected and are not fugitive. Therefore, only emissions from the lagoon/storage pond and IC engines will be used to determine if this facility is a major source.

The non-fugitive emissions from the lagoon/storage pond are calculated and shown in the dairy emissions calculation spreadsheet in Appendix E. The following table shows the non-fugitive Stationary Source Potential to Emit for the facility.

Rule 2201 Major Source Determination (lb/year)						
	NO_x	SO_x	PM₁₀	PM_{2.5}	CO	VOC
Non-fugitive SSPE1	1,872	2	61	61	1,021	1,885
Non-fugitive SSPE2	1,872	2	61	61	1,021	1,704
Major Source Threshold	20,000	140,000	140,000	140,000	200,000	20,000
Major Source?	No	No	No	No	No	No

Note: Non-fugitive PM_{2.5} assumed to be equal to non-fugitive PM₁₀

As seen in the table above, 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:

The facility or the equipment evaluated under this project is not listed as one of the categories specified in 40 CFR 52.21 (b)(1)(iii). Therefore, the PSD Major Source

threshold is 250 tpy for any regulated NSR pollutant and fugitive emissions are not considered when determining if the operation is a PSD Major Source. Therefore, only emissions from the lagoon/storage pond and IC engines will be used to determine if this facility is an existing PSD major source.

PSD Major Source Determination (tons/year)						
	NO₂	VOC	SO₂	CO	PM	PM₁₀
Estimated Facility PE before Project Increase	0.9	0.9	0.0	0.5	0.0	0.0
PSD Major Source Thresholds	250	250	250	250	250	250
PSD Major Source ? (Y/N)	N	N	N	N	N	N

As shown above, the facility is not an existing PSD major source for any regulated NSR pollutant expected to be emitted at this facility.

6. Baseline Emissions (BE)

The BE calculation (in lb/year) is performed pollutant-by-pollutant for each unit within the project to calculate the 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.

As shown in Section VII.C.5 above, the facility is not a Major Source for any pollutant.

Therefore BE = PE1.

Dairy Permits: N-8481-1-2, -2-2, -3-1, -4-1, & -5-1:

As calculated in Appendix E and shown in Section VII.C.1 above, PE1 = BE is summarized in the following table:

BE (lb/year)						
	NO _x	SO _x	PM ₁₀	PM _{2.5} *	CO	VOC
N-8481-1-2 (Milking Operation)	0	0	0	0	0	386
N-8481-2-2 (Cow Housing)	0	0	18,127	2,719	0	14,978
N-8481-3-1 (Liquid Manure Handling)	0	0	0	0	0	3,736
N-8481-4-1 (Solid Manure Handling)	0	0	0	0	0	688
N-8481-5-1 (Feed Storage & Handling)	0	0	0	0	0	36,913

* PM_{2.5} emissions from the cow housing permit are 15% of PM₁₀

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, this project does not constitute an SB 288 major modification.

8. Federal Major Modification

District Rule 2201 states that a Federal Major Modification is the same as a "Major Modification" as defined in 40 CFR 51.165 and part D of Title I of the CAA.

Since this source is not included in the 28 specific source categories specified in 40 CFR 51.165, the increases in fugitive emissions are not included in the Federal Major Modification determination.

Since this facility is not a Major Source for any pollutants, 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 SJV and which are emitted in this project are: (See 52.21 (b) (23) definition of significant)

- PM
- PM₁₀
- Hydrogen sulfide (H₂S)

- Total reduced sulfur (including H₂S)

I. Project Emissions Increase - New Major Source Determination

The post-project potentials to emit 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.

The facility or the equipment evaluated under this project is not listed as one of the categories specified in 40 CFR 52.21 (b)(1)(i). Therefore, the PSD Major Source threshold is 250 tons per year (tpy) for any regulated NSR pollutant and fugitive emissions are not considered when determining if the operation is a PSD Major Source.

PSD Major Source Determination: Potential to Emit (tons/year)							
	NO ₂	VOC	SO ₂	CO	PM	PM ₁₀	H ₂ S/TRS
Total PE from New and Modified Units	0	0.9	0	0	0	0	0.6
PSD Major Source threshold	250	250	250	250	250	250	250
New PSD Major Source?	N	N	N	N	N	N	N

As shown in the table above, the potential to emit for the project, by itself, does not exceed any PSD major source threshold. Therefore Rule 2410 is 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 emissions profile screen. Detailed QNEC calculations are included in Appendix E.

VIII. Compliance Determination

Rule 1070 Inspections

This rule applies to any source operation, which emits or may emit air contaminants.

This rule allows 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 allows the District to require record keeping, to make inspections and to conduct tests of air pollution sources.

Therefore, the following conditions will be listed on the permit 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 4.0, 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.

Rule 2201 New and Modified Stationary Source Review Rule

A. Best Available Control Technology (BACT)

1. BACT Applicability

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 exceeding two pounds per day,
- b. The relocation from one Stationary Source to another of an existing emissions unit with a potential to emit exceeding two pounds per day,
- c. Modifications to an existing emissions unit with a valid Permit to Operate resulting in an AIPE exceeding two pounds per 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 VII.A above, the permit units at a dairy include the following emissions units: 1) Milking Operation: each milking parlor; 2) Cow Housing: a) each individual freestall barn, b) each individual corral, and c) each calf hutch area; 3) Liquid Manure Handling: a) lagoon(s)/storage pond(s) and b) liquid manure land application; 4) Solid Manure Handling: a) solid manure storage and b) solid manure land application; 5) Feed Storage and Handling: a) silage piles and b) total mixed ration (TMR).

As discussed above, as part of the project the applicant is proposing to construct two new freestall barns (proposed Freestall Barns D and E). As shown in the dairy emissions calculation spreadsheet in Appendix E, the PE from each of these new units is greater than 2 lb/day for PM₁₀, VOC, and NH₃. Therefore, BACT is triggered for PM₁₀, VOC, and NH₃.

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; therefore BACT is not triggered for relocation of an emissions unit.

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

$$\text{AIPE} = \text{PE2} - \text{HAPE}$$

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)

$$\text{HAPE} = \text{PE1} \times (\text{EF2}/\text{EF1})$$

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

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

As shown in the dairy emissions calculation spreadsheet in Appendix E, the AIPE is greater than 2.0 lb/day for the following units: NH₃ from the lagoon/storage pond and NH₃ from liquid manure land application (Permit N-8481-3); NH₃ from solid manure storage and NH₃ from solid manure land application (Permit N-8481-4); and VOC

from the Total Mixed Ration (TMR) feed (Permit N-8481-5). Therefore BACT is triggered for these pollutants from these units.

d. SB 288/Federal Major Modification

As discussed in Sections VII.C.7 and VII.C.8 above, this project does not constitute an SB 288 and/or Federal Major Modification. Therefore BACT is not triggered for Major Modification purposes.

2. 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 Analysis (see Appendix F), BACT has been satisfied with the following:

Cow Housing (ATC N-8481-2-2): New Freestall Barns

New Freestall Barns

- PM₁₀: 1) Concrete feed lanes and walkways
2) Scraping of exercise pens every two weeks using pull-type scraper in the morning hours except when prevented by wet conditions
- VOC: 1) Concrete feed lanes and walkways
2) Lanes and walkways for mature cows (milk and dry cows) flushed at least four times per day. Lanes and walkways for support stock (heifers) flushed at least once per day
3) All animals fed in accordance with National Research Council (NRC) or other District-approved guidelines
4) Exercise pens properly sloped to promote drainage (minimum of 3% slope where the available space for each animal is 400 square feet or less and minimum of 1.5% where the available space for each animal is more than 400 square feet per animal), or managed to maintain a dry surface (except during periods of rainy weather)
5) Scraping of exercise pens every two weeks using pull-type scraper in the morning hours except when prevented by wet conditions
6) District Rule 4570 mitigation measures
- NH₃: 1) Concrete feed lanes and walkways
2) Lanes and walkways for mature cows (milk and dry cows) flushed at least four times per day. Lanes and walkways for support stock (heifers) flushed at least once per day
3) All animals fed in accordance with National Research Council (NRC) or other District-approved guidelines

- 4) Exercise pens properly sloped to promote drainage (minimum of 3% slope where the available space for each animal is 400 square feet or less and minimum of 1.5% where the available space for each animal is more than 400 square feet per animal), or managed to maintain a dry surface (except during periods of rainy weather)
- 5) Scraping of exercise pens every two weeks using pull-type scraper in the morning hours except when prevented by wet conditions

Liquid Manure Handling System (ATC N-8481-3-1)

Lagoons/Storage Ponds

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

Liquid Manure Land Application

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

Solid Manure Handling System (ATC N-8481-4-1)

Solid Manure Storage and Separated Solids

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

Solid Manure Land Application

- NH₃:
- 1) All animals fed in accordance with National Research Council (NRC) or other District-approved guidelines utilizing routine nutritional analysis for rations
 - 2) Rapid incorporation of solid manure into soil within two hours of land application

Total Mixed Ration (ATC N-8481-5-1)

VOC: Compliance with District Rule 4570 mitigation measures

B. Offsets

1. Offset Applicability

Offset requirements shall be triggered on a pollutant by pollutant basis and shall be required if the SSPE2 equals to 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	1,872	2	6,495	1,021	83,881
Offset Thresholds	20,000	54,750	29,200	200,000	20,000
Offsets triggered?	No	No	No	No	Yes

2. Quantity of Offsets Required

As seen above, the SSPE2 is greater than the offset thresholds for VOC only. However, pursuant to District Rule 2201, Section 4.6.9, emission offsets shall not be required for criteria pollutants from agricultural sources if emissions reductions from that source would not meet the criteria for real, permanent, quantifiable, and enforceable emission reductions. District Rule 2201, Section 4.6.9.1 states *"In no case shall the offset exemption in Section 4.6.9 apply to an agricultural source that is also a major stationary source for the pollutant for which the offset exemption is sought."* Over time, EPA policies and court determinations have established fairly rigorous definitions and tests to determine if emissions reductions satisfy the criteria to be considered real, permanent, quantifiable, and enforceable. Agricultural sources have not historically been accepted as meeting these criteria.

As shown in Section VII.C.5 above, this agricultural facility is not a major source. Additionally, the issuance of emission offsets to agricultural sources by California air districts has not yet been approved. Therefore, offsets are not required for this project.

C. Public Notification

1. Applicability

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 greater than 100 pounds during any one 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, this project does not constitute an SB 288 or Federal Major Modification; therefore, public noticing for SB 288 or Federal Major Modification purposes is not required.

b. PE > 100 lb/day

Applications which include a new emissions unit with a PE greater than 100 pounds during any one day for any pollutant will trigger public noticing requirements.

As discussed above, as part of the project the applicant is proposing to construct two new freestall barns (proposed Freestall Barns D and E). As shown in the dairy emissions calculation spreadsheet in Appendix E, this project does not include a new emissions unit which has daily emissions greater than 100 lb/day for any pollutant; therefore, public noticing is not required for this project for PE from a new emissions unit with PE > 100 lb/day.

c. Offset Threshold

The SSPE1 and SSPE2 are compared to the offset thresholds in the following table.

Offset Thresholds				
Pollutant	SSPE1 (lb/year)	SSPE2 (lb/year)	Offset Threshold	Public Notice Required?
NO _x	1,872	1,872	20,000 lb/year	No
SO _x	2	2	54,750 lb/year	No
PM ₁₀	18,188	6,495	29,200 lb/year	No
CO	1,021	1,021	200,000 lb/year	No
VOC	56,781	83,881	20,000 lb/year	No

As detailed above, there were no thresholds surpassed with this project; therefore public noticing is not required for surpassing an offset threshold.

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.

SSIPE Public Notice Thresholds					
Pollutant	SSPE2 (lb/year)	SSPE1 (lb/year)	SSIPE (lb/year)	SSIPE Public Notice Threshold	Public Notice Required?
NO _x	1,872	1,872	0	20,000 lb/year	No
SO _x	2	2	0	20,000 lb/year	No
PM ₁₀	6,495	18,188	-11,693	20,000 lb/year	No
CO	1,021	1,021	0	20,000 lb/year	No
VOC	83,881	56,781	27,100	20,000 lb/year	Yes
NH ₃	113,684	73,340	40,344	20,000 lb/year	Yes
H ₂ S	1,259	1,259	0	20,000 lb/year	No

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

e. Title V Significant Permit Modification

Since this facility does not have a Title V operating permit, this change is not a Title V significant modification, and therefore public noticing is not required for a Title V significant modification.

2. Public Notice Action

As discussed above, public noticing is required for this project because the SSIPEs for VOC and NH₃ were greater than 20,000 lb/year. Therefore, public notice documents will be submitted to the California Air Resources Board (ARB) and a public notice will be published in a local newspaper of general circulation prior to the issuance of the ATC for this equipment.

D. Daily Emission 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 DEL must be contained in the latest ATC and contained in or enforced by the latest PTO and enforceable, in a practicable manner, on a daily basis. DELs are also required to enforce the applicability of BACT.

For dairies and heifer ranches, the DEL is satisfied based on the number and types of cows at the facility and the required emission controls and mitigation measures. The number and types of cows are listed in the permit equipment description for the Cow Housing Permit (N-8481-2).

In addition, the following conditions will be placed on the ATC permits to enforce the emissions limits for each permit.

Milking Parlor (N-8481-1-2)

For the milking parlor the DEL is satisfied by the number of cows listed in the permit description. In addition, the following condition will be included on the ATC:

- Permittee shall flush or hose milk parlor immediately prior to, immediately after, or during each milking. [District Rule 2201 and 4570]

Cow Housing (N-8481-2-2)

The DEL for the Cow Housing Permit is satisfied by the types and number of cattle listed in the permit description and the following conditions that will be placed on the ATC permit to ensure compliance with required mitigation measures and BACT:

- Permittee shall feed all animals according to National Research Council (NRC) guidelines. [District Rule 2201]
- All animals at this dairy shall be housed in freestall barns. [District Rule 2201]
- 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, 4102, and 4570]
- Permittee shall flush, scrape or vacuum freestall lanes immediately prior to, immediately after or during each milking. [District Rules 2201 and 4570]
- For the proposed freestall barn that will be located directly east of the milking parlor (identified as Proposed Freestall Barn D) and the proposed freestall barn that will be located on the northern part of the dairy directly east of existing Freestall Barn A and north of the feed/equipment storage area (identified as Proposed Freestall Barn E), the feed lanes and walkways in freestall barns that house milk cows and dry cows shall be flushed at least four times per day and the feed lanes and walkways in barns that exclusively house support stock (heifers, calves, and bulls) shall be flushed at least once per day. [District Rules 2201 and 4102]
- For the proposed freestall barn that will be located directly east of the milking parlor (identified as Proposed Freestall Barn D) and the proposed freestall barn that will be located on the northern part of the dairy directly east of existing Freestall Barn A and north of the feed/equipment storage area (identified as Proposed Freestall Barn E), the exercise pens shall be scraped every two weeks using a pull-type scraper in the morning hours, except when this is prevented by wet conditions. [District Rule 2201 and 4102]
- Permittee shall remove manure that is not dry from individual cow freestall beds or shall rake, harrow, scrape, or grade freestall bedding at least once every seven (7) days. [District Rules 2201 and 4570]
- Permittee shall clean manure from exercise pens at least four (4) times per year with at least sixty (60) days between each cleaning, or permittee shall clean pens at least once

between April and July and at least once between September and December. [District Rule 2201]

- Permittee shall implement at least one of the following mitigation measures: 1) slope the surface of the exercise pens at least 3% where the available space for each animal is 400 square feet or less and shall slope the surface of the exercise pens at least 1.5% where the available space for each animal is more than 400 square feet per animal; 2) maintain the exercise pens to ensure proper drainage preventing water from standing more than forty-eight hours; or 3) harrow, rake, or scrape exercise pens sufficiently to maintain a dry surface except during periods of rainy weather. [District Rules 2201 and 4102]

In addition, because the applicant has indicated that after completion of the project all animals at the dairy will be housed in freestall barns with no animals kept in open corrals, the following conditions for District Rule 4570 corral mitigation measures that are included in the current permit will not be included in the proposed ATC permit.

- {4499} Permittee shall inspect water pipes and troughs and repair leaks at least once every seven (7) days. [District Rule 4570]
- 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]
- {4520} Permittee shall knockdown fence line manure build-up prior to it exceeding a height of twelve (12) inches at any time or point. 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]

Liquid Manure Handling System (N-8481-3-1)

The following conditions will be placed on the ATC:

- Permittee shall feed all animals according to National Research Council (NRC) guidelines. [District Rule 2201]
- Permittee shall remove solids with a solid separator system, prior to the manure entering the lagoon. [District Rules 2201, 4102, and 4570]
- Liquid manure shall be treated in an anaerobic treatment lagoon system with anaerobic treatment lagoon(s) designed and operated in accordance with National Resource Conservation Service (NRCS) California Field Office Technical Guide Code 359 - Waste Treatment Lagoon. [District Rules 2201 and 4102]
- Only liquid manure that has been treated in an anaerobic treatment lagoon shall be applied to cropland. [District Rule 2201]

- 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]

Solid Manure Handling System (N-8481-4-1)

The following conditions will be placed on the ATC:

- Permittee shall feed all animals according to National Research Council (NRC) guidelines. [District Rule 2201]
- 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]
- Permittee shall not apply solid manure with a moisture content of more than 50%. [District Rules 2201 and 4570]
- Solid manure applied to fields shall be incorporated into the soil within two hours after application. [District Rule 2201]

Feed Storage and Handling System (N-8481-5-1)

The following conditions will be placed on the ATC:

- Permittee shall feed all animals according to National Research Council (NRC) guidelines. [District Rules 2201 and 4570]
- 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]
- Permittee shall feed steam-flaked, dry rolled, cracked or ground corn or other steam-flaked, dry rolled, cracked or ground cereal grains. [District Rules 2201 and 4570]
- {4468} For bagged silage/feedstuff, permittee shall utilize a sealed feed storage system (e.g., ag bag). [District Rule 4570]
- 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]
- 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]

- 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]
- 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]
- 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]
- 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]
- 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 is not required to demonstrate compliance with Rule 2201.

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 daily emission limit requirements of Rule 2201.

As stated above, in general, dairy herd size records required for the Milking Parlor (N-8481-1), the Liquid Manure Handling System (N-8481-3), and the Solid Manure Handling System (N-8481-4) and the Feed Storage and Handling System (N-8481-5) are satisfied with the records that must be kept to demonstrate compliance with the numbers and types of cows listed in the permit equipment description for the Cow Housing (N-8481-2). In addition, the following conditions will be listed on the ATC permits.

Milking Parlor (N-8481-1-2)

- Permittee shall provide verification that milk parlors are flushed or hosed prior to, immediately after, or during each milking. [District Rules 2201 and 4570]
- 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 (N-8481-2-2)

- 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 records sufficient to demonstrate that freestall lanes are flushed, scraped or vacuumed immediately prior to, immediately after or during each milking. [District Rules 2201 and 4570]
- Permittee shall record either of the following: 1) the dates when manure that is not dry is removed from individual cow freestall beds or 2) the dates when the freestall bedding is raked, harrowed, scraped, or graded. [District Rules 2201 and 4570]
- Permittee shall demonstrate that manure from exercise pens are cleaned at least four (4) times per year with at least sixty (60) days between each cleaning or demonstrate that pens are cleaned at least once between April and July and at least once between September and December. [District Rule 2201]
- Permittee shall maintain the following applicable records: 1) maintain sufficient records to demonstrate that exercise pens are maintained to ensure proper drainage preventing water from standing for more than forty-eight hours and/or 2) maintain records of dates exercise pens are groomed (i.e., harrowed, raked, or scraped, etc.). [District Rule 2201]
- The permittee shall maintain records of: (1) an operating plan with number of times lanes and walkways are flushed per day; and (2) the frequency of scraping and manure removal from exercise pen surfaces. [District Rules 1070 and 2201]
- 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]
- 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 Handling System (N-8481-3-1)

- 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 records of design specifications and calculations, including Minimum Treatment Volume (MTV) and Hydraulic Retention Time (HRT), for the Anaerobic Treatment Lagoon system in order to demonstrate that the system has been designed and is operating in accordance with the applicable National Resource Conservation Service (NRCS) technical guide. [District Rule 2201]
- Permittee shall maintain records that only liquid manure treated with an anaerobic treatment lagoon is applied to fields. [District Rule 2201]

- 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]
- 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]

Solid Manure Handling System (N-8481-4-1)

- 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 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]
- 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]
- Permittee shall maintain records of the moisture content of the solid manure each time solid manure is land applied. [District Rules 2201 and 4570]
- 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]
- Permittee shall maintain records to demonstrate that all solid manure has been incorporated within two hours after land application. [District Rules 2201 and 4570]
- 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 System (N-8481-5-1)

- 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]

- 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]
- 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]
- Permittee shall maintain records to demonstrate animals are fed steam-flaked, dry rolled, cracked or ground corn or other steam-flaked, dry rolled, cracked or ground cereal grains. 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]
- 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]
- 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]
- 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]
- 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]
- 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]
- 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]

- 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]
- 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]
- 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 to demonstrate compliance with Rule 2201.

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 G 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 operation 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 operation will not cause a violation of an air quality standard for PM₁₀ or PM_{2.5}.

The results of the Criteria Pollutant Modeling conducted for the AAQA are summarized in the following table.

PM₁₀ Pollutant Modeling Results (Dairy Cow Housing Unit N-8481-2)		
Category	24 hr Avg.	Annual
Net Value (µg/m ³)	5.67	0.77
District Interim Significance Level for Fugitive Emissions (µg/m ³)	10.4 ¹	2.08 ¹
Result	Pass	Pass

¹ Per District Policy APR 1925 the SIL threshold for fugitive dust sources is 10.4 µg/m³ for the 24-hour average concentration and 2.08 µg/m³ for the annual concentration.

Rule 2410 Prevention of Significant Deterioration

As shown in Section VII.C.9 above, this project does not result in a new PSD major source or PSD major modification. No further discussion is required.

Rule 2520 Federally Mandated Operating Permits

Since this facility's potential emissions do not exceed any major source thresholds of Rule 2201, this facility is not a major source, and Rule 2520 does not apply.

Rule 2550 Federally Mandated Preconstruction Review for Major Sources of Air Toxics

The provisions of this rule only apply to applications to construct or reconstruct a major air toxics source with Authority to Construct issued on or after June 28, 1998.

This project does not constitute construction of a new facility or reconstruction of the existing source and, as discussed below, the facility will not be a major air toxics source after completion of the proposed project; therefore, the provisions of Rule 2550 do not apply.

Under Section 112(g) of the Clean Air Act, newly constructed facilities or reconstructed units or sources at existing facilities would be subject to 112(g) requirements if they have the potential to emit hazardous air pollutants (air toxics) in "major" amounts (10 tons or more of an individual pollutant or 25 tons or more of a combination of pollutants).⁶ Sources or facilities subject to 112(g) would be subject to stringent air pollution control requirements, referred to as "new source MACT (Maximum Achievable Control Technology)."

The federal Clean Air Act lists 189 substances as potential Hazardous Air Pollutants (Clean Air Act Sec. 112(b)(1)). Any pollutant that may be emitted from the project and is on the federal New Source Review List and the federal Clean Air Act list has been evaluated. The following table includes a list of HAPs generated at dairies including the associated emission factor.

⁶ Reconstruction" is defined as a change to a source or facility in which the cost exceeds 50 percent of the cost of constructing an entirely source or facility that is comparable to the one being rebuilt.

Hazardous Air Pollutant (HAP) Emissions		
HAP	lbs-milk/cow-yr	Source
Methanol	1.35	UC Davis - VOC Emission from Dairy Cows and their Excreta, 2005
Carbon disulfide	0.027	Dr. Schmidt - Dairy Emissions using Flux Chambers (Phase I & II), 2005
Eythylbenzene	0.003	
o-Xylene	0.005	
1,2-Dibromo-3chloropropane	0.011	
1,2,4-Trichlorobenzene	0.025	
Napthalene	0.012	
Hexachlorobutadiene	0.012	
Formaldehyde	0.005	
Acetaldehyde	0.029	
Chloroform	0.017	California State University Fresno (CSUF) - Monitoring and Modeling of ROG at California Dairies, 2005
Styrene	0.01	Dr. Schmidt - Dairy Emissions using Flux Chambers (Phase I & II) & California State University Fresno (CSUF) - Monitoring and Modeling of ROG at California Dairies, 2005
Vinyl acetate ⁷	0.08	
Toluene ⁸	0.162	
Cadmium	0.009	Air Resources Board's Profile No. 423, Livestock Operations Dust
Hexavalent Chromium	0.004	
Nickel	0.026	
Arsenic	0.005	
Cobalt	0.003	
Lead	0.033	
Total	1.828	

Although, some of the pollutants listed above may have been misidentified as HAPs due to similarities of many compounds consisting of very similar spikes (as measured through the gas Chromatograph Mass Spectroscopy - GCMS), all of these pollutants will be used in calculating the worst-case HAP emissions. Because the dairy is required to implement the VOC mitigation measures of District Rule 4570 and some units of at the dairy are subject to the BACT requirements of District Rule 2201, many of the pollutants listed above are expected to be reduced; however, no control is being applied to these factors at this time in order to calculate the worst-case emissions.

The emission calculations are shown below:

⁷ 0.01 + 0.07 = 0.08 lbs/hd-yr

⁸ 0.012 + 0.15 = 0.162 lbs/hd-yr

HAP Emissions for Facility N-8481					
Type of Cow	Number of cows		Emission Factor lbs/hd-yr ⁹		lbs/yr tons/yr
Milking Cow	2,100	x	1.828	=	3,839 1.92
Dry Cow	400	x	0.995	=	398 0.20
Support Stock	2,600	x	0.764	=	1,986 0.99
Total				=	6,223 3.11

As shown above, each individual HAP is expected to be below 10 tons per year and total HAP emissions are expected to be below 25 tons per year. The largest individual HAP would be methanol, at 2.3 tons per year (3.11 tons x {1.35 lbs-methanol/1.828 lbs-HAPs}). Therefore, this facility will not be a major air toxics source and the provisions of District Rule 2550 do not apply.

The current dairy emission factors are based on the best scientific data that were available. As with other emission factors, the dairy emission factors will be periodically updated if new scientific information indicates from recently completed and ongoing research studies indicates that revisions may be necessary.

Rule 4101 Visible Emissions

Section 5.0 stipulates that no person shall discharge into the atmosphere emissions of any air contaminant aggregating more than 3 minutes in any hour which is as dark as or darker than Ringelmann 1 (or 20% opacity).

Pursuant to Section 4.12, emissions subject to or specifically exempt from Regulation VIII (Fugitive PM₁₀ Prohibitions) are considered to be exempt.

Pursuant to District Rule 8081, Section 4.1, on-field agricultural sources are exempt from the requirements of Regulation VIII.

District Rule 8011, Section 3.35 defines an on-field agricultural source as any agricultural source that is not an off-field agricultural source.

District Rule 8011, Section 3.34 defines an off-field agricultural source as the following:

Any agricultural source that meets the definition of outdoor handling, storage and transport of bulk material; paved road; unpaved road; or unpaved vehicle/equipment traffic area

The units involved in this project are on-field agricultural sources used solely for the raising of dairy animals. Therefore, these units are exempt from the provisions of this rule.

Rule 4102 Nuisance

Rule 4102 prohibits discharge of air contaminants which could cause injury, detriment, nuisance or annoyance to the public. Public nuisance conditions are not expected as a result

⁹ The emission factor has been adjusted for each type of cow based on the ratio of amount of Volatile Solids generated by each type of cow.

of these operations, provided the equipment is well maintained. Therefore, compliance with 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* specifies that for an increase in emissions associated with a proposed new source or modification, the District 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 Technical Services Memo for this project (Appendix G), the total facility prioritization score including this project was greater than one. Therefore, an HRA was required to determine the short-term acute and long-term chronic exposure from this project.

The results of the health risk assessment are summarized in the table below.

Risk Management Review (RMR) Summary						
Categories	Milking Operation (N-8481-1-2)	Cow Housing (N-8481-2-2)	Liquid Manure (N-8481-3-1)	Solid Manure (N-8481-4-1)	Project Totals	Facility Totals
Prioritization Score	0.6	75.4	47.0	0.0	>1.0	>1.0
Acute Hazard Index	0.001	0.202	0.038	0.007	0.247	0.247
Chronic Hazard Index	0.000	0.128	0.013	0.001	0.142	0.142
Maximum Individual Cancer Risk	9.26E-08	8.18E-06	1.98E-06	0.00E-00	1.02E-05	1.06E-05
T-BACT Required?	No	Yes ¹	Yes	No		
Special Permit Conditions?	No	No	No	No		

¹ TBACT is determined on a corral by corral basis. TBACT for the Cow Housing was addressed in the conclusions section of the RMR report.

Discussion of 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 required for this project because the HRA indicates that the risk is above the District's thresholds for triggering T-BACT requirements.

For this project T-BACT is triggered for PM₁₀ and VOC from Proposed New Freestall Barns D and E (ATC N-8481-2-2) and VOC from the liquid manure handling system (ATC N-8481-3-1). T-BACT for Proposed Freestall Barns D and E is satisfied with BACT for PM₁₀ and VOC (see Appendix F), which is concrete feed lanes and walkways, scraping of exercise pens every two weeks using pull-type scraper in the morning hours except when prevented by wet conditions, lanes and walkways for mature cows (milk

and dry cows) flushed at least four times per day and lanes and walkways for support stock (heifers) flushed at least once per day, all animals fed in accordance with National Research Council (NRC) or other District-approved guidelines, and exercise pens properly sloped to promote drainage (minimum of 3% slope where the available space for each animal is 400 square feet or less and minimum of 1.5% where the available space for each animal is more than 400 square feet per animal), or managed to maintain a dry surface (except during periods of rainy weather). T-BACT for the liquid manure handling system is satisfied with BACT VOC, which is use of an anaerobic treatment lagoon designed according to NRCS guidelines (proposed by applicant). 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 by the HRA Summary in Appendix G of this report, the emissions increases for this project was determined to be less than significant.

Rule 4550 Conservation Management Practices (CMP)

This rule applies to agricultural operation sites located within the San Joaquin Valley Air Basin. The purpose of this 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.

The facility received District approval for its CMP plan. Continued compliance with the requirements of District Rule 4550 is expected.

Rule 4570 Confined Animal Facilities (CAF)

This rule applies to Confined Animal Facilities (CAF) located within the San Joaquin Valley Air Basin. The purpose of this rule is to limit emissions of Volatile Organic Compounds (VOC) from Confined Animal Facilities (CAF).

This facility was issued permits that included the mitigation measures that the facility selected to comply with Phase II of District Rule 4570 under Project N-1104467. The applicable mitigation measures will also be incorporated into the ATCs for expansion of the dairy and compliance is expected.

Section 5.0 Requirements

Pursuant to Section 5.1, owners/operators of any CAF shall submit, for approval by the APCO, a permit application for each Confined Animal Facility.

Pursuant to Section 5.1.2, a thirty-day public noticing and commenting period shall be required for all large CAF's receiving their initial Permit-to-Operate or Authority-to-Construct.

This facility has already gone through public notice for compliance with District Rule 4570; therefore, public noticing of this project is not required for purposes of complying with District Rule 4570.

Section 5.1.3 requires that owners/operators submit a facility emissions mitigation plan of the Permit-to-Operate application or Authority-to-Construct application. The mitigation plan shall contain the following information:

- The name, business address, and phone number of the owners/operators responsible for the preparation and the implementation of the mitigation measures listed in the permit.
- The signature of the owners/operators attesting to the accuracy of the information provided and adherence to implementing the activities specified in the mitigation plan at all times and the date that the application was signed.
- A list of all mitigation measures shall be chosen from the application portions of Sections 5.5 or 5.6.

Section 5.1.4 requires the Permit-to-Operate or Authority-to-Construct application to include the following information, which is in addition to the facility emission mitigation plan:

- The maximum number of animals at the facility in each production stage (facility capacity).
- Any other information necessary for the District to prepare an emission inventory of all regulated air pollutants emitted from the facility as determined by the APCO.
- The approved mitigation measures from the facility's mitigation plan will be listed on the Permit to Operate or Authority-to-Construct as permit conditions.
- The District shall act upon the Authority to Construct application or Permit to Operate application within six (6) months of receiving a complete application.

Section 5.1.6 states that the District shall act upon the Authority to Construct application or Permit to Operate application within six (6) months of receiving a complete application.

Section 5.3 requires owners/operators of any CAF to implement all VOC emission mitigation measures, as contained in the permit application, on and after 365 days from the date of issuance of either the Authority-to-Construct or the Permit-to-Operate whichever is sooner.

The permits issued to this facility under Project N-1104467 for compliance with District Rule 4570 Phase II were issued on March 1, 2012; therefore, implementation of the required mitigation measures must begin no later than March 1, 2013. Because this date has already passed, the ATCs authorizing this project will require implementation of these measures upon commencement of operation under the ATCs.

Pursuant to Section 5.4, an owner/operator may temporarily suspend use of mitigation measure(s) provided all of the following requirements are met:

- It is determined by a licensed veterinarian, certified nutritionist, CDFA, or USDA that any mitigation measure being suspended is detrimental to animal health or necessary for the

animal to molt, and a signed written copy of this determination shall be retained on-site and made available for inspection upon request.

- The owner/operator notifies the District, within forty-eight (48) hours of the determination that the mitigation measure is being temporarily suspended; the specific health condition requiring the mitigation measure to be suspended; and the duration that the measure must be suspended for animal health reasons,
- The emission mitigation measure is not suspended for longer than recommended by the licensed veterinarian or certified nutritionist for animal health reasons,
- If such a situation exists, or is expected to exist for longer than thirty (30) days, the owners/operators shall, within that thirty (30) day period, submit a new emission mitigation plan designating a mitigation measure to be implemented in lieu of the mitigation measure that was suspended, and
- The APCO, ARB, and EPA approve the temporary suspension of the mitigation measure for the time period requested by the owner/operator and a signed written copy of this determination shall be retained on site.

The following condition will be placed on each permit.

- {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]

Section 7.0 Administrative Requirements

Section 7.2 outlines the general records requirements for CAFs subject to section 5.0 requirements. Owner/operators shall maintain records of the following:

- Copies of all of the facility's permits
- The number of animals of each species and production group at the facility on a quarterly basis. Examples of records that may be used include Dairy Herd Improvement Association records and animal inventories done for financial purposes; and
- Records sufficient to demonstrate compliance with all applicable mitigation measures.

The following condition will be included on the cow housing permit.

- 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]

Section 7.3 outlines the record requirements for feed and silage mitigation measures.

Section 7.4 outlines the record requirements for milking parlor mitigation measures. Owner/operators shall maintain records verifying that the milking parlor was flushed or hosed immediately prior to, immediately after, or during each milking.

Section 7.5 outlines the record requirements for freestall/corral/animal housing.

Section 7.6 outlines the record requirements for solid manure/separated solids outside of animal housing.

Section 7.7 outlines the record requirements for liquid manure.

Section 7.8 outlines the record requirements for land application of manure.

Specific recordkeeping and monitoring conditions from sections 7.3 through 7.8 are shown below under the appropriate mitigation measures.

Section 7.9 requires owner/operators of a CAF subject to the requirements of Section 5.0 to keep and maintain the required records in Sections 7.1 through 7.8.4, as applicable, for a minimum of five (5) years and the records shall be made available to the APCO and EPA upon request. The following condition will be included on each permit.

- 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]

Section 7.10 requires specific monitoring or source testing conditions for each mitigation measure. These conditions are shown below with each mitigation measure.

The Dairy has chosen the following Mitigation Measures. All conditions required for compliance with Rule 4570 for the mitigation measures selected by the applicant are shown below. These conditions will be included on the appropriate permits.

The Dairy has chosen the following Mitigation Measures. All conditions required for compliance with Rule 4570 for the mitigation measures selected by the applicant are shown below. These conditions will be included on the appropriate permits.

General Conditions

- {4035} If a licensed veterinarian, a certified nutritionist, the California Department of Food and Agriculture (CDFA), or the United States Department of Agriculture (USDA) determines that any VOC mitigation measure (with a Rule 4570 reference) is detrimental to animal health and needs to be suspended, the Permittee 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 2201 and Rule 4570]

- 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 Mitigation Measures Required

Feed according to National Research Council (NRC) guidelines.

- {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]

Push feed so that it is within three (3) 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.

- {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 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]

Begin feeding total mixed rations within two (2) hours of grinding and mixing rations.

- {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 or record of when feeding of total mixed rations began within two hours of grinding and mixing rations. [District Rules 2201 and 4570]

Store grain in a weatherproof storage structure or under a weatherproof covering from October through May.

- {4460} Permittee shall store grain in a weatherproof storage structure or under a weatherproof covering from October through May. [District Rule 4570]
- {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 Rule 4570]

Feed steam-flaked, dry rolled, cracked or ground corn or other ground cereal grains.

- {modified 4462} Permittee shall feed steam-flaked, dry rolled, cracked or ground corn or other steam-flaked, dry rolled, cracked or ground cereal grains. [District Rules 2201 and 4570]
- {modified 4463} Permittee shall maintain records to demonstrate animals are fed steam-flaked, dry rolled, cracked or ground corn or other steam-flaked, dry rolled, cracked or ground cereal grains. 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]

Silage

Utilize a sealed feed storage system (e.g., Ag-Bag) for bagged silage.

- {4468} For bagged silage/feedstuff, permittee shall utilize a sealed feed storage system (e.g., ag bag). [District Rule 4570]

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.

- {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]

Build silage piles such that the average bulk density of silage piles 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, or 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, or incorporate the following practices when creating silage piles:

- Harvest silage crop at $\geq 65\%$ moisture for corn; and $\geq 60\%$ moisture for alfalfa/grass and other silage crops; and

- Manage silage material delivery such that no more than six (6) inches of materials are un-compacted on top of the pile.
- Incorporate the following parameters for Theoretical Length of Chop (TLC) and roller opening, as applicable, for the crop being harvested:

Crop Harvested	TLC (inches)	Roller Opening(mm)
Corn with no processing	≤ 1/2 in	N/A
Processed Corn <35% dry matter	≤ 3/4 in	1 – 4 mm
Alfalfa/Grass	≤ 1.0 in	N/A
Wheat/Cereal Grains/Other	≤ 1/2 in	N/A

- {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 or record 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]

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 square feet.

Manage multiple uncovered silage piles such that the total exposed surface area of all silage piles is less than 4,300 square feet.

Maintain silage working face use a shaver/facer to remove silage from the silage pile.

Maintain silage working face; maintain a smooth vertical surface on the working face of the silage pile.

Silage Additives: 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.

Silage Additives: 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.

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.

- {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]

Milking Parlor Mitigation Measures

Flush or hose milk parlor immediately prior to, immediately after, or during each milking.

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

Freestall Barns Mitigation Measures

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.

- {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]

Flush, scrape, or vacuum freestall flush lanes immediately prior, after, or during each milking.

- {modified 4487} Permittee shall flush, scrape or vacuum freestall lanes immediately prior to, immediately after or during each milking. [District Rules 2201 and 4570]
- {modified 4488} Permittee shall maintain records sufficient to demonstrate that freestall lanes are flushed, scraped or vacuumed immediately prior to, immediately after or during each milking. [District Rules 2201 and 4570]

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 beddings at least once every seven (7) days.

- {modified 4492} Permittee shall remove manure that is not dry from individual cow freestall beds or rake, harrow, scrape, or grade freestall bedding at least once every seven (7) days. [District Rules 2201 and 4570]
- {modified 4493} Permittee shall record either of the following: 1) the dates when manure that is not dry is removed from individual cow freestall beds or 2) the dates when the freestall bedding is raked, harrowed, scraped, or graded. [District Rules 2201 and 4570]

Corral Mitigation Measures

As discussed above, the applicant indicates that after completion of the project, all animals at the dairy (milk cows, dry cows, heifers, and bulls) will be housed in freestall barns; therefore, the corral mitigation measures of District Rule 4570 will no longer apply and the following conditions for Rule 4570 corral mitigation measures that are included in the current permit will not be included in the proposed ATC permit.

- {4499} Permittee shall inspect water pipes and troughs and repair leaks at least once every seven (7) days. [District Rule 4570]
- 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]
- {4520} Permittee shall knockdown fence line manure build-up prior to it exceeding a height of twelve (12) inches at any time or point. 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]

Land Application Mitigation Measures

Solid Manure

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

- {modified 4545} Permittee shall not apply solid manure with a moisture content of more than 50%. [District Rules 2201 and 4570]
- {modified 4546} Permittee shall maintain records of the moisture content of the solid manure each time solid manure is land applied. [District Rules 2201 and 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]

Liquid Manure

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

- {modified 4550} 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]
- {modified 4551} 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]

Liquid Manure Handling Mitigation Measures

Remove solids from the waste system with a solid separator system, prior to the waste entering the lagoon.

- {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 Handling Mitigation Measures (Large Dairies Only)

Separated Solids

Within seventy-two (72) hours of removal from housing, the owner shall remove separated solids from the facility.

- {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]

Within seventy-two (72) hours of removal from housing, the owner shall 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.

- {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]
- {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]

As demonstrated above, applicable conditions will be included on the permits for the operations at this site. The site is expected to be in compliance with the requirements of this rule. No further discussion is required.

California Health & Safety Code 42301.6 (School Notice)

The District has verified that this site is not located within 1,000 feet of a school. Therefore, pursuant to California Health and Safety Code 42301.6, a school notice is not required.

California Environmental Quality Act (CEQA)

CEQA requires each public agency to adopt objectives, criteria, and specific procedures consistent with CEQA Statutes and the CEQA 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.

Merced County (County) is the Agency which has principal responsibility for approving this dairy project. The County determined that the Project would have a significant adverse environmental impact and prepared an Environmental Impact Report (EIR) for the Project. In certifying the Final EIR, the County determined that after implementing all feasible mitigation measures certain impacts on air quality would be significant and unavoidable. The County approved the Project and adopted a Statement of Overriding Considerations (SOC), in accordance with CEQA Guidelines §15093(a), stating that economic, legal, social, technological, and other benefits resulting from the project will outweigh the unavoidable adverse environmental effects.

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). Rule 2010 requires operators of emission sources to obtain an Authority to Construct (ATC) and Permit to Operate (PTO) from the District. Rule 2201 requires that new and modified stationary sources of emissions mitigate their emissions using best available control technology (BACT) and for non-agricultural sources offsetting emissions when above certain thresholds (SB 700). As a responsible agency the District complies with CEQA by considering the EIR prepared by the Lead Agency, and by reaching its own conclusion on whether and how to approve the project involved (CEQA Guidelines §15096).

The District has prepared an Authority to Construct Application Review, this document, and has determined that compliance with District rules and required mitigation measures will reduce project specific stationary source emissions to the extent feasible. Before reaching a final decision to approve the project and issue ATCs the District will prepare findings and file a Notice of Determination consistent with CEQA Guidelines §15096 requirements.

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.

The proposed project is for an operation of public concern (dairy facility) in the Valley and triggers Best Available Control Technology (BACT). Therefore, the District determined that an Indemnification Agreement for the ATC project is required

IX. Recommendation

Compliance with all applicable rules and regulations is expected. Pending a successful NSR Public Noticing period, issue ATCs N-8481-1-2, -2-2, -3-1, -4-1, & -5-1 subject to the permit conditions on the attached draft ATC in Appendix H.

X. Billing Information

Annual Permit Fees			
Permit Number	Fee Schedule	Fee Description	Annual Fee
N-8481-1-2	3020-06	Milking Operation - Miscellaneous	\$116.00
N-8481-2-2	3020-06	Cow Housing - Miscellaneous	\$116.00
N-8481-3-1	3020-06	Liquid Manure Management - Miscellaneous	\$116.00
N-8481-4-1	3020-06	Solid Manure Management - Miscellaneous	\$116.00
N-8481-5-1	3020-06	Feed Storage and Handling - Miscellaneous	\$116.00

Appendixes

- A: Current Permits to Operate (N-8481-1-1, -2-1, -3-0, -4-0, & -5-0)
- B: Merced County Planning Commission Minutes for approval of Merced County CUP 12-014
- C: Copy of Proposed Dairy Expansion Site Plan
- D: Anaerobic Lagoon Design Check Spreadsheets
- E: Copy of Dairy Emissions Calculation Spreadsheets
- F: BACT and T-BACT Analyses for Dairy Permits
- G: Summary of Health Risk Assessment (HRA) and Ambient Air Quality Analysis (AAQA)
- H: Draft ATCs (N-8481-1-2, -2-2, -3-1, -4-1, & -5-1)

APPENDIX A

**Current Permits to Operate
(N-8481-1-1, -2-1, -3-0, -4-0, & -5-0)**

San Joaquin Valley Air Pollution Control District

PERMIT UNIT: N-8481-1-1

EXPIRATION DATE: 01/31/2017

EQUIPMENT DESCRIPTION:

1,380 COW MILKING OPERATION WITH ONE DOUBLE 24 PARALLEL (48 STALLS) MILKING PARLOR

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. 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]
4. Permittee shall flush or hose milk parlor immediately prior to, immediately after, or during each milking. [District Rule 2201 and 4570]
5. Permittee shall provide verification that milk parlors are flushed or hosed prior to, immediately after, or during each milking. [District Rules 2201 and 4570]
6. 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 1070 and 4570]
7. 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]

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

San Joaquin Valley Air Pollution Control District

PERMIT UNIT: N-8481-2-1

EXPIRATION DATE: 01/31/2017

EQUIPMENT DESCRIPTION:

COW HOUSING - 1,380 MILK COWS NOT TO EXCEED A COMBINED TOTAL OF 1,680 MATURE COWS (MILK AND DRY COWS); 1,500 TOTAL SUPPORT STOCK (HEIFERS, CALVES, AND BULLS); AND 3 FREESTALLS WITH FLUSH SYSTEM

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. 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]
4. 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]
5. Permittee shall flush, scrape or vacuum freestall lanes immediately prior to, immediately after or during each milking. [District Rules 2201 and 4570]
6. Permittee shall maintain records sufficient to demonstrate that freestall lanes are flushed, scraped or vacuumed immediately prior to, immediately after or during each milking. [District Rules 2201 and 4570]
7. Permittee shall remove manure that is not dry from individual cow freestall beds or shall rake, harrow, scrape, or grade freestall bedding at least once every seven (7) days. [District Rule 4570]
8. Permittee shall record either of the following: 1) the dates when manure that is not dry is removed from individual cow freestall beds or 2) the dates when the freestall bedding is raked, harrowed, scraped, or graded. [District Rule 4570]
9. Permittee shall inspect water pipes and troughs and repair leaks at least once every seven (7) days. [District Rule 4570]
10. 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]
11. 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]
12. 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]

PERMIT UNIT REQUIREMENTS CONTINUE ON NEXT PAGE

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

13. 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]
14. 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]
15. 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]
16. 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]
17. Permittee shall knockdown fence line manure build-up prior to it exceeding a height of twelve (12) inches at any time or point. 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]
18. Permittee shall measure and document the depth of manure at the fence line at least once every ninety (90) days. [District Rule 4570]
19. 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]
20. 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]
21. 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]

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

San Joaquin Valley Air Pollution Control District

PERMIT UNIT: N-8481-3-0

EXPIRATION DATE: 01/31/2017

EQUIPMENT DESCRIPTION:

LIQUID MANURE HANDLING SYSTEM CONSISTING OF TWO SETTLING BASINS; ONE STORAGE POND; MANURE LAND APPLIED THROUGH FLOOD IRRIGATION 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. 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]
4. Permittee shall remove solids with a solid separator system, prior to the manure entering the lagoon. [District Rule 4570]
5. Permittee shall not allow liquid manure to stand in the fields for more than twenty-four (24) hours after irrigation. [District Rule 4570]
6. 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]
7. 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]
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: N-8481-4-0

EXPIRATION DATE: 01/31/2017

EQUIPMENT DESCRIPTION:

SOLID MANURE HANDLING CONSISTING OF COVERED MANURE STOCK PILES; SOLID MANURE APPLICATION TO LAND AND 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. 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]
4. Permittee shall not apply solid manure with a moisture content of more than 50%. [District Rule 4570]
5. Permittee shall maintain records of the moisture content of the solid manure each time solid manure is land applied. [District Rule 4570]
6. 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]
7. 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]
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: N-8481-5-0

EXPIRATION DATE: 01/31/2017

EQUIPMENT DESCRIPTION:

MODIFICATION OF FEED STORAGE AND HANDLING CONSISTING OF COVERED FEED STORAGE OR COMMODITY BARN(S) AND SILAGE PILES: INCREASE HERD SIZE TO 2,100 MILK COWS, 400 DRY COWS, AND 2,600 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. 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]
4. Permittee shall feed all animals according to National Research Council (NRC) guidelines. [District Rule 4570]
5. 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]
6. 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]
7. 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]
8. Permittee shall begin feeding total mixed rations within two hours of grinding and mixing rations. [District Rule 4570]
9. 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]
10. Permittee shall store grain in a weatherproof storage structure or under a weatherproof covering from October through May. [District Rule 4570]
11. 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]
12. Permittee shall feed steam-flaked, dry rolled, cracked or ground corn or other steam-flaked, dry rolled, cracked or ground cereal grains. [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 maintain records to demonstrate animals are fed steam-flaked, dry rolled, cracked or ground corn or other steam-flaked, dry rolled, cracked or ground cereal grains. 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]
14. For bagged silage/feedstuff, permittee shall utilize a sealed feed storage system (e.g., ag bag). [District Rule 4570]
15. 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]
16. 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]
17. 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]
18. 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]
19. 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]
20. 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]
21. 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]
22. 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]
23. 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]
24. 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.

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 maintain a plan that requires that the thickness of the layer of uncompacted material delivered on top of the pile is no more than six (6) inches. [District Rule 4570]
26. 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]
27. 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]
28. 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]
29. 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]
30. 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]
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 B

Merced County Planning Commission Minutes for Approval of Merced County CUP 12-014

**MERCED COUNTY PLANNING COMMISSION
MINUTES FOR MEETING OF JANUARY 28, 2015**

The agenda, original minutes, video, and all supporting documentation (for reference purposes only) of the Merced County Planning Commission meeting of January 28, 2015 are available online at www.co.merced.ca.us/planning/plancomarchive.html.

I. CALL MEETING TO ORDER

The regularly scheduled meeting of the Merced County Planning Commission was called to order at 9:00 a.m., on January 28, 2015 in the Board Chambers located at 2222 "M" Street, Third Floor, Merced, California.

II. ROLL CALL OF COMMISSIONERS

Commissioners Present: Commissioner Jack Mobley – Acting Chairman
 Commissioner Robert Acheson
 Commissioner Mark Erreca
 Commissioner Rich Ford
 Commissioner Greg Thompson

Staff Present: Mark Hendrickson, Director
 Oksana Newmen, Deputy Director-Planning
 Ana Muniz-Laguna, Recording Secretary
 Brian Guerrero, Planner III

Legal Staff: Thomas Ebersole, County Counsel

Commissioners Absent: None

III. APPROVAL OF MINUTES

None

IV. CITIZEN COMMUNICATIONS

None

V. PUBLIC HEARINGS

- A. CONDITIONAL USE PERMIT No. CUP12-014 - Matos Dairy - To expand an existing dairy from 2,800 cows to 5,100 cows and construct a number of structures totaling 190,000 square feet on a 38 acre portion of the dairy facility totaling 468 acres. The project site is located on the southeast corner of Baily Road and Quinley Avenue in the Merced area. The property is designated Agricultural land use and zoned A-1 (General Agricultural). **BG****

Recommendations: The actions requested are to:

- 1) Certify the Environmental Impact Report and adopt the Environmental Findings of Fact; and;
- 2) Approve Conditional Use Permit CUP12-014 based on the findings and subject to the conditions of approval and mitigation measures presented in the Staff Report and adopt the Statement of Overriding Considerations and approve the Mitigation Monitoring & Reporting Program.

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Brian Guerrero, Planner III gave a PowerPoint presentation and summarized the Staff Report.

Commissioner Thompson asked if there is one property owner or multiple owners and Mr. Guerrero stated it is multiple owners but they are all tied to the dairy facility.

Commissioner Thompson inquired if the applicant had easements on the 18 parcels with the various landowners to which Mr. Guerrero stated yes they do.

The public hearing opened at 9:10 a.m.

No one spoke in favor or opposition to this application.

The public hearing closed at 9:11 a.m.

MOTION: M/S ERRECA-FORD, AND CARRIED BY A VOTE OF 5-0, THE PLANNING COMMISSION CERTIFY THE ENVIRONMENTAL IMPACT REPORT AND ADOPT THE ENVIRONMENTAL FINDINGS OF FACT; AND

MOTION: M/S ERRECA-FORD, AND CARRIED BY A VOTE OF 5-0, THE PLANNING COMMISSION APPROVE CONDITIONAL USE PERMIT No. CUP12-014 BASED ON THE 9 PROJECT FINDINGS, AND THE 20 CONDITIONS OF APPROVAL AND MITIGATION MEASURES PRESENTED IN THE STAFF REPORT AND ADOPT THE STATEMENT OF OVERRIDING CONSIDERATIONS AND APPROVE THE MITIGATION MONITORING & REPORTING PROGRAM.

Planning and Community Development Conditions:

1. Conditional Use Permit No. CUP12-014 is granted to expand the existing Larry Matos dairy from 2,800 cows (1,000 milk cows & 1,800 support stock) to 5,100 cows (2,100 milk cows and 3,000 support stock) and construct a new milk barn, two new freestall barns, additions to an existing freestall barn, hay barn, sprinkler pen, fresh water basin and a concrete slab on 11.3 acres for a total of 37.3 acres of dairy facilities, on 18 parcels totaling 468 acres.
2. The Larry Matos Dairy Expansion project shall be located, developed and operated in a manner described on the approved plot plan, Nutrient Management Plan, Waste Management Plan, mitigation measures, mitigation monitoring and reporting program, and conditions of this permit. Any changes or proposed modifications to the approved project would be based on a written request of the applicant to the Planning Director.
3. All mitigation measures identified in the Environmental Impact Report are adopted and incorporated by reference as project conditions.
4. The project shall comply with all applicable regulations administered by the County Fire Department, Environmental Health Division, Planning & Community Development, and Public Works Departments.

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5. For the purpose of conditions monitoring, an inspection fee in the amount of **\$648** shall be required. This fee shall be paid within 30 days of the approval date. Should additional inspections be required, inspection time shall be billed to the applicant / property owner at the established hourly rate at the time of the inspection. This permit will not be considered valid until the conditions monitoring fee has been paid.
6. The applicant shall obtain all necessary permits, and comply with all applicable regulations administered by Federal and State agencies.

County Counsel

7. INDEMNITY AND HOLD HARMLESS AGREEMENT:

Larry Matos has the contracted duty (hereinafter "the duty") to indemnify, defend and hold harmless, County, its Board of Supervisors, officers, employees, agents and assigns from and against any and all claims, petitions, demands, liability, judgments, awards, interest, attorney's fees, costs, experts' fees and expenses of whatsoever kind or nature, at any time arising out of or in any way connected with the performance of this Agreement, whether in tort, contract, writ of mandamus, or otherwise. This duty shall include, but not be limited to, claims, petitions, or the like for bodily injury, property damage, personal injury, contractual damages, writ of mandamus, or otherwise alleged to be caused to any person or entity including, but not limited to employees, agents, commissions, boards, and officers of Larry Matos.

Larry Matos's liability for indemnity under this Agreement shall apply, regardless of fault, to any acts or omissions, willful misconduct or negligent conduct of any kind, on the part of the Applicant, its agents, subcontractors, employees, boards, and commissions. The duty shall extend to any allegation, claim of liability, or petition, except in circumstances found by a jury or judge to be the sole and legal result of the willful misconduct of County. This duty shall arise at the first claim, petition, or allegation of liability against County. Larry Matos will on request and at its expense, defend any action or suit or proceeding arising hereunder. This clause and shall not be limited to any and all claims, petitions, demands, liability, judgments, awards, interest, attorney's fees, costs, experts' fees and expenses of whatsoever kind or nature, that may arise during the term of this Agreement but shall also apply to all such claims and the like after the term of this contract, for example, arising from land use and environmental law actions, or meeting notice law actions, brought against the County following Conditional Use Permit No. CUP12-014 approval, modification, or denial.

This clause for indemnification shall be interpreted to the broadest extent permitted by law.

Public Works/Roads Division

8. The applicant shall improve all driveways utilized by heavy truck operations associated with the dairy with either paved or concrete approaches onto the adjacent County roadway, in accordance with Chapter 7 of the Merced County Department of Public Works Improvement Standards and Specifications.
9. The applicant shall install a 150-watt pole mounted street light at each driveway approach. All work within the County right-of-way shall require an Encroachment Permit from the County.

MERCED COUNTY PLANNING COMMISSION

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Merced County Division of Environmental Health

10. The dairy operation shall comply with the Merced County Animal Confinement Ordinance as follows:
 - Salt and other mineral feed supplements shall be limited to that required to maintain animal health and optimum production according to the National Research Council standards.
 - Feed management/diet optimization plan.
 - The applicant shall provide a site plan demonstrating that all off-site residences are at least 1,000 feet from the active dairy facility.
 - The applicant shall provide a vector (fly and mosquito) and odor control program to the Division to aid in evaluating manure storage practices.
 - The California Regional Water Quality Control Board requires submittal of a Nutrient Management Plan (NMP) and a separate Waste Management Plan (WMP) for all dairies. CRWQCB requires submittal of a nutrient management report by July 1 of each year.
 - An updated CNMP shall be submitted to Merced County whenever a dairy expansion occurs
 - The applicant shall submit a signed copy of the most recent NMP and the most recent WMP reflecting the increase in facility footprint and number of cows.

Public Works/Building and Safety Division

11. A licensed architect or engineer shall design all structures to meet all local, state, and federal codes and ordinances, including but not limited to seismic and soil conditions.
12. If the property is in a flood zone the applicant shall meet FEMA requirements for structures and equipment

Merced County Fire Department

13. Fire apparatus access roads shall be designed and maintained to support the imposed loads of fire apparatus and shall be surfaced so as to provide all-weather driving capabilities. Fire apparatus access roads shall not be obstructed in any manner, including the parking of vehicles. The minimum widths and clearances established in Section 503.2.1 shall be maintained at all times.
14. Where access to or within a structure or an area is restricted because of secured openings or where immediate access is necessary for life-saving or fire-fighting purposes, the fire code official is authorized to require a key box to be installed in an approved location. The key box shall be of an approved type and shall contain keys to gain necessary access as required by the fire code official.

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15. An approved water supply capable of supplying the required fire flow for fire protection shall be provided to premises upon which facilities, buildings, or portions of buildings are hereafter constructed or moved into or within the jurisdiction.

Merced Irrigation District

16. MID right of ways shall not be used for public access to the subject site
17. MID Lateral #15 is adjoining the southerly line of said project. All improvements must be outside of any MID right of way. Proposed Freestall C-2 may be encroaching upon said Lateral #15 right of way per the submitted Dairy Facility Figure 2 aerial plan. Applicant may choose to approach MID about purchasing said Lateral #15 strip.
18. All wastewater containing manure must be contained on the subject property and isolated from MID facilities. MID will not accept any drainage water into its facilities from the subject property or the property of assignees contracted to accept wastewater that contain manure.
19. MID laterals, canals or pipelines cannot be used by the dairy to wheel any water from the dairy site to other parts of the subject property or to the property of assignees contracted to accept wastewater.
20. The MID canals deliver irrigation water to the dairy site and supporting cropland. Wherever there is comingling of wastewater containing manure at an MID irrigation delivery point, backflow prevention devices meeting MID standards must be installed. The purpose of the installation is to keep wastewater containing manure from entering any MID facilities and contaminating the water in the facility

VI. COMMISSION ACTION ITEM (S)

None

VII. DIRECTOR'S REPORT

Mark Hendrickson, Director, thanked Mr. Thomas Ebersole, County Counsel for taking the time to attend the Planning Commission meeting, and recognized Commissioner Ford for representing the Commission at the Gustine City County Dinner.

VIII. COMMISSIONERS COMMENTS

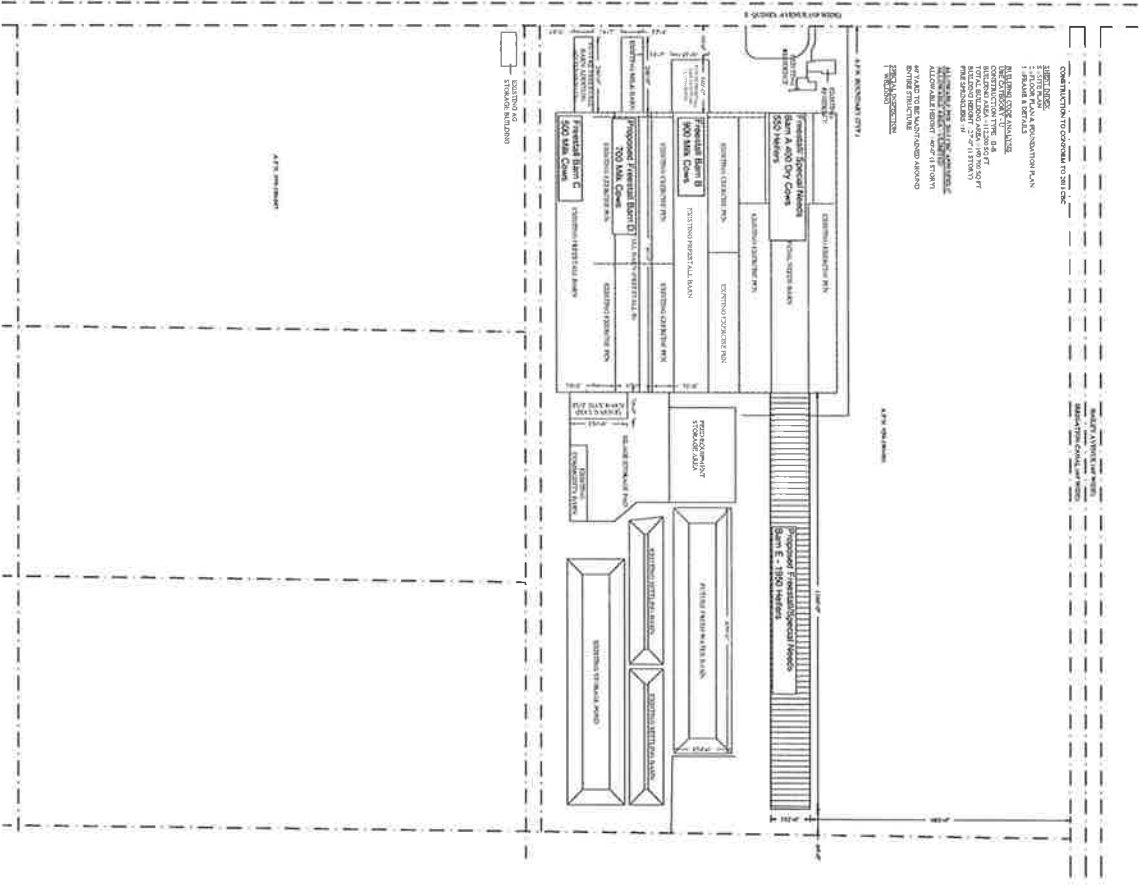
None

IX. ADJOURNMENT

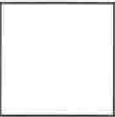
There being no further business, the meeting adjourned at 9:19 a.m.

APPENDIX C

Copy of Proposed Dairy Expansion Site Plan



PROJECT #		04-045
DESIGN		TCK
DRAWING		TCK
DATE		01/07/16
SCALE		1" = 150'-0"
SHEET		S
OF 3 SHEETS		



LARRY MATOS
S. QUINLEY AVE.
ATWATER, CA

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APPENDIX D

Anaerobic Treatment Lagoon Design Check Spreadsheets

Preliminary Lagoon Design Check in Accordance with NRCS Guideline #359

Volume of Primary Lagoon

Volume of treatment lagoon = (L x W x D) – (S x D²) x (W + L) + (4 x S² x D³ ÷ 3)

Primary Treatment Lagoon Dimensions

Length	642	ft
Width	150	ft
Depth	20	ft
Slope	1.2	ft

Volume of Primary Anaerobic Treatment Lagoon	1,561,200 ft3
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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	<u>VS</u> <u>Excreted</u> [1] (lb/day)	x	Jersey Factor (%) [2]	x	% Manure in <u>Flush</u> [3]	x	(1 - % VS Removed in Separation[4])	=	Net VS Loading (lb/day)
Milk Cows	2,100	x	17	x	71%	x	71%	x	50%	=	8,998
Dry Cow	400	x	9.2	x	71%	x	71%	x	50%	=	928
Heifer (15 to 24 months)/ Support Stock	2,600	x	7.1	x	71%	x	71%	x	50%	=	4,653
Heifer (7 to 14 months)	0	x	4.9	x	71%	x	71%	x	50%	=	0
Heifer (3 to 6 months)	0	x	2.7	x	71%	x	71%	x	50%	=	0
Calf (under 3 months)	0	x	1.0	x	71%	x	100%	x	50%	=	0
Bulls	0	x	9.2	x	71%	x	71%	x	50%	=	0
Total for Dairy											14,579

^[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 from 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] No adjustment for Holstein cattle

^[3] 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 $60\% [(71+48)/2]$.

^[4] 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) = 0.010 lb/ft3-day

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

Minimum Treatment Volume in Primary Lagoon				
Breed: Holstein Type of Cow	Net VS Loading (lb/day)		VSLR (lb/ft3-day)[1]	MTV (ft ³)
Milk Cows	8,998	÷	0.01	= 899,819
Dry Cow	928	÷	0.01	= 92,754
Heifer (15 to 24 months)/ Support Stock	4,653	÷	0.01	= 465,284
Heifer (7 to 14 months)	0	÷	0.01	= 0
Heifer (3 to 6 months)	0	÷	0.01	= 0
Calf (under 3 months)	0	÷	0.01	= 0
Bulls	0	÷	0.01	= 0
Total for Dairy				1,457,857

[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/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:

$$SAV = VPL - MTV$$

Where:

SAV = Sludge Accumulation Volume (ft³)

TVL = Total Volume of Anaerobic Treatment Lagoon(s) (ft³)

MTV = Minimum Treatment Volume (ft³)

$$SAV = TVL - MTV$$

$$SAV = 1,561,200 - 1,457,857 = 103,343 \text{ (ft}^3\text{)}$$

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:

$$HRT = (\text{Total Volume of Lagoon(s)})/HFR$$

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	2,100	x	2.40	ft ³	= 5,040 ft ³ /day
Dry Cows	400	x	1.30	ft ³	= 520 ft ³ /day
Heifers (15-24 mo)/ Support Stock	2,600	x	0.78	ft ³	= 2,028 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	5,100				7,588 ft³/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	2100 milk-cows	x	ft3	ft3
milk-cow*day			7.48 gal	day
			=	21,625.4 ft3/day

Formula:				
MTV (ft3)	/	(day)		
		HFR (ft3)		

HRT:				
1,561,200 ft3	21,625.4 ft3	day	=	days

APPENDIX E

Copy of Dairy Emissions Calculation Spreadsheet

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	1,380				1,380		
Dry Cows	300				300		
Support Stock (Heifers, Calves, and Bulls)			1,500		1,500		
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	1,380
Total Mature Cows	1,680
Support Stock (Heifers, Calves, and Bulls)	1,500
Total Calves	0
Total Dairy Head	3,180

Pre-Project Silage Information			
Feed Type	Max # Open Piles	Max Height (ft)	Max Width (ft)
Corn	1	14	150
Alfalfa			
Wheat	2	14	150

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 any new lagoon/storage pond(s) or an increase in surface area for any existing lagoon/storage pond(s)?

Post-Project Herd Size							
Herd	Flushed Freestalls	Scraped Freestalls	Flushed Corrals	Scraped Corrals	Total # of Animals		
Milk Cows	2,100				2,100		
Dry Cows	400				400		
Support Stock (Heifers, Calves, and Bulls)	2,600				2,600		
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	2,100
Total Mature Cows	2,500
Support Stock (Heifers, Calves, and Bulls)	2,600
Total Calves	0
Total Dairy Head	5,100

Post-Project Silage Information			
Feed Type	Max # Open Piles	Max Height (ft)	Max Width (ft)
Corn	1	14	150
Alfalfa			
Wheat	2	14	150

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. Note: If selected for dairies > 999 milk cows, control efficiency is already included in EF.	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. Note: If selected for dairies > 999 milk cows, CE is already included in EF.	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. 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). Heifer/Calf Ranches: Scrape corrals twice a year with at least 90 days between cleanings, excluding in-corral mounds. Note: No additional control given for increased cleaning frequency (e.g. BACT requirement).	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. Note: No additional control given for increased cleaning frequency (e.g. BACT requirement).	10%	0%
☒	☒	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. Note: If selected for dairies > 999 milk cows, CE already included in EF.	0%	0%
☐	☐	Install shade structures such that they are constructed with a light permeable roofing material. 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.	0%	0%
☐	☐	Install all shade structures uphill of any slope in the corral. 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.		
☐	☐	Clean manure from under corral shades at least once every 14 days, when weather permits access into corral. 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.		
☐	☐	Install shade structure so that the structure has a North/South orientation. 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.		
☐	☐	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. Note: If selected for dairies > 999 milk cows, control efficiency is already included in EF.	0%	0%
☒	☐	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.	10%	0%
☐	☐	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	27.10%	10.00%
		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.	10%	10%
☐	☐	(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			19.00%	19.00%
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.	10%	10%
☐	☐	(D) Have no animals in exercise pens or corrals at any time.	0%	0%
Total Control Efficiency			19.00%	19.00%

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	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%	10%
Total Control Efficiency			19.00%	19.00%

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. For dairies - implement <u>two</u> of the following: For heifer/calf ranches - 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. Note: If selected for dairies > 999 milk cows, control efficiency already included in EF.	0%	0%
☒	☒	Feed steam-flaked, dry rolled, cracked or ground corn or other ground cereal grains.	10%	10%
☐	☐	Remove uneaten wet feed from feed bunks within 24 hrs after the end of a rain event.	0%	0%
☐	☐	(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. Note: If selected for dairies, control efficiency already included in EF.	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.	0%	0%
Total Control Efficiency			28%	28%
		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.	0%	0%
Total Control Efficiency			28.0%	28.0%
		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%	0%
Total Control Efficiency			28.00%	28.00%

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%

		lbhd-yr Dairy Emissions Factors for Jersey Cows											
		Dry Cows				Medium Heifers (7 to 14 months)				Small Heifers (3 to 6 months)			
		Uncontrolled		Controlled		Uncontrolled		Controlled		Uncontrolled		Controlled	
		<1000 milb cows	>1000 milb cows	EF1	EF2	<1000 milb cows	>1000 milb cows	EF1	EF2	<1000 milb cows	>1000 milb cows	EF1	EF2
Milking Parlor	VOC	0.31	0.29	0.26	0.26	-	-	-	-	-	-	-	-
	NH3	0.34	0.31	0.28	0.28	-	-	-	-	-	-	-	-
	Total	0.13	0.13	0.10	0.10	-	-	-	-	-	-	-	-
Cow Housing	VOC	2.76	2.62	2.36	2.36	1.65	1.58	1.43	1.43	1.29	1.22	1.09	1.09
	NH3	7.10	4.69	3.42	4.22	3.83	2.55	1.86	2.30	2.98	1.95	1.43	1.76
	Total	0.03	0.02	0.02	0.02	-	-	-	-	-	-	-	-
Liquid Manure Handling	VOC	0.75	0.71	0.58	0.58	0.40	0.39	0.31	0.31	0.20	0.16	0.12	0.11
	NH3	0.60	0.57	0.46	0.46	0.32	0.31	0.25	0.25	0.19	0.15	0.13	0.13
	Total	11.20	8.55	6.81	7.45	6.21	4.83	3.55	4.18	4.83	3.71	2.95	3.29
Solid Manure Handling	VOC	1.08	0.92	0.83	0.83	0.50	0.50	0.45	0.45	0.27	0.27	0.22	0.22
	NH3	1.16	0.99	0.89	0.89	0.54	0.54	0.49	0.49	0.28	0.28	0.25	0.25
	Total	2.34	1.92	1.72	1.94	1.21	1.04	0.94	0.94	0.56	0.56	0.47	0.47
Feed Storage and Handling	VOC	6.32	6.22	4.95	4.95	3.20	3.20	2.30	2.30	1.63	1.63	1.18	1.18
	NH3	12.14	12.14	8.74	8.74	6.18	6.18	4.45	4.45	3.20	3.20	2.27	2.27
	Total	0.11	0.11	0.10	0.10	0.06	0.06	0.05	0.05	0.04	0.04	0.03	0.03
Barnyard	VOC	0.04	0.04	0.03	0.03	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01
	NH3	0.28	0.23	0.19	0.19	0.15	0.13	0.10	0.10	0.12	0.10	0.08	0.08
	Total	0.43	0.38	0.32	0.32	0.23	0.21	0.17	0.17	0.18	0.16	0.13	0.13
Pasture	VOC	0.67	0.67	0.67	0.67	0.34	0.34	0.34	0.34	0.18	0.18	0.18	0.18
	NH3	0.27	0.27	0.27	0.27	0.13	0.13	0.13	0.13	0.07	0.07	0.07	0.07
	Total	1.48	1.48	1.07	1.07	0.75	0.75	0.54	0.54	0.39	0.39	0.28	0.28
Total	VOC	2.43	2.43	2.01	2.01	1.23	1.23	1.02	1.02	0.64	0.64	0.53	0.53
	NH3	2.34	2.34	1.92	1.92	1.21	1.21	1.02	1.02	0.84	0.84	0.65	0.65
	Total	4.77	4.77	3.93	3.93	2.44	2.44	2.04	2.04	1.48	1.48	1.18	1.18

		lbhd-yr Dairy Emissions Factors for Jersey Cows			
		Uncontrolled		Controlled	
		<1000 milb cows	>1000 milb cows	EF1	EF2
Feed Storage and Handling	VOC	0.31	0.29	0.26	0.26
	NH3	0.34	0.31	0.28	0.28
	Total	0.13	0.13	0.10	0.10

		lbhd-yr Dairy Emissions Factors for Jersey Cows			
		Uncontrolled		Controlled	
		<1000 milb cows	>1000 milb cows	EF1	EF2
Feed Storage and Handling	VOC	0.31	0.29	0.26	0.26
	NH3	0.34	0.31	0.28	0.28
	Total	0.13	0.13	0.10	0.10

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 PM10 Mitigation Measures for calculations.

Post-Project PM10 Mitigation Measures

Post-Project PM10 Mitigation Measures														
Housing Name(s) or #s)	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	Barn A - Dry	dry cows	400	400										
2	Barn A - Support	support stock	550	550										
3	Barn B - Milk	milk cows	900	900										
4	Barn B - Bulls	support stock	30	30										
5	Barn C - Milk	milk cows	500	500										
6	Barn C - Bulls	support stock	15	15										
Post-Project PM10 Mitigation Measures for New Housing Units at an Expanding Dairy														
Housing Name(s) or #s)	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	Proposed Barn D - Milk	milk cows	700	700										
2	Proposed Barn D - Bulls	support stock	25	25										
3	Proposed Barn E	support stock	1980	1980										
Post-Project Total # of Cows:			5,100				2,395		dairy cows already on-site and		2,705	new cows from the expansion.)		

Post-Project PM10 Control Efficiencies and Emission Factors															
Housing Name(s) or #s	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 Barn A - Dry	freestall	dry cows	400	400	1.370										1.37
2 Barn A - Support	freestall	support stock	550	550	1.370										1.37
3 Barn B - Milk	freestall	milk cows	900	900	1.370										1.37
4 Barn B - Bulls	freestall	support stock	30	30	1.370										1.37
5 Barn C - Milk	freestall	milk cows	500	500	1.370										1.37
6 Barn C - Bulls	freestall	support stock	15	15	1.370										1.37
Post-Project PM10 Control Efficiencies and Emission Factors for New Housing Emissions Units															
Housing Name(s) or #s	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 Proposed Barn D - Milk	freestall	milk cows	700	700	1.370							15%			1.17
2 Proposed Barn D - Bulls	freestall	support stock	25	25	1.370							15%			1.17
3 Proposed Barn E	freestall	support stock	1980	1980	1.370							15%			1.17

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	Barn A - Dry	dry cows	300	3.85	13.80	1.37	3.2	1,155	11.3	4,141	1.1	411
2	Barn A - Support	support stock	0	2.95	7.16	1.37	0.0	0	0.0	0	0.0	0
3	Barn B - Milk	milk cows	900	6.81	27.25	1.37	16.8	6,129	67.2	24,525	3.4	1,233
5	Barn C - Milk	milk cows	480	6.81	27.25	1.37	9.0	3,269	35.8	13,080	1.8	658
7	Corrals	support stock	1,500	2.95	7.16	10.55	12.1	4,425	29.4	10,735	43.4	15,825
Pre-Project Total # of Cows			3,180				41.0	14,978	143.8	52,481	49.7	18,127

Pre-Project Totals						
Total # of Cows	VOC (lb/day)	VOC (lb/yr)	NH3 (lb/day)	NH3 (lb/yr)	PM10 (lb/day)	PM10 (lb/yr)
3,180	41.0	14,978	143.8	52,481	49.7	18,127

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	Barn A - Dry	dry cows	400	4.28	13.80	1.37	4.7	1,712	15.1	5,521	1.5	548
2	Barn A - Support	support stock	550	3.29	7.16	1.37	5.0	1,810	10.8	3,936	2.1	754
3	Barn B - Milk	milk cows	900	7.61	27.25	1.37	18.8	6,849	67.2	24,525	3.4	1,233
4	Barn B - Bulls	support stock	30	3.29	7.16	1.37	0.3	99	0.6	215	0.1	41
5	Barn C - Milk	milk cows	500	7.61	27.25	1.37	10.4	3,805	37.3	13,625	1.9	685
6	Barn C - Bulls	support stock	15	3.29	7.16	1.37	0.1	49	0.3	107	0.1	21
Post-Project # of Cows (non-expansion)			2,395				39.2	14,324	131.3	47,929	9.0	3,282

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)
1	Proposed Barn D - Milk	milk cows	700	7.61	27.25	1.17	14.6	5,327	52.3	19,075	2.2	816
2	Proposed Barn D - Bulls	support stock	25	3.29	7.16	1.17	0.2	82	0.5	179	0.1	29
3	Proposed Barn E	support stock	1980	3.29	7.16	1.17	17.8	6,514	38.8	14,170	6.3	2,307
	Total # of Cows From Expansion		2,705				32.7	11,923	91.6	33,424	8.6	3,152

Post-Project Totals						
Total # of Cows	VOC (lb/day)	VOC (lb/yr)	NH3 (lb/day)	NH3 (lb/yr)	PM10 (lb/day)	PM10 (lb/yr)
5,100	71.9	26,247	222.9	81,353	17.6	6,434

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	1,380	0	0	0	1,380		
Dry Cows	300	0	0	0	300		
Support Stock (Heifers, Calves and Bulls)	0	0	1,500	0	1,500		
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	14	150	1,412
Alfalfa	0	0	0	
Wheat	2	14	150	2,825

Milking Parlor				
Cow		VOC		NH3
	lb/day	lb/yr	lb/day	lb/yr
Milk Cows	1.1	386	0.4	138

Cow Housing					
Cow	VOC		NH3		PM10
	lb/day	lb/yr	lb/day	lb/yr	lb/day
Total	41.0	14,978	143.8	52,481	49.7

Liquid Manure Handling					
Cow	VOC		NH3		H2S*
	lb/day	lb/yr	lb/day	lb/yr	lb/day
Milk Cows	6.5	2,374	33.0	12,061	2.4
Dry Cows	0.8	282	3.7	1,335	0.2
Support Stock (Heifers, Calves and Bulls)	3.0	1,080	9.5	3,450	0.8
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	10.2	3,736	46.2	16,846	3.4

Solid Manure Handling				
Cow	VOC		NH3	
	lb/day	lb/yr	lb/day	lb/yr
Milk Cows	1.2	442	7.6	2,774
Dry Cows	0.1	51	0.8	306
Support Stock (Heifers, Calves and Bulls)	0.5	195	2.2	795
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	1.9	688	10.6	3,875

Feed Handling and Storage		
	Daily PE (lb-VOC/day)	Annual PE (lb-VOC/yr)
Corn Emissions	8.8	3,210
Alfalfa Emissions	0.0	0
Wheat Emissions	22.2	8,116
TMR	70.1	25,587
Total	101.1	36,913

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	1.1	0.4	0.0
Cow Housing	0.0	0.0	49.7	0.0	41.0	143.8	0.0
Liquid Manure	0.0	0.0	0.0	0.0	10.2	46.2	3.4
Solid Manure	0.0	0.0	0.0	0.0	1.9	10.6	0.0
Feed Handling	0.0	0.0	0.0	0.0	101.1	0.0	0.0
Total	0.0	0.0	49.7	0.0	155.3	201.0	3.4

Total Annual Pre-Project Potential to Emit (lb/yr)							
Permit	NOx	SOx	PM10	CO	VOC	NH3	H2S
Milking Parlor	0	0	0	0	386	138	0
Cow Housing	0	0	18,127	0	14,978	52,481	0
Liquid Manure	0	0	0	0	3,736	16,846	1,259
Solid Manure	0	0	0	0	688	3,875	0
Feed Handling	0	0	0	0	36,913	0	0
Total	0	0	18,127	0	56,701	73,340	1,259

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)

Calves 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	1,805
Solid Manure	0	0	0	0	0
Feed Handling	0	0	0	0	0
Total	0	0	0	0	1,805

Post-Project Potential to Emit (PE2)

Post-Project Herd Size							
Herd	Flushed Freestalls	Scraped Freestalls	Flushed Corrals	Scraped Corrals	Total # of Animals		
Milk Cows	2,100	0	0	0	2,100		
Dry Cows	400	0	0	0	400		
Support Stock (Heifers, Calves, and Bulls)	2,600	0	0	0	2,600		
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	14	150	1,412
Alfalfa	0	0	0	
Wheat	2	14	150	2,825

Milking Parlor				
Cow	VOC		NH3	
Milk Cows	lb/day	lb/yr	lb/day	lb/yr
Total	1.6	588	0.6	210

Cow Housing					
	VOC		NH3		PM10
	lb/day	lb/yr	lb/day	lb/yr	lb/day
Total	71.9	26,247	222.9	81,353	17.6

Liquid Manure Handling						
Cow	VOC		NH3		H2S	
	lb/day	lb/yr	lb/day	lb/yr	lb/day	lb/yr
Milk Cows	6.0	2,184	50.3	18,354	2.4	880
Dry Cows	0.6	224	4.9	1,780	0.2	86
Support Stock (Heifers, Calves, and Bulls)	3.1	1,118	16.4	5,980	0.8	292
Large Heifers	0.0	0	0.0	0	0	0
Medium Heifers	0.0	0	0.0	0	0	0
Small Heifers	0.0	0	0.0	0	0	0
Calves	0.0	0	0.0	0	0	0
Bulls	0.0	0	0.0	0	0	0
Total	9.7	3,526	71.5	26,114	3.4	1,259

Solid Manure Handling				
Cow	VOC		NH3	
	lb/day	lb/yr	lb/day	lb/yr
Milk Cows	1.8	672	11.6	4,221
Dry Cows	0.2	68	1.1	408
Support Stock (Heifers, Calves, and Bulls)	0.9	338	3.8	1,378
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	3.0	1,078	16.5	6,007

Feed Handling and Storage		
	Daily PE (lb-VOC/day)	Annual PE (lb-VOC/yr)
Corn Emissions	8.8	3,210
Alfalfa Emissions	0.0	0
Wheat Emissions	22.2	8,116
TMR	112.4	41,036
Total	143.4	52,362

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	1.6	0.6	0.0
Cow Housing	0.0	0.0	17.6	0.0	71.9	222.9	0.0
Liquid Manure	0.0	0.0	0.0	0.0	9.7	71.5	3.4
Solid Manure	0.0	0.0	0.0	0.0	3.0	16.5	0.0
Feed Handling	0.0	0.0	0.0	0.0	143.4	0.0	0.0
Total	0.0	0.0	17.6	0.0	229.6	311.6	3.4

Total Annual Post-Project Potential to Emit (lb/yr)							
Permit	NOx	SOx	PM10	CO	VOC	NH3	H2S
Milking Parlor	0	0	0	0	588	210	0
Cow Housing	0	0	6,434	0	26,247	81,353	0
Liquid Manure	0	0	0	0	3,526	26,114	1,259
Solid Manure	0	0	0	0	1,078	6,007	0
Feed Handling	0	0	0	0	52,362	0	0
Total	0	0	6,434	0	83,801	113,684	1,259

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/ug

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

Calculation for TMR emissions:

Annual PE = (# cows) x (EF2) x (0.658 m³) x (525,600 min/yr) x (2.20E-9 lb/ug)

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
Milking Parlor	0	0	0	0	0
Cow Housing	0	0	0	0	0
Liquid Manure	0	0	0	0	1,704
Solid Manure	0	0	0	0	0
Feed Handling	0	0	0	0	0
Total	0	0	0	0	1,704

BACT Applicability

Milking Parlor					
VOC Emissions					
	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
Milk Cows	1.6	1.1	0.28	0.28	0.5
Total					0.5
NH3 Emissions					
	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
Milk Cows	0.6	0.4	0.10	0.10	0.2
Total					0.2

Cow Housing					
See detailed cow housing AIPE calculations on following pages.					

Liquid Manure Handling					
VOC Emissions - Lagoon/Storage Pond(s)					
	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
Milk Cows	2.9	3.1	0.50	0.83	1.0
Dry Cows	0.3	0.4	0.27	0.45	0.1
Support Stock (Heifers, Calves, and Bulls)	1.5	1.4	0.21	0.35	0.7
Large Heifers	0.0	0.0	0.21	0.35	0.0
Medium Heifers	0.0	0.0	0.14	0.24	0.0
Small Heifers	0.0	0.0	0.08	0.13	0.0
Calves	0.0	0.0	0.04	0.06	0.0
Bulls	0.0	0.0	0.13	0.21	0.0
Total					1.8

VOC Emissions - Land Application					
	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
Milk Cows	3.1	3.4	0.54	0.89	1.1
Dry Cows	0.3	0.4	0.29	0.49	0.1
Support Stock (Heifers, Calves, and Bulls)	1.6	1.5	0.22	0.37	0.7
Large Heifers	0.0	0.0	0.22	0.37	0.0
Medium Heifers	0.0	0.0	0.15	0.25	0.0
Small Heifers	0.0	0.0	0.08	0.14	0.0
Calves	0.0	0.0	0.04	0.07	0.0
Bulls	0.0	0.0	0.13	0.22	0.0
Total					1.8

NH3 Emissions - Lagoon/Storage Pond(s)					
	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
Milk Cows	24.1	15.8	4.19	4.19	8.3
Dry Cows	2.4	1.8	2.15	2.15	0.6
Support Stock (Heifers, Calves, and Bulls)	8.0	4.6	1.12	1.12	3.4
Large Heifers	0.0	0.0	1.12	1.12	0.0
Medium Heifers	0.0	0.0	0.77	0.77	0.0
Small Heifers	0.0	0.0	0.61	0.61	0.0
Calves	0.0	0.0	0.18	0.18	0.0
Bulls	0.0	0.0	1.53	1.53	0.0
Total					12.3

BACT triggered for NH3 for Lagoon/Storage Ponds					
NH3 Emissions - Land Application					
	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
Milk Cows	26.2	17.2	4.55	4.55	9.0
Dry Cows	2.5	1.9	2.30	2.30	0.6
Support Stock (Heifers, Calves, and Bulls)	8.4	4.8	1.18	1.18	3.6
Large Heifers	0.0	0.0	1.18	1.18	0.0
Medium Heifers	0.0	0.0	0.87	0.87	0.0
Small Heifers	0.0	0.0	0.66	0.66	0.0
Calves	0.0	0.0	0.19	0.19	0.0
Bulls	0.0	0.0	1.65	1.65	0.0
Total					13.2

BACT triggered for NH3 for Liquid Manure Land Application					
H2S Emissions - Lagoon/Storage Pond(s)					
	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
Milk Cows	2.4	2.4	0.59	0.59	0.0
Dry Cows	0.2	0.2	0.30	0.30	0.0
Support Stock (Heifers, Calves, and Bulls)	0.8	0.8	0.16	0.16	0.0
Large Heifers	0.0	0.0	0.16	0.16	0.0
Medium Heifers	0.0	0.0	0.11	0.11	0.0
Small Heifers	0.0	0.0	0.09	0.09	0.0
Calves	0.0	0.0	0.03	0.03	0.0
Bulls	0.0	0.0	0.22	0.22	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	0.7	0.5	0.13	0.13	0.2
Dry Cows	0.1	0.1	0.07	0.07	0.0
Support Stock (Heifers, Calves, and Bulls)	0.4	0.2	0.05	0.05	0.2
Large Heifers	0.0	0.0	0.05	0.05	0.0
Medium Heifers	0.0	0.0	0.04	0.04	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					0.4

VOC Emissions - Land Application					
	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
Milk Cows	1.1	0.7	0.19	0.19	0.4
Dry Cows	0.1	0.1	0.10	0.10	0.0
Support Stock (Heifers, Calves, and Bulls)	0.6	0.3	0.06	0.06	0.3
Large Heifers	0.0	0.0	0.06	0.06	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					0.7

NH3 Emissions - Solid Manure Storage/Separated Solids Piles					
	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
Milk Cows	5.4	3.6	0.94	0.94	1.8
Dry Cows	0.5	0.4	0.48	0.48	0.1
Support Stock (Heifers, Calves, and Bulls)	1.6	1.0	0.25	0.25	0.8
Large Heifers	0.0	0.0	0.25	0.25	0.0
Medium Heifers	0.0	0.0	0.18	0.18	0.0
Small Heifers	0.0	0.0	0.13	0.13	0.0
Calves	0.0	0.0	0.04	0.04	0.0
Bulls	0.0	0.0	0.35	0.35	0.0
Total					2.7

BACT triggered for NH3 for Solid Manure Storage					
NH3 Emissions - Land Application					
	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
Milk Cows	6.1	4.0	1.07	1.07	2.1
Dry Cows	0.6	0.4	0.54	0.54	0.2
Support Stock (Heifers, Calves, and Bulls)	2.0	1.2	0.28	0.28	0.8
Large Heifers	0.0	0.0	0.28	0.28	0.0
Medium Heifers	0.0	0.0	0.20	0.20	0.0
Small Heifers	0.0	0.0	0.15	0.15	0.0
Calves	0.0	0.0	0.05	0.05	0.0
Bulls	0.0	0.0	0.39	0.39	0.0
Total					3.1

Feed Storage and Handling					
VOC Emissions - Silage					
	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
Corn Silage	8.8	8.8	21,155	21,155	0.0
Alfalfa Silage	0.0	0.0	10,649	10,649	0.0
Wheat Silage	22.2	22.2	26,745	26,745	0.0
Total					0.0
VOC Emissions - TMR					
	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
TMR	112.4	70.1	10,575	10,575	42.3
BACT triggered for VOC for TMR					42.3

Cow Housing - VOC Emissions							
	Housing Name(s) or #(s)	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)	BACT Triggered?
1	Barn A - Dry	4.7	4.2	4.28	3.85	0.5	No
2	Barn A - Support	5.0	4.4	3.29	2.95	0.6	No
3	Barn B - Milk	18.8	16.8	7.61	6.81	2.0	No
4	Barn B - Bulls	0.3	0.0	3.29	0.00	0.3	No
5	Barn C - Milk	10.4	9.0	7.61	6.81	1.4	No
6	Barn C - Bulls	0.1	0.0	3.29	0.00	0.1	No
7	Corrals	0.0	12.1	0.00	2.95	0.0	No
New Units from Expansion							
	Housing Name(s) or #(s)	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	PE2 (lb/day)	BACT Triggered?
1	Proposed Barn D - Milk	14.6	0.0	7.61	0.00	14.6	Yes
2	Proposed Barn D - Bulls	0.2	0.0	3.29	0.00	0.2	No
3	Proposed Barn E	17.8	0.0	3.29	0.00	17.8	Yes

Cow Housing - NH3 Emissions						
Housing Name(s) or #(s)	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)	BACT Triggered?
Barn A - Dry	15.1	15.1	13.80	13.80	0.0	No
Barn A - Support	10.8	10.8	7.16	7.16	0.0	No
Barn B - Milk	67.2	67.2	27.25	27.25	0.0	No
Barn B - Bulls	0.6	0.0	7.16	0.00	0.6	No
Barn C - Milk	37.3	35.8	27.25	27.25	1.5	No
Barn C - Bulls	0.3	0.0	7.16	0.00	0.3	No
Corrals	0.0	29.4	0.00	7.16	0.0	No
New Units from Expansion						
Housing Name(s) or #(s)	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	PE2 (lb/day)	BACT Triggered?
Proposed Barn D - Milk	52.3	0.0	27.25	0.00	52.3	Yes
Proposed Barn D - Bulls	0.5	0.0	7.16	0.00	0.5	No
Proposed Barn E	38.8	0.0	7.16	0.00	38.8	Yes

*Multiple emissions units (freestalls, corrals, calf hutch areas, etc.) are combined in these rows. BACT applicability has been calculated for EACH emissions unit in this row.

Cow Housing - PM10 Emissions						
	Housing Name(s) or #(s)	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
1	Barn A - Dry	1.5	1.5	1.37	1.37	0.0
2	Barn A - Support	2.1	2.1	1.37	1.37	0.0
3	Barn B - Milk	3.4	3.4	1.37	1.37	0.0
4	Barn B - Bulls	0.1	0.0	1.37	0.00	0.1
5	Barn C - Milk	1.9	1.8	1.37	1.37	0.1
6	Barn C - Bulls	0.1	0.0	1.37	0.00	0.1
7	Corrals	0.0	43.4	0.00	10.55	0.0
New Units from Expansion						
	Housing Name(s) or #(s)	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	PE2 (lb/day)
1	Proposed Barn D - Mix	2.2	0.0	1.17	0.00	2.2
2	Proposed Barn D - Bulls	0.1	0.0	1.17	0.00	0.1
3	Proposed Barn E	6.3	0.0	1.17	0.00	6.3

*Multiple emissions units (freestalls, corrals, calf hutch areas, etc.) are combined in these rows. BACT applicability has been calculated for EACH emissions unit in this row.

Increase in Emissions

SSIFE (lb/yr)							
	NOx	SOx	PM10	CO	VOC	NH3	H2S
Milking Parlor	0	0	0	0	202	72	0
Cow Housing	0	0	-11,693	0	11,269	28,872	0
Liquid Manure	0	0	0	0	-210	9,268	0
Solid Manure	0	0	0	0	390	2,132	0
Feed Handling	0	0	0	0	15,449	0	0
Total	0	0	-11,693	0	27,100	40,344	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	0.5	0.2	0.0
Cow Housing	0.0	0.0	-32.0	0.0	30.9	79.1	0.0
Liquid Manure	0.0	0.0	0.0	0.0	-0.5	25.4	0.0
Solid Manure	0.0	0.0	0.0	0.0	1.1	5.8	0.0
Feed Handling	0.0	0.0	0.0	0.0	42.3	0.0	0.0
Total	0.0	0.0	-32.0	0.0	74.2	110.5	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	-101	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	-101	0	0

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	588	210
Daily PE2 (lb/day)	0.0	0.0	0.0	0.0	1.6	0.6
Quarterly Net Emissions Change (lb/qtr)	1: 0.0	0.0	0.0	0.0	50.4	18.0
	2: 0.0	0.0	0.0	0.0	50.4	18.0
	3: 0.0	0.0	0.0	0.0	50.4	18.0
	4: 0.0	0.0	0.0	0.0	50.4	18.0

Cow Housing						
	NOx	SOx	PM10	CO	VOC	NH3
Annual PE2 (lb/yr)	0	0	6,434	0	26,247	81,353
Daily PE2 (lb/day)	0.0	0.0	17.6	0.0	71.9	222.9
Quarterly Net Emissions Change (lb/qtr)	1: 0.0	0.0	-2,923.3	0.0	2,817.3	7,218.0
	2: 0.0	0.0	-2,923.3	0.0	2,817.3	7,218.0
	3: 0.0	0.0	-2,923.3	0.0	2,817.3	7,218.0
	4: 0.0	0.0	-2,923.3	0.0	2,817.3	7,218.0

Liquid Manure Handling							
	NOx	SOx	PM10	CO	VOC	NH3	H2S
Annual PE2 (lb/yr)	0	0	0	0	3,526	26,114	1,259
Daily PE2 (lb/day)	0.0	0.0	0.0	0.0	9.7	71.5	3.4
Quarterly Net Emissions Change (lb/qtr)	1: 0.0	0.0	0.0	0.0	-52.4	2,317.0	0.0
	2: 0.0	0.0	0.0	0.0	-52.4	2,317.0	0.0
	3: 0.0	0.0	0.0	0.0	-52.4	2,317.0	0.0
	4: 0.0	0.0	0.0	0.0	-52.4	2,317.0	0.0

Solid Manure Handling						
	NOx	SOx	PM10	CO	VOC	NH3
Annual PE2 (lb/yr)	0	0	0	0	1,078	6,007
Daily PE2 (lb/day)	0.0	0.0	0.0	0.0	3.0	16.5
Quarterly Net Emissions Change (lb/qtr)	1: 0.0	0.0	0.0	0.0	97.6	533.1
	2: 0.0	0.0	0.0	0.0	97.6	533.1
	3: 0.0	0.0	0.0	0.0	97.6	533.1
	4: 0.0	0.0	0.0	0.0	97.6	533.1

Feed Storage and Handling						
	NOx	SOx	PM10	CO	VOC	NH3
Annual PE2 (lb/yr)	0	0	0	0	52,362	0
Daily PE2 (lb/day)	0.0	0.0	0.0	0.0	143.4	0.0
Quarterly Net Emissions Change (lb/qtr)	1: 0.0	0.0	0.0	0.0	3,862.2	0.0
	2: 0.0	0.0	0.0	0.0	3,862.2	0.0
	3: 0.0	0.0	0.0	0.0	3,862.2	0.0
	4: 0.0	0.0	0.0	0.0	3,862.2	0.0

APPENDIX F

BACT and T-BACT Analyses for Dairy Permits

Larry Matos Dairy (N-8481, Project # N-1160118)

TOP-DOWN BACT and T-BACT ANALYSES

Pursuant to Section 5.2 of the Settlement Agreement between the District and the Western United Dairyman and the Alliance of Western Milk Producers Inc, signed September 20, 2004, "... the District will not make any Achieved in Practice BACT determinations for individual dairy permits or for the dairy BACT guidance until the final BACT guidance has been adopted by the APCO....".¹⁰ Therefore, a cost effectiveness analysis will be performed for all the technologies, which have not been proposed by the applicant.

The U.S. Environmental Protection Agency (USEPA) RACT/BACT/LAER Clearinghouse, the California Air Pollution Control Officers Association (CAPCOA) BACT Clearinghouse, the San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD) BACT Clearinghouse, the Bay Area Air Quality Management District (BAAQMD), and the South Coast Air Quality Management District (SCAQMD) BACT Guidelines were reviewed to determine potential control technologies for this class and category of operation. No BACT guidelines were found for this class and category of source.

I. Pollutants Emitted from Dairies

1. PM₁₀ Emissions from Dairies

The National Ambient Air Quality Standards currently regulate concentrations of particulate matter with an aerodynamic diameter of 10 micrometers or less (PM₁₀) and particulate matter with an aerodynamic diameter of 2.5 micrometers or less (PM_{2.5}). Studies have shown that particles in the smaller size fractions contribute most to human health effects. The PM_{2.5} standard was published in 1997, but is only recently beginning to be implemented because of the time that was required to resolve litigation regarding the standard. On April 5, 2005, EPA finalized classification of areas for the PM_{2.5} standard. On April 21, 2011 District Rule 2201 – New and Modified Stationary Source Review Rule was amended to incorporate PM_{2.5} new and modified source review requirements.

All animal confinement facilities are sources of particulate matter emissions. However, the composition of these emissions will vary. Dust emissions from unpaved surfaces, dry manure storage sites, and land application sites are potential particulate matter emission sources. Sources of particulate matter emissions at a dairy include feed, bedding materials, dry manure, animal dander, and unpaved soil surfaces such as corrals.

The mass of particulate matter emitted from totally or partially enclosed confinement facilities, as well as the particle size distribution, depend on type of ventilation and

¹⁰ Settlement Agreement. Western United Dairyman, Alliance of Western Milk Producers v. San Joaquin Valley Air Pollution Control District, settled in the Fresno Superior Court September 2004 (<http://www.valleyair.org/busind/pto/dpag/settlement.pdf>)

ventilation rate. Particulate matter emissions from naturally ventilated buildings will be lower than those from mechanically ventilated buildings.

2. VOC Formation and Emissions from Manure:

Volatile Organic Compounds (VOCs) result from ruminant digestive processes and are formed as intermediate metabolites when organic matter manure decomposes. Under aerobic conditions, any VOCs formed in the manure are rapidly oxidized to carbon dioxide and water. Under anaerobic conditions, complex organic compounds are microbially decomposed to volatile organic acids and other volatile organic compounds, which in turn are mostly converted to methane and carbon dioxide by methanogenic bacteria. When the activity of the methanogenic bacteria is not inhibited, virtually all of the VOCs are metabolized to simpler compounds, and the potential for VOC emissions is minimized. However, the inhibition of methane formation results in a buildup of VOCs in the manure and ultimately to volatilization to the air. Inhibition of methane formation typically is caused by low temperatures or excessive loading rates, which both create an imbalance between the populations of microorganisms responsible for the formation of VOC and methane. VOC emissions will vary with temperature because the rate of VOC formation, reduction to methane, and volatilization and the solubility of individual compounds vary with temperature.¹¹ VOC emissions from manure and the associated field application site can be minimized by a properly designed and operated stabilization process (such as an anaerobic treatment lagoon). In contrast, VOC emissions will be higher from storage tanks, ponds, overloaded anaerobic lagoons, and the land application sites associated with these systems.

3. Emissions from Silage and Total Mixed ration (TMR):

Volatile Organic Compounds (VOCs) are created during the process that is used to create silage, which is preserved, fermented plant matter that is fed to cattle. The purpose of silage production is to move the ensiled plant material from an aerobic phase to an anaerobic phase as quickly as possible and achieve a rapid drop in pH that will hinder further microbial decomposition in order to preserve the nutritive value of the forage. The rapid drop in pH is primarily caused by conversion of soluble carbohydrates to nonvolatile lactic acid. In addition to lactic acid, alcohols (primarily ethanol), volatile fatty acids (primarily acetic acid), and other VOC compounds (primarily oxygenated VOCs) are also formed during the process. These VOCs largely remain trapped in the silage piles until the silage is exposed to the surrounding atmosphere at the open face of the silage pile from where silage is removed, during mixing, or when placed in feed lanes for the cattle to consume as a Total Mixed Ration (TMR). Once exposed to the surrounding air much of the VOCs contained in the silage and TMR will begin to be rapidly emitted to the atmosphere and the concentration of the VOCs in the silage and TMR will decrease. Loss of VOCs from the silage and TMR can be reduced by minimizing the area exposed to the atmosphere and good silage management practices that will reduce the formation of these VOCs in the silage reduce aerobic deterioration, which leads to heating of the open faces of silage piles and of the TMR placed in the feed lanes.

¹¹ EPA Document "Emissions from Animal Feeding Operations" (Draft, August 15, 2001), pg. 2-10

4. Ammonia Emissions from Dairies

When sulfur dioxide and nitrogen oxides are present, ammonia is a precursor for the secondary formation of PM_{2.5} in the atmosphere. Ammonia reacts with sulfuric and nitric acids, which are produced from sulfur dioxide and nitrogen oxides in the ambient air, to form ammonium sulfate, ammonium nitrate, and other fine particulates.¹² Exposure to high levels of ammonia can cause irritation to the skin, throat, lungs, and eyes.

Ammonia volatilization is the result of the microbial decomposition of nitrogenous compounds in manure. The primary nitrogenous compound in dairy manure is urea, but nitrogenous compounds also occur in the form of undigested organic nitrogen in animal feces. Whenever urea comes in contact with the enzyme urease, which is excreted in animal feces, the urea will hydrolyze rapidly to form ammonia and this ammonia will be emitted soon after. The formation of ammonia will continue more slowly (over a period of months or years) with the microbial breakdown of organic nitrogen in the manure. Because ammonia is highly soluble in water, ammonia will accumulate in manure handled as liquids and semi-solids or slurries, but will volatilize rapidly with drying from manure handled as solids.

The potential for ammonia volatilization exists wherever manure is present, and ammonia will be emitted from confinement buildings, open lots, stockpiles, anaerobic lagoons, and land application from both wet and dry handling systems. The rate of ammonia volatilization is influenced by a number of factors including the concentrations of nitrogenous compounds in the manure, temperature, air velocity, surface area, moisture, and pH. Because of its high solubility in water, the loss of ammonia to the atmosphere will be more rapid when drying of manure occurs. However, there the difference in total ammonia emissions between solid and liquid manure handling systems may not be great if liquid manure is stored over extended periods of time prior to land application.¹³

5. Hydrogen Sulfide Emissions from Dairies

Hydrogen Sulfide (H₂S) is produced from the anaerobic decomposition of organic sulfur compounds. In the absence of oxygen, sulfur reducing bacteria in the lagoons and storage ponds reduce sulfate ions in the manure into sulfide. Aqueous sulfide exists in three different forms: molecular (un-dissociated) hydrogen sulfide (H₂S) and the bisulfide (HS⁻) and sulfide (S²⁻) ions. In aqueous solutions molecular H₂S exists in equilibrium with the bisulfide (HS⁻) and sulfide (S²⁻) ions but only molecular H₂S, not the ionized forms, can be transferred across the gas-liquid interface and emitted to the atmosphere. The fractional amount of the form of sulfide present in a solution is a function of temperature and pH. Under acidic conditions (pH < 7) greater amounts of sulfide will be in the form of molecular H₂S and the potential for H₂S emissions will increase. As the pH increases, a greater proportion of sulfide will be in the ionic form and the potential for H₂S emissions will decrease.

¹² Workshop Review Draft for EPA Regional Priority AFO Science Question Synthesis Document - Air Emission Characterization and Management, pg. 2

¹³ Emissions From Animal Feeding Operations – Draft, US EPA – Emissions Standards Division, August 15, 2001, pgs. 2-6 and 2-7

In a dairy, the conditions for the production of hydrogen sulfide exist in small amounts such as wet indentions in corrals, manure piles, and separated solids piles. However, the most significant sources are the liquid manure lagoons and storage ponds.

II. Top Down BACT Analysis for the Cow Housing Permit Unit (N-8481-2) – New Freestall Barns

1. BACT Analysis for PM₁₀ Emissions from Proposed Freestall Barns:

a. Step 1 - Identify all control technologies

The following control options were identified for PM₁₀ emissions from dairy freestall barns.

Freestall Barns

1) Design and Management Practices

- Concrete feed lanes and walkways
- Scraping of exercise pens every two weeks using a pull-type scraper in the morning hours except when prevented by wet conditions

Description of Control Technologies

Concrete Feedlanes and Walkways

Dairy animals are typically housed in freestall barns or open corrals. In a freestall barn, the milk and dry cows are grouped in large pens with free access to feed bunks, water, and stalls for resting, and exercise corral areas. An open corral is a large open area where cows are confined with unlimited access to feed and water.

Constructing the feed lanes and walkways of concrete causes the dairy animals to spend an increased amount of time on a paved surface rather than dry dirt, thus reducing PM₁₀ emissions. Additionally, the manure that is deposited in the lanes and walkways will be flushed, which will prevent PM₁₀ emissions from drying manure.

Scraping of Exercise Pens and Open Corrals with a Pull-Type Scraper

As stated above, dairy animals are typically housed in freestall barns or open corrals. The surface of the corrals and freestall exercise pens is composed of earth and deposited manure, both of which have the potential for particulate matter emissions either as a result of wind or animal movement. Frequent scraping of corral surfaces will reduce the amount of dry manure on the corral surfaces that may be pulverized by the cows' hooves and emitted as PM₁₀.

Increasing the frequency that corrals and pens are scraped is expected to reduce emissions of gaseous pollutants from the corral and pen surfaces and PM that results from the cattle hooves acting on the surfaces of the corrals and pens;

however, requiring an excessively high frequency may negate these emission reductions because of the NO_x and PM emitted from combustion of fuel for the tractor and PM emissions resulting from use of the tractor on the corral surface.

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.

Freestall Barns

1) Design and Management Practices

- Concrete feed lanes and walkways
- Scraping of exercise pens every two weeks using a pull-type scraper in the morning hours except when prevented by wet conditions

d. Step 4 - Cost Effectiveness Analysis

Freestall Barns

1. Design and Management Practices

- Concrete feed lanes and walkways
- Scraping of exercise pens every two weeks using a pull-type scraper in the morning hours except when prevented by wet conditions

The options above are all achieved in practice; therefore a cost analysis is not required.

e. Step 5 - Select BACT

BACT for PM₁₀ from the freestall barns is satisfied with:

- 1) Concrete feed lanes and walkways
- 2) Scraping of exercise pens every two weeks using a pull-type scraper in the morning hours except when prevented by wet conditions

2. BACT Analysis for VOC Emissions from the Proposed Freestall Barns:

a. Step 1 - Identify all control technologies

Since specific VOC emissions control efficiencies have not been identified in the literature for dairy cow housing areas, the control efficiencies will be estimated based on the control efficiencies of similar processes and engineering judgment. Unless specifically noted, for practices required to reduce VOC emissions, a 10% control efficiency will be assumed for the specific portion of the emission source or process affected by the measure.

The following options were identified as possible controls for VOC emissions from the cow housing (cow housing permit unit):

1) Feed and Manure Management Practices

- Concrete feed lanes and walkways
- Frequent Cleaning of lanes and walkways
 1. Lanes and walkways for mature cows (milk and dry cows) flushed four times per day. Lanes and walkways for support stock (heifers) flushed at least once per day; or
 2. Lanes and walkways for mature cows (milk and dry cows) scraped four times per day with an automatic or electric scraper. Lanes and walkways for support stock (heifers) cleaned at least once per day; or
 3. Lanes and walkways for mature cows (milk and dry cows) scraped four times per day with a tractor/skid steer. Lanes and walkways for support stock (heifers) cleaned at least once per day; or
 4. Lanes and walkways for mature cows (milk and dry cows) vacuumed four times per day. Lanes and walkways for support stock (heifers) cleaned at least once per day;
- All animals fed in accordance with National Research Council (NRC) or other District-approved guidelines
- Exercise pens and open corrals properly sloped to promote drainage (minimum of 3% slope where the available space for each animal is 400 square feet or less and minimum of 1.5% where the available space for each animal is more than 400 square feet per animal), or managed to maintain a dry surface (except during periods of rainy weather)
- Scraping of exercise pens and open corrals every two weeks using a pull-type scraper in the morning hours except when prevented by wet conditions
- VOC mitigation measures required by District Rule 4570

Description of Control Technologies

1) Feed and Manure Management Practices

Concrete Lanes and Walkways

Dairy animals spend a large amount of time on the lanes and walkways. Constructing these areas of concrete will reduce particulate matter emissions by having the animals spend more time on a paved surface rather than dry dirt. The concrete lanes and walkways create an avenue for the flush or scrape manure removal systems. The flush system will further reduce particulate matter emissions and will also reduce VOC and ammonia emissions (see below). Although concrete feed lanes and walkways are necessary for an effective manure removal system, they do not individually reduce emissions of gaseous pollutants; therefore, no VOC control efficiency is assigned for this practice.

Frequent Cleaning of Feed Lanes and Walkways

Many dairy operations use flush or scrape systems to remove manure from the corral and freestall feed lanes and walkways. When dairies use a flush system, a large

volume of water is introduced at the head of the paved area of the corrals or freestalls, and the cascading water removes the manure. The required volume of flush water varies with the size and slope of the area to be flushed. When dairies use a scrape system for manure management, manure is typically scraped from the cow housing lanes using a tractor or skid steer with a scraping attachment, or using an automatic mechanical scraper. The automatic scraper usually consists of a hinged v-shaped scraper driven by a cable or chain. The mechanical scraper is periodically dragged forward to draw manure to the end of a lane. After completing a pass, the chain or cable reverses direction and pulls the scraper back in the opposite direction. The scraped manure is either temporarily stored in a pile where liquids are allowed to drain off, or loaded onto a truck or tractor for transport or land application. A smaller number of dairies may also use vacuum trucks to remove manure from the cow housing areas. Manure vacuumed from the lanes can be applied to adjacent cropland, transported offsite, or placed in a digester. The freestall and corral lanes for milk and dry cows are typically flushed or scraped twice per day, but the cleaning frequency can vary between one to four times per day. The lanes for support stock are usually flushed or scraped once per day or less frequently.

In addition to cleaning the corral and freestall lanes and walkways, the flush, scrape, and vacuum systems also serve as an emission control for reducing VOC emissions. The manure deposited in the lanes, which is a source of VOC emissions, is removed from the cow housing area by the flush, scrape, or vacuum system. Flush systems also reduce PM₁₀ and ammonia emissions. Additionally, many of the VOCs emitted from fresh cow manure, such as alcohols (ethanol and methanol) and many Volatile Fatty Acids (VFAs), are highly soluble in water. Therefore, when a flush system is used, a large percentage of these compounds will dissolve in the flush water and will not be emitted from the cow housing permit unit. The flush water can then carry the manure and the dissolved volatile compounds to an anaerobic treatment lagoon or other manure stabilization process for treatment.

It must be noted that the system for cleaning the lanes and walkways will only control the VOCs emitted from the manure it will have little or no effect on enteric emissions produced from the cows' digestive processes. As stated above, the feed lanes and walkways in the cow housing areas are typically cleaned twice per day. Cleaning the lanes four times per day will increase the frequency that manure is removed from the cow housing permit unit. Although the control efficiency for VOCs may actually be much higher, increasing the cleaning frequency of the lanes will be conservatively assumed to have a control efficiency of 10% for VOCs emitted from manure until better data becomes available.

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 VOC emissions can be reduced by reducing the quantity of undigested nutrients in the manure. Many of the VOCs emitted from Confined Animal Facilities, including dairies, originate from the decomposition of

undigested protein in animal waste.¹⁴ This undigested protein also produces ammonia and hydrogen sulfide emissions. 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 VOCs, ammonia, and hydrogen sulfide.

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.

Based on very limited data (Klaunser, 1998, *J Prod Agric*), diet manipulation decreased nitrogen excretion by 34% while improving milk production. Up to 70% of excess nitrogen is lost off of the farm through volatilization, denitrification and leaching. Because of limited research, feeding dairy animals in accordance with National Research Council (NRC) or other District-approved guidelines will be assumed to have a conservative control efficiency of only 5-10% for both enteric VOC emissions from dairy animals and VOC emissions from manure.

Scraping of Exercise Pens and Open Corrals with a Pull-Type Scraper

Many dairies use equipment pulled by tractors to periodically scrape the surfaces of corrals and freestall exercise pens. Frequent scraping corrals and exercise pens will reduce the amount of manure on the corral surfaces, which will reduce VOC and ammonia emissions resulting from decomposition of this manure. This practice will also provide a uniform surface, reducing anaerobic conditions on the corral surface, which will reduce gaseous pollutants from this area. The frequency that corrals and exercise pens are scraped at dairies can vary from as little as once a year to every week.

Increasing the frequency that corrals and exercise pens are scraped is expected to reduce emissions of gaseous pollutants from the corral and exercise pen surfaces and PM emissions that result from the cattle hooves acting on the surface of the corrals and exercise pens; however, requiring an excessively high frequency may negate these emission reductions because of the NO_x and PM emitted from combustion of fuel for the tractor and PM emissions resulting from use of the tractor on the corrals and exercise pens.

b. Step 2 - Eliminate Options

There are no technologically infeasible options to eliminate from step 1. However, the following options will be eliminated from consideration because the emissions from increased use of tractors are expected to offset the benefits of any VOC reductions from these practices.

¹⁴ "Emissions of Volatile Organic Compounds Originating from UK Livestock Agriculture", Hobbs, P.J. 2004 – Journal of the Science of Food and Agriculture

- a) Lanes and walkways for mature cows (milk and dry cows) scraped four times per day with a tractor/skid steer. Lanes and walkways for support stock (heifers) cleaned at least once per day;
- b) Lanes and walkways for mature cows (milk and dry cows) vacuumed four times per day. Lanes and walkways for support stock (heifers) cleaned at least once per day

c. Step 3 - Rank remaining options by control effectiveness

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

1) Feed and Manure Management Practices

- Concrete feed lanes and walkways
- Frequent cleaning of lanes and walkways
Flushing is generally the most effective method of using frequent cleaning of the lanes to reduce emissions; however, because some dairies may be unable to flush at increased frequencies because of water constraints, use of automatic scraping system will be allowed when dairies demonstrate that they are unable to flush at increased frequencies.
 - 1. Lanes and walkways for mature cows (milk and dry cows) flushed four times per day. Lanes and walkways for support stock (heifers) flushed at least once per day; or
 - 2. For dairies that are not able to use a flush system, lanes and walkways for mature cows (milk and dry cows) scraped four times per day with an automatic scraper (or equivalent). Lanes and walkways for support stock (heifers) cleaned at least once per day
- All animals fed in accordance with National Research Council (NRC) or other District-approved guidelines
- Exercise pens and open corrals properly sloped to promote drainage (minimum of 3% slope where the available space for each animal is 400 square feet or less and minimum of 1.5% where the available space for each animal is more than 400 square feet per animal), or managed to maintain a dry surface (except during periods of rainy weather)
- Scraping of exercise pens and open corrals every two weeks using pull-type scraper in the morning hours except when prevented by wet conditions
- VOC mitigation measures required by District Rule 4570

d. Step 4 - Cost Effectiveness Analysis

The only remaining option is Achieved in Practice and has been proposed by the applicant; therefore a cost analysis is not required.

e. Step 5 - Select BACT

The facility is proposing concrete feed lanes and walkways; to flush the feed lanes and walkways for the milk and dry cows four times per day and to flush feed lanes and walkways for the remaining animals once per day; to feed all animals in accordance with National Research Council (NRC), to properly slope corrals and exercise pens or

manage corrals and exercise pens to maintain a dry surface, and to scrape exercise pens every two weeks with a pull-type scraper except during wet conditions, which satisfies the BACT requirements.

3. BACT Analysis for NH₃ Emissions from Proposed Dairy Freestall Barns:

a. Step 1 - Identify all control technologies

A cost effectiveness threshold has not been established for ammonia. Therefore, only options that meet the District's definition of Achieved-in-Practice controls will be evaluated.

The following management practices have been identified as possible control options for the NH₃ emissions from the proposed freestall barns:

1) Feed and Manure Management Practices

- Concrete feed lanes and walkways
- Frequent Cleaning of feed lanes and walkways
 1. Lanes and walkways for mature cows (milk and dry cows) flushed four times per day. Lanes and walkways for support stock (heifers) flushed at least once per day; or
 2. Lanes and walkways for mature cows (milk and dry cows) scraped four times per day with an automatic scraper. Lanes and walkways for support stock (heifers) cleaned at least once per day; or
 3. Lanes and walkways for mature cows (milk and dry cows) scraped four times per day with a tractor/skid steer. Lanes and walkways for support stock (heifers) cleaned at least once per day; or
 4. Lanes and walkways for mature cows (milk and dry cows) vacuumed four times per day. Lanes and walkways for support stock (heifers) cleaned at least once per day;
- All animals fed in accordance with National Research Council (NRC) or other District-approved guidelines
- Exercise pens and open corrals properly sloped to promote drainage (minimum of 3% slope where the available space for each animal is 400 square feet or less and minimum of 1.5% where the available space for each animal is more than 400 square feet per animal), or managed to maintain a dry surface (except during periods of rainy weather)
- Scraping of exercise pens and open corrals every two weeks using pull-type scraper in the morning hours except when prevented by wet conditions

Description of Control Technologies

1) Feed and Manure Management Practices

Concrete Feed Lanes and Walkways

Dairy animals spend a large amount of time on the feed lanes and walkways. Constructing these areas of concrete will reduce particulate matter emissions by having the animals spend more time on a paved surface rather than dry dirt. The concrete

lanes and walkways create an avenue for the flush or scrape manure removal systems. The flush system will further reduce particulate matter emissions and will also reduce VOC and ammonia emissions (see below).

Frequent Cleaning of Feed Lanes and Walkways

Many dairy operations use flush or scrape systems to remove manure from the corral and freestall feed lanes and walkways. When dairies use a flush system, a large volume of water is introduced at the head of the paved area of the corrals or freestalls, and the cascading water removes the manure. The required volume of flush water varies with the size and slope of the area to be flushed. When dairies use a scrape system for manure management, manure is typically scraped from the cow housing lanes using a tractor or skid steer with a scraping attachment, or using an automatic mechanical scraper. The automatic scraper usually consists of a hinged v-shaped scraper driven by a cable or chain. The mechanical scraper is periodically dragged forward to draw manure to the end of a lane. After completing a pass, the chain or cable reverses direction and pulls the scraper back in the opposite direction. The scraped manure is either temporarily stored in a pile where liquids are allowed to drain off, or loaded onto a truck or tractor for transport or land application. A smaller number of dairies may also use vacuum trucks to remove manure from the cow housing areas. Manure vacuumed from the lanes can be applied to adjacent cropland, transported offsite, or placed in a digester. The freestall and corral lanes for milk and dry cows are typically flushed or scraped twice per day, but the cleaning frequency can vary between one to four times per day. The lanes for support stock are usually flushed or scraped once per day or less frequently.

In addition to cleaning the corral and freestall feed lanes and walkways, the flush, scrape, and vacuum systems also serve as an emission control for reducing emissions. The manure deposited in the lanes, which is a source of NH_3 emissions, is removed from the cow housing area by the flush, scrape, or vacuum system. Additionally, ammonia is highly soluble in water. Therefore, when a flush system is used, a large portion of ammonia will be flushed away with the flush water and will not be emitted from the cow housing permit unit.

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.

Scraping of Exercise Pens and Open Corrals with a Pull-Type Scraper

Frequent scraping the freestall exercise pens and corrals will reduce the amount of manure on the corral surfaces, which will reduce VOC and ammonia emissions resulting from decomposition of this manure. This practice will also provide a uniform surface, reducing anaerobic conditions on the corral surface, which will reduce gaseous pollutants from this area.

Increasing the frequency that corrals and exercise pens are scraped is expected to reduce emissions of gaseous pollutants from the corral and exercise pen surfaces and PM emissions that result from the cattle hooves acting on the surface of the corrals and exercise pens; however, requiring an excessively high frequency may negate these emission reductions because of the NO_x and PM emitted from combustion of fuel for the tractor and PM emissions resulting from use of the tractor on the corrals and exercise pens.

b. Step 2 - Eliminate options

There are no technologically infeasible options to eliminate from step 1. However, the following options will be eliminated from consideration because the emissions from increased use of tractors are expected to offset the benefits of any NH₃ reductions from these practices.

- a) Lanes and walkways for mature cows (milk and dry cows) scraped four times per day with a tractor/skid steer. Lanes and walkways for support stock (heifers) cleaned at least once per day; or
- b) Lanes and walkways for mature cows (milk and dry cows) vacuumed four times per day. Lanes and walkways for support stock (heifers) cleaned at least once per day

c. Step 3 - Rank remaining options by control effectiveness

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

1) Feed and Manure Management Practices

- Concrete feed lanes and walkways
- Frequent cleaning of lanes and walkways

Cleaning lanes by frequent flushing is much more effective at reducing ammonia emissions than frequent scraping; however, because some dairies may be unable to flush at increased frequencies because of water constraints, use of automatic scraping system will be allowed when dairies demonstrate that they are unable to flush at increased frequencies.

1. Lanes and walkways for mature cows (milk and dry cows) flushed four times per day. Lanes and walkways for support stock (heifers) flushed at least once per day; or

2. For dairies that are not able to use a flush system, lanes and walkways for mature cows (milk and dry cows) scraped four times per day with an automatic scraper (or equivalent). Lanes and walkways for support stock (heifers) cleaned at least once per day
- All animals fed in accordance with National Research Council (NRC) or other District-approved guidelines
- Exercise pens and open corrals properly sloped to promote drainage (minimum of 3% slope where the available space for each animal is 400 square feet or less and minimum of 1.5% where the available space for each animal is more than 400 square feet per animal), or managed to maintain a dry surface (except during periods of rainy weather)
- Scraping of exercise pens and open corrals every two weeks using pull-type scraper in the morning hours except when prevented by wet conditions

d. Step 4 - Cost Effectiveness Analysis

The only remaining option is Achieved in Practice and has been proposed by the applicant; therefore a cost analysis is not required.

e. Step 5 - Select BACT

The facility is proposing concrete feed lanes and walkways; to flush the feed lanes and walkways for the milk and dry cows four times per day and to flush feed lanes and walkways for the remaining animals one time per day; and to feed all animals in accordance with National Research Council (NRC) or other District-approved guidelines, to properly slope corrals or manage corrals to maintain a dry surface, and to scrape exercise pens every two weeks with a pull-type scraper except during wet conditions, which satisfies the BACT requirements.

III. Top Down BACT and T-BACT Analyses for the Liquid Manure Handling System – Lagoon/Storage Pond (N-8481-3)

1. T-BACT Analysis for VOC Emissions from the Lagoon/Storage Pond

a. Step 1 - Identify all control technologies

The following options were identified as possible controls for VOC emissions from the lagoon/storage pond:

- 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 CO₂ 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 (CH₄), carbon dioxide (CO₂), 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 12 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 lagoon as long as all the criteria are met and that the liquid manure is not drawn less than 6 feet 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 - Mechanical Separator(s)

Mechanical separators separate solids out from the liquid/slurry stream. There are many different versions of separators on the market. The percentage of separation varies depending on screen size and type of separation system. However, a 50% solid removal efficiency is used as a general rule of thumb. Although the separation efficiency can be improved by better separation or addition of separators or screens, 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 volatiles solids that ends up in the lagoon will most likely not change even though there is an increase in solid removal efficiency. In addition, there is no data that links higher removal efficiency with an increase in VOC emission reduction.

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 according to NRCS guidelines, and solids removal/separation system (mechanical separator(s) or settling basin(s)/weeping wall(s)) (40% control efficiency)

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 (August 2009) of the latest 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 (March 2008) of the NRCS AWMFH, the total amount of manure excreted each day by a milk cow, a dry cow, and a large heifer will result in 2.9 lb-BOD₅/day, 1.4 lb-BOD₅/day, and 1.2 lb-BOD₅/day, respectively. Assuming that Jersey cattle excrete 71% of the manure of Holstein cattle and at least 80% of the manure will be flushed to the lagoon system, the minimum lagoon surface area required for a naturally aerobic lagoon in the San Joaquin Valley treating manure from a Jersey cattle herd consisting of 2,100 milk cows, 400 dry cows, 2,600 and heifers can be calculated as follows:

$$\begin{aligned}\text{BOD}_5 \text{ loading (lb/day)} &= (2,100 \text{ milk cows} \times 2.9 \text{ lb-BOD}_5/\text{cow-day} + 400 \text{ dry cows} \times \\ &\quad 1.4 \text{ lb-BOD}_5/\text{cow-day} + 2,600 \text{ heifers} \times 1.2 \text{ lb-BOD}_5/\text{cow-} \\ &\quad \text{day}) \times 0.71 \text{ (Jersey adjustment)} \times 0.80 \\ &= 5,549 \text{ lb-BOD}_5/\text{day}\end{aligned}$$

$$\begin{aligned}\text{Minimum Surface Area (acres)} &= 5,549 \text{ lb-BOD}_5/\text{day} \div 55 \text{ lb-BOD}_5/\text{acre-day} \\ &= 100.9 \text{ acres}\end{aligned}$$

As shown above, the minimum surface area required for a naturally aerobic lagoon to treat manure from the proposed number of milk cows and dry cows is 100.9 acres. This does not include the additional surface area that would be required to treat manure from other 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.

An aerobic lagoon must 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 discussed above, a lagoon handling flushed manure from Jersey cattle herd consisting of 2,100 milk cows, 400 dry cows, 2,600 and heifers will have a loading rate of approximately 5,549 lb-BOD₅/day (2,517 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 2,100 Jersey milk cows and 400 dry cows is calculated as follows:

$$2,517 \text{ kg-BOD}_5/\text{day} \div (0.68 \text{ kg-O}_2/\text{kW-hr}) \times (365 \text{ day/year}) = 1,351,037 \text{ kW-hr/year}$$

Cost of Electricity

The cost of electricity will be based upon the average Year-to-Date price for industrial electricity in California as of November 2016, as taken from the Energy Information Administration (EIA) website:¹⁵

$$\text{Average cost of electricity} = \$0.1216/\text{kW-hr}$$

¹⁵ http://www.eia.gov/electricity/monthly/epm_table_grapher.cfm?t=epmt_5_06_b

The electricity cost for complete aeration is calculated as follows:

$$1,351,037 \text{ kW-hr/year} \times \$0.1216/\text{kW-hr} = \$164,286/\text{year}$$

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:

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

Lagoon/Storage Pond VOC Reductions for Complete Aeration							
Type of Cow	# of cows	x	Lagoon EF (lb/cow-yr)	x	Control (%)	=	lb-VOC/yr
Jersey Milk Cow	2,100	x	1.08	x	90%	=	2,041
Jersey Dry Cow	400	x	0.58	x	90%	=	209
Jersey Support Stock/Large Heifers	2,600	x	0.45	x	90%	=	1,053
Jersey Baby Calf (0-3 months)	0	x	0.08	x	90%	=	0
Total (lb-VOC/yr)							3,303

Cost of Reductions

$$\begin{aligned} \text{Cost of reductions} &= (\$164,286/\text{year}) / [(3,303 \text{ lb-VOC/year})(1 \text{ ton}/2000 \text{ lb})] \\ &= \$99,477/\text{ton} \end{aligned}$$

As shown above, 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

The District has determined that anaerobic digesters are not Achieved in Practice BACT for VOC from lagoons/storage ponds because of limited number of installations, high costs for digesters, and the potential increases in NO_x emissions from combustion of the digester gas; therefore a cost analysis is required.

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)¹⁶ and the California Energy Commission (CEC) Public Interest Energy Research (PIER) Program Dairy Methane Digester System Program Evaluation Report (Feb 2009).¹⁷ The graph in the EPA AgSTAR publication gives capital costs ranging from approximately \$700 to \$1,600 per cow for digester systems. 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 lactating 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, the more conservative capital cost of \$585/cow will be used. Thus, the installation capital cost for the proposed herd of 2,100 milk cows is at least \$1,228,500 (\$585/cow x 2,100 milk 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)

$$A = [\$1,228,500 \times 0.1(1.1)^{10}] / [(1.1)^{10} - 1]$$

$$= \$199,933/\text{year}$$

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

¹⁶ "Anaerobic Digestion Capital Costs for Dairy Farms" (May 2010), EPA AgSTAR

¹⁷ "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>

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.

The potential quantity of electricity produced is calculated as follows:

$$\begin{aligned}\text{Electrical Produced} &= 670.3 \text{ kW-hr}/(\text{milk cow-yr}) \times 2,100 \text{ milk cows} \\ &= 1,407,630 \text{ kW-hr/yr}\end{aligned}$$

Potential Cost Savings from Production of Electricity

The value of electricity generated will be calculated using the previously cited EIA rate of \$0.1216/kW-hr.

$$\begin{aligned}\text{Potential Cost Savings} &= 1,407,630 \text{ kW-hr/yr} \times \$0.1216/\text{kW-hr} \\ &= \$171,168/\text{yr}\end{aligned}$$

The annualized capital cost less the potential savings from electricity produced is \$28,765 (\$199,933 - \$171,168).

VOC Emissions Reductions

The annual VOC emissions reductions are calculated as:

$$[\text{Number of cows}] \times [\text{Lagoon/Storage Pond VOC EF (lb/cow-year)}] \times [\text{Covered Lagoon Digester Efficiency for Lagoon/Storage Pond (80\%)}]$$

Lagoon/Storage Pond VOC Reductions for Digester							
Type of Cow	# of cows	x	Lagoon EF (lb/cow-yr)	x	Control (%)	=	lb-VOC/yr
Jersey Milk Cow	2,100	x	1.08	x	80%	=	1,814
Jersey Dry Cow	400	x	0.58	x	80%	=	186
Jersey Support Stock/Large Heifers	2,600	x	0.45	x	80%	=	936
Jersey Baby Calf (0-3 months)	0	x	0.08	x	80%	=	0
Total (lb-VOC/yr)							2,936

Cost of Reductions

$$\begin{aligned}\text{Cost of reductions} &= (\$28,765/\text{year})/[(2,936 \text{ lb-VOC/year})(1 \text{ ton}/2000 \text{ lb})] \\ &= \$19,595/\text{ton}\end{aligned}$$

As shown above, based the installation cost alone, excluding any operating costs and after offsetting the installation 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 T-BACT

The applicant has proposed an anaerobic treatment system designed according to NRCS guidelines, and a solids removal/separation system. The proposal satisfies T-BACT for this unit.

2. BACT Analysis for NH₃ Emissions from the Lagoon/Storage Pond

a. Step 1 - Identify all control technologies

A cost effectiveness threshold has not been established for ammonia. Therefore, only options that meet the District's definition of Achieved-in-Practice controls will be considered for ammonia at this time. (Although these options must meet the District definition of Achieved-in-Practice, pursuant to the Settlement Agreement (9/20/2004) between the District and Western United Dairyman and Alliance of Western Milk Producers Inc¹⁰, the District will not deem any control options Achieved-in-Practice until after the Dairy BACT Guideline has been established.)

The following practice has been identified as a possible control option for the NH₃ emissions from the lagoon/storage pond. No other control technologies that meet the definition of Achieved-in-Practice have been identified for the lagoon/storage pond.

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

Description of Control Technologies

1) 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 the liquid manure in the lagoon/storage pond.

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

d. Step 4 - Cost Effectiveness Analysis

The only remaining option is Achieved in Practice and has been proposed by the applicant; therefore a cost analysis is not required.

e. Step 5 - Select BACT

The facility is proposing to feed all animals in accordance with National Research Council (NRC) or other District-approved guidelines, which satisfies the BACT requirements.

IV. Top-Down BACT Analysis for the Liquid Manure Handling System – Liquid Manure Land Application (N-8481-3)

1. BACT Analysis for NH₃ Emissions from the Liquid Manure Land Application

a. Step 1 - Identify all control technologies

A cost effectiveness threshold has not been established for ammonia. Therefore, only options that meet the District's definition of Achieved-in-Practice controls will be considered for ammonia at this time. (Although these options must meet the District definition of Achieved-in-Practice, pursuant to the Settlement Agreement (9/20/2004) between the District and Western United Dairyman and Alliance of Western Milk Producers Inc¹⁰, the District will not deem any control options Achieved-in-Practice until after the Dairy BACT Guideline has been established.)

The following practice has been identified as a possible control option for the NH₃ emissions from the liquid manure land application. No other control technologies that meet the definition of Achieved-in-Practice have been identified for liquid manure land application.

- 1) Animals fed in accordance with National Research Council (NRC) or other District-approved guidelines utilizing routine nutritional analysis for rations.

Description of Control Technologies

1) 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 liquid manure applied to cropland.

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

d. Step 4 - Cost Effectiveness Analysis

The only remaining option is Achieved in Practice and has been proposed by the applicant; therefore a cost analysis is not required.

e. Step 5 - Select BACT

The facility is proposing to feed all animals in accordance with National Research Council (NRC) or other District-approved guidelines.

V. Top Down BACT Analysis for the Solid Manure Handling – Solid Manure Storage (N-8481-4)

1. BACT Analysis for NH₃ Emissions

a. Step 1 - Identify all control technologies

A cost effectiveness threshold has not been established for ammonia. Therefore, only options that meet the District's definition of Achieved-in-Practice controls will be considered for ammonia at this time.

The following practice has been identified as a possible control option for the NH₃ emissions from the storage of solid manure and separated manure solids. No other control technologies that meet the definition of Achieved-in-Practice have been identified for the storage of solid manure and separated solids.

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

Description of Control Technologies

1) 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 extent to achieve the maximum uptake of protein by animals and minimize excretion of nitrogen in the manure, which will reduce ammonia emissions from the storage of 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 only remaining option is Achieved in Practice and has been proposed by the applicant; therefore a cost analysis is not required.

e. Step 5 - Select BACT

The facility is proposing to feed all animals in accordance with National Research Council (NRC) or other District-approved guidelines utilizing routine nutritional analysis for rations, which satisfies the BACT requirements.

VI. Top Down BACT Analysis for the Solid Manure Handling – Solid Manure Land Application (N-8481-4)

1. BACT Analysis for NH₃ Emissions

a. Step 1 - Identify all control technologies

A cost effectiveness threshold has not been established for ammonia. Therefore, only options that meet the District's definition of Achieved-in-Practice controls will be considered for ammonia at this time.

The following practices have been identified as possible control options for the NH₃ emissions from the land application of solid manure and separated manure solids. No other control technologies that meet the definition of Achieved-in-Practice have been identified for solid manure land application.

- 1) Animals fed in accordance with National Research Council (NRC) or other District-approved guidelines
- 2) Immediate incorporation of solid manure that has been applied to land into the soil

Description of Control Technologies

1) 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 extent to achieve the maximum uptake of protein by animals and minimize excretion of nitrogen in the manure, which will reduce ammonia emissions from manure applied to cropland.

2) Immediate Incorporation of Solid Manure that has Been Applied to Land into the Soil

Immediate incorporation of the manure into the soil will reduce any volatilization of gaseous pollutants, including ammonia and VOC. Reduction in gaseous emissions is achieved by minimizing the amount of time that the manure is exposed to the atmosphere. Once manure has been incorporated into the soil, VOCs, ammonia, and any hydrogen sulfide are absorbed onto particles of soil providing the opportunity for these soil microbes to oxidize these compounds into carbon dioxide, water, nitrates, and sulfates.¹⁸

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
- 2) Immediate incorporation of solid manure that has been applied to land into the soil within two hours of application

d. Step 4 - Cost Effectiveness Analysis

The only remaining option is Achieved in Practice and has been proposed by the applicant; therefore a cost analysis is not required.

e. Step 5 - Select BACT

The facility is proposing to feed all animals in accordance with National Research Council (NRC) or other District-approved guidelines utilizing routine nutritional analysis

¹⁸ Page 9-38 of U.S. EPA's Draft Document Emissions From Animal Feeding Operations (<http://www.epa.gov/ttn/chief/ap42/ch09/draft/draftanimalfeed.pdf>)

for rations and to incorporate solid manure applied to cropland immediately (within two hours) after application, which satisfies the BACT requirements.

VII. Top Down BACT Analysis for the Feed Storage and Handling System – Total Mixed Ration (TMR) (N-8481-6)

1. BACT Analysis for VOC Emissions

a. Step 1 - Identify all control technologies

Since specific VOC emissions control efficiencies have not been identified in the literature for dairy TMR, the control efficiencies will be estimated based on the control efficiencies of similar processes and engineering judgment.

The following options were identified as possible controls for VOC emissions from the Total Mixed Ration (TMR) (Feed Handling and Storage permit)

1) Rule 4570 Management Practices for TMR

Description of Control Technologies

1) Rule 4570 Management Practices for 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 stream-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 VOCs since most of the compounds emitted are highly soluble in water. More details about these management practices are included in the District document Final Staff Report – Revised Proposed Amendments to Rule 4570 (Confined Animal Facilities), dated October 21, 2010.

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) Rule 4570 Management Practices for TMR

d. Step 4 - Cost Effectiveness Analysis

Rule 4570 Management Practices for TMR:

The only remaining option is Achieved in Practice and has been proposed by the applicant; therefore a cost analysis is not required.

e. Step 5 - Select BACT

The facility is proposing to implement the management practices required by District Rule 4570 to reduce VOC emissions from the TMR, which satisfies the BACT requirements.

APPENDIX G

Summary of Health Risk Assessment (HRA) and Ambient Air Quality Analysis (AAQA)

San Joaquin Valley Air Pollution Control District

Risk Management Review

To: Ramon Norman – Permit Services

From: Marissa Williams – Technical Services

Date: September 28, 2016

Facility Name: Larry Matos Dairy

Location: 100 S. Quinley Ave., Merced, CA

Application #(s): N-8481-1-2, 2-2, 3-1, 4-1, 5-1

Project #: N-1160118

A. RMR SUMMARY

RMR Summary						
Categories	Milk Parlor (Unit 1-2)	Cow Housing (Unit 2-2)	Liquid Manure Handling (Unit 3-1)	Liquid Manure Handling (Unit 4-1)	Project Totals	Facility Totals
Prioritization Score	0.6	75.4	47.0	0.0	>1.0	>1.0
Acute Hazard Index	0.001	0.202	0.038	0.007	0.247	0.247
Chronic Hazard Index	0.000	0.128	0.013	0.001	0.142	0.142
Maximum Individual Cancer Risk	9.26E-08	8.18E-06	1.98E-06	0.00E-00	1.02E-05	1.06E-05
T-BACT Required?	No	Yes ¹	Yes	No		
Special Permit Requirements?	No	No	No	No		

¹TBACT is determined on a corral by corral basis. TBACT will be addressed in the Conclusions Section of this report.

Proposed Permit Requirements

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

Unit 2-2 (Freestall Barns D & E):

T-BACT is required for this unit because of emissions of DBCP, Acrylonitrile, and 1,3-Butadiene which are VOCs, and Arsenic which is a PM-10.

Unit 3-1

T-BACT is required for this unit because of emissions of 1,3-Butadiene which is a VOCs.

B. RMR REPORT

I. Project Description

Technical Services received a request on July 21, 2016 to perform a Risk Management Review (RMR) and Ambient Air Quality Analysis (AAQA) for a proposed dairy expansion project. The modification includes an increase in herd size to 2,100 milk cows, 400 dry cows, 2,500 heifers, and 100 bulls (5,100 total head). Unit 1-2 consists of one double 24 parallel (48 stalls) milking parlor and the increase to 2,100 milk cows. Unit 2-2 consists of the modification of cow housing, involving the relocation of heifers that are currently kept in leased corrals on the west side of S Quinley Ave. The housing modification also includes the construction of one new 725-cow freestall barn and one new 1980-cow freestall barn. Unit 3-1 consists of modifications to liquid manure handling, Unit 4-1 consists of modifications to solid manure handling, and Unit 5-1 includes the modification of feed storage and handling as a result of increased herd size.

II. Analysis

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 and from emissions provided by the project engineer. Emissions were then input into the San Joaquin Valley APCD's Hazard Assessment and Reporting Program (SHARP). In accordance with the District's Risk Management Policy for Permitting New and Modified Sources (APR 1905, May 28, 2015), risks from the proposed unit's toxic emissions were prioritized using the procedure in the 1990 CAPCOA Facility Prioritization Guidelines. The prioritization score for the facility is 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 2010-2014 from Merced 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:

Analysis Parameters Unit 1-2 (Milk Parlor)			
Source Type	Area	Location Type	Rural
Approx. Area (m²)	1065.2	Release Height (m)	1
# of Cows	720*	Ammonia (lb/hr)	0.008
		Ammonia(lb/yr)	72

*Used to calculate VOC TAC emissions

Analysis Parameters Unit 2-2 (Freestall Barn A)			
Source Type	Area	Location Type	Rural
Approx. Area (m ²)	16,875	Release Height (m)	1
# of Cows	100*	Ammonia (lb/hr)	0.163
PM10 (lb/hr)	0.017	Ammonia (lb/yr)	1,432
PM10 (lb/yr)	137		

*Used to calculate VOC TAC emissions

Analysis Parameters Unit 2-2 (Freestall Barn B)			
Source Type	Area	Location Type	Rural
Approx. Area (m ²)	13,720	Release Height (m)	1
# of Cows	30*	Ammonia (lb/hr)	0.025
PM10 (lb/hr)	0.004	Ammonia (lb/yr)	222
PM10 (lb/yr)	41		

*Used to calculate VOC TAC emissions

Analysis Parameters Unit 2-2 (Freestall Barn C)			
Source Type	Area	Location Type	Rural
Approx. Area (m ²)	11,000	Release Height (m)	1
# of Cows	35*	Ammonia (lb/hr)	0.075
PM10 (lb/hr)	0.008	Ammonia (lb/yr)	676
PM10 (lb/yr)	48		

*Used to calculate VOC TAC emissions

Analysis Parameters Unit 2-2 (Freestall Barn D)			
Source Type	Area	Location Type	Rural
Approx. Area (m ²)	10,125	Release Height (m)	1
# of Cows	725*	Ammonia (lb/hr)	2.279
PM10 (lb/hr)	0.096	Ammonia (lb/yr)	19,967
PM10 (lb/yr)	845		

*Used to calculate VOC TAC emissions

Analysis Parameters Unit 2-2 (Freestall Barn E)			
Source Type	Area	Location Type	Rural
Approx. Area (m ²)	10,424	Release Height (m)	1
# of Cows	1980*	Ammonia (lb/hr)	1.675
PM10 (lb/hr)	0.263	Ammonia (lb/yr)	14,682
PM10 (lb/yr)	2,307		

*Used to calculate VOC TAC emissions

Analysis Parameters Unit 3-1 (Lagoon1)			
Source Type	Area	Location Type	Rural
Approx. Area (m²)	9058.0	Release Height (m)	0
Ammonia (lb/hr)	0.86	Ammonia(lb/yr)	7,573
# of Cows	1920*		

*Used to calculate VOC TAC emissions

Analysis Parameters Unit 3-1 (Lagoon 2)			
Source Type	Area	Location Type	Rural
Approx. Area (m²)	2118.2	Release Height (m)	0
Ammonia (lb/hr)	0.20	Ammonia(lb/yr)	1,782
# of Cows	1920*		

*Used to calculate VOC TAC emissions

Analysis Parameters Unit 3-1 (Lagoon 3)			
Source Type	Area	Location Type	Rural
Approx. Area (m²)	2118.2	Release Height (m)	0
Ammonia (lb/hr)	0.20	Ammonia(lb/yr)	1,782
# of Cows	1920*		

*Used to calculate VOC TAC emissions

Analysis Parameters Unit 3-1 Land Application*			
Source Type	Area	Location Type	Rural
Approx. Area (m²)	1,803,760	Release Height (m)	0
Ammonia (lb/hr)	0.89	Ammonia (lb/yr)	7,811

*Ammonia emissions for both liquid manure and dry manure application were evaluated based on farmland application area.

Analysis Parameters Unit 4-1 Dry Manure			
Source Type	Area	Location Type	Rural
Approx. Area (m²)	715	Release Height (m)	0
Ammonia (lb/hr)	0.24	Ammonia (lb/yr)	2,132

AAQA. In addition to the RMR, Technical Services performed modeling for the criteria pollutant PM₁₀ using AERMOD. The emission rate used was 3,378 lb PM₁₀/year. 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	5.67	0.77
Interim Significance Level	10.4 ¹	2.08 ¹
Result	Pass	Pass

¹Per District 1925 the SIL threshold for fugitive dust sources is 10.4 µg/m³ for the 24-hour average concentration and 2.08 µg/m³ for the annual concentration.

III. Conclusion

Unit 2-2 (Freestall Barn D & E) and Unit 3-1:

The acute and chronic indices are below 1.0 and the cancer risk associated with these units is greater than 1.0 in a million, but less than 20 in a million. **In accordance with the District's Risk Management Policy, these units are approved with Toxic Best Available Control Technology (T-BACT)** for the addition of the Freestall Barn D and Barn E in Unit 2-2, and for modification to liquid manure handling in Unit 3-1.

Unit 1-2 and Unit 4-1

The acute and chronic indices are below 1.0 and the cancer risk factor is less than 1.0 in a million. **In accordance with the District's Risk Management Policy, these units are approved without Toxic Best Available Control Technology (T-BACT).**

To ensure that human health risks will not exceed District allowable levels; the permit requirements listed on page 1 of this report must be included for these proposed units.

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.

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.

IV. Attachments

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

APPENDIX H

**Draft ATCs
(N-8481-1-2, -2-2, -3-1, -4-1, & -5-1)**

San Joaquin Valley
Air Pollution Control District

AUTHORITY TO CONSTRUCT

ISSUANCE DATE: DRAFT

PERMIT NO: N-8481-1-2

LEGAL OWNER OR OPERATOR: LARRY MATOS

MAILING ADDRESS: 5460 OAK AVE
MERCED, CA 95340

LOCATION: 100 S QUINLEY AVE
MERCED, CA 95340

EQUIPMENT DESCRIPTION:

MODIFICATION OF 1,380 COW MILKING OPERATION WITH ONE DOUBLE 24 PARALLEL (48 STALLS) MILKING PARLOR: INCREASE MILK COWS TO 2,100

CONDITIONS

1. Authority to Construct (ATC) permits N-8481-1-2, -2-2, -3-1, -4-1, and -5-1 shall be implemented concurrently. [District Rule 2201]
2. {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]
3. {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]
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 flush or hose milk parlor immediately prior to, immediately after, or during each milking. [District Rule 2201 and 4570]

CONDITIONS CONTINUE ON NEXT PAGE

YOU MUST NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (209) 557-6400 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.

Seyed Sadredin, Executive Director, APCO

Arnaud Marjollet, Director of Permit Services

N-8481-1-2 : Mar 22 2017 11:25AM - NORMANR : Joint Inspection NOT Required

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]
8. {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]

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San Joaquin Valley
Air Pollution Control District

AUTHORITY TO CONSTRUCT

ISSUANCE DATE: DRAFT

PERMIT NO: N-8481-2-2

LEGAL OWNER OR OPERATOR: LARRY MATOS

MAILING ADDRESS: 5460 OAK AVE
MERCED, CA 95340

LOCATION: 100 S QUINLEY AVE
MERCED, CA 95340

EQUIPMENT DESCRIPTION:

MODIFICATION OF COW HOUSING - 1,380 MILK COWS NOT TO EXCEED A COMBINED TOTAL OF 1,680 MATURE COWS (MILK AND DRY COWS); 1,500 TOTAL SUPPORT STOCK (HEIFERS, CALVES, AND BULLS); AND 3 FREESTALLS WITH FLUSH/SCRAPE SYSTEM: INCREASE HERD SIZE TO 2,100 JERSEY MILK COWS NOT TO EXCEED A COMBINED TOTAL OF 2,500 MATURE COWS (MILK AND DRY COWS), AND 2,600 SUPPORT STOCK (HEIFERS, CALVES, AND BULLS); CONSTRUCT TWO NEW FREESTALL BARNs (ONE IN EXISTING EXERCISE PENS AND ONE ON CLEARED CROPLAND); AND RELOCATE HEIFERS FROM CORRALS ON WEST OF S QUINLEY AVE TO FREESTALLS ON EAST SIDE OF S QUINLEY AVE

CONDITIONS

1. Authority to Construct (ATC) permits N-8481-1-2, -2-2, -3-1, -4-1, and -5-1 shall be implemented concurrently. [District Rule 2201]
2. {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]
3. {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]

CONDITIONS CONTINUE ON NEXT PAGE

YOU MUST NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (209) 557-6400 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.

Seyed Sadredin, Executive Director / APCO

Arnaud Marjolle, Director of Permit Services

N-8481-2-2 : Mar 22 2017 11:25AM - NORMANR : Joint Inspection NOT Required

4. If a licensed veterinarian, a certified nutritionist, the California Department of Food and Agriculture (CDFA), or the United States Department of Agriculture (USDA) determines that any VOC mitigation measure (with a Rule 4570 reference) is detrimental to animal health and needs to be suspended, the Permittee 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 Rules 2201 and 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. All animals at this dairy shall be housed in freestall barns. [District Rule 2201]
8. Permittee shall pave feedlanes 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, 4102, and 4570]
9. Permittee shall flush, scrape or vacuum freestall lanes immediately prior to, immediately after or during each milking. [District Rules 2201 and 4570]
10. Permittee shall maintain records sufficient to demonstrate that freestall lanes are flushed, scraped or vacuumed immediately prior to, immediately after or during each milking. [District Rules 2201 and 4570]
11. For the proposed freestall barn that will be located directly east of the milking parlor (identified as Proposed Freestall Barn D) and the proposed freestall barn that will be located on the northern part of the dairy directly east of existing Freestall Barn A and north of the feed/equipment storage area (identified as Proposed Freestall Barn E), the feed lanes and walkways in freestall barns that house milk cows and dry cows shall be flushed at least four times per day and the feed lanes and walkways in barns that exclusively house support stock (heifers, calves, and bulls) shall be flushed at least once per day. [District Rules 2201 and 4102]
12. For the proposed freestall barn that will be located directly east of the milking parlor (identified as Proposed Freestall Barn D) and the proposed freestall barn that will be located on the northern part of the dairy directly east of existing Freestall Barn A and north of the feed/equipment storage area (identified as Proposed Freestall Barn E), the exercise pens shall be scraped every two weeks using a pull-type scraper in the morning hours, except when this is prevented by wet conditions. [District Rule 2201 and 4102]
13. Permittee shall remove manure that is not dry from individual cow freestall beds or shall rake, harrow, scrape, or grade freestall bedding at least once every seven (7) days. [District Rules 2201 and 4570]
14. Permittee shall record either of the following: 1) the dates when manure that is not dry is removed from individual cow freestall beds or 2) the dates when the freestall bedding is raked, harrowed, scraped, or graded. [District Rules 2201 and 4570]
15. Permittee shall clean manure from exercise pens at least four (4) times per year with at least sixty (60) days between each cleaning, or permittee shall clean pens at least once between April and July and at least once between September and December. [District Rule 2201]
16. Permittee shall demonstrate that manure from exercise pens are cleaned at least four (4) times per year with at least sixty (60) days between each cleaning or demonstrate that pens are cleaned at least once between April and July and at least once between September and December. [District Rule 2201]
17. Permittee shall implement at least one of the following mitigation measures: 1) slope the surface of the exercise pens at least 3% where the available space for each animal is 400 square feet or less and shall slope the surface of the exercise pens at least 1.5% where the available space for each animal is more than 400 square feet per animal; 2) maintain the exercise pens to ensure proper drainage preventing water from standing more than forty-eight hours; or 3) harrow, rake, or scrape exercise pens sufficiently to maintain a dry surface except during periods of rainy weather. [District Rules 2201 and 4102]

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CONDITIONS CONTINUE ON NEXT PAGE

18. Permittee shall maintain the following applicable records: 1) maintain sufficient records to demonstrate that exercise pens are maintained to ensure proper drainage preventing water from standing for more than forty-eight hours and/or 2) maintain records of dates exercise pens are groomed (i.e., harrowed, raked, or scraped, etc.). [District Rule 2201]
19. The permittee shall maintain records of: (1) an operating plan with number of times lanes and walkways are flushed per day; and (2) the frequency of scraping and manure removal from exercise pen surfaces. [District Rules 1070 and 2201]
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]
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]
22. {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]

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San Joaquin Valley
Air Pollution Control District

AUTHORITY TO CONSTRUCT

ISSUANCE DATE: DRAFT

PERMIT NO: N-8481-3-1

LEGAL OWNER OR OPERATOR: LARRY MATOS
MAILING ADDRESS: 5460 OAK AVE
MERCED, CA 95340

LOCATION: 100 S QUINLEY AVE
MERCED, CA 95340

EQUIPMENT DESCRIPTION:

MODIFICATION OF LIQUID MANURE HANDLING SYSTEM CONSISTING OF SETTLING BASIN(S); ONE STORAGE POND; MANURE LAND APPLIED THROUGH FLOOD IRRIGATION AND FURROW IRRIGATION; ALLOW FOR INCREASE IN LIQUID MANURE DUE TO INCREASE IN HERD SIZE AUTHORIZED BY ATC N-8481-2-2; AND CONVERT EXISTING STORAGE POND TO A SINGLE-CELL ANAEROBIC TREATMENT LAGOON (642' X 150' X 22')

CONDITIONS

1. Authority to Construct (ATC) permits N-8481-1-2, -2-2, -3-1, -4-1, and -5-1 shall be implemented concurrently. [District Rule 2201]
2. {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]
3. {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]
4. If a licensed veterinarian, a certified nutritionist, the California Department of Food and Agriculture (CDFA), or the United States Department of Agriculture (USDA) determines that any VOC mitigation measure (with a Rule 4570 reference) is detrimental to animal health and needs to be suspended, the Permittee 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 Rules 2201 and 4570]
5. Permittee shall feed all animals according to National Research Council (NRC) guidelines. [District Rule 2201]

CONDITIONS CONTINUE ON NEXT PAGE

YOU MUST NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (209) 557-6400 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.

Seyed Sadredin, Executive Director / APCO

Arnaud Marjolle, Director of Permit Services

N-8481-3-1 : Mar 22 2017 11:25AM - NORMANR : Joint Inspection NOT Required

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, 4102, and 4570]
8. Liquid manure shall be treated in an anaerobic treatment lagoon system with anaerobic treatment lagoon(s) designed and operated in accordance with National Resource Conservation Service (NRCS) California Field Office Technical Guide Code 359 - Waste Treatment Lagoon. [District Rules 2201 and 4102]
9. Permittee shall maintain records of design specifications and calculations for the Anaerobic Treatment Lagoon system, including Minimum Treatment Volume (MTV) and Hydraulic Retention Time (HRT), in order to demonstrate that the system has been designed and is operating in accordance with the applicable National Resource Conservation Service (NRCS) technical guide. [District Rule 2201]
10. To maintain the required minimum treatment volume, the minimum liquid depth in the anaerobic treatment lagoon shall be at least 6 ft at maximum drawdown, unless a different minimum depth is approved in writing by the District and NRCS. Markers shall be installed in the treatment lagoon to indicate the maximum operating level and the maximum drawdown level. [District Rule 2201]
11. Only liquid manure that has been treated in an anaerobic treatment lagoon shall be applied to cropland. [District Rule 2201]
12. Permittee shall maintain records that only liquid manure treated with an anaerobic treatment lagoon is applied to fields. [District Rule 2201]
13. 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]
14. 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]
15. 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]
16. {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]

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San Joaquin Valley
Air Pollution Control District

AUTHORITY TO CONSTRUCT

PERMIT NO: N-8481-4-1

ISSUANCE DATE: DRAFT

LEGAL OWNER OR OPERATOR: LARRY MATOS
MAILING ADDRESS: 5460 OAK AVE
MERCED, CA 95340

LOCATION: 100 S QUINLEY AVE
MERCED, CA 95340

EQUIPMENT DESCRIPTION:

MODIFICATION OF SOLID MANURE HANDLING CONSISTING OF MANURE STOCK PILES; SOLID MANURE APPLICATION TO LAND AND/OR HAULED OFFSITE: ALLOW FOR INCREASE IN SOLID MANURE DUE TO INCREASE IN HERD SIZE AUTHORIZED BY ATC N-8481-2-2

CONDITIONS

1. Authority to Construct (ATC) permits N-8481-1-2, -2-2, -3-1, -4-1, and -5-1 shall be implemented concurrently. [District Rule 2201]
2. {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]
3. {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]
4. If a licensed veterinarian, a certified nutritionist, the California Department of Food and Agriculture (CDFA), or the United States Department of Agriculture (USDA) determines that any VOC mitigation measure (with a Rule 4570 reference) is detrimental to animal health and needs to be suspended, the Permittee 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 Rules 2201 and 4570]
5. Permittee shall feed all animals according to National Research Council (NRC) guidelines. [District Rule 2201]

CONDITIONS CONTINUE ON NEXT PAGE

YOU MUST NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (209) 557-6400 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.

Seyed Sadredin, Executive Director / APCO

Arnaud Marjollet, Director of Permit Services

N-8481-4-1 - Mar 22 2017 11:25AM - NORMANR - Joint Inspection NOT Required

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 Rule 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. Permittee shall not apply solid manure with a moisture content of more than 50%. [District Rules 2201 and 4570]
11. Permittee shall maintain records of the moisture content of the solid manure each time solid manure is land applied. [District Rules 2201 and 4570]
12. {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]
13. Solid manure applied to fields shall be incorporated into the soil within two hours after application. [District Rule 2201]
14. Permittee shall maintain records to demonstrate that all solid manure has been incorporated within two hours after land application. [District Rule 2201]
15. 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]
16. {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]

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San Joaquin Valley
Air Pollution Control District

AUTHORITY TO CONSTRUCT

ISSUANCE DATE: DRAFT

PERMIT NO: N-8481-5-1

LEGAL OWNER OR OPERATOR: LARRY MATOS
MAILING ADDRESS: 5460 OAK AVE
MERCED, CA 95340

LOCATION: 100 S QUINLEY AVE
MERCED, CA 95340

EQUIPMENT DESCRIPTION:

MODIFICATION OF FEED STORAGE AND HANDLING CONSISTING OF COVERED FEED STORAGE OR COMMODITY BARN(S), SILAGE PILES, AND TOTAL MIXED RATION FEEDING: ALLOW FOR INCREASE IN FEED DUE TO INCREASE IN HERD SIZE AUTHORIZED BY ATC N-8481-2-2

CONDITIONS

1. Authority to Construct (ATC) permits N-8481-1-2, -2-2, -3-1, -4-1, and -5-1 shall be implemented concurrently. [District Rule 2201]
2. {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]
3. {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]
4. If a licensed veterinarian, a certified nutritionist, the California Department of Food and Agriculture (CDFA), or the United States Department of Agriculture (USDA) determines that any VOC mitigation measure (with a Rule 4570 reference) is detrimental to animal health and needs to be suspended, the Permittee 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 Rules 2201 and 4570]
5. Permittee shall feed all animals according to National Research Council (NRC) guidelines. [District Rules 2201 and 4570]

CONDITIONS CONTINUE ON NEXT PAGE

YOU MUST NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (209) 557-6400 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.

Seyed Sadredin, Executive Director / APCO

Arnaud Marjolle, Director of Permit Services

N-8481-5-1 : Mar 22 2017 11:25AM - NORMANR : Joint Inspection NOT Required

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. {4460} Permittee shall store grain in a weatherproof storage structure or under a weatherproof covering from October through May. [District Rule 4570]
12. {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 Rule 4570]
13. Permittee shall feed steam-flaked, dry rolled, cracked or ground corn or other steam-flaked, dry rolled, cracked or ground cereal grains. [District Rules 2201 and 4570]
14. Permittee shall maintain records to demonstrate animals are fed steam-flaked, dry rolled, cracked or ground corn or other steam-flaked, dry rolled, cracked or ground cereal grains. 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]
15. {4468} 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 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]

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CONDITIONS CONTINUE ON NEXT PAGE

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 manufacturer's 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 Rules 2201 and 4570]

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CONDITIONS CONTINUE ON NEXT PAGE

32. {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]

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