



JUL 10 2012

Scott Wickstrom
Redtop Jerseys
5638 Columbus Avenue
Hilmar, CA 95324

**Re: Notice of Preliminary Decision - Authority to Construct
Project Number: C-1095388**

Dear Mr. Wickstrom:

Enclosed for your review and comment is the District's analysis of Redtop Jerseys's application for an Authority to Construct for modification of the permitted herd composition from 4,800 Jersey milk cow (9,447 total head) to 7,200 Jersey milk cows and 1,350 dry cows (8,550 total head), at the existing dairy operation located at 21463 Road 4, Chowchilla, CA.

The notice of preliminary decision for this project will be published approximately three days from the date of this letter. Please submit your written comments on this project within the 30-day public comment period which begins on the date of publication of the 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,

David Warner
Director of Permit Services

DW:rn

Enclosures

Seyed Sadredin
Executive Director/Air Pollution Control Officer

Northern Region
4800 Enterprise Way
Modesto, CA 95356-8718
Tel: (209) 557-6400 FAX: (209) 557-6475

Central Region (Main Office)
1990 E. Gettysburg Avenue
Fresno, CA 93726-0244
Tel: (559) 230-6000 FAX: (559) 230-6061

Southern Region
34946 Flyover Court
Bakersfield, CA 93308-9725
Tel: 661-392-5500 FAX: 661-392-5585



JUL 10 2012

Mike Tollstrup, Chief
Project Assessment Branch
Stationary Source Division
California Air Resources Board
PO Box 2815
Sacramento, CA 95812-2815

Re: Notice of Preliminary Decision - Authority to Construct
Project Number: C-1095388

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Enclosed for your review and comment is the District's analysis of Redtop Jerseys's application for an Authority to Construct for modification of the permitted herd composition from 4,800 Jersey milk cow (9,447 total head) to 7,200 Jersey milk cows and 1,350 dry cows (8,550 total head), at the existing dairy operation located at 21463 Road 4, Chowchilla, CA.

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Madera Tribune
Madera Tribune

**NOTICE OF PRELIMINARY DECISION
FOR THE PROPOSED ISSUANCE OF
AN AUTHORITY TO CONSTRUCT**

NOTICE IS HEREBY GIVEN that the San Joaquin Valley Unified Air Pollution Control District solicits public comment on the proposed issuance of Authority to Construct to Redtop Jerseys for modification of the permitted herd composition from 4,800 Jersey milk cow (9,447 total head) to 7,200 Jersey milk cows and 1,350 dry cows (8,550 total head), at the existing dairy operation located at 21463 Road 4, Chowchilla, CA.

The analysis of the regulatory basis for this proposed action, Project #C-1095388, is available for public inspection at http://www.valleyair.org/notices/public_notices_idx.htm and the District office at the address below. Written comments on this project must be submitted within 30 days of the publication date of this notice to **DAVID WARNER, DIRECTOR OF PERMIT SERVICES, SAN JOAQUIN VALLEY UNIFIED AIR POLLUTION CONTROL DISTRICT, 1990 EAST GETTYSBURG AVENUE, FRESNO, CA 93726.**

**San Joaquin Valley Air Pollution Control District
Authority to Construct
Application Review
Modify Dairy Herd Composition**

Facility Name:	Red Top Jerseys	Date:	May 31, 2012
Mailing Address:	5638 Columbus Avenue Hilmar, CA 95324	Engineer:	Ramon Norman
Contact Person:	Scott Wickstrom	Lead Engineer:	Martin Keast
Telephone:	(209) 634-6719		
Application #s:	C-6831-1-3, -2-3, -3-3, -4-3, & -8-1		
Project #:	C-1095388		
Deemed Complete:	March 1, 2012		

I. Proposal

Red Top Jerseys Dairy has requested Authority to Construct (ATC) permits to modify the herd composition at their existing 4,800 Jersey milk cow (9,447 total head) dairy operation to 7,200 Jersey milk cows (8,550 total head). This project will modify the District permits for the dairy operation to allow the dairy to house the number of animals allowed by the Madera County Conditional Use Permit (CUP #2008-024). In addition, the mitigation measures that the applicant has selected to comply with District Rule 4570 Phase II will be incorporated into the ATCs for the dairy.

For the project, Red Top Jerseys Dairy proposes to construct one additional rotary milk parlor, with 60 milking stalls; one additional freestall barn capable of housing 1,200 mature cows; and one covered special needs barn, including stalls for fresh and special needs cows, pens for maternity cows and sick cows, and a hospital area. The special needs barn will be constructed instead of the half-sized freestall barn capable of housing 600 mature cows, which was evaluated under Project C-1050585 for expansion of the dairy to the current permitted size and approved under ATC C-6831-2-1. In addition, for the project, Red Top Jerseys Dairy proposes to construct an additional concrete processing pit with an additional double screen mechanical separator and a concrete pad for stacking of manure.

There are currently no exercise pens or open corrals at the dairy and none are proposed under this project. The dairy will not house any heifers, calves, or bulls onsite. Based on the ATC permits issued under Project C-1050585, the dairy is currently permitted for the following herd composition: 4,800 Jersey milk cows, 782 dry cows, and 3,865 large heifers (15-24 months). After approval of this project for expansion of the dairy, the dairy will be permitted for the following herd composition: 7,200 Jersey milk cows and 1,350 dry cows, not to exceed a combined total of 8,550 mature cows (milk and dry). (See Appendix A for current Permits to Operate and previously-issued ATC permits.)

The dairy requires ATC permits for each of the following permit units: Milking Operation (C-6831-1) including three rotary milking parlors; Cow Housing Permit (C-6831-2) including seven freestall barns and one half freestall barns with flushed lanes and a special needs barn; Liquid Manure Handling System (C-6831-3) including two double screen mechanical separators, two processing pits, two anaerobic treatment lagoons, and one storage pond; Solid Manure Handling System (C-6831-4) consisting of manure stockpiles with solid manure applied to cropland and hauled offsite; and Feed Storage and Handling Permit (C-6831-8) consisting of commodity barns and covered silage piles.

Changing the permitted herd composition of the dairy from 4,800 Jersey milk cows (9,447 total head) to 7,200 Jersey milk cows and 1,350 dry cows (8,550 total head) will result in emissions exceeding the Best Available Control Technology (BACT) threshold of 2.0 lb/day for the following pollutants from the following operations at the dairy: VOC and NH₃ from the cow housing permit unit (Permit C-6831-2); NH₃ and H₂S emissions from the lagoons and storage ponds and NH₃ from liquid manure land application at the dairy (Permit C-6831-3 - liquid manure handling system); and NH₃ emissions from solid manure storage and solid manure land application at the dairy (Permit C-6831-4 - solid manure handling system). Therefore, BACT will be required for these operations. Because there will be an overall decrease in herd size and all of the animals at the dairy will be housed in flushed freestall barns with no exercise corrals, there will be a decrease in PM₁₀ emissions from the dairy. Because all of the large heifers at the dairy will be removed, there will be no increase in the area of feed placed for the cows and no overall increase in feed emissions for the project.

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 (CARB), 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.

The expansion of the dairy is a discretionary project subject to the requirements of the California Environmental Quality Act (CEQA). Madera County approved the project after preparing a Mitigated Negative Declaration (MND #2009-02) to address environmental concerns resulting from the project. As a responsible agency, the District must decide on the adequacy of the environmental documents prepared by the Lead Agency, Madera County, make appropriate findings, and file the required notices. Prior to reaching a final decision to approve the project and issue the ATCs, the District will prepare findings and will file a Notice of Determination consistent with CEQA Guidelines §15096 requirements upon approval of the project.

II. Applicable Rules

Rule 2010	Permits Required (12/17/92)
Rule 2201	New and Modified Stationary Source Review Rule (4/21/11)
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 21463 Road 4 at the intersection of Road 4 and Avenue 21 in Chowchilla, CA (Mt. Diablo Meridian Township 10S, Range 14E, Sections 16, 17, 20, & 21 in Madera County (APN 20-130-013)). The equipment 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

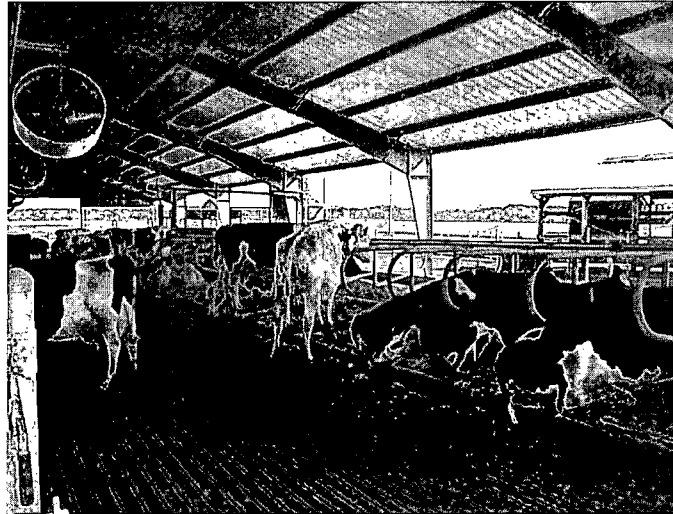
The primary function of Red Top Jerseys Dairy is the production of milk, which is used to make products for human consumption. Production of milk requires a herd of mature dairy cows that are lactating. In order to produce milk, the cows must be bred and give birth. The gestation period for a cow is 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. At this dairy, calves are sent offsite to be raised until breeding age and there are no young heifers or calves housed onsite. Only milk cows and dry cows will be housed onsite after completion of the project.

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 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. There are no exercise pens or open corrals at this dairy.



Freestalls and Concrete Feed lane

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. After completion of this project, the dairy will include a covered special needs barn with stalls for fresh and special needs cows and pens for maternity cows and sick cows

Milking Parlors

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 currently includes two rotary milking parlors. For the project, the dairy will construct one additional 60-stall rotary milking parlor, resulting in a total of three rotary milking parlors after completion of the project. The lactating cows will be milked two times per day in the milking parlor. The milking parlor will have concrete floors sloped to a drain. Manure that is deposited in the milking parlor will be sprayed or flushed into the drain using fresh water after each milking. The effluent from the milking parlors will be carried through pipes to the liquid manure handling system.

Liquid Manure Handling System

After completion of the project, the liquid manure handling system for the dairy will include the following components:

- Two processing pits (flush water recycling sumps)
- Two double screen mechanical separators (existing double screen separator near the lagoon system and proposed separator north of the proposed special needs barn)
- One 700 ft x 250 ft x 30 ft anaerobic treatment lagoon with a side slope of 2.0
- One 400 ft x 250 ft x 30 ft anaerobic treatment lagoon with a side slope of 2.0
- One 960 ft x 280 ft x 30 ft storage pond with a side slope of 2.0

Processing Pits (Flush Water Recycling Sumps)

A processing pit is a small basin or sump that temporarily stores the flush water from the milking parlor and the freestall flush system. The processing pit allows this water to be reused to flush the concrete feedlanes in the freestall barns. After each flush, the flush water, including the waste from the feedlanes, is returned to the processing pit to be recycled in the next flush. As the volume of flush water in the processing pit increases, pumps and agitators are turned on. The agitators mix the contents in the processing pit so that the solids in the processing pit do not settle. The stored flush water is then pumped to a mechanical separator to remove the fibrous solids prior to the lagoon. This is done daily or several times a day to prevent excessive solids buildup and to ensure that the water used for flushing the freestalls is relatively clean. Reusing flush water from the processing pit decreases the amount of piping and energy required by recycling the flush water and pumping water from a central location. The dairy is proposing to construct an additional processing pit and will have two processing pits after completion of this project. When the volume of liquid in either of the processing pits exceeds the preset levels, the liquid manure from that pit will be pumped to the mechanical separators prior to entering the lagoon.

Mechanical Separators

As stated above, the liquid manure from the processing pits will be pumped to mechanical screen separators for solids separation prior to entering the lagoon system. Solids separation removes material from the waste stream that would prematurely fill a lagoon or storage pond. A mechanical separator may achieve a solids removal rate of 20-50%. The efficiency of treatment would suffer without separation, which would result in more odors and potentially more VOC emissions from the liquid manure handling system. Most of the separated solids are fibrous material that leads to excessive sludge buildup or the formation of crusts on the surface of the storage ponds, both of which interfere with pumping operations. 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 one double screen mechanical separator located near the lagoon and storage ponds. For this project the applicant has proposed to construct an additional double screen mechanical separator and a concrete pad for stacking of manure that will be located north of the special needs barn. Conveyors will pile the solids onto concrete stacking pads. The pads will be sloped to promote drainage to drains located around the perimeter of the stacking pads. The solids will be removed on a weekly basis. The separated solids from the mechanical separator will either be immediately incorporated into cropland or dried and stored for use as fertilizer or as bedding in the freestalls.

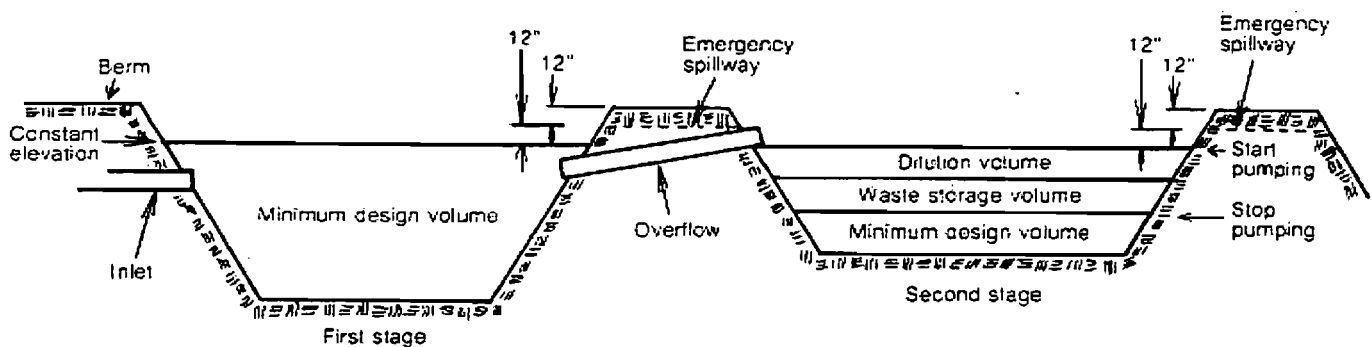
Anaerobic Treatment Lagoons

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 dairy currently includes an anaerobic treatment lagoon system designed in accordance with the specifications set forth in NRCS practice standard 359. The anaerobic treatment lagoon system consists of a 700 ft x 250 ft x 30 ft anaerobic treatment lagoon and a 400 ft x 250 ft x 30 ft anaerobic treatment lagoon followed by a storage pond. The two anaerobic treatment lagoons will be designed to maintain a constant liquid level to ensure a stable bacterial population, which will promote more efficient anaerobic digestion. The effluent from the treatment lagoons will overflow into the storage pond/secondary lagoon, which is designed for liquid storage. The liquid level of the storage ponds/secondary lagoons fluctuates and they can be emptied when necessary. Effluent from the storage pond is used for the irrigation of cropland. All of the manure at the dairy will be pumped to the anaerobic treatment lagoons.



Storage Pond/Secondary Lagoon

The dairy has a 960 ft x 280 ft x 30 ft storage pond designed for temporary collection and storage of organic waste. Storage ponds are designed to have a storage period of about 90 to 180 days and may be completely emptied when pumped. As stated above, the storage pond/secondary lagoon at this dairy will be part of a two-stage anaerobic treatment lagoon system. Storage ponds are designed to 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 manure from the storage pond will be used to irrigate crops.

Manure Stock Piles (Storage)

The only solid manure that will be stockpiled at this dairy is the separated solids from the mechanical separators. The separated solids will be immediately incorporated into cropland or will be dried and stored for use as fertilizer or as bedding in the freestalls.

V. Equipment Listing

C-6831-1

Pre-Project Equipment Description (ATC):

C-6831-1-2: 4,800 JERSEY COW MILKING OPERATION WITH TWO 72-STALL ROTARY MILKING PARLORS

Existing Milking Parlors

Two 95 ft x 95 ft rotary milking parlors each with 72 milking stalls

Proposed Modification:

Increase the number of milking cows to 7,200; Construct one additional rotary milking parlor, with 60 milking stalls; and add mitigation measures for Rule 4570

Post Project Equipment Description:

C-6831-1-3: 7,200 JERSEY COW MILKING OPERATION WITH TWO 72-STALL ROTARY MILKING PARLORS AND ONE 60-STALL ROTARY MILKING PARLOR

Post-Project Milking Parlors

Two 95 ft x 95 ft rotary milking parlors each with 72 milking stalls
One 95 ft x 95 ft rotary milking parlors with 60 milking stalls

C-6831-2

Pre-Project Equipment Description (ATC):

C-6831-2-1: COW HOUSING – 4,800 JERSEY MILK COWS, 782 DRY COWS, AND 3,865 LARGE HEIFERS (BETWEEN 15-24 MONTHS OLD) HOUSED IN SIX (6) FREESTALL BARNS WITH FLUSH SYSTEMS AND NO EXERCISE CORRALS; INCLUDING SPECIAL NEEDS HOUSING

Proposed Modification:

Modify herd size to 7,200 Jersey milk cows and 1,350 dry cows with no heifers or calves onsite; Construct two additional freestall barns and one covered special needs barn; Add mitigation measures for Rule 4570

Post Project Equipment Description:

C-6831-2-3: COW HOUSING – 7,200 JERSEY MILK COWS NOT TO EXCEED A COMBINED TOTAL OF 8,550 MATURE COWS (MILK AND DRY); AND 8 FREESTALLS WITH FLUSH SYSTEM AND NO EXERCISE CORRALS; INCLUDING SPECIAL NEEDS HOUSING

C-6831-3

Pre-Project Equipment Description (ATC):

C-6831-3-1: LIQUID MANURE HANDLING SYSTEM CONSISTING OF ONE PROCESSING PIT, ONE DOUBLE SCREEN MECHANICAL SEPARATOR, ONE 700' X 250' X 30' ANAEROBIC TREATMENT LAGOON, ONE 400' X 250' X 30' ANAEROBIC TREATMENT LAGOON, AND ONE 960' X 280' X 30' STORAGE POND. MANURE IS LAND APPLIED THROUGH FLOOD IRRIGATION AND FURROW IRRIGATION

Proposed Modification:

Allow increase in liquid manure from changing herd size to 7,200 Jersey milk cows and 1,350 dry cows; Construct a second processing pit and double-screen mechanical separator; Add mitigation measures for Rule 4570

Post Project Equipment Description:

C-6831-3-3: LIQUID MANURE HANDLING SYSTEM CONSISTING OF TWO PROCESSING PITS; TWO DOUBLE SCREEN MECHANICAL SEPARATORS; TWO ANAEROBIC TREATMENT LAGOONS (700' X 250' X 30' AND 400' X 250' X 30'), AND ONE STORAGE POND; MANURE IS LAND APPLIED THROUGH FLOOD IRRIGATION AND FURROW IRRIGATION

C-6831-4

Pre-Project Equipment Description (ATC):

C-6831-4-2: SOLID MANURE HANDLING CONSISTING OF COVERED SEPARATED SOLIDS STOCK PILES WITH SOLID MANURE APPLICATION TO LAND WITH IMMEDIATE INCORPORATION

Proposed Modification:

Allow increase in solid manure from changing herd size to 7,200 Jersey milk cows and 1,350 dry cows; Add mitigation measures for Rule 4570

Post Project Equipment Description:

C-6831-4-3: SOLID MANURE HANDLING CONSISTING OF MANURE STOCK PILES; SOLID MANURE APPLICATION TO LAND AND HAULED OFFSITE

C-6831-8

Pre-Project Equipment Description (ATC):

C-6831-8-0: FEED STORAGE AND HANDLING CONSISTING OF COMMODITY BARNs AND SILAGE PILES

Proposed Modification:

Modify feed handling for changing herd size to 7,200 Jersey milk cows and 1,350 dry cows; Add mitigation measures for Rule 4570

Post Project Equipment Description:

C-6831-8-1: FEED STORAGE AND HANDLING CONSISTING OF COMMODITY BARN
AND SILAGE PILES

VI. Emission Control Technology Evaluation

PM₁₀, VOC, and NH₃ are the major pollutants of concern from dairy operations. H₂S is also emitted from anaerobic processes on dairies. Gaseous pollutant emissions at a dairy result from the ruminant digestive processes (enteric emissions), from the decomposition and fermentation of feed, and also from the decomposition of organic material in dairy manure. Volatile Organic Compounds (VOCs) 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 Parlors (C-6831-1):

This dairy uses a flush/spray system to wash out the manure from the milking parlors after each group of cows is milked. Since the milking parlors are constantly flushed, there will be no particulate matter emissions from the milking parlors. Manure, which is a source of VOC emissions, is removed from the milking parlors 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 parlors will also be reduced by flushing after each milking. Flushing the milking parlors after each milking will also reduce anaerobic decomposition of manure on the milking parlor floor thereby eliminating any potential H₂S emissions.

Cow Housing (C-6831-2) and Feed

All of the cows at Red Top Jerseys Dairy are housed in freestall barns with concrete lanes and no exercise corrals. Practices that will be utilized to reduce emissions at the dairy include: freestall barns; frequent flushing of lanes; and feeding animals in accordance with NRC guidelines. These practices are described below.

Freestall Barns

All of the milk cows and dry cows at Red Top Jerseys Dairy will be housed in freestall barns. Particulate matter emissions from freestall barns are greatly reduced 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.

Frequent Flushing

Manure, which is a source of emissions, will be removed from the freestall lanes by flushing. 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 freestall lanes. The lanes and walkways for the mature cows (lactating and dry cows) will be flushed four times per day.

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 NH₃, VOCs, and H₂S upon decomposition. Uneaten feed will be removed from the feed lanes on a daily basis to minimize gaseous emissions from decomposition.

Liquid Manure Handling System (C-6831-3)

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

Anaerobic Treatment Lagoon

The liquid manure handling system at Red Top Jerseys Dairy consists of a two-stage anaerobic treatment lagoon system 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. A two-stage anaerobic treatment lagoon system also has an air pollution benefit over single lagoon systems. Odorous emissions are reduced with a two-stage system since the primary lagoon has a constant treatment volume, which promotes more efficient anaerobic digestion. The proposed anaerobic treatment lagoon system meets the appropriate design requirements (see design check in Appendix B).

Solids Separation

The lagoon system at Red Top Jerseys Dairy will include two mechanical separators 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 ponds 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 (C-6831-8) - 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 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 sulfates¹.

Covered Lagoon Anaerobic Digester:

Pursuant to Section 5.3 of the Settlement Agreement (9/20/2004) between the District and the Western United Dairyman and the Alliance of Western Milk Producers Inc, installation of an anaerobic digester will only be required if this technology is proven effective in reducing emissions and is required by the final Dairy BACT Guideline.² The applicant has agreed to install a lagoon cover if it is required. The proposed lagoon system has been designed so that it can be retrofit with a cover and converted to a covered lagoon digester meeting the specifications set forth in NRCS practice standard 365 – Anaerobic Digester – Ambient Temperature. If an anaerobic digester is required by the final Dairy BACT Guideline, the applicant shall submit the details of the proposed covered lagoon anaerobic digester system and combustion device to the District and shall install the system in accordance with the timeframes and procedures established by the APCO in the Dairy BACT Guideline.

Feed Handling and Storage (C-6831-8):

The feed storage system at Red Top Jerseys Dairy includes two corn silage piles (100 feet wide by 24 feet high), one oat silage pile (100 feet wide by 18 feet high), one alfalfa silage pile (100 feet wide by 18 feet high), and silage storage bags. The dairy will may have a maximum of one of each type of silage pile at any given time. 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.

¹ 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>)

² 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>)

- Only emissions from lagoons/storage pond and turbine engine 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 1,125 bhp (750 kW) emergency turbine engine (Permit #C-6831-5-0) is based on 100 hours of operation per year.
- All of the milk cows and dry cows at Red Top Jerseys Dairy will be housed in freestall barns with flushed lanes and no exercise corrals.
- No heifers, calves, or mature bulls will be housed onsite at this dairy.
- All PM₁₀ emissions from the dairy will be allocated to the cow housing permit unit (C-6831-2).
- The PM₁₀ control efficiency for freestall barns with no exercise pens is 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 of the liquid manure handling permit unit (C-6831-2).
- The mechanical separator will remove at least 50% of solids prior to the manure entering the anaerobic treatment lagoon.³
- 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 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 support stock were developed by taking the ratio of volatile solids excreted by the different types of cows to the milk cow and multiplying it by the milk cow VOC emission factor.
- The NH₃ emission factors for milk cows are based on the dairy cattle ammonia emission factor used by the California Air Resources Board. This emission factor was apportioned to the dairy permit units based on VOC emissions from manure. The NH₃ emission factors for the support stock were developed by taking the ratio of nitrogen excreted by the different types of cows to the milk cow and multiplying it by the milk cow NH₃ emission factor.
- Dairy VOC and NH₃ emission factors are primarily based on Holstein cattle. The cattle at Red Top Jerseys 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

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

cow) and consume less feed and produce less manure. Therefore, the enteric emissions and emissions from manure will be adjusted by a factor of 72% to account for the smaller size and reduced manure production of Jersey cattle.

- Because this dairy has no open corrals or exercise pens, it will be assumed that there are no emissions for corrals or pens at this dairy.
- For BACT analysis purposes, each permit unit at a dairy will also be treated as an emissions unit, except for the liquid manure handling permit unit. For BACT analysis purposes, the liquid manure handling permit unit will contain two emission units: 1) lagoon(s)/storage pond(s) and 2) liquid manure land application.
- Feeding animals in accordance with the National Research Council (NRC) guidelines is a feed formulation practice used to improve animal health and productivity. This typically limits the overfeeding of certain nutrients that have the potential of increasing emissions. This mitigation measure has the potential of reducing a significant amount of emissions, however, since there is not much data available, a conservative control efficiency of 5% will be applied to the overall dairy EF.
- 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.
- Red Top Jerseys Dairy will flush the feed lanes for mature cows four times a day. Flushing the feed lanes four times per day 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 will also have a reduction in ammonia emissions, however, due to limited data, these reductions will not be quantified in this evaluation.

B. Emission Factors

Dairy Permits (C-6831-1, -2, -3, & -4)

The emission factors for PM₁₀, VOC, NH₃, and H₂S given in the following tables will be used to calculate the pre and post-project emissions from the following permit units: the milking operation (permit C-6831-1); the cow housing (permit C-6831-2); the liquid manure handling system (permit C-6831-3); solid manure handling (permit C-6831-4).

PM₁₀ Emission Factors for the Dairy

All animals at this dairy will be housed in freestall barns with no exercise corrals. Housing cows in freestall barns with no exercise corrals eliminates any contact the cows have with dry manure and dust from the corrals, which will significantly reduce PM₁₀ emissions from the cow housing area. Based on the SJVAPCD memo, *Dairy and Feedlot PM₁₀ Mitigation Practices and their Control Efficiencies*, a conservative control efficiency of 80% will be applied to this practice.

PM₁₀ Emission Factors for Dairy Cows				
	Uncontrolled Emission Factor (lb-PM₁₀/head-yr)	Source	Control	Controlled Emission Factor (lb-PM₁₀/head-yr)
Mature Cows housed in Freestalls*	1.37	Based on a Summer 2003 study by Texas A&M ASAE at a West Texas Dairy	No Exercise Corrals & Manure-based Bedding (80%)	0.274

*For pre-project emission calculations, this emission factor will also be used for the large heifers (15 to 24 months) at this dairy because they are also housed in freestalls with no exercise corrals

VOC Emission factors for Dairies

The following tables list the VOC emission factors for dairy animals that are generally implementing the requirements of Phase I of District Rule 4570. These emission factors are based on Holstein dairy animals and will be adjusted for Jersey animals as explained above. The adjusted emission factors and the control efficiencies given in the assumptions above will be used to calculate the post-project VOC emissions from the dairy.

lb/hd-yr Dairy Emissions Factors for Holstein Dairy Cows				
		Milk Cow	Dry Cow	Support Stock*
Total lb/hd-yr EF for each type of Animal		15.8	8.6	6.6
Milking Parlor	Enteric Emissions in Milking Parlors	0.41	-	-
	Milking Parlor Floor	0.03	-	-
	Milking Parlor Total	0.44	-	-

Ib/hd-yr Dairy Emissions Factors for Holstein Dairy Cows				
		Milk Cow	Dry Cow	Support Stock*
Cow Housing	Enteric Emissions in Cow Housing	3.69	2.23	1.71
	Corrals/Pens	6.6	3.59	2.76
	Bedding	1.0	0.54	0.42
	Lanes	0.8	0.44	0.33
	Cow Housing Total	12.1	6.8	5.2
Liquid Manure Handling	Lagoons/Storage Ponds	1.3	0.71	0.54
	Liquid Manure Land Application	1.4	0.76	0.58
	Liquid Manure Handling Total	2.7	1.5	1.1
Solid Manure Handling	Solid Manure Storage	0.15	0.08	0.06
	Separated Solids Piles	0.06	0.03	0.03
	Solid Manure Land Application	0.33	0.18	0.14
	Solid Manure Handling Total	0.54	0.29	0.23

*In order to conservatively calculate the emissions, the emission factors for large heifers (15 to 24 months) are used for support stock.

Silage and TMR (Total Mixed Ration) VOC Emissions Flux (C-6831-8-1)	
Type of Feed	Emissions Flux (lb/ft²-day)
Corn Silage*	1.02E-02
Alfalfa Silage*	5.15E-03
Wheat Silage*	1.29E-02
Total Mixed Ration (TMR)**	3.85E-03

*Assuming that the pile is completely covered except the front face

** Rations fed within 48 hours of grinding/mixing

Control Efficiencies for BACT and Rule 4570 Mitigation Measures

This will be required to implement various mitigation measures to comply with District Rule 4570. Because the dairy previously expanded and was subject to BACT, the majority of these mitigation measures, or very similar measures, are currently required. Therefore the controlled emission factors will be used for calculating pre-project and post-project VOC emissions from non-feed sources.

C-6831-1: Milking Parlor

Enteric Emissions Mitigations		
Apply	Mitigation	CE (%)
√	Feed according to National Research Council (NRC) guidelines.	5
Total CE		5

Milking Parlor Floor Mitigations		
Apply	Mitigation	CE (%)
√	Feed according to National Research Council (NRC) guidelines.	5
√	Flush or hose milk parlor immediately prior to, immediately after, or during each milking NOTE: Control efficiency already included in EF	0
Total CE		5

C-6831-2: Cow Housing

Enteric Emissions Mitigations		
Apply	Mitigation	CE (%)
√	Feed according to National Research Council (NRC) guidelines.	5
Total CE		5

Corrals/Pens Mitigations		
N/A – No Corrals or Pens at this Dairy		

Bedding Mitigations		
Apply	Mitigation	CE (%)
√	Feed according to National Research Council (NRC) guidelines.	5
Total CE		5

Lanes Mitigations		
Apply	Mitigation	CE (%)
√	Feed according to National Research Council (NRC) guidelines.	5

Lanes Mitigations		
Apply	Mitigation	CE (%)
√	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 *No control efficiency at this time.	0
√	BACT: Flush lanes four times per day for mature cows and two times per day for support stock (10%) Rule 4570 Measure: 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 three (3) times per day.	10
Total CE		14.5

C-6831-3: Liquid Manure Handling

Lagoons/Storage Ponds Mitigations		
Apply	Mitigation	CE (%)
√	Feed according to National Research Council (NRC) guidelines.	5
√	Use an anaerobic treatment lagoon designed according to NRCS Guideline No. 359. (Required as BACT)	40
√	Remove solids from the waste system with a solid separator system, prior to the waste entering the lagoon NOTE: Control efficiency already included in EF	0
Total CE		43

Liquid Manure Land Application Mitigations		
Apply	Mitigation	CE (%)
√	Feed according to National Research Council (NRC) guidelines.	5

Liquid Manure Land Application Mitigations		
Apply	Mitigation	CE (%)
√	Only apply liquid manure that has been treated with an anaerobic or aerobic treatment lagoon, aerobic lagoon, or digester system. (Required as BACT)	40
√	Allow liquid manure to stand in the fields for no more than twenty-four (24) hours after irrigation NOTE: Control efficiency already included in EF	0
Total CE		43

C-6831-4: Solid Manure Handling

Solid Manure Storage Mitigations		
Apply	Mitigation	CE (%)
√	Feed according to National Research Council (NRC) guidelines.	5
Total CE		5

Separated Solids Piles Mitigations		
Apply	Mitigation	CE (%)
√	Feed according to National Research Council (NRC) guidelines.	5
√	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
Total CE		14.5

Solid Manure Land Application Mitigations		
Apply	Mitigation	CE (%)
√	Feed according to National Research Council (NRC) guidelines.	5

Solid Manure Land Application Mitigations		
Apply	Mitigation	CE (%)
√	<p>BACT - Solid manure applied to fields shall be incorporated into the soil immediately (within two hours) after application.</p> <p>Rule 4570 Measure - Incorporate all solid manure within 72 hours of land application</p> <p>NOTE: Control efficiency already included in EF</p>	0
Total CE		5

C-6831-5: Silage & TMR

Corn/Alfalfa/Wheat Silage Mitigations		
Apply	Mitigation	*CE (%)
√	<p>1. Utilize a sealed feed storage system (e.g. Ag-Bag) for bagged silage.</p> <p>< or ></p> <p>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</p> <p>Implement one of the following:</p> <p>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,</p> <p>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;</p> <p>c) harvest silage crop at > or = 65% moisture for corn; and > = 60% moisture for alfalfa/grass and other silage crops; manage silage material delivery</p>	39

Corn/Alfalfa/Wheat Silage Mitigations		
Apply	Mitigation	*CE (%)
	<p>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 Manage exposed silage</p> <p>Implement two of the following:</p> <p><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.</p> <p><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</p> <p><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 proprionic 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.</p>	
*Total CE		39

*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 (agbag)

TMR Mitigations		
Apply	Mitigation	CE (%)
√	Push feed so that it is within 3 feet of feedlane fence within 2 hours of putting out the feed or use a feed trough or other feeding structure designed to maintain feed within reach of the cows.	10

TMR Mitigations		
Apply	Mitigation	CE (%)
√	Begin feeding total mixed rations within 2 hours of grinding and mixing rations NOTE: Control efficiency already included in EF	0
√	Feed stream-flaked, dry rolled, cracked or ground corn or other ground cereal grains.	10
Total CE		19

Controlled VOC Emission Factors for the Dairy

The following tables list the controlled VOC emission factors that will be used to calculate the pre-project and post-project VOC emissions for the enteric and manure sources at the dairy and will be used to calculate the post-project VOC emissions for the feed sources at the dairy. The non-feed emission factors are based on Holstein dairy animals. As explained above, these emission factors will be adjusted by a factor of 72% to account for the smaller size, feed consumption, and manure production of the Jersey animals at the dairy.

Ib/hd-yr VOC Emission Factors for Holstein Dairy Cows Including the Controls Implemented at the Dairy				
		Milk Cow	Dry Cow	Support Stock*
Milking Parlor	Enteric Emissions in Milking Parlors	0.39	-	-
	Milking Parlor Floor	0.029	-	-
	Milking Parlor Total	0.42	-	-
Cow Housing	Enteric Emissions in Cow Housing	3.506	2.119	1.625
	Corrals/Pens	N/A	N/A	N/A
	Bedding	0.95	0.513	0.399
	Lanes	0.684	0.376	0.282
	Cow Housing Total	5.14	3.01	2.31
Liquid Manure Handling	Lagoons/Storage Ponds	0.741	0.405	0.308
	Liquid Manure Land Application	0.798	0.433	0.331
	Liquid Manure Handling Total	1.54	0.84	0.64

Ib/hd-yr VOC Emission Factors for Holstein Dairy Cows Including the Controls Implemented at the Dairy				
		Milk Cow	Dry Cow	Support Stock*
Solid Manure Handling	Solid Manure Storage	0.143	0.076	0.057
	Separated Solids Piles	0.0513	0.0257	0.0257
	Solid Manure Land Application	0.314	0.171	0.12
	Solid Manure Handling Total	0.51	0.27	0.20

*In order to conservatively calculate the emissions, the emission factors for large heifers (15 to 24 months) are used for support stock.

Ib/hd-yr VOC Emission Factors for Jersey Dairy Cows Including the Controls Implemented at the Dairy				
		Milk Cow	Dry Cow	Support Stock*
Milking Parlor	Enteric Emissions in Milking Parlors	0.281	-	-
	Milking Parlor Floor	0.0209	-	-
	Milking Parlor Total	0.30	-	-
Cow Housing	Enteric Emissions in Cow Housing	2.524	1.526	1.17
	Corrals/Pens	N/A	N/A	N/A
	Bedding	0.684	0.369	0.287
	Lanes	0.492	0.271	0.203
	Cow Housing Total	3.70	2.17	1.66
Liquid Manure Handling	Lagoons/Storage Ponds	0.534	0.292	0.222
	Liquid Manure Land Application	0.575	0.318	0.238
	Liquid Manure Handling Total	1.11	0.60	0.46
Solid Manure Handling	Solid Manure Storage	0.103	0.0547	0.041
	Separated Solids Piles	0.0369	0.0185	0.0185
	Solid Manure Land Application	0.226	0.123	0.0864
	Solid Manure Handling Total	0.37	0.20	0.15

*In order to conservatively calculate the emissions, the emission factors for large heifers (15 to 24 months) are used for support stock.

Silage and TMR (Total Mixed Ration) VOC Emissions Flux Including the Controls Implemented at the Dairy (C-6831-8-2)	
Type of Feed	Emissions Flux (lb/ft²-day)
Corn Silage	6.22E-03
Alfalfa Silage	3.14E-03
Wheat Silage	7.87E-03
Total Mixed Ration (TMR)	3.12E-03

NH₃ Emission Factors for Dairies

The following table lists the NH₃ emission factors for dairy animals. These emission factors are based on Holstein dairy animals. As explained above, these emission factors will be adjusted by a factor of 72% to account for the smaller size, feed consumption, and manure production of the Jersey animals at the dairy.

lb/hd-yr NH₃ Emissions Factors for Holstein Dairy Cows				
		Milk Cow	Dry Cow	Support Stock*
Milking Parlor	Milking Parlor Floor	0.19	-	-
	Milking Parlor Total	0.19	-	-
Cow Housing	Corrals/Pens	N/A	N/A	N/A
	Bedding	6.3	3.2	1.7
	Lanes	5.1	2.6	1.3
	Cow Housing Total	11.4	5.8	3.0
Liquid Manure Handling	Lagoons/Storage Ponds	8.2	4.2	2.2
	Liquid Manure Land Application	8.9	4.5	2.3
	Liquid Manure Handling Total	17.1	8.7	4.5
Solid Manure Handling	Solid Manure Storage	0.95	0.48	0.25
	Separated Solids Piles	0.38	0.19	0.10
	Solid Manure Land Application	2.09	1.06	0.55
	Solid Manure Handling Total	3.42	1.73	0.90

*In order to conservatively calculate the emissions, the emission factors for large heifers (15 to 24 months) are used for support stock.

Ib/hd-yr NH₃ Emissions Factors for Emission Factors for Jersey Cows at the Dairy				
		Milk Cow	Dry Cow	Support Stock[*]
Milking Parlor	Milking Parlor Floor	0.14	-	-
	Milking Parlor Total	0.14	-	-
Cow Housing	Corrals/Pens	N/A	N/A	N/A
	Bedding	4.54	2.30	1.224
	Lanes	3.67	1.87	0.936
	Cow Housing Total	8.2	4.2	2.2
Liquid Manure Handling	Lagoons/Storage Ponds	5.90	3.02	1.58
	Liquid Manure Land Application	6.41	3.24	1.66
	Liquid Manure Handling Total	12.3	6.3	3.2
Solid Manure Handling	Solid Manure Storage	0.684	0.346	0.18
	Separated Solids Piles	0.274	0.137	0.072
	Solid Manure Land Application	1.50	0.763	0.396
	Solid Manure Handling Total	2.46	1.25	0.65

*In order to conservatively calculate the emissions, the emission factors for large heifers (15 to 24 months) are used for support stock.

Hydrogen Sulfide (H₂S)

Hydrogen Sulfide (H₂S) 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 H₂S emissions at a dairy. The H₂S 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, average annual H₂S emissions will be conservatively estimated as 10% of the average annual NH₃ emissions from the storage pond. This is because both organic 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 H₂S emissions.⁴ However, because studies have indicated substantial variation in daily H₂S emission rates, the maximum

⁴ 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]

daily H₂S rate will be conservatively estimated at five times the average daily H₂S in this evaluation.

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 VOC controls currently in use at the dairy.

Milking Parlors (C-6831-1)

As discussed above, the Jersey cow emission factors, adjusted for the controls implemented at the dairy, will be used to calculate PE1 for the milking parlors.

VOC

$$\begin{aligned} PE1_{VOC} &= (4,800 \text{ Jersey milk cows}) \times (0.3 \text{ lb-VOC/cow-year}) \\ &= \mathbf{1,440 \text{ lb-VOC/year}} \end{aligned}$$

$$\begin{aligned} PE1_{VOC} &= (1,440 \text{ lb-VOC/year}) \div (365 \text{ day/year}) \\ &= \mathbf{3.9 \text{ lb-VOC/day}} \end{aligned}$$

NH₃

$$\begin{aligned} PE1_{NH_3} &= (4,800 \text{ Jersey milk cows}) \times (0.14 \text{ lb-NH}_3\text{/cow-year}) \\ &= \mathbf{672 \text{ lb-NH}_3\text{/year}} \end{aligned}$$

$$\begin{aligned} PE1_{NH_3} &= (672 \text{ lb-NH}_3\text{/year}) \div (365 \text{ day/year}) \\ &= \mathbf{1.8 \text{ lb-NH}_3\text{/day}} \end{aligned}$$

Pre-Project Potential to Emit (PE1) C-6831-1-2		
	Daily Emissions (lb/day)	Annual Emissions (lb/year)
NO _x	0	0
SO _x	0	0
PM ₁₀	0	0
CO	0	0
VOC	3.9	1,440
NH ₃	1.8	672

Cow Housing (C-6831-2)

As discussed above, the Jersey cow emission factors, adjusted for the controls implemented at the dairy, will be used to calculate PE1 for the cow housing permit.

PM₁₀

$$PE1_{PM10} = [(4,800 \text{ Jersey milk cows} \times 0.274 \text{ lb-PM}_{10}/\text{cow-year}) + (782 \text{ dry cows} \times 0.274 \text{ lb-PM}_{10}/\text{cow-year}) + (3,865 \text{ heifers 15-24 mo.} \times 0.274 \text{ lb-PM}_{10}/\text{cow-year})]$$

$$= \mathbf{2,588 \text{ lb-PM}_{10}/\text{year}}$$

$$PE1_{PM10} = (2,588 \text{ lb-PM}_{10}/\text{year}) \div (365 \text{ day/year})$$

$$= \mathbf{7.1 \text{ lb-PM}_{10}/\text{day}}$$

VOC

$$PE1_{VOC} = [(4,800 \text{ Jersey milk cows} \times 3.70 \text{ lb-VOC}/\text{cow-year}) + (782 \text{ dry cows} \times 2.17 \text{ lb-VOC}/\text{cow-year}) + (3,865 \text{ heifers 15-24 mo.} \times 1.66 \text{ lb-VOC}/\text{cow-year})]$$

$$= \mathbf{25,873 \text{ lb-VOC}/\text{year}}$$

$$PE1_{VOC} = (25,873 \text{ lb-VOC}/\text{year}) \div (365 \text{ day/year})$$

$$= \mathbf{70.9 \text{ lb-VOC}/\text{day}}$$

NH₃

$$PE1_{NH3} = [(4,800 \text{ Jersey milk cows} \times 8.2 \text{ lb-NH}_3/\text{cow-year}) + (782 \text{ dry cows} \times 4.2 \text{ lb-NH}_3/\text{cow-year}) + (3,865 \text{ heifers 15-24 mo.} \times 2.2 \text{ lb-NH}_3/\text{cow-year})]$$

$$= \mathbf{51,147 \text{ lb-NH}_3/\text{year}}$$

$$PE1_{NH3} = (51,147 \text{ lb-NH}_3/\text{year}) \div (365 \text{ day/year})$$

$$= \mathbf{140.1 \text{ lb-NH}_3/\text{day}}$$

Pre-Project Potential to Emit (PE1) C-6831-2-1		
	Daily Emissions (lb/day)	Annual Emissions (lb/year)
NO _x	0	0
SO _x	0	0
PM ₁₀	7.1	2,588
CO	0	0
VOC	70.9	25,873
NH ₃	140.1	51,147

Liquid Manure Handling System (C-6831-3: Lagoons, Storage Ponds, & Liquid Manure Land Application)

As discussed above, the Jersey cow emission factors, adjusted for the controls implemented at the dairy, will be used to calculate PE1 for the liquid manure handling system.

Lagoon/Storage Pond:

$$PE1_{VOC} = [(4,800 \text{ Jersey milk cows} \times 0.534 \text{ lb-VOC}/\text{cow-year}) + (782 \text{ dry cows} \times 0.292 \text{ lb-VOC}/\text{cow-year}) + (3,865 \text{ heifers 15-24 mo.} \times 0.222 \text{ lb-VOC}/\text{cow-year})]$$

$$= \mathbf{3,650 \text{ lb-VOC}/\text{year}}$$

$$\begin{aligned} PE1_{VOC} &= (3,650 \text{ lb-VOC/year}) \div (365 \text{ day/year}) \\ &= 10.0 \text{ lb-VOC/day} \end{aligned}$$

$$\begin{aligned} PE1_{NH_3} &= [(4,800 \text{ Jersey milk cows} \times 5.90 \text{ lb-NH}_3/\text{cow-year}) + (782 \text{ dry cows} \times 3.02 \text{ lb-NH}_3/\text{cow-year}) + (3,865 \text{ heifers 15-24 mo.} \times 1.58 \text{ lb-NH}_3/\text{cow-year})] \\ &= 36,788 \text{ lb-NH}_3/\text{year} \end{aligned}$$

$$\begin{aligned} PE1_{NH_3} &= (36,788 \text{ lb-NH}_3/\text{year}) \div (365 \text{ day/year}) \\ &= 100.8 \text{ lb-NH}_3/\text{day} \end{aligned}$$

$$\begin{aligned} PE1_{H_2S} &= 36,788 \text{ lb-NH}_3/\text{year} \times 0.10 \text{ lb-H}_2\text{S}/\text{lb-NH}_3 \\ &= 3,679 \text{ lb-H}_2\text{S}/\text{year} \end{aligned}$$

$$\begin{aligned} PE1_{H_2S} &= (3,679 \text{ lb-H}_2\text{S}/\text{year}) \div (365 \text{ day/year}) \times 5 \\ &= 50.4 \text{ lb-H}_2\text{S}/\text{day} \end{aligned}$$

Liquid Manure Land Application:

$$\begin{aligned} PE1_{VOC} &= [(4,800 \text{ Jersey milk cows} \times 0.575 \text{ lb-VOC}/\text{cow-year}) + (782 \text{ dry cows} \times 0.318 \text{ lb-VOC}/\text{cow-year}) + (3,865 \text{ heifers 15-24 mo.} \times 0.238 \text{ lb-VOC}/\text{cow-year})] \\ &= 3,929 \text{ lb-VOC}/\text{year} \end{aligned}$$

$$\begin{aligned} PE1_{VOC} &= (3,929 \text{ lb-VOC}/\text{year}) \div (365 \text{ day/year}) \\ &= 10.8 \text{ lb-VOC}/\text{day} \end{aligned}$$

$$\begin{aligned} PE1_{NH_3} &= [(4,800 \text{ Jersey milk cows} \times 6.41 \text{ lb-NH}_3/\text{cow-year}) + (782 \text{ dry cows} \times 3.24 \text{ lb-NH}_3/\text{cow-year}) + (3,865 \text{ heifers 15-24 mo.} \times 1.66 \text{ lb-NH}_3/\text{cow-year})] \\ &= 39,718 \text{ lb-NH}_3/\text{year} \end{aligned}$$

$$\begin{aligned} PE1_{NH_3} &= (39,718 \text{ lb-NH}_3/\text{year}) \div (365 \text{ day/year}) \\ &= 108.8 \text{ lb-NH}_3/\text{day} \end{aligned}$$

Total Pre-Project Emissions from Liquid Manure Handling System (C-6831-3-2):

Pre-Project Potential to Emit (PE1) C-6831-3-2						
Pollutant	Lagoon Emissions (lb/year)	+	Land Application (lb/year)	=	Total from Liquid Manure Handling	
					Annual Emissions (lb/year)	Daily Emissions (lb/day)
NO _x	0	+	0	=	0	0.0
SO _x	0	+	0	=	0	0.0
PM ₁₀	0	+	0	=	0	0.0
CO	0	+	0	=	0	0.0
VOC	3,650	+	3,929	=	7,579	20.8
NH ₃	36,788	+	39,718	=	76,506	209.6

Solid Manure Handling System (C-6831-4)

As discussed above, the Jersey cow emission factors, adjusted for the controls implemented at the dairy, will be used to calculate PE1 for the solid manure handling system.

$$\begin{aligned} PE1_{VOC} &= [(4,800 \text{ Jersey milk cows} \times 0.37 \text{ lb-VOC/cow-year}) + (782 \text{ dry cows} \times 0.20 \text{ lb-VOC/cow-year}) + (3,865 \text{ heifers 15-24 mo.} \times 0.15 \text{ lb-VOC/cow-year})] \\ &= 2,512 \text{ lb-VOC/year} \end{aligned}$$

$$\begin{aligned} PE1_{VOC} &= (2,512 \text{ lb-VOC/year}) \div (365 \text{ day/year}) \\ &= 6.9 \text{ lb-VOC/day} \end{aligned}$$

$$\begin{aligned} PE1_{NH_3} &= [(4,800 \text{ Jersey milk cows} \times 2.46 \text{ lb-NH}_3\text{/cow-year}) + (782 \text{ dry cows} \times 1.25 \text{ lb-NH}_3\text{/cow-year}) + (3,865 \text{ heifers 15-24 mo.} \times 0.65 \text{ lb-NH}_3\text{/cow-year})] \\ &= 15,298 \text{ lb-NH}_3\text{/year} \end{aligned}$$

$$\begin{aligned} PE1_{NH_3} &= (15,298 \text{ lb-NH}_3\text{/year}) \div (365 \text{ day/year}) \\ &= 41.9 \text{ lb-NH}_3\text{/day} \end{aligned}$$

Pre-Project Potential to Emit (PE1) C-6831-4-2		
	Daily Emissions (lb/day)	Annual Emissions (lb/year)
NO _x	0	0
SO _x	0	0
PM ₁₀	0	0
CO	0	0
VOC	6.9	2,512
NH ₃	41.9	15,298

Feed Storage and Handling (C-6831-8)

Silage Pile Open Face Area:

$$= [\#open \text{ face piles}] \times [height] \times (([width] + ([width]/(0.1667 \times ([width]/[height]) + 1.111)))/2)$$

Corn Area

$$= 1 \times 24 \text{ ft} \times ((100 \text{ ft} + (100 \text{ ft} / (0.1667 \times (100 \text{ ft} / 24 \text{ ft}) + 1.111 \text{ ft}))) / 2)$$

$$= 1,865 \text{ ft}^2$$

Alfalfa Area

$$= 1 \times 18 \text{ ft} \times ((100 \text{ ft} + (100 \text{ ft} / (0.1667 \times 100 \text{ ft} / 18 \text{ ft}) + 1.111 \text{ ft}))) / 2)$$

$$= 1,342 \text{ ft}^2$$

Wheat Area

$$= 1 \times 18 \text{ ft} \times ((100 \text{ ft} + (100 \text{ ft} / (0.1667 \times 100 \text{ ft} / 18 \text{ ft}) + 1.111 \text{ ft}))) / 2)$$

$$= 1,342 \text{ ft}^2$$

Corn Silage Pile:

$$\begin{aligned} PE_{1\text{voc}} &= 1,865 \text{ ft}^2 \times 1.02\text{E-}02 \text{ lb-VOC/ft}^2\text{-day} \times 365 \text{ day/year} \\ &= 6,943 \text{ lb-VOC/year} \end{aligned}$$

$$\begin{aligned} PE_{1\text{voc}} &= 1,865 \text{ ft}^2 \times 1.02\text{E-}02 \text{ lb-VOC/ft}^2\text{-day} \\ &= 19.0 \text{ lb-VOC/day} \end{aligned}$$

Alfalfa Silage Pile:

$$\begin{aligned} PE_{1\text{voc}} &= 1,342 \text{ ft}^2 \times 5.15\text{E-}03 \text{ lb-VOC/ft}^2\text{-day} \times 365 \text{ day/year} \\ &= 2,523 \text{ lb-VOC/year} \end{aligned}$$

$$\begin{aligned} PE_{1\text{voc}} &= 1,342 \text{ ft}^2 \times 5.15\text{E-}03 \text{ lb-VOC/ft}^2\text{-day} \\ &= 6.9 \text{ lb-VOC/day} \end{aligned}$$

Wheat/Oat Silage Pile:

$$\begin{aligned} PE_{1\text{voc}} &= 1,342 \text{ ft}^2 \times 1.29\text{E-}02 \text{ lb-VOC/ft}^2\text{-day} \times 365 \text{ day/year} \\ &= 6,319 \text{ lb-VOC/year} \end{aligned}$$

$$\begin{aligned} PE_{1\text{voc}} &= 1,342 \text{ ft}^2 \times 1.29\text{E-}02 \text{ lb-VOC/ft}^2\text{-day} \\ &= 17.3 \text{ lb-VOC/day} \end{aligned}$$

Total Mixed Ration (TMR)

$$\begin{aligned} PE_{1\text{voc}} &= 9,447 \text{ total head} \times 7.08 \text{ ft}^2/\text{head} \times 3.85\text{E-}03 \text{ lb-VOC/ft}^2\text{-day} \times 365 \text{ day/year} \\ &= 93,990 \text{ lb-VOC/year} \end{aligned}$$

$$\begin{aligned} PE_{1\text{voc}} &= 9,447 \text{ total head} \times 7.08 \text{ ft}^2/\text{head} \times 3.85\text{E-}03 \text{ lb-VOC/ft}^2\text{-day} \\ &= 257.5 \text{ lb-VOC/day} \end{aligned}$$

Total Pre-Project Emissions from Feed Storage and Handling Permit (C-6831-8-0):

$$\begin{aligned} PE_{1\text{voc}} &= 6,943 \text{ lb-VOC/year} + 2,523 \text{ lb-VOC/year} + 6,319 \text{ lb-VOC/year} + 93,990 \text{ lb-VOC/year} \\ &= 109,775 \text{ lb-VOC/year} \end{aligned}$$

$$\begin{aligned} PE_{1\text{voc}} &= (109,775 \text{ lb-VOC/year}) \div (365 \text{ day/year}) \\ &= 300.8 \text{ lb-VOC/day} \end{aligned}$$

2. Post Project Potential to Emit (PE2)

Milking Parlors (C-6831-1)

As discussed above, the Jersey cow emission factors, adjusted for the controls implemented at the dairy, will be used to calculate PE2 for the milking parlors.

VOC

$$\begin{aligned} PE_{2\text{voc}} &= (7,200 \text{ Jersey milk cows}) \times (0.3 \text{ lb-VOC/cow-year}) \\ &= \mathbf{2,160 \text{ lb-VOC/year}} \end{aligned}$$

$$\begin{aligned} PE2_{VOC} &= (2,160 \text{ lb-VOC/year}) \div (365 \text{ day/year}) \\ &= \mathbf{5.9 \text{ lb-VOC/day}} \end{aligned}$$

NH₃

$$\begin{aligned} PE2_{NH_3} &= (7,200 \text{ Jersey milk cows}) \times (0.14 \text{ lb-NH}_3/\text{cow-year}) \\ &= \mathbf{1,008 \text{ lb-NH}_3/\text{year}} \end{aligned}$$

$$\begin{aligned} PE2_{NH_3} &= (1,008 \text{ lb-NH}_3/\text{year}) \div (365 \text{ day/year}) \\ &= \mathbf{2.8 \text{ lb-NH}_3/\text{day}} \end{aligned}$$

Post-Project Potential to Emit (PE2) C-6831-1-3		
	Daily Emissions (lb/day)	Annual Emissions (lb/year)
NO _x	0	0
SO _x	0	0
PM ₁₀	0	0
CO	0	0
VOC	5.9	2,160
NH ₃	2.8	1,008

Cow Housing (C-6831-2)

As discussed above, the Jersey cow emission factors, adjusted for the controls implemented at the dairy, will be used to calculate PE2 for the cow housing permit.

PM₁₀

$$\begin{aligned} PE2_{PM_{10}} &= [(7,200 \text{ Jersey milk cows} \times 0.274 \text{ lb-PM}_{10}/\text{cow-year}) + (1,350 \text{ dry cows} \times \\ &\quad 0.274 \text{ lb-PM}_{10}/\text{cow-year})] \\ &= \mathbf{2,343 \text{ lb-PM}_{10}/\text{year}} \end{aligned}$$

$$\begin{aligned} PE2_{PM_{10}} &= (2,343 \text{ lb-PM}_{10}/\text{year}) \div (365 \text{ day/year}) \\ &= \mathbf{6.4 \text{ lb-PM}_{10}/\text{day}} \end{aligned}$$

VOC

$$\begin{aligned} PE2_{VOC} &= [(7,200 \text{ Jersey milk cows} \times 3.70 \text{ lb-VOC}/\text{cow-year}) + (1,350 \text{ dry cows} \times 2.17 \\ &\quad \text{lb-VOC}/\text{cow-year})] \\ &= \mathbf{29,570 \text{ lb-VOC}/\text{year}} \end{aligned}$$

$$\begin{aligned} PE2_{VOC} &= (29,570 \text{ lb-VOC}/\text{year}) \div (365 \text{ day/year}) \\ &= \mathbf{81.0 \text{ lb-VOC}/\text{day}} \end{aligned}$$

NH₃

$$\begin{aligned} PE2_{NH_3} &= [(7,200 \text{ Jersey milk cows} \times 8.2 \text{ lb-NH}_3/\text{cow-year}) + (1,350 \text{ dry cows} \times 4.2 \text{ lb-} \\ &\quad \text{NH}_3/\text{cow-year})] \\ &= \mathbf{64,710 \text{ lb-NH}_3/\text{year}} \end{aligned}$$

$$\begin{aligned} PE2_{NH_3} &= (64,710 \text{ lb-NH}_3/\text{year}) \div (365 \text{ day/year}) \\ &= 177.3 \text{ lb-NH}_3/\text{day} \end{aligned}$$

Post-Project Potential to Emit (PE2) C-6831-2-3		
	Daily Emissions (lb/day)	Annual Emissions (lb/year)
NO _x	0	0
SO _x	0	0
PM ₁₀	6.4	2,343
CO	0	0
VOC	81.0	29,570
NH ₃	177.3	64,710

Liquid Manure Handling System (C-6831-3: Lagoon, Storage Pond, & Liquid Manure Land Application)

As discussed above, the Jersey cow emission factors, adjusted for the controls implemented at the dairy, will be used to calculate PE2 for the liquid manure handling system.

Lagoon/Storage Pond:

$$\begin{aligned} PE2_{VOC} &= [(7,200 \text{ Jersey milk cows} \times 0.534 \text{ lb-VOC/cow-year}) + (1,350 \text{ dry cows} \times \\ &\quad 0.292 \text{ lb-VOC/cow-year})] \\ &= 4,239 \text{ lb-VOC/year} \end{aligned}$$

$$\begin{aligned} PE2_{VOC} &= (4,239 \text{ lb-VOC/year}) \div (365 \text{ day/year}) \\ &= 11.6 \text{ lb-VOC/day} \end{aligned}$$

$$\begin{aligned} PE2_{NH_3} &= [(7,200 \text{ Jersey milk cows} \times 5.90 \text{ lb-NH}_3/\text{cow-year}) + (1,350 \text{ dry cows} \times 3.02 \\ &\quad \text{lb-NH}_3/\text{cow-year})] \\ &= 46,557 \text{ lb-NH}_3/\text{year} \end{aligned}$$

$$\begin{aligned} PE2_{NH_3} &= (46,557 \text{ lb-NH}_3/\text{year}) \div (365 \text{ day/year}) \\ &= 127.6 \text{ lb-NH}_3/\text{day} \end{aligned}$$

$$\begin{aligned} PE2_{H_2S} &= 46,557 \text{ lb-NH}_3/\text{year} \times 0.10 \text{ lb-H}_2\text{S}/\text{lb-NH}_3 \\ &= 4,656 \text{ lb-H}_2\text{S}/\text{year} \end{aligned}$$

$$\begin{aligned} PE2_{H_2S} &= (4,656 \text{ lb-H}_2\text{S}/\text{year}) \div (365 \text{ day/year}) \times 5 \\ &= 63.8 \text{ lb-H}_2\text{S}/\text{day} \end{aligned}$$

Liquid Manure Land Application:

$$\begin{aligned} PE2_{VOC} &= [(7,200 \text{ Jersey milk cows} \times 0.575 \text{ lb-VOC/cow-year}) + (1,350 \text{ dry cows} \times \\ &\quad 0.318 \text{ lb-VOC/cow-year})] \\ &= 4,569 \text{ lb-VOC/year} \end{aligned}$$

$$\begin{aligned} PE2_{VOC} &= (4,569 \text{ lb-VOC/year}) \div (365 \text{ day/year}) \\ &= 12.5 \text{ lb-VOC/day} \end{aligned}$$

$$\begin{aligned} PE2_{NH_3} &= [(7,200 \text{ Jersey milk cows} \times 6.41 \text{ lb-NH}_3/\text{cow-year}) + (1,350 \text{ dry cows} \times 3.24 \\ &\quad \text{lb-NH}_3/\text{cow-year})] \\ &= 50,526 \text{ lb-NH}_3/\text{year} \end{aligned}$$

$$\begin{aligned} PE2_{NH_3} &= (39,718 \text{ lb-NH}_3/\text{year}) \div (365 \text{ day/year}) \\ &= 138.4 \text{ lb-NH}_3/\text{day} \end{aligned}$$

Total Post-Project Emissions from Liquid Manure Handling System (C-6831-3-2):

Post-Project Potential to Emit (PE1) C-6831-3-3						
Pollutant	Lagoon Emissions (lb/year)	+	Land Application (lb/year)	=	Total from Liquid Manure Handling	
					Annual Emissions (lb/year)	Daily Emissions (lb/day)
NO _x	0	+	0	=	0	0.0
SO _x	0	+	0	=	0	0.0
PM ₁₀	0	+	0	=	0	0.0
CO	0	+	0	=	0	0.0
VOC	4,239	+	4,569	=	8,808	24.1
NH ₃	46,557	+	50,526	=	97,083	266.0

Solid Manure Handling System (C-6831-4)

As discussed above, the Jersey cow emission factors, adjusted for the controls implemented at the dairy, will be used to calculate PE2 for the solid manure handling system.

$$\begin{aligned} PE2_{VOC} &= [(7,200 \text{ Jersey milk cows} \times 0.37 \text{ lb-VOC}/\text{cow-year}) + (1,350 \text{ dry cows} \times 0.20 \\ &\quad \text{lb-VOC}/\text{cow-year})] \\ &= 2,934 \text{ lb-VOC}/\text{year} \end{aligned}$$

$$\begin{aligned} PE2_{VOC} &= (2,934 \text{ lb-VOC}/\text{year}) \div (365 \text{ day/year}) \\ &= 8.0 \text{ lb-VOC}/\text{day} \end{aligned}$$

$$\begin{aligned} PE2_{NH_3} &= [(7,200 \text{ Jersey milk cows} \times 2.46 \text{ lb-NH}_3/\text{cow-year}) + (1,350 \text{ dry cows} \times 1.25 \\ &\quad \text{lb-NH}_3/\text{cow-year})] \\ &= 19,400 \text{ lb-NH}_3/\text{year} \end{aligned}$$

$$\begin{aligned} PE2_{NH_3} &= (19,400 \text{ lb-NH}_3/\text{year}) \div (365 \text{ day/year}) \\ &= 53.1 \text{ lb-NH}_3/\text{day} \end{aligned}$$

Post-Project Potential to Emit (PE2) C-6831-4-3		
	Daily Emissions (lb/day)	Annual Emissions (lb/year)
NO _x	0	0
SO _x	0	0
PM ₁₀	0	0
CO	0	0
VOC	8.0	2,934
NH ₃	53.2	19,400

Feed Storage and Handling (C-6831-8)

As discussed above, the silage pile and feed emission factors, adjusted for the control efficiencies for District Rule 4570 mitigation measures that will be required at the dairy, will be used to calculate PE2 for the feed handling and storage permit unit.

Silage Pile Open Face Area:

$$= [\text{\#open face piles}] \times [\text{height}] \times (([\text{width}] + ([\text{width}] / (0.1667 \times ([\text{width}] / [\text{height}] + 1.111)))) / 2)$$

Corn Area

$$= 1 \times 24 \text{ ft} \times ((100 \text{ ft} + (100 \text{ ft} / (0.1667 \times (100 \text{ ft} / 24 \text{ ft}) + 1.111 \text{ ft}))) / 2)$$

$$= 1,865 \text{ ft}^2$$

Alfalfa Area

$$= 1 \times 18 \text{ ft} \times ((100 \text{ ft} + (100 \text{ ft} / (0.1667 \times 100 \text{ ft} / 18 \text{ ft}) + 1.111 \text{ ft}))) / 2)$$

$$= 1,342 \text{ ft}^2$$

Wheat Area

$$= 1 \times 18 \text{ ft} \times ((100 \text{ ft} + (100 \text{ ft} / (0.1667 \times 100 \text{ ft} / 18 \text{ ft}) + 1.111 \text{ ft}))) / 2)$$

$$= 1,342 \text{ ft}^2$$

Corn Silage Pile:

$$\text{PE2}_{\text{VOC}} = 1,865 \text{ ft}^2 \times 6.22\text{E-}03 \text{ lb-VOC/ft}^2\text{-day} \times 365 \text{ day/year}$$

$$= 4,234 \text{ lb-VOC/year}$$

$$\text{PE2}_{\text{VOC}} = 1,865 \text{ ft}^2 \times 1.02\text{E-}02 \text{ lb-VOC/ft}^2\text{-day}$$

$$= 11.6 \text{ lb-VOC/day}$$

Alfalfa Silage Pile:

$$\text{PE2}_{\text{VOC}} = 1,342 \text{ ft}^2 \times 3.14\text{E-}03 \text{ lb-VOC/ft}^2\text{-day} \times 365 \text{ day/year}$$

$$= 1,538 \text{ lb-VOC/year}$$

$$\text{PE2}_{\text{VOC}} = 1,342 \text{ ft}^2 \times 3.14\text{E-}03 \text{ lb-VOC/ft}^2\text{-day}$$

$$= 4.2 \text{ lb-VOC/day}$$

Wheat/Oat Silage Pile:

$$\text{PE2}_{\text{VOC}} = 1,342 \text{ ft}^2 \times 7.87\text{E-}03 \text{ lb-VOC/ft}^2\text{-day} \times 365 \text{ day/year}$$

$$= 3,855 \text{ lb-VOC/year}$$

$$\text{PE2}_{\text{VOC}} = 1,342 \text{ ft}^2 \times 7.87\text{E-}03 \text{ lb-VOC/ft}^2\text{-day}$$

$$= 10.6 \text{ lb-VOC/day}$$

Total Mixed Ration (TMR)

$$\text{PE2}_{\text{VOC}} = 8,550 \text{ total head} \times 7.08 \text{ ft}^2/\text{head} \times 3.12\text{E-}03 \text{ lb-VOC/ft}^2\text{-day} \times 365 \text{ day/year}$$

$$= 68,936 \text{ lb-VOC/year}$$

$$\text{PE2}_{\text{VOC}} = 8,550 \text{ total head} \times 7.08 \text{ ft}^2/\text{head} \times 3.12\text{E-}03 \text{ lb-VOC/ft}^2\text{-day}$$

$$= 188.9 \text{ lb-VOC/day}$$

Total Post-Project Emissions from Feed Storage and Handling Permit (C-6831-8-0):

$$\text{PE2}_{\text{VOC}} = 4,234 \text{ lb-VOC/year} + 1,538 \text{ lb-VOC/year} + 3,855 \text{ lb-VOC/year} + 68,936 \text{ lb-VOC/year}$$

$$= 78,563 \text{ lb-VOC/year}$$

$$\text{PE2}_{\text{VOC}} = (78,563 \text{ lb-VOC/year}) \div (365 \text{ day/year})$$

$$= 215.2 \text{ lb-VOC/day}$$

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.

Pre-Project Stationary Source Potential to Emit [SSPE1] (lb/year)							
	NO _x	SO _x	PM ₁₀	CO	VOC	NH ₃	H ₂ S
C-6831-1-2 (Milk Parlors)	0	0	0	0	1,440	672	0
C-6831-2-2 (Cow Housing)	0	0	2,588	0	25,873	51,147	0
C-6831-3-2 (Liquid Manure Handling)	0	0	0	0	7,579	76,506	3,679
C-6831-4-2 (Solid Manure Handling)	0	0	0	0	2,512	15,298	0
C-6831-5-0 (1,125 bhp (750 kW) Emergency Turbine)	901	2	12	3	0	0	0
C-6831-8-0 (Feed Storage & Handling)	0	0	0	0	109,775	0	0
Pre-Project SSPE (SSPE1)	901	2	2,600	3	147,179	143,623	3,679

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

Pursuant to Section 4.10 of District Rule 2201, the Post Project Stationary Source Potential to Emit (SSPE2) 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 that have occurred at the source, and which have not been used on-site.

Post-Project Stationary Source Potential to Emit [SSPE2] (lb/year)							
	NO _x	SO _x	PM ₁₀	CO	VOC	NH ₃	H ₂ S
C-6831-1-3 (Milk Parlors)	0	0	0	0	2,160	1,008	0
C-6831-2-3 (Cow Housing)	0	0	2,343	0	29,570	64,710	0
C-6831-3-2 (Liquid Manure Handling)	0	0	0	0	8,808	97,083	4,656
C-6831-4-3 (Solid Manure Handling)	0	0	0	0	2,934	19,400	0
C-6831-5-0 (1,125 bhp (750 kW) Emergency Turbine)	901	2	12	3	0	0	0
C-6831-8-1 (Feed Storage & Handling)	0	0	0	0	78,563	0	0
Post-Project SSPE (SSPE2)	901	2	2,355	3	122,035	182,201	4,656

5. 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. However, for the purposes of determining major source status, the SSPE2 shall not include 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.”

In determining whether a facility is a major source, fugitive emissions are not counted unless the facility belongs to certain specified source categories. 40 CFR 71.2 (Definitions, Major Source (2)) states the following:

(2) A major stationary source of air pollutants or any group of stationary sources 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 (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; (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 71.2 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 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 Volatile Organic Compounds 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, as discussed in more detail below.

Milking Center

The mechanical system for the milking parlors can be utilized to capture the gases emitted from the milking parlors, however in order to capture all of the gases, and to keep an appropriate negative pressure throughout the system, the holding area would also need to be entirely enclosed. No facility currently encloses the holding area since cows are continuously going in and out of the barn throughout the day. The capital required to enclose this large area would also be significant. Since the holding area is primarily kept open, the District cannot reasonably demonstrate that emissions can pass through a stack, chimney, vent, or other functionally equivalent opening.

Cow Housing

Although there are smaller dairy farms that have enclosed freestall barns, these barns are not fully enclosed and none of the barns have been found to vent the exhaust through a collection device. The airflow requirements through dairy barns are extremely

high, primarily for herd health purposes. The airflow requirements will be even higher in the San Joaquin valley, where temperatures reach in excess of 110 degrees in the hot summer. Collection and control of the exhaust including the large amounts of airflow have not yet been achieved by any facility. Due to this difficulty, the District cannot reasonably demonstrate that emissions can pass through a stack, chimney, vent, or other functionally equivalent opening.

Manure Storage Areas

Many dairies have been found to cover dry manure piles. Covering dry manure piles is also a mitigation measure included in District Rule 4570. However, the District was not able to find any facility, which currently captures the emissions from the storage or handling of manure piles. Although many of these piles are covered, the emissions cannot easily be captured. Therefore, the District cannot reasonably demonstrate that these emissions can pass through a stack, chimney, vent, or other functionally equivalent opening. In addition, emissions from manure piles have been shown to be insignificant from recent studies.

Land Application

Emissions generated from the application of manure on land cannot reasonably be captured due to the extremely large areas, in some cases thousands of acres, of cropland at dairies. Therefore, the District cannot reasonably demonstrate that these emissions can pass through a stack, chimney, vent, or other functionally equivalent opening.

Feed Handling and Storage

The majority of dairies store the silage piles underneath a tarp or in an agbag. The entire pile is covered except for the face of the pile. The face of the pile is kept open due to the continual need to extract the silage for feed purposes. The silage pile is disturbed 2-3 times per day. Because of the ongoing disturbance to these piles, it makes it extremely difficult to design a system to capture the emissions from these piles. In fact, as far as the District is aware, no system has been designed to successfully extract the gases from the face of the pile to capture them, and, as important, no study has assessed the potential impacts on silage quality of a continuous air flow across the silage pile, as would be required by such a collection system. Therefore, the District cannot demonstrate that these emissions can be reasonably expected to pass through a stack, chimney, vent, or other functionally equivalent opening.

Therefore, the VOC emissions from these sources 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 lagoons/storage ponds and emergency turbine will be used to determine if this facility is a major source.

The post-project emissions from the lagoon/storage pond at this dairy were calculated in Section VII.C.2 above. The following table shows the non-fugitive Post-Project Stationary Source Potential to Emit for the dairy.

Non-Fugitive Post-Project Stationary Source Potential to Emit [SSPE2] (lb/year)					
	NO _x	SO _x	PM ₁₀	CO	VOC
C-6831-1-3 (Milk Parlors)	0	0	0	0	0
C-6831-2-3 (Cow Housing)	0	0	0	0	0
C-6831-3-2 (Liquid Manure Handling)	0	0	0	0	4,239
C-6831-4-3 (Solid Manure Handling)	0	0	0	0	0
C-6831-5-0 (1,125 bhp (750 kW) Emergency Turbine)	901	2	12	3	0
C-6831-8-1 (Feed Storage & Handling)	0	0	0	0	0
Non Fugitive SSPE2	901	2	12	3	4,239

Major Source Determination (lb/year)					
	NO _x	SO _x	PM ₁₀	CO	VOC
Non-Fugitive SSPE1	901	2	12	3	3,929
Non-Fugitive SSPE2	901	2	12	3	4,239
Major Source Threshold	20,000	140,000	140,000	200,000	20,000
Major Source?	No	No	No	No	No

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.

6. Baseline Emissions (BE)

The BE calculation (in lb/year) is performed on a pollutant-by-pollutant basis to determine the amount of offsets required, where necessary. However, agricultural operations that are not major sources are exempt from offsets pursuant to Section 4.6.9 of District Rule 2201. Therefore, BE calculations are not required for the dairy permits.

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. Additionally, since the facility is not a major source for PM₁₀ (140,000 lb/year), it is not a major source for PM_{2.5} (200,000 lb/year).

9. 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 the project file.

VIII. Compliance

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 for the following*:

- 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 a Title I Modification.

*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, each permit unit at a dairy is treated as an emissions unit for BACT purposes, except for the liquid manure handling permit unit, which is treated as two emissions units: lagoon(s)/storage pond(s) and liquid manure land application.

As discussed above, the dairy is an existing operation and all permitted units addressed under this project exist as part of the dairy. Therefore BACT is not triggered for installation of new units with PE > 2 lb/day purposes.

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 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 Potential to Emit prior to modification or relocation, (lb/day)

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

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

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

HAPE for the dairy emission units will be calculated based on the pre-project annual emissions and the pre-project emission factors for each type of cow, which were taken from the tables in Section VII.C.1 above, and the post-project emission factors that were used in the tables in Section VII.C.2 above to calculate the post project emissions (PE2) from the units.

Milking Operation (ATC C-6831-1-3)

As seen in Section VII.C.2 of this evaluation, the applicant is proposing to install a new milking operation with a PE greater than 2.0 lbs/day for VOC and NH₃; therefore, BACT is triggered for VOC and NH₃ from the milk parlor.

AIPE for Milking Operation

VOC

$$\text{PE2} = 5.9 \text{ lb-VOC/day (calculated in Section VII.C.2 above)}$$

$$\text{HAPE} = 3.9 \text{ lb-VOC/day} \times (0.3 \text{ lb-VOC/cow-yr}) / (0.3 \text{ lb-VOC/cow-yr}) = 3.9 \text{ lb-VOC/day}$$

$$\begin{aligned} \text{AIPE} &= 5.9 \text{ lb-VOC/day} - 3.9 \text{ lb-VOC/day} \\ &= 2.0 \text{ lb-VOC/day} \end{aligned}$$

NH₃

$$\text{PE2} = 2.8 \text{ lb-NH}_3\text{/day (calculated in Section VII.C.2 above)}$$

$$\text{HAPE} = 1.8 \text{ lb-NH}_3\text{/day} \times (0.14 \text{ lb-NH}_3\text{/cow-yr}) / (0.14 \text{ lb-NH}_3\text{/cow-yr}) = 1.8 \text{ lb-NH}_3\text{/day}$$

$$\begin{aligned} \text{AIPE} &= 2.8 \text{ lb-NH}_3\text{/day} - 1.8 \text{ lb-NH}_3\text{/day} \\ &= 1.0 \text{ lb-NH}_3\text{/day} \end{aligned}$$

As demonstrated above, the AIPE for the project for the milking operation does not exceed 2.0 lb/day for VOC or NH₃; therefore BACT is not triggered for VOC or NH₃ from the milking operation. Although BACT is not triggered for the milking operation under this project, the dairy was previously issued ATC permits for expansion of the dairy under Project C-1050585 and the dairy will continue to be subject to the applicable BACT requirements resulting from the previous expansion.

Cow Housing (ATC C-6831-2-3) – Modify Herd Size from 4,800 Jersey Milk Cows (9447 total head) to 7,200 Jersey Milk Cows (8,550 total head):

AIPE for Cow Housing

PM₁₀

PE2 = 6.4 lb-PM₁₀/day (calculated in Section VII.C.2 above)

HAPE for PM₁₀ from the Cow Housing Permit (Permit C-6831-2)							
Type of Cow	PE ₁ (lb/yr)	x	(EF ₂) (lb/hd-yr)	÷	(EF ₁) (lb/hd-yr)	=	HAPE (lb/yr)
Jersey Milk Cow	1,315	x	0.274	÷	0.274	=	1,315
Jersey Dry Cow	214	x	0.274	÷	0.274	=	214
Support Stock/ Heifer (15-24 months)	1,059	x	0.274	÷	0.274	=	1,059
HAPE for PM₁₀ from Cow Housing (C-6831-2)						Total lb/yr	2,588
						lb/day = total lb/yr ÷ (365 day/yr)	7.1

$$\begin{aligned} \text{AIPE} &= 6.4 \text{ lb-PM}_{10}/\text{day} - 7.1 \text{ lb-PM}_{10}/\text{day} \\ &= -0.7 \text{ lb-PM}_{10}/\text{day} \end{aligned}$$

VOC

PE2 = 81.0 lb-VOC/day (calculated in Section VII.C.2 above)

HAPE for VOC from the Cow Housing Permit (Permit C-6831-2)							
Type of Cow	PE ₁ (lb/yr)	x	(EF ₂) (lb/hd-yr)	÷	(EF ₁) (lb/hd-yr)	=	HAPE (lb/yr)
Jersey Milk Cow	17,760	x	3.7	÷	3.7	=	17,760
Jersey Dry Cow	1,697	x	2.17	÷	2.17	=	1,697
Support Stock/ Heifer (15-24 months)	6,416	x	1.66	÷	1.66	=	6,416
HAPE for VOC from Cow Housing (C-6831-2)						Total lb/yr	25,873
						lb/day = total lb/yr ÷ (365 day/yr)	70.9

$$\begin{aligned} \text{AIPE} &= 81.0 \text{ lb-VOC}/\text{day} - 70.9 \text{ lb-VOC}/\text{day} \\ &= 10.1 \text{ lb-VOC}/\text{day} \end{aligned}$$

NH₃

PE2 = 177.3 (calculated in Section VII.C.2 above)

HAPE for NH₃ from the Cow Housing Permit (Permit C-6831-2)							
Type of Cow	PE ₁ (lb/yr)	x	(EF ₂) (lb/hd-yr)	+	(EF ₁) (lb/hd-yr)	=	HAPE (lb/yr)
Jersey Milk Cow	39,360	x	8.2	+	8.2	=	39,360
Jersey Dry Cow	3,284	x	4.2	+	4.2	=	3,284
Support Stock/ Heifer (15-24 months)	8,503	x	2.2	+	2.2	=	8,503
HAPE for NH₃ from Cow Housing (C-6831-2)						Total lb/yr	51,147
						lb/day = total lb/yr + (365 day/yr)	140.1

$$\begin{aligned} \text{AIPE} &= 177.3 \text{ lb-NH}_3/\text{day} - 140.1 \text{ lb-NH}_3/\text{day} \\ &= 37.2 \text{ lb-NH}_3/\text{day} \end{aligned}$$

As demonstrated above, the AIPE for the project for the cow housing permit does not exceed 2.0 lb/day for PM₁₀ but exceeds 2.0 lb/day for VOC and NH₃; therefore BACT is not triggered for PM₁₀ from the cow housing permit unit but BACT is triggered for VOC and NH₃ from the cow housing permit unit.

Liquid Manure Handling System (ATC C-6831-3-3: Lagoon & Storage Ponds and Liquid Manure Land Application):

AIPE for Lagoons & Storage Ponds

VOC

$$\text{PE}_2 = 11.6 \text{ lb-VOC/day (calculated in Section VII.C.2 above)}$$

HAPE for VOC from Lagoons/Storage Ponds (Permit C-6831-3)							
Type of Cow	PE ₁ (lb/yr)	x	(EF ₂) (lb/hd-yr)	+	(EF ₁) (lb/hd-yr)	=	HAPE (lb/yr)
Jersey Milk Cow	2,563	x	0.534	+	0.534	=	2,563
Jersey Dry Cow	228	x	0.292	+	0.292	=	228
Support Stock/ Heifer (15-24 months)	858	x	0.222	+	0.222	=	858
HAPE for VOC from Lagoons/Ponds (C-6831-3)						Total lb/yr	3,649
						lb/day = total lb/yr + (365 day/yr)	10.0

$$\begin{aligned} \text{AIPE} &= 11.6 \text{ lb-VOC/day} - 10.0 \text{ lb-VOC/day} \\ &= 1.6 \text{ lb-VOC/day} \end{aligned}$$

NH₃

$$\text{PE}_2 = 127.6 \text{ lb-NH}_3/\text{day (calculated in Section VII.C.2 above)}$$

HAPE for NH ₃ from Lagoons/Storage Ponds (Permit C-6831-3)								
Type of Cow	PE ₁ (lb/yr)	x	(EF ₂) (lb/hd-yr)	÷	(EF ₁) (lb/hd-yr)	=	HAPE (lb/yr)	
Jersey Milk Cow	28,320	x	5.9	÷	5.9	=	28,320	
Jersey Dry Cow	2,362	x	3.02	÷	3.02	=	2,362	
Support Stock/ Heifer (15-24 months)	6,107	x	1.58	÷	1.58	=	6,107	
HAPE for NH₃ from Lagoons/Ponds (C-6831-3)		Total lb/yr					=	36,789
		lb/day = total lb/yr ÷ (365 day/yr)					=	100.8

$$\begin{aligned} \text{AIPE} &= 127.6 \text{ lb-NH}_3/\text{day} - 100.8 \text{ lb-NH}_3/\text{day} \\ &= 26.8 \text{ lb-NH}_3/\text{day} \end{aligned}$$

H₂S

$$\text{PE}_2 = 63.8 \text{ lb-H}_2\text{S}/\text{day} \text{ (calculated in Section VII.C.2 above)}$$

HAPE for H ₂ S from Lagoons/Storage Ponds (Permit C-6831-3)								
Type of Cow	PE ₁ (lb/yr)	x	(EF ₂) (lb/hd-yr)	÷	(EF ₁) (lb/hd-yr)	=	HAPE (lb/yr)	
Jersey Milk Cow	2,832	x	0.59	÷	0.59	=	2,832	
Jersey Dry Cow	236	x	0.302	÷	0.302	=	236	
Support Stock/ Heifer (15-24 months)	611	x	0.158	÷	0.158	=	611	
HAPE for H₂S from Lagoons/Ponds (C-6831-3)		Total lb/yr*					=	3,679
		Max lb/day* = total lb/yr ÷ (365 day/yr) x 5					=	50.4

*Annual H₂S emissions estimated as 10% of the annual ammonia emissions from the lagoon. Maximum Daily emissions estimated as 5 times the average daily emissions.

$$\begin{aligned} \text{AIPE} &= 63.8 \text{ lb-H}_2\text{S}/\text{day} - 50.4 \text{ lb-H}_2\text{S}/\text{day} \\ &= 13.4 \text{ lb-H}_2\text{S}/\text{day} \end{aligned}$$

As demonstrated above, the AIPE for the project for the lagoon and storage ponds does not exceed 2.0 lb/day for VOC but exceeds 2.0 lb/day for NH₃ and H₂S therefore; therefore BACT is not triggered for VOC from the lagoon and storage ponds but BACT is triggered for NH₃ and H₂S from the lagoon and storage ponds. Although BACT is not triggered for VOC from the lagoon and storage ponds under this project, the dairy was previously issued ATC permits for expansion of the dairy under Project C-1050585 and the dairy will continue to be subject to the applicable BACT requirements for VOC resulting from the previous expansion.

AIPE for Liquid Manure Land Application

VOC

$$\text{PE}_2 = 12.5 \text{ lb-VOC}/\text{day} \text{ (calculated in Section VII.C.2 above)}$$

HAPE for VOC from Liquid Manure Land Application (Permit C-6831-3)							
Type of Cow	PE ₁ (lb/yr)	x	(EF ₂) (lb/hd-yr)	÷	(EF ₁) (lb/hd-yr)	=	HAPE (lb/yr)
Jersey Milk Cow	2,760	x	0.575	÷	0.575	=	2,760
Jersey Dry Cow	249	x	0.318	÷	0.318	=	249
Support Stock/ Heifer (15-24 months)	920	x	0.238	÷	0.238	=	920
HAPE for VOC from Liquid Manure Land Application (C-6831-3)						Total lb/yr	3,929
						lb/day = total lb/yr ÷ (365 day/yr)	10.8

$$\begin{aligned} \text{AIPE} &= 12.5 \text{ lb-VOC/day} - 10.8 \text{ lb-VOC/day} \\ &= 1.7 \text{ lb-VOC/day} \end{aligned}$$

NH₃

$$\text{PE2} = 138.4 \text{ lb-NH}_3/\text{day (calculated in Section VII.C.2 above)}$$

HAPE for NH₃ from Liquid Manure Land Application (Permit C-6831-3)							
Type of Cow	PE ₁ (lb/yr)	x	(EF ₂) (lb/hd-yr)	÷	(EF ₁) (lb/hd-yr)	=	HAPE (lb/yr)
Jersey Milk Cow	30,768	x	6.41	÷	6.41	=	30,768
Jersey Dry Cow	2,534	x	3.24	÷	3.24	=	2,534
Support Stock/ Heifer (15-24 months)	6,416	x	1.66	÷	1.66	=	6,416
HAPE for NH₃ from Liquid Manure Land Application (C-6831-3)						Total lb/yr	39,718
						lb/day = total lb/yr ÷ (365 day/yr)	108.8

$$\begin{aligned} \text{AIPE} &= 138.4 \text{ lb-NH}_3/\text{day} - 108.8 \text{ lb-NH}_3/\text{day} \\ &= 29.6 \text{ lb-NH}_3/\text{day} \end{aligned}$$

As demonstrated above, the AIPE for the project for liquid manure land application does not exceed 2.0 lb/day for VOC but exceeds 2.0 lb/day for NH₃; therefore BACT is not triggered for VOC from liquid manure land application but BACT is triggered for NH₃ from liquid manure land application. Although BACT is not triggered for VOC from liquid manure land application under this project, the dairy was previously issued ATC permits for expansion of the dairy under Project C-1050585 and the dairy will continue to be subject to the applicable BACT requirements for VOC resulting from the previous expansion.

Solid Manure Handling System (ATC C-6831-4-3):

AIPE for Solid Manure Handling System

VOC

$$\text{PE2} = 8.0 \text{ lb-VOC/day (calculated in Section VII.C.2 above)}$$

HAPE for VOC from the Solid Manure Handling System (Permit C-6831-4)							
Type of Cow	PE ₁ (lb/yr)	x	(EF ₂) (lb/hd-yr)	÷	(EF ₁) (lb/hd-yr)	=	HAPE (lb/yr)
Jersey Milk Cow	1,776	x	0.37	÷	0.37	=	1,776
Jersey Dry Cow	156	x	0.2	÷	0.2	=	156
Support Stock/ Heifer (15-24 months)	580	x	0.15	÷	0.15	=	580
HAPE for VOC from the Solid Manure Handling System (C-6831-4)						Total lb/yr	2,512
						lb/day = total lb/yr ÷ (365 day/yr)	6.9

$$\text{AIPE} = 8.0 \text{ lb-VOC/day} - 6.9 \text{ lb-VOC/day} \\ = 1.1 \text{ lb-VOC/day}$$

NH₃

$$\text{PE}_2 = 53.1 \text{ lb-NH}_3/\text{day (calculated in Section VII.C.2 above)}$$

HAPE for NH₃ from the Solid Manure Handling System (Permit C-6831-4)							
Type of Cow	PE ₁ (lb/yr)	x	(EF ₂) (lb/hd-yr)	÷	(EF ₁) (lb/hd-yr)	=	HAPE (lb/yr)
Jersey Milk Cow	11,808	x	2.46	÷	2.46	=	11,808
Jersey Dry Cow	978	x	1.25	÷	1.25	=	978
Support Stock/ Heifer (15-24 months)	2,512	x	0.65	÷	0.65	=	2,512
HAPE for NH₃ from the Solid Manure Handling System (C-6831-4)						Total lb/yr	15,298
						lb/day = total lb/yr ÷ (365 day/yr)	41.9

$$\text{AIPE} = 53.1 \text{ lb-NH}_3/\text{day} - 41.9 \text{ lb-NH}_3/\text{day} \\ = 11.2 \text{ lb-NH}_3/\text{day}$$

As demonstrated above, the AIPE for the project for the solid manure handling system does not exceed 2.0 lb/day for VOC but exceeds 2.0 lb/day for NH₃; therefore BACT is not triggered for VOC from the solid manure handling system but BACT is triggered for NH₃ from the solid manure handling system.

Feed Storage and Handling Permit Unit (ATC C-6831-8-1):

AIPE for Solid Manure Handling System

VOC

$$\text{PE}_2 = 215.2 \text{ lb-VOC/day (calculated in Section VII.C.2 above)}$$

HAPE for VOC from the Feed Storage and Handling System (Permit C-6831-8)							
Type of Cow	PE ₁ (lb/yr)	x	(EF ₂) (lb-/ft ² -day)	÷	(EF ₁) (lb-/ft ² -day)	=	HAPE (lb/yr)
Corn Silage Pile	6,943	x	6.22E-03	÷	1.02E-02	=	4,234
Alfalfa Silage Pile	2,523	x	3.14E-03	÷	5.15E-03	=	1,538
Wheat/Oat Silage Pile	6,319	x	7.87E-03	÷	1.29E-02	=	3,855
Total Mixed Ration (TMR)	93,990	x	3.12E-03	÷	3.85E-03	=	76,169
HAPE for VOC from the Solid Manure Handling System (C-6831-4)		Total lb/yr					85,796
		lb/day = total lb/yr ÷ (365 day/yr)					235.1

$$\begin{aligned} \text{AIPE} &= 215.2 \text{ lb-VOC/day} - 235.1 \text{ lb-VOC/day} \\ &= -19.9 \text{ lb-VOC/day} \end{aligned}$$

As demonstrated above, the AIPE for the project for the feed storage and handling system does not exceed 2.0 lb/day for VOC; therefore BACT is not triggered for VOC from the feed storage and handling system.

d. SB 288/Federal Major Modification

As discussed in Section VII.C.7 above, this project does not constitute an SB 288 or a Federal Major Modification; therefore BACT is not triggered for an SB 288 Major Modification or Federal Major Modification.

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 C), BACT for the project has been satisfied with the following:

Cow Housing (ATC C-6831-2-3)

- VOC:
- 1) Concrete feed lanes and walkways
 - 2) Feed lanes and walkways for mature cows (milk and dry cows) flushed four times per day.
 - 3) All animals fed in accordance with National Research Council (NRC) or other District-approved guidelines utilizing routine nutritional analysis for rations.

- NH₃:
- 1) Concrete feed lanes and walkways
 - 2) Feed lanes and walkways for mature cows (milk and dry cows) flushed four times per day.

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

Liquid Manure Handling System (ATC C-6831-3-3)

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.

- H₂S: 1) All animals fed in accordance with National Research Council (NRC) or other District-approved guidelines utilizing routine nutritional analysis for rations.
- 2) Separation of solids from liquid manure stream prior to treatment in the lagoons.

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 C-6831-4-3)

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

Additionally, District Rule 2201 defines BACT as including the most stringent emission limitation or control technique, including process and equipment changes, that has been found by the APCO to be cost effective and technologically feasible for such class or category of source. The District has found that the basic mitigation measures required by District Rule 4570 are cost effective and technologically feasible for confined animal facilities. Therefore, in addition to the BACT requirements evaluated in the Top-Down BACT Analysis and listed above, implementation of the mitigation measures that the applicant has selected to comply with Rule 4570 will also be required as part of BACT for VOC and NH₃ emissions from the dairy.

B. Offsets

Pursuant to Section 4.6.9 of District Rule 2201, agricultural sources that are not major sources are exempt from offsets if emissions reductions from that source would not meet the criteria for real, permanent, quantifiable, and enforceable emission reductions. Over time, EPA policies and court determinations have established fairly rigorous definitions and tests for each of these terms.

For agricultural operations and other nontraditional sources of emissions, it is difficult to demonstrate that emission reductions are real, permanent, quantifiable, enforceable, and surplus – *as those terms are defined by EPA and case law*. Under SB 700, the air districts are prohibited from requiring offsets for sources for which the above demonstration cannot be made. These sources may include, for example, crop farm fugitive dust, agricultural burning, and non-equipment operations at CAFs. When it becomes possible to

demonstrate that emissions (increases and reductions) are real, permanent, quantifiable, enforceable, and surplus, Emission Reduction Credits (ERCs) may be granted and offsets required. A program to allow this would have to include a regulation that is approved by EPA and incorporated into the State Implementation Plan (SIP). Such regulations specify appropriate quantification methodologies, and other provisions that ensure the reduction meet all the applicable tests, and the regulatory process allows for public review and comment.

To date, EPA has not approved the issuance of ERCs by California air districts for agricultural activities. This has been the case even for reductions from on-the-farm equipment that is similar to traditional stationary sources. Therefore, ERCs will not be granted, nor will offsets be required for agricultural sources until the District has adopted the needed regulations, and EPA has approved those regulations and incorporated them into the SIP. Therefore, offsets are not required for this project.

C. Public Notification

1. Applicability

Public noticing is required for:

- a. New Major Sources, Federal Major Modifications, and SB 288 Major Modifications,
- b. Any new emissions unit with a Potential to Emit greater than 100 pounds during any one day for any one pollutant,
- c. Any project which results in the offset thresholds being surpassed, and/or
- d. Any project with an SSIPE of greater than 20,000 lb/year for any pollutant.

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.

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, the dairy is an existing operation and all permitted units addressed under this project exist as part of the dairy. There are no new emissions units associated with this project. Therefore public noticing is not required for this project for PE from new emissions unit > 100 lb/day.

c. Offset Threshold

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

Offset Threshold				
Pollutant	SSPE1 (lb/year)	SSPE2 (lb/year)	Offset Threshold	Public Notice Required?
NO _x	901	901	20,000 lb/year	No
SO _x	2	2	54,750 lb/year	No
PM ₁₀	2,600	2,355	29,200 lb/year	No
CO	3	3	200,000 lb/year	No
VOC	147,179	122,035	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.

e. 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.

Stationary Source Increase in Permitted Emissions [SSIPE] – Public Notice					
Pollutant	SSPE2 (lb/year)	SSPE1 (lb/year)	SSIPE (lb/year)	SSIPE Public Notice Threshold	Public Notice Required?
NO _x	901	901	0	20,000 lb/year	No
SO _x	2	2	0	20,000 lb/year	No
PM ₁₀	2,355	2,600	-245	20,000 lb/year	No
CO	3	3	0	20,000 lb/year	No
VOC	122,035	147,179	-25,144	20,000 lb/year	No
NH ₃	182,201	143,623	38,578	20,000 lb/year	Yes
H ₂ S	4,656	3,679	977	20,000 lb/year	No

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

2. Public Notice Action

As discussed above, public noticing is required for this project because the SSIPE for NH₃ was greater than 20,000 lb/year. Therefore, public notice documents will be submitted to the California Air Resources Board (CARB) and a public notice will be published in a local newspaper of general circulation in the county of the project prior to the issuance of the ATCs for the dairy.

D. Daily Emission Limits (DELs)

Daily Emissions Limitations (DELs) and other enforceable conditions are required by Section 3.17 to restrict a unit's maximum daily emissions, to a level at or below the emissions associated with the maximum design capacity. Per Sections 3.17.1 and 3.17.2,

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, the DEL is satisfied based on the number and types of cows at the dairy 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 C-6831-2).

Milking Parlor (C-6831-1-3)

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

The milking parlor shall be flushed or sprayed down immediately after, or during the milking of each group of cows. [District Rules 2201 & 4570]

Cow Housing (C-6831-2-3)

The following condition will be added to limit the total number of cows housed at the dairy:

The total number of cattle housed at this dairy at any one time shall not exceed any of the following: 7,200 Jersey milk cows and 1,350 dry cows. [District Rule 2201]

Additionally, the following conditions will be placed on the ATC to ensure that the DEL requirements for PM₁₀ and BACT are met:

Milk cows and dry cows shall be housed in freestall barns. [District Rule 2201]

There shall be no exercise pens, corrals, or drylots at this dairy. [District Rule 2201].

The following conditions will be placed on the ATC to ensure that the DEL requirements for VOC are met:

The freestall lanes at this dairy shall be flushed at least four times per day. [District Rules 2201 and 4570]

Permittee shall maintain an operating plan that requires the freestall lanes to be flushed at least four times per day. [District Rules 2201 and 4570]

Permittee shall feed all animals according to National Research Council (NRC) guidelines. [District Rule 2201]

Liquid Manure Handling System (C-6831-3-3)

Since emissions from the liquid manure handling system depend on the amount of manure handled, the following conditions will be placed on the permit:

The lagoon system shall handle flush manure from no more than 7,200 Jersey milk cows and 1,350 dry cows. [District Rule 2201]

The following condition will be placed on the ATC to ensure that the DEL requirements for VOC are met:

The lagoon system shall be configured as an anaerobic treatment lagoon system with two anaerobic treatment lagoons designed and operated in accordance with National Resource Conservation Service (NRCS) California Field Office Technical Guide Code 359 - Waste Treatment Lagoon. [District Rule 2201]

Feed Storage and Handling System (C-6831-8-1)

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]

No more than one of each of the following types of silage piles shall be open at any one time: corn silage pile; alfalfa silage pile; wheat/oat/other silage pile. [District Rule 2201]

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

The following condition will be placed on the permit:

- Fence lines shall be inspected to remove any ridges of manure that form under them.

3. Recordkeeping

Recordkeeping is required to demonstrate compliance with the public notification and daily emission limit requirements of Rule 2201. In general, recordkeeping for the Milking Parlor (C-6831-1), the Liquid Manure Handling System (C-6831-3), and the Solid Manure Handling System (C-6831-4) and the Feed Storage and Handling System (C-6831-8) is 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 (C-6831-2). Conditions that will be placed on the ATC permits are listed below.

Cow Housing (C-6831-2)

The following conditions will appear on the ATC for 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]

- All records shall be kept and maintained for a minimum of five (5) years and shall be made available to the APCO and EPA upon request. [District Rules 2201 and 4570]

Liquid Manure Handling System (C-6831-3)

To ensure that the lagoon system is designed and operating properly, the following condition will be placed on the ATC for the Liquid Manure Handling System:

- 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 anaerobic treatment lagoon(s) is applied to fields. [District Rules 1070 and 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]
- All records shall be kept and maintained for a minimum of five (5) years and shall be made available to the APCO and EPA upon request. [District Rules 2201 and 4570]

The permit units are also subject to the recordkeeping requirements of Section 7.2 of District Rule 4570, *Confined Animal Facilities*. Many of the recordkeeping requirements discussed above are also required to demonstrate compliance with District Rule 4570, which will be discussed under the Rule 4570 section below.

4. Reporting

No reporting is required to demonstrate compliance with Rule 2201.

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.

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).⁵ 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)."

⁵ 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.

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.

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 ⁶	0.08	
Toluene ⁷	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. Since this dairy is complying with the Best Available Control Technology (BACT) requirements and Rule 4570 mitigation measures, 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:

⁶ 0.01 + 0.07 = 0.08 lbs/hd-yr
⁷ 0.012 + 0.15 = 0.162 lbs/hd-yr

HAP Emissions for Red Top Jerseys Dairy (Facility C-6831)						
Type of Cow	Number of cows		Emission Factor lbs/hd-yr ⁸	=	lbs/yr	tons/yr
Milking Cow	7,200	x	1.828	=	13,162	6.58
Dry Cow	1,350	x	0.995	=	1,343	0.67
Support Stock/ Heifer (15-24 mo)	0	x	0.764	=	0	0.00
Total				=	14,505	7.25

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 5.35 tons per year (7.25 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. Although the proposed project is not subject to District Rule 2550, the project will be subject to the BACT requirements of District Rule 2201. Because the dairy was subject BACT to reduce VOC emissions and the majority of HAPs emitted from dairies are also VOCs, significant HAP reductions are expected and BACT for VOC emissions would satisfy the MACT requirements if they were applicable.

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. Future updates may result in changes to the current emission factors and/or control efficiencies for various practices and measures, but until the information has been evaluated, use of such information would therefore be premature, potentially flawed, and inconsistent with good governance and good science.

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.

An on-field agricultural source is defined in Rule 8011, Section 3.35 as the following:

- Activities conducted solely for the purpose of preparing land for the growing of crops or the raising of fowl or animals, such as brush or timber clearing, grubbing, scraping, ground excavation, land leveling, grading, turning under stalks, disking, or tilling;

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

⁸ 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.

Rule 4102 Nuisance

Section 4.0 prohibits discharge of air contaminants which could cause injury, detriment, nuisance or annoyance to the public.

This project is proposing BACT and has proposed all mitigation measures required by Rule 4570. Therefore, this dairy is expected to comply with this rule.

California Health and 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 D), the total facility prioritization score including this project was greater than one. Therefore, a health risk assessment was required to determine the short-term acute and long-term chronic exposure from this project.

Risk Summary						
Categories	Milking Parlor (C-6831-1-3)	Cow Housing (C-6831-2-3)	Liquid Manure (C-6831-3-3)	Solid Manure (C-6831-4-3)	Feed Storage (C-6831-8-1)	Facility Totals
Prioritization Score	0.00	0.05	0.07	0.01	N/A ²	>1
Acute Hazard Index	0.00	0.09	0.05	0.04	N/A ²	0.68
Chronic Hazard Index	0.00	0.02	0.04	0.00	N/A ²	0.06
Maximum Individual Cancer Risk (10⁻⁶)	N/A ¹	N/A ¹	N/A ¹	N/A ¹	N/A ²	3.1E-06
T-BACT Required?	No	No	No	No	No	
Special Permit Conditions?	No	No	No	No	No	

- 1 The Maximum Individual Cancer Risk was not calculated since there are no risk factors associated with the Air Pollutant (Ammonia) under analysis.
- 2 Unit -8-1 (Feed Storage and Handling) was not modeled since there was no increase in toxic emissions from this unit.

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 not required for this project because the HRA indicates that the risk is not above the District’s thresholds for triggering T-BACT requirements; therefore, compliance with the District’s Risk Management Policy is expected.

District policy APR 1905 also specifies that the increase in emissions associated with a proposed new source or modification not have acute or chronic indices, or a cancer risk

greater than the District's significance levels (i.e. acute and/or chronic indices greater than 1 and a cancer risk greater than 10 in a million). As outlined in the table above and by the HRA Summary in Appendix D 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 on January 13, 2006. The applicant will be required to update the existing CMP application to incorporate any changes resulting from construction of the new dairy. 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).

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 the previous version of District Rule 4570; therefore, public noticing for this project is not required for purposes of complying with District Rule 4570. However, as previously mentioned, the project will be subject to public notice for purposes of District Rule 2201.

Pursuant to Section 5.1.3, owners/operators shall 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.

Pursuant to Section 5.1.4, the Permit-to-Operate or Authority-to-Construct application shall 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.

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

Pursuant to Section 5.3, owners/operators of any CAF shall 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.

Implementation of the mitigation measures required by Rule 4570 is usually required within 365 days of issuance of the ATC permits. However, because it has been determined that the mitigation measures required by Rule 4570 for the project are required as BACT, implementation of these measures will be required upon commencement of operation under the ATCs authorizing this project.

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.

- {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]

Section 7.0 Administrative Requirements

Section 7.2 General Records for CAFs Subject to Section 5.0 Requirements:

- Copies of all of the facility's permits
- Copies of all laboratory tests, calculations, logs, records, and other information required to demonstrate compliance with all applicable requirements of this rule, as determined by the APCO, ARB, EPA.
- Records of the number of animals of each species and production group at the facility on the permit issuance date. Quarterly records of any changes to this information shall also be maintained, (e.g. Dairy Herd Improvement Association records, animal inventories done for financial purposes, etc.)

The following condition will be placed on the cow housing permit:

- {4449} Permittee shall maintain a record of the number of animals of each species and production group at the facility and shall maintain quarterly records of any changes to this information. [District Rule 4570]

Specific recordkeeping and monitoring conditions are shown below under the appropriate mitigation measures.

Pursuant to Section 7.9, owners/operators of a CAF subject to the requirements of Section 5.0 shall 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. Therefore, the following condition will be placed on the permit:

- {4453} Permittee shall keep and maintain all records for a minimum of five (5) years and shall make records available to the APCO and EPA upon request. [District Rule 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 placed 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]
- {4453} Permittee shall keep and maintain all records for a minimum of five (5) years and shall make records available to the APCO and EPA upon request. [District Rule 4570]

Feed Mitigation Measures Required

Required

Feed according to National Research Council (NRC) guidelines.

- {4454} Permittee shall feed all animals according to National Research Council (NRC) guidelines. [District Rules 2201 and 4570]
- {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.

- {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]
- {4457} Permittee shall maintain an operating plan/record that requires feed to be pushed within three feet of feedlane fence within two hours of putting out the feed, or use of a feed trough or other structure designed to maintain feed within reach of the animals. [District Rules 2201 and 4570]

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

- {4458} Permittee shall begin feeding total mixed rations within two hours of grinding and mixing rations. [District Rules 2201 and 4570]

- {4459} Permittee shall maintain an operating plan/record of when feeding of total mixed rations began within two hours of grinding and mixing rations. [District Rules 2201 and 4570]

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 Rules 2201 and 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 Rules 2201 and 4570]

Optional

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

- {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]
- {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 Rules 2201 and 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.

- {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]

- {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:

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

- {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]
- {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]

- {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]
- {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]
- {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]
- {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]
- {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]
- {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]
- {4479} For each silage pile that Option 3 (Moisture, TLC, Roller Opening, & Material Delivery) is chosen as a mitigation measure for building the pile, the permittee shall maintain a plan that requires that the thickness of the layer of un-compacted material delivered on top of the pile is no more than six (6) inches. [District Rules 2201 and 4570]

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.

- {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]
- {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]
- {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]
- {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

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

- Permittee shall flush or hose down milk parlors immediately after or during each milking. [District Rules 2201 and 4570]
- Permittee shall provide verification that milk parlors are flushed or hosed down immediately after or during each milking. [District Rules 2201 and 4570]

Freestall Barn

Required

Pave feed lanes, 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.

- Permittee shall pave feedlanes, where present, for a width of at least 8 feet along the side of the feedlane fence where animals are present for milk and dry cows and at least 6 feet along the side of the feedlane fence where animals are present for heifers. [District Rule 4570]

Optional

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

This Rule 4570 mitigation measure requires the freestalls to be flushed, scraped, or vacuumed immediately prior to, immediately after or during each milking. Milk cows at a dairy are typically milked two or three times per day. Although this mitigation measure only requires the freestall barns to be flushed least as frequently as the cows are milked, BACT requires that the freestall lanes for all mature cows be flushed at least four times per day; therefore, the following conditions will be placed on the ATC permit to ensure compliance:

- The freestall lanes at this dairy shall be flushed at least four times per day. [District Rules 2201 and 4570]
- Permittee shall maintain an operating plan that requires the freestall lanes to be flushed at least four times per day. [District Rules 2201 and 4570]
- {4488} Permittee shall maintain records sufficient to demonstrate that freestall lanes are flushed at least four times per day. [District Rules 2201 and 4570]

Have no animals in exercise pens or corrals at any time.

- There shall be no exercise pens, corrals, or drylots at this dairy. [District Rule 2201]

- {4496} Permittee shall not allow animals in exercise pens, corrals, or drylots at any time. [District Rules 2201 and 4570]
- {4497} Permittee shall maintain an operating plan or provide verification that no animals are allowed in exercise pens, corrals, or drylots at any time. [District Rules 2201 and 4570]

Solid Manure

Remove separated solids from the facility within seventy-two (72) hours of removal from the drying process. Within seventy two (72) hours of removal from the drying process, 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.

- {4529} Within seventy two (72) hours of removal of separated solids from the drying process, permittee shall either 1) remove separated solids from the dairy, 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]
- {4530} Permittee shall keep records of dates when separated solids are removed from the dairy 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]

Liquid Manure

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

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

Land Application

Solid

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

Although Rule 4570 only requires that solid manure applied to fields be incorporated within 72 hours, the previous ATC for expansion of the dairy required solid manure to be incorporated immediately after application to land and this may be considered a BACT requirement. Therefore, the more stringent requirement from the previous ATC for the dairy expansion will

be maintained. The following conditions will be placed on the ATC permit to ensure compliance:

- Solid manure applied to fields shall be incorporated into the soil immediately (within two hours) after land application. [District Rules 2201 and 4570]
- Permittee shall maintain records to demonstrate that all solid manure has been incorporated immediately (within two hours) after land application. [District Rules 2201 and 4570]

Liquid

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

- {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]
- {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]

Compliance with the requirements of District Rule 4570 is expected.

California Health and Safety Code 42301.6 (School Notice)

The applicant states 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 Senate Bill 700 (SB 700)

The Red Top Jerseys Dairy is an agricultural operation that raises dairy cows for the production of milk for human consumption. Pursuant to Senate Bill (SB) 700, all agriculture operations, including Confined Animal Facilities (CAF), with emissions greater than ½ the major source emissions threshold levels (5.0 ton/year of NO_x or VOC), are required to obtain a District permit.

The post-project emissions from the dairy exceed the 5.0 ton-VOC/year threshold and the dairy is also classified as a large CAF by the California Air Resources Board (ARB). The facility previously applied for District permits and has applied for ATC permits for this project; therefore compliance with the requirements of SB 700 is expected.

California Environmental Quality Act (CEQA)

The California Environmental Quality Act (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 San Joaquin Valley Unified Air Pollution Control District (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.
- 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.

The proposed project is located in Madera County and Madera County is the Lead Agency for the project. Madera County approved amending the Conditional Use Permit for the dairy (CUP #2008-024) to allow for 7,200 Jersey milk cows and 1,350 dry cows with no heifers or calves after preparation of a Mitigated Negative Declaration (MND #2009-02). Madera County originally approved CUP #99-023 the construction of the dairy with 4,800 Jersey milk cows after preparation of an Environmental Impact Report (EIR) (State Clearinghouse (SCH) No. 2000052055).

Madera County is the Agency which has the principal responsibility for approving this project. The District is a Responsible Agency for the project because of its discretionary approval power over the project via its Permits Rule (Rule 2010) and New Source Review Rule (Rule 2201), (CEQA Guidelines §15381). 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 offsetting emissions when above certain thresholds for non-agricultural sources (SB 700). As a responsible agency the District complies with CEQA by considering the Mitigated Negative Declaration 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.

IX. Recommendation

Compliance with all applicable rules and regulations is expected. Pending a successful Public Noticing period, issue Authorities to Construct C-6831-1-3, -2-3, -3-3, -4-3, & -8-1 subject to the permit conditions on the attached draft Authorities to Construct in Appendix E.

X. Billing Information

Annual Permit Fees			
Permit Number	Fee Schedule	Fee Description	Annual Fee
C-6831-1-3	3020-06	Milking Center - Miscellaneous	\$105.00
C-6831-2-3	3020-06	Cow Housing - Miscellaneous	\$105.00
C-6831-3-3	3020-06	Liquid Manure Management - Miscellaneous	\$105.00
C-6831-4-3	3020-06	Solid Manure Management - Miscellaneous	\$105.00
C-6831-8-1	3020-06	Feed Storage and Handling - Miscellaneous	\$105.00

Appendixes

- A: Current Permits to Operate (C-6831-1-0, -2-0, -3-0, & -4-2) and Previously Issued ATC Permits (C-6831-1-1, -1-2, -2-1, -2-2, -3-1, -3-2, & -8-0)
- B: Anaerobic Lagoon Design Check Spreadsheets
- C: BACT Analysis
- D: Summary of Health Risk Assessment (HRA)
- E: Draft ATCs (C-6831-1-3, -2-3, -3-3, -4-3, & -8-1)

APPENDIX A

**Current Permits to Operate
(C-6831-1-0, -2-0, -3-0, & -4-2)**

&

**Previously Issued ATC Permits
(C-6831-1-1, -1-2, -2-1, -2-2, -3-1, -3-2, & -8-0)**

San Joaquin Valley Air Pollution Control District

PERMIT UNIT: C-6831-1-0

EXPIRATION DATE: 12/31/2011

EQUIPMENT DESCRIPTION:

1,800 JERSEY COW MILKING OPERATION WITH ONE 72 STALL ROTARY 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. 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: C-6831-2-0

EXPIRATION DATE: 12/31/2011

EQUIPMENT DESCRIPTION:

COW HOUSING - 1,800 JERSEY MILK COWS, 100 DRY COWS AND 54 LARGE HEIFERS (BETWEEN 15-24 MONTHS OLD) HOUSED IN ONE FREESTALL BARN (1200 STANCHIONS) WITH FLUSH SYSTEM; INCLUDES ONE SPECIAL NEEDS HOUSING FREESTALL (600 STANCHIONS) 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. 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: C-6831-3-0

EXPIRATION DATE: 12/31/2011

EQUIPMENT DESCRIPTION:

LIQUID MANURE HANDLING SYSTEM CONSISTING OF ONE PROCESSING PIT; ONE MECHANICAL SEPARATOR, ONE SPLIT ANAEROBIC TREATMENT LAGOON (700X250X30, 400X250X30) AND ONE STORAGE POND (960X280X30); MANURE IS 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. 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: C-6831-4-2

EXPIRATION DATE: 12/31/2011

EQUIPMENT DESCRIPTION:

SOLID MANURE HANDLING CONSISTING OF COVERED MANURE STOCK PILES WITH SOLID MANURE APPLICATION TO LAND: ALLOW INCREASE IN SOLID MANURE FROM ADDITIONAL 5,400 JERSEY MILK COWS, 1,000 DRY COWS, AND 146 LARGE HEIFERS (15-24 MONTHS OLD)

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. Separated solids piles shall be removed from the stacking pads at least on a weekly basis. [District Rule 2201]
4. Dried separated solids shall be stored in a weatherproof structure from October through May or shall be covered with weatherproof coverings from October through May, except for times, not to exceed twenty-four (24) hours per event, when wind events remove the covering. [District Rule 2201]
5. Solid manure applied to fields shall be incorporated into the soil immediately (within two hours) after application. [District Rule 2201]
6. Dry manure (less than 50% moisture by weight) shall not be applied to fields when wind speeds exceed 10 miles per hour. [District Rule 2201]
7. 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 4570]
8. Permittee shall cover dry animal waste piles outside the pens with a weatherproof covering from October through May, except for times, not to exceed twenty-four (24) hours per event, when wind events remove the covering. [District Rule 4570]
9. Permittee shall maintain records to demonstrate that dry animal waste piles outside the pens are covered with a weatherproof covering from October through May. [District Rule 4570]
10. Permittee shall cover dry separated solids outside the pens with a weatherproof covering from October through May, except for times, not to exceed twenty-four (24) hours per event, when wind events remove the covering. [District Rule 4570]

PERMIT UNIT REQUIREMENTS CONTINUE ON NEXT PAGE
These terms and conditions are part of the Facility-wide Permit to Operate.

11. Permittee shall maintain records, such as manufacturer warranties or other documentation, demonstrating that the weatherproof covering over solid animal waste and/or weatherproof covering over separated solids, are installed, used, and maintained in accordance with manufacturer recommendations and applicable standards listed in NRCS Field Office Technical Guide Code 313 or 367, or any other applicable standard approved by the APCO, ARB, and EPA. [District Rule 4570]
12. Permittee shall maintain records to demonstrate dry separated solids outside the pens are covered with a weatherproof covering from October through May. [District Rule 4570]
13. Permittee shall land incorporate all solid animal waste within seventy-two (72) hours of removal from animal housing. [District Rule 4570]
14. Permittee shall maintain records that show that all solid animal waste has been incorporated within seventy-two (72) hours of removal from animal housing. [District Rule 4570]
15. All records shall be kept and maintained for a minimum of five (5) years and shall be made available to the APCO, ARB and EPA upon request. [District Rule 4570]
16. 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

AUTHORITY TO CONSTRUCT

PERMIT NO: C-6831-1-1

ISSUANCE DATE: 12/05/2006

LEGAL OWNER OR OPERATOR: REDTOP JERSEYS LLC
MAILING ADDRESS: 5638 COLUMBUS AVE
HILMAR, CA 95324

LOCATION: ROAD 4
SECTIONS 16,17, 20, & 21, TOWNSHIP 10S, RANGE 14E
CHOWCHILLA, CA

EQUIPMENT DESCRIPTION:

MODIFICATION OF MILKING OPERATION FOR 1,800 JERSEY MILK COWS INCLUDING ONE (1) ROTARY MILKING PARLOR WITH 72 MILKING STALLS: CONSTRUCT ONE (1) NEW ROTARY MILKING PARLOR WITH 72 MILKING STALLS AND INCREASE THE NUMBER OF JERSEY MILK COWS TO 4,800

CONDITIONS

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. No more than 4,800 milk cows shall be milked in the milking parlors. [District Rule 2201]
4. The milking parlors shall be flushed or sprayed down immediately after each group of cows is milked. [District Rule 2201]
5. Permittee shall maintain daily records of the number of cows milked in the milking parlor. [District Rules 1070 and 2201]
6. All records shall be maintained and retained on-site for a period of at least 5 years and shall be made available for District inspection upon request. [District Rule 1070]
7. The owner or operator of this dairy shall submit any Authority to Construct (ATC) application necessary to comply with District Rule 4570 in accordance with the compliance schedule established in Section 8.0 of Rule 4570. [District Rule 4570]

YOU MUST NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (559) 230-5950 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


DAVID WARNER, Director of Permit Services

C-6831-1-1 - Dec 5 2006 12:12PM - NORMANR Joint Inspection NOT Required



San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT

AUTHORITY TO CONSTRUCT

PERMIT NO: C-6831-1-2

ISSUANCE DATE: 04/20/2007

LEGAL OWNER OR OPERATOR: REDTOP JERSEYS LLC

MAILING ADDRESS: 5638 COLUMBUS AVE
HILMAR, CA 95324

LOCATION: ROAD 4
SECTIONS 16,17, 20, & 21, TOWNSHIP 10S, RANGE 14E
CHOWCHILLA, CA

EQUIPMENT DESCRIPTION:

MODIFICATION OFF: MILKING OPERATION FOR 4,800 JERSEY MILK COWS INCLUDING TWO (2) ROTARY MILKING PARLORS, EACH WITH 72 MILKING STALLS ADD MITIGATION MEASURES TO COMPLY WITH RULE 4570

CONDITIONS

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. No more than 4,800 milk cows shall be milked in the milking parlors. [District Rule 2201]
4. The milking parlors shall be flushed or sprayed down immediately after each group of cows is milked. [District Rule 2201]
5. Permittee shall maintain daily records of the number of cows milked in the milking parlor. [District Rule 1070 and 2201]
6. Permittee shall implement and maintain all the VOC Mitigation Measures contained in this permit, on and after 365 days of issuance of this ATC. [District Rule 4570]

CONDITIONS CONTINUE ON NEXT PAGE

YOU MUST NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (559) 230-5950 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

DAVID WARNER, Director of Permit Services

C4631-1-2: Apr 20 2007 2:16PM - THAOKD : Joint Inspection NOT Required

7. 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, 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 4570]
8. Permittee shall flush or hose milk parlor immediately prior to, immediately after, or during each milking. [District Rule 4570]
9. Permittee shall provide verification that milk parlors are flushed or hosed prior to, immediately after, or during each milking. [District Rule 4570]
10. All records shall be kept and maintained for a minimum of five (5) years and shall be made available to the APCO, ARB and EPA upon request. [District Rule 4570]
11. This permit does not authorize the violation of any conditions established for this facility (e.g. maximum number of animals or animal units, construction requirements, etc.) 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. [District Rules 2070 and 2080]



San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT

AUTHORITY TO CONSTRUCT

PERMIT NO: C-6831-2-1

ISSUANCE DATE: 12/07/2006

LEGAL OWNER OR OPERATOR: REDTOP JERSEYS LLC
MAILING ADDRESS: 5638 COLUMBUS AVE
HILMAR, CA 95324

LOCATION: ROAD 4
SECTIONS 16,17, 20, & 21, TOWNSHIP 10S, RANGE 14E
CHOWCHILLA, CA

EQUIPMENT DESCRIPTION:

MODIFICATION OF COW HOUSING - FLUSH DAIRY CONSISTING OF 1,800 JERSEY MILK COWS, 100 DRY COWS, AND 54 LARGE HEIFERS (BETWEEN 15-24 MONTHS OLD) INCLUDING FREESTALL BARNs AND SPECIAL NEEDS HOUSING: INCREASE HERD SIZE TO 4,800 JERSEY MILK COWS, 782 DRY COWS, AND 3,865 LARGE HEIFERS (15-24 MONTHS); CONSTRUCT FIVE NEW FREESTALL BARNs (1,200 MATURE HEAD EACH) AND ONE HALF-SIZED FREESTALL BARN (600 MATURE HEAD)

CONDITIONS

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. The total number of cattle housed at the dairy at any one time shall not exceed any of the following: 4,800 Jersey milk cows; 782 dry cows; and 3,865 large heifers (15-24 months). [District Rule 2201]
4. The new freestall barns shall not have any exercise corrals. [District Rule 2201]
5. The feed lanes and walkways in the freestall barns shall be constructed of concrete. [District Rule 2201]
6. The feed lanes at this dairy shall be flushed at least four times per day. [District Rule 2201]
7. All animals at this dairy shall be fed in accordance with the National Research Council (NRC) guidelines utilizing routine dairy nutritionist analyses of rations. [District Rule 2201]

CONDITIONS CONTINUE ON NEXT PAGE

YOU MUST NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (559) 230-5950 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

DAVID WARNER, Director of Permit Services

C-6831-2-1 : Dec 7 2006 2:22PM - KEASTMD : Joint Inspection NOT Required

8. Refused feed shall be removed from feed lanes on a daily basis to prevent decomposition. Refused feed shall be properly disposed off after removal. [District Rule 2201]
9. Silage shall be fully enclosed or covered with tarps, except for the area where feed is being removed from the pile. Leachate from the silage shall be collected and sent to a waste treatment system such as a lagoon in a timely manner (minimum of once every twenty-four (24) hours). [District Rule 2201]
10. Permittee shall maintain water systems such as overflow water, misters, and any water distribution area. These systems, if broken, leaking, or malfunctioning, shall be repaired in a timely fashion. Holes and wallows near watering troughs and feeding areas should be a high priority. [District Rule 2201]
11. Fence lines shall be inspected to remove any ridges of manure that form under them. [District Rule 2201]
12. Permittee shall maintain daily records of the number of milk cows and dry cows at this dairy and shall maintain weekly records of the number of large heifers (between 15 to 24 months of age) at this dairy. [District Rule 2201]
13. Permittee shall maintain records of the nutritional analysis in the feed for all cows and the number of times the feed lanes are flushed per day. [District Rule]
14. Permittee shall maintain records sufficient to demonstrate that refused feed was removed from the cow housing areas and properly disposed every day. [District Rule 2201]
15. All records shall be maintained and retained on-site for a period of at least 5 years and shall be made available for District inspection upon request. [District Rule 1070]
16. The owner or operator of this dairy shall submit any Authority to Construct (ATC) application necessary to comply with District Rule 4570 in accordance with the compliance schedule established in Section 8.0 of Rule 4570. [District Rule 4570]



San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT

AUTHORITY TO CONSTRUCT

PERMIT NO: C-6831-2-2

ISSUANCE DATE: 04/20/2007

LEGAL OWNER OR OPERATOR: REDTOP JERSEYS LLC

MAILING ADDRESS: 5638 COLUMBUS AVE
 HILMAR, CA 95324

LOCATION: ROAD 4
 SECTIONS 16,17, 20, & 21, TOWNSHIP 10S, RANGE 14E
 CHOWCHILLA, CA

EQUIPMENT DESCRIPTION:

MODIFICATION OF: COW HOUSING - 4,800 JERSEY MILK COWS, 782 DRY COWS, AND 3,865 LARGE HEIFERS (BETWEEN 15-24 MONTHS OLD) HOUSED IN SIX (6) FULL-LENGTH AND TWO (2) HALF-LENGTH FREESTALL BARNs WITH FLUSH SYSTEMS AND NO EXERCISE CORRALS; INCLUDING SPECIAL NEEDS HOUSING ADD MITIGATION MEASURES TO COMPLY WITH RULE 4570.

CONDITIONS

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. The total number of cattle housed at the dairy at any one time shall not exceed any of the following: 4,800 Jersey milk cows, 782 dry cows, and 3,856 large heifers (15-24- months). [District Rule 2201]
4. The new freestall barns shall not have any exercise corrals. [District Rule 2201]
5. The feed lanes and walkways in the freestall barns shall be constructed of concrete. [District Rule 2201]
6. The feed lanes at this dairy shall be flushed at least four times a day. [District Rule 2201/4570]
7. All animals at this dairy shall be fed in accordance with the National Research Council (NRC) guidelines utilizing routine dairy nutritionist analyses of rations. [District Rule 2201/4570]
8. Refused Feed shall be removed from feed lanes on a daily basis to prevent decomposition. Refused feed shall be properly disposed off after removal. [District Rule 2201]

CONDITIONS CONTINUE ON NEXT PAGE

YOU MUST NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (559) 230-5950 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

DAVID WARNER, Director of Permit Services

C-6831-2-2 : Apr 20 2007 2:18PM - THAO:KO : Joint Inspection NOT Required

9. Silage shall be fully enclosed or covered with tarps, except for the area where feed is being removed from the pile. Leachate from the silage shall be collected and sent to a waste treatment system such as a lagoon in a timely manner (minimum of once every twenty-four (24) hours). [District Rule 2201]
10. Permittee shall maintain water systems such as overflow water, mister, and any water distribution area. These systems, if broken, leaking, or malfunctioning, shall be repaired in a timely fashion. Holes and wallows near watering troughs and feeding areas should be a high priority. [District Rule 2201]
11. Fence lines shall be inspected to remove any ridges of manure that from under them. [District Rule 2201]
12. Permittee shall maintain daily records of the number of milk cows and dry cows at this dairy and shall maintain weekly records of the number of large heifers (between 15 to 24 months of age) at this dairy. [District Rule 2201]
13. Permittee shall maintain records of the nutritional analysis in the feed for all cows and the number of times the feed lanes are flushed per day. [District Rule 2201]
14. Permittee shall maintain records sufficient to demonstrate that refused feed was removed from the cow housing areas and properly disposed every day. [District Rule 2201]
15. Permittee shall implement and maintain all the VOC Mitigation Measures contained in this permit, on and after 365 days of issuance of this ATC. [District Rule 4570]
16. 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, 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 4570]
17. Permittee shall groom (rake, harrow, scrape, or grade) bedding in freestalls at least once every fourteen (14) days. [District Rule 4570]
18. Permittee shall record the date that bedding in freestalls is raked, harrowed, scraped or graded at least once every fourteen (14) days. [District Rule 4570]
19. Permittee shall clean concreted areas such that the depth of animal waste does not exceed twelve (12) inches at any point or time, except for in-corral mounding. [District Rule 4570]
20. Permittee shall measure and document the depth of manure on the concrete lanes at least once every ninety (90) days. [District Rule 4570]
21. Permittee shall maintain corrals/pens to ensure drainage and prevent water from standing more than forty-eight (48) hours after a storm. [District Rule 4570]
22. Permittee shall maintain sufficient records to demonstrate that corrals/pens are maintained to ensure drainage and prevent water from standing for more than forty-eight (48) hours after a storm. [District Rule 4570]
23. Permittee shall manage corrals such that the animal waste depth in the corral does not exceed twelve (12) inches at any time or point, except for in-corral mounding. [District Rule 4570]
24. Permittee shall measure and document the depth of manure in the corrals/pens at least once every ninety (90) days. [District Rule 4570]
25. Permittee shall knockdown fence line animal waste build-up prior to it exceeding a height of twelve (12) inches at any time or point. [District Rule 4570]
26. Permittee shall measure and document the depth of manure at the fence line at least once every ninety (90) days. [District Rule 4570]
27. Permittee shall scrape or flush feed aprons in corrals at least once every seven (7) days. [District Rule 4570]
28. Permittee shall record the date that feed aprons in corrals are scraped or flushed. [District Rule 4570]
29. Permittee shall install floats on the troughs or use another method approved by the APCO, ARB, and EPA to ensure that the water in the troughs does not overflow or spill onto an earthen ground. [District Rule 4570]

CONDITIONS CONTINUE ON NEXT PAGE

30. Permittee shall maintain a record of the number of animals of each production group at the Facility and shall maintain quarterly records of any changes to this information. Such records may include DHIA monthly records, milk production invoices, ration sheets or periodic inventory records. [District Rule 4570]
31. All records shall be kept and maintained for a minimum of five (5) years and shall be made available to the APCO, ARB and EPA upon request. [District Rule 4570]
32. This permit does not authorize the violation of any conditions established for this facility (e.g. maximum number of animals or animal units, construction requirements, etc.) 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. [District Rules 2070 and 2080]



San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT

AUTHORITY TO CONSTRUCT

PERMIT NO: C-6831-3-1

ISSUANCE DATE: 12/07/2006

LEGAL OWNER OR OPERATOR: REDTOP JERSEYS LLC
MAILING ADDRESS: 5638 COLUMBUS AVE
 HILMAR, CA 95324

LOCATION: ROAD 4
 SECTIONS 16,17, 20, & 21, TOWNSHIP 10S, RANGE 14E
 CHOWCHILLA, CA

EQUIPMENT DESCRIPTION:

MODIFICATION OF LIQUID MANURE HANDLING SYSTEM CONSISTING OF ONE (1) PROCESSING PIT, ONE (1) MECHANICAL SEPARATOR, ONE (1) 1,100' X 250' X 30' ANAEROBIC TREATMENT LAGOON, AND ONE (1) 960' X 280' X 30' STORAGE POND. MANURE IS LAND APPLIED THROUGH FLOOD IRRIGATION AND FURROW IRRIGATION: CONSTRUCT A SECOND PROCESSING PIT AND MECHANICAL SEPARATOR; ALLOW INCREASE IN LIQUID MANURE FROM 3,000 ADDITIONAL JERSEY MILK COWS, 682 ADDITIONAL DRY COWS, AND 3,811 ADDITIONAL LARGE HEIFERS (15-24 MONTHS OLD)

CONDITIONS

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. The liquid manure handling system shall handle flush manure from no more than 4,800 Jersey milk cows; 782 dry cows; and 3,865 large heifers (15-24 months). [District Rule 2201]
4. The dairy shall utilize mechanical separators to reduce the solids entering the lagoon system. The mechanical separators shall be equipped with dewatering presses to reduce the moisture of separated solids. [District Rule 2201]
5. The anaerobic treatment lagoon system shall be a two-stage system designed and operated in accordance with National Resource Conservation Service (NRCS) California Field Office Technical Guide Code 359 - Waste Treatment Lagoon. [District Rule 2201]

CONDITIONS CONTINUE ON NEXT PAGE

YOU MUST NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (559) 230-5950 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

DAVID WARNER, Director of Permit Services

C-6831-3-1 : Dec 7 2006 2:22PM - KEASTMD : Joint Inspection NOT Required

Central Regional Office • 1990 E. Gettysburg Ave. • Fresno, CA 93726 • (559) 230-5900 • Fax (559) 230-6061

6. Liquid manure used for irrigation of cropland shall only be taken from the storage pond/secondary lagoon after treatment in the primary lagoon. Effluent from the storage pond shall be applied to cropland at agronomic rates in accordance with the Regional Water Quality Control Board's Requirements. [District Rule 2201]
7. Liquid manure from the storage pond shall be applied to cropland in thin layers and shall be mixed with irrigation water at a ratio in compliance with the facility nutrient management plan and in accordance with the requirements of Regional Water Quality Control Board. [District Rule 2201]
8. Permittee shall maintain records of design specifications and calculations for the Anaerobic Treatment Lagoon system in order to demonstrate that the system has been designed and is operating according to the applicable National Resource Conservation Service (NRCS) technical guide. [District Rules 1070 and 2201]
9. Installation of an anaerobic digester may be required for this operation contingent upon the final Dairy BACT Guideline. If the final Dairy BACT Guideline requires the installation of an an anaerobic digester for this operation, the permittee shall install the system in accordance with the timeframes and procedures established by the APCO. [District Rule 2201]
10. The owner or operator of this dairy shall submit any Authority to Construct (ATC) application necessary to comply with District Rule 4570 in accordance with the compliance schedule established in Section 8.0 of Rule 4570. [District Rule 4570]



San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT

AUTHORITY TO CONSTRUCT

PERMIT NO: C-6831-3-2

ISSUANCE DATE: 04/20/2007

LEGAL OWNER OR OPERATOR: REDTOP JERSEYS LLC
MAILING ADDRESS: 5638 COLUMBUS AVE
HILMAR, CA 95324

LOCATION: ROAD 4
SECTIONS 16,17, 20, & 21, TOWNSHIP 10S, RANGE 14E
CHOWCHILLA, CA

EQUIPMENT DESCRIPTION:

MODIFICATION OF: LIQUID MANURE HANDLING SYSTEM CONSISTING OF TWO (2) PROCESSING PITS, TWO (2) MECHANICAL SEPARATORS, ONE (1) 1,100' X 250' X 30' ANAEROBIC TREATMENT LAGOON, AND ONE (1) 960' X 280' X 30' STORAGE POND. MANURE IS LAND APPLIED THROUGH FLOOD IRRIGATION AND FURROW IRRIGATION ADD MITIGATION MEASURES TO COMPLY WITH RULE 4570

CONDITIONS

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. The liquid manure handling system shall handle flush manure from no more than 4,800 Jersey milk cows; 782 dry cows; and 3,865 large heifers (15-24 months). [District Rule 2201]
4. The dairy shall utilize mechanical separators to reduce the solids entering the lagoon system. The mechanical separators shall be equipped with dewatering presses to reduce the moisture of separated solids. [District Rule 2201/4570]
5. The anaerobic treatment lagoon system shall be a two-stage system designed and operated in accordance with National Resource Conservation Service (NRCS) California Field Office Technical Guide Code 359 - Waste Treatment Lagoon. [District Rule 2201]

CONDITIONS CONTINUE ON NEXT PAGE

YOU MUST NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (559) 230-5950 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


DAVID WARNER, Director of Permit Services
C-6831-3-2 - Apr 20 2007 3:18PM - THAKHO - Joint Inspection NOT Required

6. Liquid manure used for irrigation of cropland shall only be taken from the storage pond/secondary lagoon after treatment in the primary lagoon. Effluent from the storage pond shall be applied to cropland at agronomic rates in accordance with the Regional Water Quality Control Board's Requirements. [District Rule 2201]
7. Liquid manure from the storage pond shall be applied to cropland in thin layers and shall be mixed with irrigation water at a ratio in compliance with the facility nutrient management plan and in accordance with the requirements of Regional Water Quality Control Board. [District Rule 2201]
8. Permittee shall maintain records of design specifications and calculations for the Anaerobic Treatment Lagoon system in order to demonstrate that the system has been designed and is operating according to the applicable National Resource Conservation Service (NRCS) technical guide. [District Rule 2201]
9. Installation of an anaerobic digester may be required for this operation contingent upon the final Dairy BACT Guideline. If the final Dairy BACT Guideline requires the installation of an anaerobic digester for this operation, the permittee shall install the system in accordance with the timeframes and procedures established by the APCO. [District Rule 2201]
10. Permittee shall implement and maintain all the VOC Mitigation Measures contained in this permit, on and after 365 days of issuance of this ATC. [District Rule 4570]
11. 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, 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 4570]
12. Permittee shall not allow liquid animal waste to stand in the fields for more than twenty-four (24) hours after irrigation. [District Rule 4570]
13. Permittee shall maintain records to demonstrate liquid animal waste will does not stand in the fields for more than twenty-four (24) hours after irrigation. [District Rule 4570]
14. All records shall be kept and maintained for a minimum of five (5) years and shall be made available to the APCO, ARB and EPA upon request. [District Rule 4570]
15. This permit does not authorize the violation of any conditions established for this facility (e.g. maximum number of animals or animal units, construction requirements, etc.) 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. [District Rules 2070 and 2080]



San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT

AUTHORITY TO CONSTRUCT

PERMIT NO: C-6831-8-0

ISSUANCE DATE: 04/20/2007

LEGAL OWNER OR OPERATOR: REDTOP JERSEYS LLC
MAILING ADDRESS: 5638 COLUMBUS AVE
HILMAR, CA 95324

LOCATION: ROAD 4
SECTIONS 16,17, 20, & 21, TOWNSHIP 10S, RANGE 14E
CHOWCHILLA, CA

EQUIPMENT DESCRIPTION:
FEED STORAGE AND HANDLING CONSISTING OF COMMODITY BARNs AND SILAGE PILES

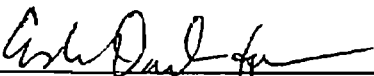
CONDITIONS

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. Permittee shall implement and maintain all the VOC Mitigation Measures contained in this permit, on and after 365 days of issuance of this ATC. [District Rule 4570]
4. If a licensed veterinarian or a certified nutritionist determines that any VOC mitigation measure will be required to be suspended as a detriment to animal health, 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 4570]
5. Permittee shall feed all animals according to National Research Council (NRC) guidelines. [District Rule 4570]
6. Permittee shall maintain records of feed content, formulation, and quantity of feed additive utilized, to demonstrate compliance with National Research Council (NRC) guidelines. Records such as feed company guaranteed analyses (feed tags), ration sheets, or feed purchase records may be used to meet this requirement. [District Rule 4570]

CONDITIONS CONTINUE ON NEXT PAGE

YOU MUST NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (559) 230-5950 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



DAVID WARNER, Director of Permit Services
C-6831-8-0 - Apr 20 2007 3:10PM - THADKO - Joint Inspection NOT Required

7. Permittee shall feed high moisture corn or steam-flaked corn to animals and shall not feed any dry rolled corn to animals. [District Rule 4570]
8. Permittee shall maintain records to demonstrate animals are fed high moisture corn or steam-flaked corn and no dry rolled corn. 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]
9. Permittee shall remove feed from the area where animals stand to eat feed at least once every fourteen (14) days. [District Rule 4570]
10. Permittee shall maintain records of dates when feed was removed from the area where animals stand to eat. [District Rule 4570]
11. Permittee shall feed or dispose of rations within forty-eight (48) hours of grinding and mixing rations. [District Rule 4570]
12. Permittee shall maintain records of when feed was either fed to animals or disposed of within forty-eight (48) hours of grinding and mixing rations. [District Rule 4570]
13. Permittee shall cover all silage piles, except for the area where feed is being removed from the pile. [District Rule 4570]
14. All records shall be kept and maintained for a minimum of five (5) years and shall be made available to the APCO, ARB and EPA upon request. [District Rule 4570]
15. This permit does not authorize the violation of any conditions established for this facility (e.g. maximum number of animals or animal units, construction requirements, etc.) 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. [District Rules 2070 and 2080]

APPENDIX B

Anaerobic Treatment Lagoon Design Check Spreadsheets

Lagoon Design Check in Accordance with NRCS Guideline #359

Proposed Volume for 1st Lagoon

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

Primary Treatment Lagoon Dimensions

Length	700	ft
Width	250	ft
Depth	30	ft
Slope	2	ft

Volume of First Anaerobic Treatment Lagoon	3,684,000 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

Proposed Volume for 2nd Lagoon

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

Primary Treatment Lagoon Dimensions

Length	400	ft
Width	250	ft
Depth	30	ft
Slope	2	ft

**Volume of Second
Anaerobic Treatment**

1,974,000 ft³

INSTRUCTIONS

* only input yellow fields

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

Lagoon Design Check in Accordance with NRCS Guideline #359

Net Volatile Solids loading Calculation

Net Volatile Solids (VS) Loading of Treatment Lagoons											
Breed: Holstein Type of Cow	Number of Animals	x	VS Excreted[1] (lb/day)	x	Jersey Adjustment (%)[2]	x	% Manure in Flush[3]	x	(1 - % VS Removed in Separation[4])	=	Net VS Loading (lb/day)
Milk Cows	7,200	x	17	x	72%	x	100%	x	50%	=	44,064
Dry Cow	1,350	x	9.2	x	72%	x	100%	x	50%	=	4,471
Heifer (15 to 24 months)	0	x	7.1	x	72%	x	100%	x	50%	=	0
Heifer (7 to 14 months)	0	x	4.9	x	72%	x	100%	x	50%	=	0
Heifer (3 to 6 months)	0	x	2.7	x	72%	x	100%	x	50%	=	0
Calf (under 3 months)	0	x	1.0	x	72%	x	100%	x	50%	=	0
Bulls	0	x	9.2	x	72%	x	100%	x	50%	=	0
Total for Dairy											48,535

[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] 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) and consume less feed and produce less manure. Therefore, the volatile solids excretion rate will be adjusted by a factor of 72% to account for the smaller size and reduced manure production of Jersey cattle.

[3] Since there are no corrals or exercise pens at this dairy, it is assumed that 100% of the manure will be flushed to the lagoon system.

[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	Net VS Loading (lb/day)		VSLR (lb/1000 ft³-day)[1]		MTV (ft³)
Type of Cow					
Milk Cows	44,064	÷	0.01	=	4,406,400
Dry Cow	4,471	÷	0.01	=	447,120
Heifer (15 to 24 months)	0	÷	0.01	=	0
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					4,853,520

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

Lagoon Design Check in Accordance with NRCS Guideline #359

Sludge Accumulation Volume

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

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

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

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

Where:

SAV = Sludge Accumulation Volume (ft³)

VPL = Total Combined Volume of 1st and 2nd Anaerobic Treatment Lagoons (ft³)

MTV = Minimum Treatment Volume (ft³)

$$\text{VPL} = \begin{array}{l} \text{Volume of 1st Anaerobic} \\ \text{Treatment Lagoon} \end{array} + \begin{array}{l} \text{Volume of 2nd Anaerobic} \\ \text{Treatment Lagoon} \end{array}$$

$$\text{VPL} = 3,684,000 + 1,974,000 = 5,658,000 \text{ (ft}^3\text{)}$$

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

SAV =	5,658,000	-	4,853,520	=	804,480	(ft³)
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Lagoon Design Check in Accordance with NRCS Guideline #359

Hydraulic Retention Time (HRT) Calculation

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

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

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

where:

HFR = Hydraulic flow rate (1000ft³/day)

HRT = Hydraulic Retention Time (day)

The Hydraulic Flow Rate is Calculated below

Type	# of cows		Amount of Manure*		HFR
Milk Cows	7,200	x	2.40	ft ³ =	17,280 ft ³ /day
Dry Cows	1,350	x	1.30	ft ³ =	1,755 ft ³ /day
Heifers (15-24 mo)	0	x	0.78	ft ³ =	- 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	8,550				19,035 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	ft ³	+	ft ³
Milk Cow*Day	Milk Cows		gallon		day

Total HFR:



50 gal	7200 milk-cows	x	ft ³	+	19,035	ft ³
milk-cow*day			7.48 gal			day
						= 67,163.3 ft ³ /day

Formula:

MTV (ft ³)	/	(day)	=
		HFR (ft ³)	

HRT:



4,853,520 ft ³	day	=	= 72.2644204 days
	67,163.3 ft ³		

APPENDIX C
BACT Analysis for Dairy Permits

Red Top Jerseys Dairy (C-6831, Project # C-1095388)

TOP-DOWN BACT ANALYSIS

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....".⁹ 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 ventilation rate. Particulate matter emissions from naturally ventilated buildings will be lower than those from mechanically ventilated buildings.

⁹ 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/dpaq/settlement.pdf>)

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.¹⁰ 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.

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

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

acids, which are produced from sulfur dioxide and nitrogen oxides in the ambient air, to form ammonium sulfate, ammonium nitrate, and other fine particulates.¹¹ 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.¹²

5. Hydrogen Sulfide Emissions from Dairies

Hydrogen Sulfide (H_2S) 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 (H_2S) and the bisulfide (HS^-) and sulfide (S^{2-}) ions. In aqueous solutions molecular H_2S exists in equilibrium with the bisulfide (HS^-) and sulfide (S^{2-}) ions but only molecular H_2S , 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 H_2S and the potential for H_2S emissions will increase. As the pH increases, a greater proportion of sulfide will be in the ionic form and the potential for H_2S emissions will decrease.

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.

¹¹ Workshop Review Draft for EPA Regional Priority AFO Science Question Synthesis Document - Air Emission Characterization and Management, pg. 2

¹² Emissions From Animal Feeding Operations – Draft, US EPA – Emissions Standards Division, August 15, 2001, pgs. 2-6 and 2-7

II. Top Down BACT Analysis for the Cow Housing Permit Unit (C-6831-2)

2. BACT Analysis for VOC Emissions from the Cow Housing Permit Unit:

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.

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

- 1) Enclosed freestalls vented to a control device (e.g. incinerator, biofilter, e.g) - Entire herd ($\approx 64-72\%$; 80% Capture and 80-90% Control of cow housing emissions)
- 2) Feed and Manure Management Practices
 - Concrete feed lanes and walkways for all cows
 - Feed lanes and walkways for milk cows and dry cows flushed four times per day
 - All animals fed in accordance with National Research Council (NRC) or other District-approved guidelines
 - VOC mitigation measures required by District Rule 4570

Description of Control Technologies

1) Enclosed Freestall Barns vented to a Control Device

In a freestall barn, cows are grouped in large pens with free access to feed bunks, water, and stalls for resting. In the mild climate of the San Joaquin Valley, the typical freestall barn is an open structure (roof but no sides). The primary freestall design consists of a roof that provides shade with all sides open to allow air to flow through, which keeps the cows cool. The open freestall barns take advantage of natural summer winds in the San Joaquin Valley that are generally greater than four mph. The natural winds result in an excellent summer ventilation rate that is equivalent to 1,000 cfm per cow more, which is why open dairy barns are generally recommended in the San Joaquin Valley. In colder climates enclosed or partially enclosed barns may be utilized to protect cows from winter extremes. However, no completely enclosed freestall barns that were installed at a California dairy were identified.

Although the potential to enclose cows in a barn may exist, the feasibility of reasonably collecting the gas through a stack, chimney, or vent remains in question considering the extremely large amounts of airflow going through the barns needed to keep the cows cool. The airflow requirements would be even higher in the San Joaquin valley, where temperatures can exceed 110° F in the hot summer. If the barn exhaust can be properly captured it may be possible to vent it to a VOC control device. If the gases can be properly captured, then those gases may be and sent to a control device. It is estimated that up to 80% of the gases emitted from enclosed freestall barns can be captured by the mechanical ventilation system and sent to a control device, such as an incinerator or biofilter.

Thermal incineration is a well-established VOC control technique. During combustion, gaseous hydrocarbons are oxidized to form CO₂ and water. In addition to the difficulty of capturing all of the gases in a freestall barn, a disadvantage of thermal incineration is that when concentrations of combustible VOCs in the gas stream are very low very large amounts of supplemental fuel must be used to sufficiently increase the temperature of all of the ventilation air in order to incinerate these VOCs. This generally renders incineration cost prohibitive for large flows of dilute VOCs, such as in the ventilation air from a freestall barn. Because of this biofilters have generally been found to be more cost-effective for handling dilute streams of biodegradable VOCs. A biofilter is a device for removing contaminants from a gas in which the gas is passed through a media that supports microbial activity by which pollutants are degraded by biological oxidation. During biofiltration microorganisms oxidize the gaseous organic contaminants, ammonia, and sulfur compounds in the exhaust air resulting in carbon dioxide, nitrogen, water, salt, and biomass. Additional information on biofiltration is given below in the analysis for enclosed freestall barns vented to a control device.

Although many questions remain about the reasonability of requiring animals to be confined in buildings and venting the exhaust to a control device, it will be considered for purposes of this analysis.

2) 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 system. 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 flush system, they do not individually reduce emissions of gaseous pollutants; therefore, no VOC control efficiency will be assigned for this practice.

Increased Flushing for Feed Lanes and Walkways

Many dairy operations use a flush system to remove manure from the corral and freestall feed lanes and walkways. The flush system introduces a large volume of water 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. The freestall and corral lanes for milk and dry cows are typically flushed twice per day, but the flushing frequency can vary between one to four times per day. The lanes for support stock are usually flushed once per day or less frequently.

In addition to cleaning the corral and freestall feed lanes and walkways, the flush system also serves as an emission control for reducing PM₁₀, VOC, and ammonia emissions. The manure deposited in the lanes, which is a source of VOC emissions, is removed from the cow housing area by the flush system. 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, 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 flush system 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 flushed twice per day. Flushing the lanes four times per day will increase the frequency that manure is removed from the cow housing permit unit and should result in a higher percentage of soluble volatile compounds being dissolved in the flush. Although the control efficiency for VOCs may actually be much higher, flushing the freestall lanes four times per day 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.¹³ 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 10% for both enteric VOC emissions from dairy animals and VOC emissions from manure.

¹³ "Emissions of Volatile Organic Compounds Originating from UK Livestock Agriculture", Hobbs, P.J. 2004 – Journal of the Science of Food and Agriculture

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) Enclosed freestalls vented to a control device (e.g. incinerator, biofilter, e.g) (≈68-72% ; 80% Capture and 85-90% Control of cow housing emissions)
- 2) Feed and Manure Management Practices
 - Concrete feed lanes and walkways for all cows
 - Feed lanes and walkways for milk cows and dry cows flushed four times per day
 - All animals fed in accordance with National Research Council (NRC) or other District-approved guidelines
 - VOC mitigation measures required by District Rule 4570

d. Step 4 - Cost Effectiveness Analysis

Enclosed Freestall Barns Vented to a Control Device (Biofilter)

The analysis below is based on the Analysis for Confining Livestock in Enclosed Buildings and Venting Emissions to a Control Device contained in the District document Final Staff Report – Revised Proposed Amendments to Rule 4570 (Confined Animal Facilities), Appendix E – Analysis of Class Two Mitigation Measures for Revised Proposed Amendments to Rule 4570 (Confined Animal Facilities) dated October 21, 2010. Additional details regarding the cost analysis can be found in the referenced report for the amendments to District Rule 4570.

This analysis does not quantify all of the costs or examine all of the potential issues that make requiring this option infeasible but it is intended to more accurately reflect the actual costs to implement this measure. The use of a biofilter as a control device for VOCs is expected to result in much lower costs than other control options, such as incineration. The U.S. Environmental Protection Agency (US EPA), Clean Air Technology Center (CATC) document "Using Bioreactors to Control Air Pollution" states, "*The capital cost of a bioreaction installation is usually just a fraction of the cost of a traditional control device installation. Operating costs are usually considerably less than the costs of traditional technology, too.*"¹⁴ Therefore, this analysis will evaluate the use of a biofilter to determine the minimum cost of the emission reductions that would be achieved by venting enclosed animal housing to a control device.

Description of Control Technology

A biofilter is a device for removing contaminants from a gas in which the gas is passed through a media that supports microbial activity by which pollutants are degraded by

¹⁴ U.S. Environmental Protection Agency, The Clean Air Technology Center (CATC), "Using Bioreactors to Control Air Pollution" EPA-456/R-03-003, (E143-03), September 2003, <http://www.epa.gov/ttn/catc/dir1/fbiorect.pdf>

biological oxidation. During biofiltration, exhaust air containing pollutants passes through a media that contains an established, diverse population of aerobic microorganisms. These microorganisms oxidize the gaseous organic contaminants, ammonia, and sulfur compounds in the exhaust air resulting in carbon dioxide, nitrogen, water, salt, and biomass. The bacterial cultures (microorganisms that typically consist of several species coexisting in a colony) that use oxygen to biodegrade organics are called aerobic cultures. These aerobic cultures are usually supported by organic material contained in the biofilter, such as compost, wood chips, soil, peat, etc. Biofilters must maintain sufficient porosity to allow the contaminated air stream to pass through for treatment and to minimize anaerobic conditions. The moisture content of biofilter beds must also be regulated to ensure that there is sufficient moisture to maintain the microorganisms needed for treatment while avoiding excess moisture that can cause anaerobic conditions. A filtration system may be required upstream of a biofilter to remove particular matter which will clog the biofilter over time. Biofilters must be maintained free of rodents and weeds to avoid channeling of gases through the filter media and a loss of performance. The filter media of natural biofilters needs to be replaced periodically because of deterioration and loss of porosity.

Since biofilters rely on living organisms to function, a biofilter's performance will be affected by several factors, including: ambient temperature; temperature of the air stream being treated; the pollutant concentrations in the air stream; moisture content of the filter and air stream, and pH of the filter media. These parameters should be monitored to ensure optimum operating conditions for the biofilter.

Advantages and Disadvantages of Using a Biofilter to Control Emissions

Some of the general advantages related to the use of biofilters include: low installation costs for traditional biofilter designs; generally low operating costs in comparison to other control technologies; high control efficiencies for some compounds such as aldehydes, organic acids, hydrogen sulfide, and certain water-soluble organic compounds.

Some of the general disadvantages of the use of biofilters include: large land requirements for traditional biofilter designs; difficulty in determining the control efficiency for traditional open biofilter designs; for biofilters that use inexpensive natural bed media, the filter bed media must be replaced every 2 to 5 years; biofilters usually require some time to reach optimum control efficiency after initial startup and after periods of nonuse because of the need to establish or re-establish the microbial population; and biofilters can also be a source of nitrous oxide emissions due to denitrification.

Additional disadvantages specifically related to the use of biofilters to control emissions from livestock include: facilities that currently use natural ventilation would incur additional costs because of the need to convert to mechanical ventilation; facilities that currently use mechanical ventilation systems may need to upgrade these systems to overcome the increased pressure drop across the biofiltration system; greater energy usage for all facilities to push air through the biofilter; few reported cases where a biofilter has been shown to be economically viable when applied to animal feeding

operations¹⁵; a very large biofilter system must be used to handle these huge flow rates while maintaining adequate contact time for treatment of emissions. Finally, because of the extremely large airflow rates needed to provide adequate ventilation for livestock it is not practical to treat all of the ventilation air from large confined animal housing units.

Biofilter VOC Control Efficiency

It is assumed that 80% of the gasses emitted from the enclosed animal housing will be captured by the mechanical ventilation system and that a properly functioning biofilter will eliminate 85% of the captured VOC emissions¹⁶; therefore, the total control for VOCs from the enclosed animal housing = $0.80 \times 0.85 = 68\%$.

Cost Estimates for Enclosed Freestall Barns for this Analysis

Based on the information contained in the District Staff Report for the Revised Proposed Amendments to Rule 4570 (Confined Animal Facilities) dated October 21, 2010, the following cost estimates for enclosed freestall barns will be used in this analysis.

Capital Cost for Enclosed Freestall Barn (2010): \$1,700-2,700/cow

Estimated Adjusted Capital Cost: \$1,275-2,025/cow (capital cost estimate reduced by 25% because it may be possible to use the existing concrete work and some of the existing freestall infrastructure with the new building shell)

For more conservative calculations, the estimated adjusted capital cost above will be reduced by multiplying by a factor of 72% to account for the smaller size and reduced space requirements of Jersey cattle, resulting in the following capitol cost estimate: **\$918-1,458/cow**

Increased Operating Costs¹⁷: **\$74- 98/cow more**

Capital Cost for Freestall Barn Enclosure for 7,200 Jersey Milk Cows and 1,350 Dry Cows

Low capital cost estimate: $\$918/\text{cow} \times 8,550 \text{ cows} = \$7,848,900$

High capital cost estimate: $\$1,458/\text{cow} \times 8,550 \text{ cows} = \$12,456,900$

¹⁵ U.S. Environmental Protection Agency, "Emissions from Animal Feeding Operations" (Draft), EPA Contract No. 68-D6-0011, August 15, 2001, pg. 9-20, <http://www.epa.gov/ttn/chief/ap42/ch09/draft/draftanimalfeed.pdf>

¹⁶ The SCAQMD Rule 1133.2 staff report (page 18) indicates control efficiencies of 80-90% for VOC for existing biofilter composting applications and that a well-designed, well-operated, and well-maintained biofilter is capable of achieving 80 percent control efficiency for VOC, http://www.aqmd.gov/rules/doc/r1133/r1133_staffreport.pdf

¹⁷ Increased operating costs were based on information from following document, adjusted to 2010 dollars assuming 3% annual inflation: Dhuyvetter, Kevin C., Harner, Joe P., Smith, John F., & Bradford, Barry J., Kansas State University Department of Agricultural Economics, "Economic Considerations of Low-Profile Cross-Ventilated Freestall Barns", Presented at Dairy Housing of the Future, Sioux Falls, South Dakota. September 10-11, 2008, [http://www.aqmanager.info/Faculty/dhuyvetter/presentations/2008/LPCV%20Conference\(Sep2008\).pdf](http://www.aqmanager.info/Faculty/dhuyvetter/presentations/2008/LPCV%20Conference(Sep2008).pdf)

Increased Operating Costs for Enclosed Freestall Barns for 7,200 Jersey Milk Cows and 1,350 Dry Cows

Low operating cost estimate: \$74/cow-yr x 8,550 cows = \$632,700/yr
 High operating cost estimate: \$98/cow-yr x 8,550 cows = \$837,900/yr

Cost Estimate for Biofilters

Several reference documents were consulted to determine the expected capital and operating costs of using a biofilter to control VOC emissions from enclosed animal housing for evaluation of the Class Two Mitigation Measures contained in the District Staff Report for the Revised Proposed Amendments to Rule 4570 (Confined Animal Facilities) dated October 21, 2010. Several companies that specialize in building and supplying biofilters and bio-scrubbers for the control of VOC emissions were also contacted to request capital cost estimates for biofilter systems specifically for the treatment of VOC emissions from dairy cows housed in enclosed barns. The resulting cost estimates from the District staff report are summarized below. Based on the information reviewed, it was also determined that there would not be any additional cost reduction benefit related to economy of scale for biofilters handling the large flow rates from freestall barns. For purposes of this analysis, the following biofilter cost estimates will be used.

Capital Cost (2010): **\$3-35/cfm**
 Operating Costs (2010): **\$2.12-20/cfm**

The cost is largely dependent on the airflow rate that the biofilter must handle. Biofilters used to treat exhaust air should be sized to treat the maximum ventilation rate, which is typically the warm weather rate. The higher cost estimate is representative of a biotrickling filter, which may be necessary to handle the high air flow rates from the barns.

Required Airflow Rate of the Freestall Barns

In order to calculate the costs of this control option, the airflow rate required for the freestall barns must be determined. The University of Minnesota's publication "Improving Mechanical Ventilation in Dairy Barns"¹⁸, gives minimum ventilation rates for dairy cattle, which are listed in the table below.

Minimum Ventilation Rates for Dairy Cows (cfm/cow)			
Age	Winter	Mild Weather	Summer
Baby Calf	15	50	100
Heifer (2-12 months)	20	60	130
Heifer (12-24 months)	30	80	180
Mature Cow	50	170	500 – 1,000

¹⁸ "Improving Mechanical Ventilation in Dairy Barns", J.P. Chastain,
http://www.milkproduction.com/Library/Articles/Improving_mechanical_ventilation.htm

The minimum summer ventilation rate listed for mature cows is 500 cfm per cow. However, according to the University of Minnesota publication and Cornell University's publication "Natural or Tunnel Ventilation of Freestall Structures: What is Right for Your Dairy Facility?"¹⁹, the minimum required airflow rate in the summer increases to 1,000 cfm per cow if tunnel ventilation is used to provide additional cooling.

The climate in the San Joaquin Valley is characterized by mild winters and hot summers. Because of the warmer climate, it is expected that tunnel ventilation or a similar system would need to be employed in an enclosed freestall barn to prevent excessive heat stress. Additionally, tunnel ventilation systems are more representative of the types of systems that would be required to capture and control emissions.

Minimum Summer Air Requirements for freestall barns vented to a biofilter for 7,200 Jersey Milk Cows and 1,350 Dry Cows:

The minimum required summer airflow rate for housing 7,200 milk cows and 1,350 dry cows in enclosed freestalls is calculated as below:

Low Summer Ventilation Rate: $7,200 \text{ milk cows} \times 500 \text{ cfm/cow} + 1,350 \text{ milk cows} \times 500 \text{ cfm/cow} = 4,275,000 \text{ cfm}$

High Summer Ventilation Rate: $7,200 \text{ milk cows} \times 1,000 \text{ cfm/cow} + 1,350 \text{ milk cows} \times 1,000 \text{ cfm/cow} = 8,550,000 \text{ cfm}$

The estimated calculated minimum ventilation rates calculated above will be reduced by multiplying by a factor of 72% to account for the smaller size of Jersey cattle, resulting in the following minimum summer airflow rate for housing 7,200 Jersey milk cows and 1,350 dry cows in enclosed freestalls:

Low Summer Ventilation Rate: 3,078,000 cfm

High Summer Ventilation Rate: 6,156,000 cfm

Capital Cost of a Biofilter for 7,200 Jersey Milk Cows and 1,350 Dry Cows

The lower cost estimate does not include installation of the required ductwork. As stated above, the estimated capital costs for a biofilter range of between \$3.00 per cfm and \$35.00 per cfm. The capital cost estimates of a biofilter for enclosed freestall barns housing 7,200 Jersey milk cows and 1,350 dry cows are calculated as follows:

Low capital cost estimate: $\$3.00/\text{cfm} \times 3,078,000 \text{ cfm} = \$9,234,000$

High capital cost estimate: $\$35.00/\text{cfm} \times 6,156,000 \text{ cfm} = \$215,460,000$

Operating Costs for a Biofilter for 7,200 Jersey Milk Cows and 1,350 Dry Cows

Low operating cost estimate: $\$2.12/\text{cfm-yr} \times 3,078,000 \text{ cfm} = \$6,525,360/\text{yr}$

High operating cost estimate: $\$20.00/\text{cfm-yr} \times 6,156,000 \text{ cfm} = \$123,120,000/\text{yr}$

¹⁹ Natural or Tunnel Ventilation of Freestall Structures: What is Right for Your Dairy Facility?, C.A. Gooch, <http://www.ansci.cornell.edu/pdfs/nattunnel.pdf>

Annualized Capital Costs for Biofilter for 7,200 Jersey Milk Cows and 1,350 Dry Cows

Pursuant to District Policy APR 1305, section X (11/09/99), the cost for the purchase of the biofilter will be spread over the expected life of the system using the capital recovery equation. The expected life of the entire system (fans, media, plenum, etc) will be estimated at 10 years. A 10% interest rate is assumed in the equation and the assumption will be made that the equipment has no salvage value at the end of the ten-year cycle.

$$A = [P \times I(1+I)^N] / [(1+I)^N - 1]$$

Where: A = Annual Cost
P = Present Value (freestall enclosure and biofilter)
I = Interest Rate (10%)
N = Equipment Life (10 years)

Low Annualized Capital Cost Estimate =
 $[(\$7,848,900 + \$9,234,000) \times 0.1(1.1)^{10}] / [(1.1)^{10} - 1] = \$2,780,163/\text{year}$

High Annualized Capital Cost Estimate =
 $[(\$12,456,900 + \$215,460,000) \times 0.1(1.1)^{10}] / [(1.1)^{10} - 1] = \$37,092,426/\text{year}$

Total Annual Cost Estimates

The total annualized capital costs and operating costs for a freestall enclosure vented to a biofilter are given below. For the least expensive biofilters, the biofilter media (e.g., soil, compost, wood chips) must be replaced after 3-5 years in order to remain effective. This may be an additional cost because it may not have been included in the least expensive operating cost estimates provided above.

Total annual cost estimate = (total annualized capital cost) + (increased operating cost for an enclosed freestall barn) + (biofilter operating cost)

Low total annual cost estimate = $(\$2,780,163/\text{yr}) + (\$632,700/\text{yr}) + (\$6,525,360/\text{yr})$
 = $\$9,938,223/\text{year}$

High total annual cost estimate = $(\$37,092,426/\text{yr}) + (\$837,900/\text{yr}) + (\$123,120,000/\text{yr})$
 = $\$161,050,326/\text{year}$

Potential Income from Increased Milk Production

Cooling milk cows in enclosed freestall barns may reduce heat stress and result in increased milk production. Because dairy cows in California already have some of the highest milk production rates in the nation, it is questionable regarding whether enclosing the milk cows will result in any significant increases in milk production. This is because heat stress is related to both temperature and humidity and it is likely that the increased temperatures in California relative to other states are mitigated by the much lower humidity. Although questions remain about the potential to increase milk production in the San Joaquin Valley by reducing heat stress, this potential benefit will be quantified for this analysis.

Potential Increased Daily Milk Production: 4-6 lb/cow-day (District 4570 Staff Report, June 2006)

Potential Increased Annual Milk Production: 1,460-2,190 lb/cow-yr
Class 4b Price of milk²⁰ for March 2012: \$13.67/cwt
Income from increased milk production: \$199.58-299.37/cow-yr

Max Income from increased milk production for 7,200 milk cows:
7,200 milk cows x \$299.37/cow-yr = \$2,155,464/yr

Low total annual cost estimate – income from increased milk production =
(\$9,938,223/yr) - (\$2,155,464/yr) = \$7,782,759/year

VOC Emission Reductions for 7,200 Jersey Milk Cows and 1,350 Dry Cows

The annual VOC Emission reductions for enclosed freestall barns for 7,200 Jersey Milk Cows and 1,350 Dry Cows vented to a biofilter are calculated as follows:

VOC Emissions from Cows (Enteric) and Manure:

[Number of cows] x [Uncontrolled Cow Housing VOC EF (lb/cow-year)] x [Jersey adjustment Factor] x [Capture Efficiency] x [Biofilter Control Efficiency]

VOC Reductions from Jersey Cows Housed in Enclosed Freestall Barns Vented to a Biofilter (Cows, Stalls, & Lanes)											
Type of Cow	# of cows	x	Housing EF* (lb/cow-yr)	x	Jersey Adj. (%)	x	Capture (%)	x	Control (%)	=	lb-VOC/yr
Milk Cow	7,200	x	5.93	x	72%	x	80%	x	85%	=	20,904
Dry Cow	1,350	x	3.21	x	72%	x	80%	x	85%	=	2,122
Support Stock/ Large Heifer	0	x	2.46	x	72%	x	80%	x	85%	=	0
Total (lb-VOC/yr)											23,026

*For milk cows, emissions in the milk parlor(s) are included in the cow housing emission factor

VOC Emissions from TMR:

[Number of cows] x [Area of TMR (ft²/cow)] x [Uncontrolled TMR Flux Rate (lb-VOC/ft²-day)] x [365/day/year] x [Capture Efficiency] x [Biofilter Control Efficiency]

²⁰ http://www.cdfa.ca.gov/dairy/pdf/Prices_Grid.pdf; The Class 4b milk price was because dairy industry representatives state that increased production is purchased at the lowest price. Additionally, sufficient increased production will cause the price to fall

VOC Reductions from TMR (Feed) for Cows Housed in Enclosed Freestall Barns Vented to a Biofilter													
Type of Cow	# of cows	x	TMR Area* (ft ² /cow)	x	TMR Flux (lb/ft ² -day)	x	365 day/yr	x	Capture (%)	x	Control (%)	=	lb-VOC/yr
Milk Cow	7,200	x	7.08	x	3.85E-03	x	365	x	80%	x	85%	=	48,711
Dry Cow	1,350	x	7.08	x	3.85E-03	x	365	x	80%	x	85%	=	9,133
Support Stock	0	x	7.08	x	3.85E-03	x	365	x	80%	x	85%	=	0
Total (lb-VOC/yr)													57,844

For more conservative calculations the TMR Area has not been reduced to account for the reduced size and feed consumption of Jersey cows when compared to Holsteins

Total VOC Emission Reductions from Milk Parlor, Cow Housing, and TMR =23,026 lb-VOC/yr + 57,844 lb-VOC/yr = 80,870 lb-VOC/yr

Cost of VOC Emission Reductions

Low Estimate²¹ = (\$7,782,759/year)/[(80,870 lb-VOC/year)(1 ton/2000 lb)]
= **\$192,476/ton of VOC reduced**

High Estimate = (\$161,050,326/year)/[(80,870 lb-VOC/year)(1 ton/2000 lb)]
= **\$3,982,944/ton of VOC reduced**

As shown above, the costs for a freestall enclosure and biofilter would cause the cost of the VOC reductions to be at least \$192,476/ton. There are additional costs related to increased electricity use, and regulatory compliance and testing that have not been quantified in this analysis. Even without these costs, it is clear that the cost of the VOC emission reductions achieved would be far greater than the \$17,500/ton-VOC cost effectiveness threshold of the District BACT policy. The equipment is therefore not cost effective and is being removed from consideration at this time.

Feed and Manure Management Practices:

- Concrete feed lanes and walkways for all cows
- Feed lanes and walkways for milk cows and dry cows flushed four times per day
- All animals fed in accordance with National Research Council (NRC) or other District-approved guidelines
- VOC mitigation measures required by District Rule 4570

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 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.

²¹ Includes reduction in overall annual costs because of potential additional revenue from maximum supposed increase in milk production.

Additionally, District Rule 2201 defines BACT as including the most stringent emission limitation or control technique, including process and equipment changes, that have been found by the APCO to be cost effective and technologically feasible for such class or category of sources or for a specific source. The District has found that the basic mitigation measures required by District Rule 4570 are cost effective and technologically feasible for confined animal facilities and the applicant has proposed these options. Therefore, in addition to the BACT requirements determined in the Top-Down BACT Analysis above, implementation of the mitigation measures that the applicant has selected to comply with Rule 4570 will also be required as part of BACT for VOC emissions from the cow housing permit.

3. BACT Analysis for NH₃ Emissions from the Cow Housing Permit Unit:

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 in this project. However, for purposes of the Dairy BACT Guideline, the District will not deem any control options Achieved-in-Practice until after the final Dairy BACT Guideline has been established

The following management practices have been identified as possible control options for the NH₃ emissions from the cow housing permit unit and have been proposed by the applicant:

1) Feed and Manure Management Practices

- Concrete feed lanes and walkways for all cows
- Feed lanes and walkways for milk cows and dry cows flushed four times per day
- All animals fed in accordance with National Research Council (NRC) or other District-approved guidelines

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 system. The flush system will further reduce particulate matter emissions and will also reduce VOC and ammonia emissions (see below).

Increased Flushing for feed lanes and walkways

Many dairy operations use a flush system to remove manure from the corral and freestall feed lanes and walkways. The flush system introduces a large volume of water 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. The freestall and corral lanes for milk and dry cows are

typically flushed twice per day, but the flushing frequency can vary between one to four times per day. The lanes for support stock are usually flushed once per day or less frequently.

In addition to cleaning the corral and freestall feed lanes and walkways, the flush system also serves as an emission control for reducing PM₁₀, VOC, and ammonia emissions. The manure deposited in the lanes, which is also a source of NH₃ emissions, is removed from the cow housing area by the flush system. Ammonia has a high affinity for water and is highly soluble in water. Therefore, 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.

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) Feed and Manure Management Practices

- Concrete feed lanes and feed walkways for all cows
- Feed lanes and walkways for milk cows and dry cows flushed four times per day and feed lanes
- All animals fed in accordance with National Research Council (NRC) or other District-approved guidelines

d. Step 4 - Cost Effectiveness Analysis

The applicant has proposed the only option listed; therefore a cost 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 feed all animals in accordance with National Research Council (NRC) or other District-approved guidelines utilizing routine nutritional analysis for rations.

Additionally, District Rule 2201 defines BACT as including the most stringent emission limitation or control technique, including process and equipment changes, that have been found by the APCO to be cost effective and technologically feasible for such class or category of sources or for a specific source. The District has found that the basic mitigation measures required by District Rule 4570 are technologically feasible for confined animal facilities and the applicant has proposed these options. Although District Rule 4570 is only intended to reduce VOC emissions, many of these measures also reduce ammonia emissions. Therefore, in addition to the BACT requirements determined in the Top-Down BACT Analysis above, implementation of the mitigation measures that the applicant has selected to comply with Rule 4570 will also be required as part of BACT for NH₃ emissions from the cow housing permit.

III. Top Down BACT Analysis for the Liquid Manure Handling System – Lagoon/Storage Pond (C-6831-3)

1. 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 Inc², 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 utilizing routine nutritional analysis for rations.

d. Step 4 - Cost Effectiveness Analysis

The applicant has proposed the only option listed; 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.

Additionally, District Rule 2201 defines BACT as including the most stringent emission limitation or control technique, including process and equipment changes, that has been found by the APCO to be cost effective and technologically feasible for such class or category of sources or for a specific source. The District has found that the basic mitigation measures required by District Rule 4570 are technologically feasible for confined animal facilities and the applicant has proposed these options. Although District Rule 4570 is only intended to reduce VOC emissions, many of these measures also reduce ammonia emissions. Therefore, in addition to the BACT requirements determined in the Top-Down BACT Analysis above, implementation of the mitigation measures that the applicant has selected to comply with Rule 4570 will also be required as part of BACT for NH₃ emissions from the lagoon/storage pond.

2. BACT Analysis for H₂S Emissions from the Lagoon(s)/Storage Pond(s)

a. Step 1 - Identify all control technologies

A cost effectiveness threshold has not been established for hydrogen sulfide. 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 a possible control options for the H₂S 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
- 2) Solids Separation
- 3) Increasing the pH of Lagoons/Ponds (> 7), with monitoring and recordkeeping, and adjustment with lime (or similar base) as needed
- 4) Reduce or Eliminate the Use of Copper Sulfate as a Footbath Disinfectant

Description of Control Technologies

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

H₂S is produced as a result of the decomposition of sulfur compounds in the manure under anaerobic conditions. The presence of these sulfur compounds in the manure is primarily due to excretion of excess sulfur from the digestive tract, as well as other inorganic sources.²² The potential for hydrogen sulfide emissions can be reduced by reducing the amount of undigested sulfur compounds in the manure.

Nutritional management of dairy feed is routinely practiced to improve milk production and herd health. Because both organic Nitrogen and Sulfur compounds are primarily components of amino acids, they tend to occur in set ratios and strategies to reduce the excretion of undigested protein and Nitrogen will also reduce the amount of Sulfur in the manure. A diet that is formulated to feed proper amounts of ruminantly-degradable protein will result in improved protein utilization by the animal and corresponding reduction in sulfur content of the manure, which will reduce the potential for production of H₂S.

2) **Solids Separation**

Solids separation will reduce loading and the amount of organic Sulfur compounds that are stored under anaerobic conditions, thereby reducing the potential for production of H₂S.

²² <http://www.epa.gov/ttnchie1/ap42/ch09/draft/draftanimalfeed.pdf>

Reducing the loading of lagoons also creates conditions that are more favorable to the growth of sulfur-reducing phototrophic bacteria. Phototrophic or red water treatment lagoons have a characteristic purple, pink, or rose color. Purple sulfur bacteria utilize hydrogen sulfide and volatile organic acids as an electron source for anoxygenic photosynthesis and utilize volatile organic acids and alcohols as a carbon source for growth. This reduces the concentration of these compounds at the surface of the lagoons and reduces the rate of volatilization of these compounds to the atmosphere.

In addition to mechanical separators, settling basins can also be used to remove solids; however, they must be frequently emptied (at least every six months) so the removed solids do not remain anaerobic.

3) Increasing the pH of Lagoons/Ponds (pH > 7)

Aqueous sulfide exists in three different forms: molecular (un-dissociated) hydrogen sulfide (H_2S) and the bisulfide (HS^-) and sulfide (S^{2-}) ions and all three comprise total sulfide. In aqueous solutions molecular H_2S exists in equilibrium with the bisulfide (HS^-) and sulfide (S^{2-}) ions but only molecular H_2S , 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) most of the sulfide will be in the form of molecular H_2S and the potential for H_2S emissions will increase. On the other hand, as the pH increases, a greater proportion of sulfide will be in the form of the bisulfide ion and the potential for H_2S emissions will decrease. Continued increases in pH will result in the formation sulfide ion but this amount of sulfide present in this form is negligible until the pH is above 12, well above the range of a typical dairy lagoon. If the pH is high enough, virtually all the sulfide will be in the ionic forms and there would be negligible H_2S emissions.

While increasing the pH high enough to completely eliminate H_2S emissions is probably not feasible in a large body of liquid such as a dairy manure lagoon, emissions may still be significantly reduced by increasing the pH of the lagoon and maintaining it in the basic range (> 7). Increases in pH can be achieved by the addition of lime (or similar base) to the lagoon. Monitoring and record keeping would be needed to ensure that the pH is maintained above the recommended value.

4) Reduce or Eliminate the Use of Copper Sulfate as a Footbath Disinfectant

Some researchers have recommended reducing or eliminating the use of Copper Sulfate as a means of reducing H_2S emissions from lagoons. This will reduce the amount of inorganic sulfur compounds that are stored under anaerobic conditions, thereby reducing the potential for production of H_2S . Copper Sulfate can also be detrimental to purple sulfur bacteria and other anaerobic microbes that reduce VOC and H_2S .²³

²³ <http://www.cals.uidaho.edu/edComm/pdf/CIS/CIS1148.pdf>;
<http://courses.cals.uidaho.edu/bae/bae404/Dairy%20Odor%20Mgmt.pdf>; and
http://www.deq.idaho.gov/media/635665-58_0101_0502_scientific_basis_final.pdf

Copper Sulfate is one of the main disinfectants used in dairy footbaths to prevent the occurrence and spread digital dermatitis (aka hairy foot warts) on the hooves of dairy cattle. Digital dermatitis is a health concern that can result in lameness in dairy cattle.

b. Step 2 - Eliminate technologically infeasible options

There are no technologically infeasible options to eliminate from step 1, but the following control options should not be considered further:

1) Increasing the pH of Lagoons/Ponds

This measure should not be considered because it would result in significant increases in Ammonia emissions. Under pH conditions close to neutral or acidic ($\text{pH} \leq 7$) Ammonia exists primarily as the soluble Ammonium ion, which is retained in the lagoon²⁴. When the pH increases, the Ammonium ion (NH_4^+) is increasingly converted into unionized Ammonia, which can be emitted into the atmosphere. Under normal circumstances properly operated lagoons will have a pH that is close to neutral or is slightly basic. In lagoons and ponds ammoniacal nitrogen is generally present in significantly greater quantities than sulfide. Therefore, increasing the pH will result in large increases in ammonia emissions with much smaller decreases in hydrogen sulfide emissions. Additionally, it is reasonable to assume that properly designed treatment lagoons will remain in a pH range that is effective in reducing VOC and odors and forcing large changes in the pH may negatively affect the equilibrium that has been established by the microbial populations in properly designed treatment lagoon systems. Because of these factors, increasing the pH of lagoons and ponds will not be required.

2) Reduce or Eliminate the Use of Copper Sulfate as a Footbath Disinfectant

Copper Sulfate is one of the main disinfectants used in dairy footbaths to prevent the occurrence and spread digital dermatitis (aka hairy foot warts) on the hooves of dairy cattle. Digital dermatitis is a health concern that can result in lameness in dairy cattle. Further research is needed to better quantify the effect that the use of copper sulfate has on H₂S emissions and to additional research is needed regarding the effectiveness and practicality of the use of alternative disinfectants for the prevention of digital dermatitis. Therefore, this practice will not be required at this time but may be reevaluated later.

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) Solids Separation

²⁴ <http://pubs.ext.vt.edu/442/442-110/442-110.html>

d. Step 4 - Cost Effectiveness Analysis

The remaining control options are achieved in practice and have 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 and to separate solids from the manure stream prior to treatment in the lagoon, which satisfies the BACT requirements.

IV. Top Down BACT Analysis for the Liquid Manure Handling System – Liquid Manure Land Application (C-6831-3)

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 Inc², 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 utilizing routine nutritional analysis for rations.

d. Step 4 - Cost Effectiveness Analysis

The applicant has proposed the only option listed; 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.

Additionally, District Rule 2201 defines BACT as including the most stringent emission limitation or control technique, including process and equipment changes, that has been found by the APCO to be cost effective and technologically feasible for such class or category of sources or for a specific source. The District has found that the basic mitigation measures required by District Rule 4570 are technologically feasible for confined animal facilities and the applicant has proposed these options. Although District Rule 4570 is only intended to reduce VOC emissions, many of these measures also reduce ammonia emissions. Therefore, in addition to the BACT requirements determined in the Top-Down BACT Analysis above, implementation of the mitigation measures that the applicant has selected to comply with Rule 4570 will also be required as part of BACT for NH₃ emissions from liquid manure land application.

V. Top Down BACT Analysis for the Solid Manure Handling and land Application (C-6831-4)

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 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
- 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 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.

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.²⁵

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

d. Step 4 - Cost Effectiveness Analysis

The remaining control options are achieved in practice and have 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 and to incorporate solid manure applied to cropland immediately (within two hours) after application, which satisfies the BACT requirements.

Additionally, District Rule 2201 defines BACT as including the most stringent emission limitation or control technique, including process and equipment changes, that has been found by the APCO to be cost effective and technologically feasible for such class or category of sources or for a specific source. The District has found that the basic mitigation measures required by District Rule 4570 are technologically feasible for confined animal facilities and the applicant has proposed these options. Although District Rule 4570 is only intended to reduce VOC emissions, many of these measures also reduce ammonia emissions. Therefore, in addition to the BACT requirements determined in the Top-Down BACT Analysis above, implementation of the mitigation measures that the applicant has selected to comply with Rule 4570 will also be required as part of BACT for NH₃ emissions from the solid manure handling system.

²⁵ 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>)

APPENDIX D

Summary of Health Risk Assessment (HRA)

San Joaquin Valley Air Pollution Control District Risk Management Review

To: Ramon Norman – Permit Services
 From: Cheryl Lawler – Technical Services
 Date: May 14, 2012
 Facility Name: Red Top Jerseys
 Location: 21463 Road 4, Chowchilla
 Application #(s): C-6831-1-3, 2-3, 3-3, 4-3, & 8-1
 Project #: C-1095388

A. RMR SUMMARY

RMR Summary					
Categories	Milk Parlors (Unit 1-3)	Cow Housing (Unit 2-3)	Lagoons (Unit 3-3)	Solid Manure Handling (Unit 4-3)	Facility Totals
Prioritization Score	0.00	0.05	0.07	0.01	>1
Acute Hazard Index	0.00	0.09	0.05	0.04	0.68
Chronic Hazard Index	0.00	0.02	0.04	0.00	0.06
Maximum Individual Cancer Risk	N/A*	N/A*	N/A*	N/A*	3.1E-06
T-BACT Required?	No	No	No	No	
Special Permit Conditions?	No	No	No	No	

*The Maximum Individual Cancer Risk was not calculated since there are no risk factors associated with the Hazardous Air Pollutant (Ammonia) under analysis.

B. RMR REPORT

I. Project Description

Technical Services performed a Risk Management Review (RMR) for a dairy operation proposing to modify the herd composition at their existing dairy. The overall emissions from the proposed modification are decreasing with the exception of Ammonia. Therefore, only the increased amounts of Ammonia were used during the review, analysis, and modeling of this RMR project. In addition, because the existing lagoon configuration and total surface area are not changing, H2S review and analysis was not required per District policy.

II. Analysis

Units 1-3, 2-3, 3-3, & 4-3

Technical Services performed prioritizations using the District's HEARTs database. Increased Ammonia emission rates were calculated and supplied by the processing engineer. In accordance with the District's *Risk Management Policy for Permitting New and Modified Sources* (APR 1905-1, March 2, 2001), risks from the units were prioritized using

the procedures in the 1990 CAPCOA Facility Prioritization Guidelines and incorporated in the District's HEART's database. Even though the prioritization scores for these units were less than one (see RMR Summary Table); the facility's combined cumulative prioritization scores totaled to greater than one. Therefore, a refined Health Risk Assessment was required and performed for the project. AERMOD was used with area source parameters outlined below and concatenated 5-year meteorological data from Madera to determine maximum dispersion factors at the nearest residential and business receptors. The dispersion factors were input into the HARP model to calculate the Chronic and Acute Hazard Indices and the Carcinogenic Risk.

Unit 8-1

No prioritization or further review was required for Unit 8-1 (feed storage & handling).

The following parameters were used for the review:

Analysis Parameters C-6831, Project C-1095399			
Total Annual Increase of NH3 (lb/yr)	38,578	Total Hourly Increase of NH3 (lb/hr)	4.4
Project Location Type	Rural	Closest Receptor Distance (m)	396
		Closest Receptor Type	Business

Per District policy, H2S emissions analysis was not required for Unit 3-3 (lagoons), because the total surface area of the lagoons was not increasing or changing.

III. Conclusions

The acute and chronic indices are below 1.0; and there is no maximum individual cancer risk associated with the Hazardous Air Pollutant (Ammonia) under review. In accordance with the District's Risk Management Policy, the project is approved **without** Toxic Best Available Control Technology (T-BACT).

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

APPENDIX E
Draft ATCs (#C-6831-1-3, -2-3, & -3-3, 4-3, & -8-1)

San Joaquin Valley
Air Pollution Control District

AUTHORITY TO CONSTRUCT

ISSUANCE DATE: DRAFT
DRAFT

PERMIT NO: C-6831-1-3

LEGAL OWNER OR OPERATOR: REDTOP JERSEYS LLC
MAILING ADDRESS: 5638 COLUMBUS AVE
HILMAR, CA 95324

LOCATION: 21519 ROAD 4
CHOWCHILLA, CA

EQUIPMENT DESCRIPTION:

MODIFICATION OF 4,800 JERSEY COW MILKING OPERATION WITH TWO 72-STALL ROTARY MILKING PARLORS; INCREASE MILK COWS TO 7,200; CONSTRUCT ADDITIONAL 60-STALL ROTARY MILKING PARLOR; AND ADD MITIGATION MEASURES FOR RULE 4570

CONDITIONS

1. {3215} Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to enter the permittee's premises where a permitted source is located or emissions related activity is conducted, or where records must be kept under condition of the permit. [District Rule 1070]
2. {3216} Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to have access to and copy, at reasonable times, any records that must be kept under the conditions of the permit. [District Rule 1070]
3. {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]
4. Permittee shall flush or hose down milk parlors immediately after or during each milking. [District Rules 2201 and 4570]

CONDITIONS CONTINUE ON NEXT PAGE

YOU MUST NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (559) 230-5950 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

DAVID WARNER, Director of Permit Services

C-6831-1-3 : Jun 5 2012 10:00AM - NORMANR : Joint Inspection NOT Required

5. Permittee shall provide verification that milk parlors are flushed or hosed down immediately after or during each milking. [District Rules 2201 and 4570]
6. All records shall be kept and maintained for a minimum of five (5) years and shall be made available to the APCO and EPA upon request. [District Rules 1070 and 4570]
7. {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]

DRAFT

San Joaquin Valley
Air Pollution Control District

AUTHORITY TO CONSTRUCT

ISSUANCE DATE: DRAFT
DRAFT

PERMIT NO: C-6831-2-3

LEGAL OWNER OR OPERATOR: REDTOP JERSEYS LLC
MAILING ADDRESS: 5638 COLUMBUS AVE
HILMAR, CA 95324

LOCATION: 21519 ROAD 4
CHOWCHILLA, CA

EQUIPMENT DESCRIPTION:

MODIFICATION OF COW HOUSING - 4,800 JERSEY MILK COWS, 782 DRY COWS, AND 3,865 LARGE HEIFERS (15-24 MONTHS) HOUSED IN SIX (6) FULL-LENGTH AND TWO (2) HALF-LENGTH FREESTALL BARNs WITH FLUSH SYSTEMS AND NO EXERCISE CORRALS; INCLUDING SPECIAL NEEDS HOUSING; MODIFY HERD SIZE TO 7,200 JERSEY MILK COWS AND 1,350 DRY COWS WITH NO HEIFERS OR CALVES; CONSTRUCT TWO ADDITIONAL FREESTALL BARNs AND ONE COVERED SPECIAL NEEDS BARN; ADD MITIGATION MEASURES FOR RULE 4570

CONDITIONS

1. {3215} Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to enter the permittee's premises where a permitted source is located or emissions related activity is conducted, or where records must be kept under condition of the permit. [District Rule 1070]
2. {3216} Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to have access to and copy, at reasonable times, any records that must be kept under the conditions of the permit. [District Rule 1070]
3. {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]
4. The total number of cattle housed at this dairy at any one time shall not exceed any of the following: 7,200 Jersey milk cows and 1,350 dry cows. [District Rule 2201]

CONDITIONS CONTINUE ON NEXT PAGE

YOU MUST NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (559) 230-5950 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

DRAFT

DAVID WARNER, Director of Permit Services
C-6831-2-3 : Jun 5 2012 10:00AM - NORMANR : Joint Inspection NOT Required

5. Milk cows and dry cows shall be housed in freestall barns. [District Rule 2201]
6. The freestall lanes and walkways at this dairy shall be constructed of concrete. [District Rule 2201]
7. Permittee shall pave feedlanes, where present, for a width of at least 8 feet along the side of the feedlane fence where animals are present for milk and dry cows and at least 6 feet along the side of the feedlane fence where animals are present for heifers. [District Rule 4570]
8. The freestall lanes at this dairy shall be flushed at least four times per day. [District Rules 2201 and 4570]
9. Permittee shall maintain an operating plan that requires the freestall lanes to be flushed at least four times per day. [District Rules 2201 and 4570]
10. Permittee shall maintain records sufficient to demonstrate that freestall lanes are flushed at least four times per day. [District Rules 2201 and 4570]
11. There shall be no exercise pens, corrals, or drylots at this dairy. [District Rule 2201]
12. Permittee shall not allow animals in exercise pens, corrals, or drylots at any time. [District Rules 2201 and 4570]
13. Permittee shall maintain an operating plan or provide verification that no animals are allowed in exercise pens, corrals, or drylots at any time. [District Rules 2201 and 4570]
14. Permittee shall feed all animals according to National Research Council (NRC) guidelines. [District Rule 2201]
15. 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]
16. Fence lines shall be inspected to remove any ridges of manure that form under them. [District Rule 2201]
17. Permittee shall maintain weekly records of the number of milk cows and dry cows at this dairy. [District Rule 2201]
18. 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]
19. All records shall be kept and maintained for a minimum of five (5) years and shall be made available to the APCO and EPA upon request. [District Rules 1070 & 4570]
20. {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]

DRAFT

San Joaquin Valley
Air Pollution Control District

AUTHORITY TO CONSTRUCT

ISSUANCE DATE: DRAFT
DRAFT

PERMIT NO: C-6831-3-3

LEGAL OWNER OR OPERATOR: REDTOP JERSEYS LLC
MAILING ADDRESS: 5638 COLUMBUS AVE
HILMAR, CA 95324

LOCATION: 21519 ROAD 4
CHOWCHILLA, CA

EQUIPMENT DESCRIPTION:

MODIFICATION OF LIQUID MANURE HANDLING SYSTEM CONSISTING OF ONE PROCESSING PIT, ONE DOUBLE SCREEN MECHANICAL SEPARATOR, ONE 700' X 250' X 30' ANAEROBIC TREATMENT LAGOON, ONE 400' X 250' X 30' ANAEROBIC TREATMENT LAGOON, AND ONE 960' X 280' X 30' STORAGE POND. MANURE IS LAND APPLIED THROUGH FLOOD IRRIGATION AND FURROW IRRIGATION; ALLOW INCREASE IN LIQUID MANURE FROM CHANGING HERD SIZE TO 7,200 JERSEY MILK COWS AND 1,350 DRY COWS; CONSTRUCT A SECOND PROCESSING PIT AND DOUBLE-SCREEN MECHANICAL SEPARATOR; ADD MITIGATION MEASURES FOR RULE 4570

CONDITIONS

1. {3215} Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to enter the permittee's premises where a permitted source is located or emissions related activity is conducted, or where records must be kept under condition of the permit. [District Rule 1070]
2. {3216} Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to have access to and copy, at reasonable times, any records that must be kept under the conditions of the permit. [District Rule 1070]
3. {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]

CONDITIONS CONTINUE ON NEXT PAGE

YOU MUST NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (559) 230-5950 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

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DAVID WARNER, Director of Permit Services
C-6831-3-3: Jun 5 2012 10:00AM - NORMANR : Joint Inspection NOT Required

4. The lagoon system shall handle flush manure from no more than 7,200 Jersey milk cows and 1,350 dry cows. [District Rule 2201]
5. Permittee shall remove solids with a solid separator system, prior to the manure entering the lagoon(s). [District Rules 2201 and 4570]
6. The lagoon system shall be configured as an anaerobic treatment lagoon system with two anaerobic treatment lagoons designed and operated in accordance with National Resource Conservation Service (NRCS) California Field Office Technical Guide Code 359 - Waste Treatment Lagoon. [District Rule 2201]
7. Permittee shall maintain records of design specifications and calculations 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 Rules 1070 and 2201]
8. Liquid manure used for irrigation of cropland shall only be taken from the storage pond(s)/secondary lagoon(s) after treatment in the primary anaerobic treatment lagoons. [District Rule 2201]
9. Permittee shall maintain records that only liquid manure treated with anaerobic treatment lagoon(s) is applied to fields. [District Rules 1070 and 2201]
10. Liquid manure from the storage pond shall be mixed with irrigation water at a ratio in compliance with the facility nutrient management plan and applied to cropland at agronomic rates in accordance with the requirements of Regional Water Quality Control Board. [District Rule 2201]
11. 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]
12. 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]
13. All records shall be kept and maintained for a minimum of five (5) years and shall be made available to the APCO and EPA upon request. [District Rules 1070 & 4570]
14. Installation of an anaerobic digester may be required for this operation contingent upon the final Dairy BACT Guideline. If the final Dairy BACT Guideline requires the installation of an an anaerobic digester for this operation, the permittee shall install the system in accordance with the timeframes and procedures established by the APCO. [District Rule 2201]
15. {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
DRAFT

PERMIT NO: C-6831-4-3

LEGAL OWNER OR OPERATOR: REDTOP JERSEYS LLC
MAILING ADDRESS: 5638 COLUMBUS AVE
HILMAR, CA 95324

LOCATION: 21519 ROAD 4
CHOWCHILLA, CA

EQUIPMENT DESCRIPTION:

MODIFICATION OF SOLID MANURE HANDLING CONSISTING OF COVERED SEPARATED SOLIDS STOCK PILES WITH SOLID MANURE APPLICATION TO LAND WITH IMMEDIATE INCORPORATION; ALLOW INCREASE IN SOLID MANURE FROM CHANGING HERD SIZE TO 7,200 JERSEY MILK COWS AND 1,350 DRY COWS; ADD MITIGATION MEASURES FOR RULE 4570

CONDITIONS

1. {3215} Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to enter the permittee's premises where a permitted source is located or emissions related activity is conducted, or where records must be kept under condition of the permit. [District Rule 1070]
2. {3216} Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to have access to and copy, at reasonable times, any records that must be kept under the conditions of the permit. [District Rule 1070]
3. {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]

CONDITIONS CONTINUE ON NEXT PAGE

YOU MUST NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (559) 230-5950 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

DAVID WARNER, Director of Permit Services

C-6831-4-3 : Jun 5 2012 10:00AM - NORMANR : Joint Inspection NOT Required

4. 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]
5. 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]
6. 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]
7. All runoff and leachate from solid manure storage areas shall be directed to the lagoon or other wastewater treatment system. [District Rule 2201]
8. Dry manure (less than 50% moisture by weight) shall not be applied to fields when wind speeds exceed 10 miles per hour. [District Rule 2201]
9. Solid manure applied to fields shall be incorporated into the soil immediately (within two hours) after application. [District Rules 2201 and 4570]
10. Permittee shall maintain records to demonstrate that all solid manure has been incorporated immediately (within two hours) after land application. [District Rules 2201 and 4570]
11. All records shall be kept and maintained for a minimum of five (5) years and shall be made available to the APCO and EPA upon request. [District Rules 1070 & 4570]
12. {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
DRAFT

PERMIT NO: C-6831-8-1

LEGAL OWNER OR OPERATOR: REDTOP JERSEYS LLC
MAILING ADDRESS: 5638 COLUMBUS AVE
HILMAR, CA 95324

LOCATION: 21519 ROAD 4
CHOWCHILLA, CA

EQUIPMENT DESCRIPTION:

MODIFICATION OF FEED STORAGE AND HANDLING CONSISTING OF COMMODITY BARNs AND SILAGE PILES;
MODIFY FEED HANDLING FOR CHANGING HERD SIZE TO 7,200 JERSEY MILK COWS AND 1,350 DRY COWS; ADD
MITIGATION MEASURES FOR RULE 4570

CONDITIONS

1. {3215} Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to enter the permittee's premises where a permitted source is located or emissions related activity is conducted, or where records must be kept under condition of the permit. [District Rule 1070]
2. {3216} Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to have access to and copy, at reasonable times, any records that must be kept under the conditions of the permit. [District Rule 1070]
3. {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]
4. Permittee shall feed all animals according to National Research Council (NRC) guidelines. [District Rule 2201 and 4570]

CONDITIONS CONTINUE ON NEXT PAGE

YOU MUST NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (559) 230-5950 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

DAVID WARNER, Director of Permit Services

C-6831-8-1: Jun 5 2012 10:00AM - NORMANR : Joint Inspection NOT Required

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 Rules 2201 and 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 Rules 2201 and 4570]
7. Permittee shall maintain an operating plan/record that requires feed to be pushed within three feet of feedlane fence within two hours of putting out the feed, or use of a feed trough or other structure designed to maintain feed within reach of the animals. [District Rules 2201 and 4570]
8. {4458} Permittee shall begin feeding total mixed rations within two hours of grinding and mixing rations. [District Rule 4570]
9. {4459} Permittee shall maintain an operating plan/record of when feeding of total mixed rations began within two hours of grinding and mixing rations. [District Rule 4570]
10. {4460} Permittee shall store grain in a weatherproof storage structure or under a weatherproof covering from October through May. [District Rule 4570]
11. {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]
12. {4462} 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]
13. {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 Rule 4570]
14. For bagged silage/feedstuff, permittee shall utilize a sealed feed storage system (e.g., ag bag). [District Rules 2201 and 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 Rules 2201 and 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 Rules 2201 and 4570]
17. {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 Rule 4570]
18. {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 Rule 4570]
19. {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 Rule 4570]

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CONDITIONS CONTINUE ON NEXT PAGE

20. {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 Rule 4570]
21. {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 Rule 4570]
22. {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 Rule 4570]
23. {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 Rule 4570]
24. {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 Rule 4570]
25. {4479} For each silage pile that Option 3 (Moisture, TLC, Roller Opening, & Material Delivery) is chosen as a mitigation measure for building the pile, the permittee shall maintain a plan that requires that the thickness of the layer of un-compacted material delivered on top of the pile is no more than six (6) inches. [District Rule 4570]
26. {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 Rule 4570]
27. {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 Rule 4570]
28. {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 Rule 4570]
29. {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 manufacturers instructions for application of the additive. [District Rule 4570]
30. No more than one of each of the following types of silage piles shall be open at any one time: corn silage pile; alfalfa silage pile; wheat/oat/other silage pile. [District Rule 2201]
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 1070 and 4570]

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CONDITIONS CONTINUE ON NEXT PAGE

32. All runoff and leachate from silage and commodity pads shall be directed to the lagoon or other wastewater treatment system. [District Rule 2201]
33. {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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