San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT

HEALTHY AIR LIVING™

APR 02 2014

Frank Rocha
Frank N. Rocha Dairy LLP
23125 E. Lone Tree Rd
Escalon, CA 95320

Re: Notice of Preliminary Decision - Authority to Construct
Facility Number: N-7145
Project Number: N-1130483

Dear Mr. Rocha:

Enclosed for your review and comment is the District's analysis of Frank N. Rocha Dairy LLP's application for an Authority to Construct for the expansion of an existing dairy operation from a maximum capacity of 2,010 milk cows, not to exceed a combined total of 2,440 mature cows (milk and dry), 1,070 support stock (heifers and bulls), and 150 calves; to a maximum capacity of 3,000 milk cows, not to exceed a combined total of 3,430 mature cows (milk and dry), 1,580 support stock (heifers and bulls), and 150 calves; including the construction of two new freestall barns, at 23243 Lone Tree Rd, Escalon.

The notice of preliminary decision for this project will be published approximately three days from the date of this letter. After addressing all comments made during the 30-day public notice period, the District intends to issue the Authority to Construct. Please submit your written comments on this project within the 30-day public comment period, as specified in the enclosed public notice.

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

Sincerely,

David Warner
Director of Permit Services

DW:jka

Enclosures

cc: Mike Tollstrup, CARB (w/ enclosure) via email

Seyed Sadredin
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San Joaquin Valley Air Pollution Control District
Authority to Construct Application Review
Dairy Expansion

Facility Name:	Frank N. Rocha Dairy LLP	Date:	March 5, 2014
Mailing Address:	23125 Lone Tree Rd	Engineer:	Jonah Aiyabei
	Escalon, CA 95320	Lead Engineer:	Martin Keast
Contact Person:	Frank N. Rocha		
Telephone:	(209) 652-2918		
Application #s:	N-7145-1-5, 2-4, 3-3, 4-3, and 8-2		
Project #:	N-1130483		
Deemed Complete:	December 23, 2013		

I. Proposal

Frank N. Rocha Dairy has requested Authority to Construct (ATC) permits to expand an existing dairy operation from a maximum capacity of 2,010 milk cows, not to exceed a combined total of 2,440 mature cows (milk and dry), 1,070 support stock (heifers and bulls), and 150 calves, to a maximum capacity of 3,000 milk cows, not to exceed a combined total of 3,430 mature cows (milk and dry), 1,580 support stock (heifers and bulls), and 150 calves. The expansion will include the construction one 300-cow freestall barn and one 600-cow freestall barn.

The proposed project involves physical modifications and changes in throughput affecting all the emission units related to the dairy operation, which will require a change in equipment descriptions and operating permit conditions. Therefore, pursuant to District Rule 2201 section 3.25, the proposed project constitutes an NSR modification of the milk barn, cow housing, liquid manure management system, solid manure management system and the feed handling and storage.

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 County of San Joaquin (County) is the public agency having principal responsibility for approving this project, and is therefore the Lead Agency. The District is a Responsible Agency for the project because of its discretionary approval power via its Permits Rule (Rule 2010) and New Source Review Rule (Rule 2201). As a Responsible Agency, the District complies with CEQA by considering the environmental document prepared by the Lead Agency; and by reaching its own conclusion on whether and how to approve the

project. As discussed further in Section VIII of this evaluation, the District has determined that no additional findings are required. The District will file a Notice of Determination with the County upon ATC issuance.

II. Applicable Rules

Rule 1070 Inspections (12/17/92)
Rule 2201 New and Modified Stationary Source Review Rule (4/21/11)
Rule 2410 Prevention of Significant Deterioration (6/16/11)
Rule 2520 Federally Mandated Operating Permits (6/21/01)
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 23243 Lone Tree Road in Escalon. The equipment is not located within 1,000 feet of the outer boundary of any 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 a 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 various age categories of cows at a typical dairy.

The milk cows usually generate anywhere from 130 to 150 pounds of manure per day. Manure accumulates in confinement areas such as freestall barns and the milk barn. Manure is primarily deposited in areas where the herd is fed and given water. How the manure is collected, stored and treated depends on the manure management techniques chosen by the dairy operator.

Dairy manure may be collected and managed as a liquid, a semi-solid slurry, or as 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.

Milking Operation – Milk Barn:

The milk barn is a separate building, apart from the lactating cow confinement. The milk barn 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 milk barn, which in turn, is located in the immediate vicinity of the cow housing. Frank N. Rocha Dairy's main milk barn has one 80-stall (double-40 parallel) milking parlor. The milk barn has concrete floors sloped to a drain. Manure that is deposited in the milk barn will be sprayed into the drain using pressurized hoses after each milking. The manure is then carried through pipes to the liquid manure treatment system.

A secondary 60-stall milking parlor is used for milking cows in the hospital barn. The hospital barn milking parlor will have concrete floors sloped to a drain. Manure that is deposited in the parlor will be sprayed into the drain using pressurized hoses after each milking. The manure is then carried through pipes to the liquid manure treatment system.

Cow Housing - Freestall Barns, Bedpack Barns, and Open Corrals:

All milk cows, the majority of dry cows, and some heifers will be housed in freestall barns or bedpack barns. In freestall barns, cows are grouped in large pens with free access to feed bunks, waterers, and stalls for resting. A standard free-stall barn design has a feed alley in the center of the barn separating two feed bunks on each side. A variety of types of bedding materials are used for animal comfort and to prevent animal injury. In addition, loose dirt exercise pens adjoining the barns are provided. Manure from freestall barn feed lanes will be removed by flushing with water at least four times daily. Manure from the exercise pen surfaces will be removed by scraping weekly with a box-type scraper.

Some dry cows and the majority of heifers will be housed in open corrals, which are large loose dirt open areas where cows are confined. The corrals will have paved feed lanes and shade structures. Manure from the feed lanes will be removed by flushing or scraping, whereas manure from the unpaved surfaces of the corrals will be removed by scraping weekly with a box-type scraper.

Liquid Manure Management - Solids Separation and Anaerobic Treatment:

Solids separation removes material from the waste stream that would prematurely fill the treatment lagoon and storage ponds. The efficiency of treatment would also be significantly lower without separation; resulting in more odors and potentially more VOC emissions from the liquid manure management system. Most of the separated solids are fibrous materials that lead 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. As a final benefit, the separated solids may be recycled and used for soil amendments, re-feeding, bedding, etc. Solid separation at Frank N. Rocha Dairy is accomplished with the use of a settling basin.

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:

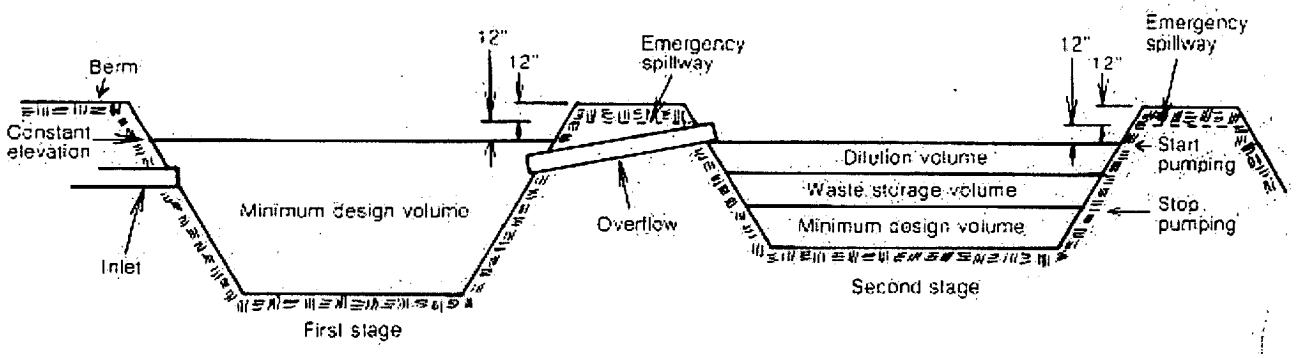
1) Minimum treatment volume - The minimum design volume must account for all potential sludge, treatment, precipitation, and runoff volumes;

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 ft^3/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 anaerobic treatment lagoon system usually consists of two stages, a treatment lagoon (primary lagoon) and a storage pond (secondary lagoon). The effluent from the treatment lagoon overflows into the storage pond/secondary lagoon, which is designed for liquid storage. The liquid level of the storage pond/secondary lagoon fluctuates and can be emptied when necessary. Effluent from the storage pond is used for the irrigation of cropland.



Instead of a primary treatment lagoon and a separate storage pond, Frank N. Rocha Dairy will use one lagoon that meets the anaerobic treatment design requirements discussed above. Irrigation effluent will be drawn from the treatment lagoon, but a constant minimum volume must be maintained at all times. The lagoon will not be fully emptied or drawn down below a level of 7 feet, which corresponds to the dairy's required minimum treatment

volume for the manure that is handled in liquid form, in order to sustain the microbial activity required for anaerobic treatment. It must be noted that the treatment lagoon itself is 25 feet deep and for most of the year the liquid volume is expected to be well above the 12 foot level recommended to optimum anaerobic treatment. The liquid volume will only be drawn down to the 7 foot level for a short period during peak irrigation season.

Solid Manure Management - Manure Stockpiles (Storage):

Solid manure from vacuuming or scraping of barn lanes of other paved areas will be dried promptly on manure drying pads and subsequently stacked in stockpiles to await land application. Solid manure in corral areas will be stored in stockpiles, which as usually located in the middle of each corral. The stockpiles are removed several times a year for application to land or shipment offsite. Separated solids may also be dried and stockpiled until needed for use as freestall bedding, land application or offsite shipment.

Feed Handling and Storage - Commodity Barns, Silage Piles, and Total Mixed Rations (TMR):

Dairy cattle feed consists primarily of silage, which is made from corn, wheat, alfalfa, or a variety of other feed crops. The silage is made by placing the harvested crops, chopped to desired pieces if necessary, into piles, which are then compacted with heavy equipment to remove air. The piles are then tightly covered to avoid reintroduction of air. This allows anaerobic microbes present in the crops to multiply, resulting in fermentation of the organic material in the feed. When the silage is ready, one end of the pile can be opened and the required amount of silage can be removed from that end on a daily basis.

In order to provide the right nutritional balance, silage is usually blended with other feed additives, such as oils, whey, seeds and grains, nut hulls, and various salts and minerals before it is fed to the cattle. These additives are usually stored in commodity barns to avoid exposure to weather.

TMR refers to a blended mixture of silage and additives that is ready to be fed to the cattle. Most dairies prepare their TMRs in small batches using a feed wagon equipped with a mixer. The silage and additives are placed in the feed wagon in the proportions prescribed by the dietary requirements of the group of cows to be fed. These ingredients are then thoroughly mixed in the wagon and delivered to the feed bunks.

V. Equipment Listing

Existing Equipment Descriptions:

N-7145-1-4: 2,010 COW MILKING OPERATION WITH A DOUBLE-40 (80 STALL) PARALLEL MILKING PARLOR AND A 60 STALL FLAT HOSPITAL MILKING BARN

N-7145-2-2: COW HOUSING - 2,010 MILK COWS, NOT TO EXCEED A COMBINED TOTAL OF 2,440 MATURE COWS (MILK AND DRY); 1,220 SUPPORT

STOCK (HEIFERS, CALVES AND BULLS); AND FREESTALLS WITH A FLUSH SYSTEM

N-7145-3-2: LIQUID MANURE HANDLING SYSTEM CONSISTING OF 3 SETTLING BASINS, 1 TREATMENT LAGOON AND 1 STORAGE POND; MANURE IS LAND APPLIED THROUGH FLOOD IRRIGATION AND FURROW IRRIGATION

N-7145-4-2: SOLID MANURE HANDLING CONSISTING OF OPEN MANURE STOCK PILES WITH SOLID MANURE APPLICATION TO LAND

N-7145-8-1: FEED STORAGE AND HANDLING CONSISTING OF COMMODITY BARNS AND SILAGE PILES

Proposed Modifications:

N-7145-1-5: MODIFICATION OF 2,010 COW MILKING OPERATION WITH A DOUBLE-40 (80 STALL) PARALLEL MILKING PARLOR AND A 60 STALL FLAT HOSPITAL MILKING BARN: INCREASE MAXIMUM NUMBER OF MILK COWS TO 3,000.

N-7145-2-4: MODIFICATION OF COW HOUSING - 2,010 MILK COWS, NOT TO EXCEED A COMBINED TOTAL OF 2,440 MATURE COWS (MILK AND DRY); 1,220 SUPPORT STOCK (HEIFERS, CALVES AND BULLS); AND FREESTALLS WITH A FLUSH SYSTEM: EXPAND MAXIMUM HERD SIZE TO 3,000 MILK COWS, NOT TO EXCEED A COMBINED TOTAL OF 3,430 MATURE COWS (MILK AND DRY); 1,580 SUPPORT STOCK (HEIFERS AND BULLS); AND 150 CALVES (0 - 3 MONTHS); AND CONSTRUCT ONE 600-COW FREESTALL BARN; AND ONE 300-COW FREESTALL BARN.

N-7145-3-3: MODIFICATION OF LIQUID MANURE HANDLING SYSTEM CONSISTING OF 3 SETTLING BASINS, 1 TREATMENT LAGOON AND 1 STORAGE POND; MANURE IS LAND APPLIED THROUGH FLOOD IRRIGATION AND FURROW IRRIGATION: ADD ANAEROBIC TREATMENT REQUIREMENT; INCREASE IN THROUGHPUT DUE TO HERD EXPANSION.

N-7145-4-3: MODIFICATION OF SOLID MANURE HANDLING CONSISTING OF OPEN MANURE STOCK PILES WITH SOLID MANURE APPLICATION TO LAND: INCREASE IN THROUGHPUT DUE TO HERD EXPANSION.

N-7145-8-2: MODIFICATION OF FEED STORAGE AND HANDLING CONSISTING OF COMMODITY BARNS AND SILAGE PILES: INCREASE IN THROUGHPUT DUE TO HERD EXPANSION.

Post Project Equipment Descriptions:

N-7145-1-5: 3,000 COW MILKING OPERATION WITH ONE DOUBLE 40 PARALLEL (80 STALLS) MILKING PARLOR AND ONE DOUBLE 30 FLAT (60 STALLS) HOSPITAL MILKING PARLOR

N-7145-2-4: COW HOUSING - 3,000 MILK COWS, NOT TO EXCEED A COMBINED TOTAL OF 3,430 MATURE COWS (MILK AND DRY); 1,580 SUPPORT STOCK (HEIFERS AND BULLS); 150 CALVES (0 - 3 MONTHS); AND 6 FREESTALL BARNS WITH A FLUSH SYSTEM

N-7145-3-3: LIQUID MANURE HANDLING SYSTEM, CONSISTING OF THREE SETTLING BASINS, ONE ANAEROBIC TREATMENT LAGOON (1450'X132'X25') AND ONE STORAGE POND; MANURE IS LAND APPLIED THROUGH FLOOD IRRIGATION AND FURROW IRRIGATION

N-7145-4-3: SOLID MANURE HANDLING CONSISTING OF OPEN MANURE STOCK PILES WITH SOLID MANURE APPLICATION TO LAND

N-7145-8-2: FEED STORAGE AND HANDLING CONSISTING OF COMMODITY BARNS AND SILAGE PILES

VI. Emission Control Technology Evaluation

PM_{10}, VOC, and NH_3 are the major pollutants of concern from dairy operations. Gaseous pollutant emissions emanate from the ruminant digestive processes (enteric emissions), from the decomposition and fermentation of feed, and also from decomposition of organic material in 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. 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 are used to control emissions at this dairy. Some of these practices include housing design, frequent cleaning and manure removal, liquid manure treatment, and feeding cattle per NRC guidelines. These control methods are discussed in more detail in the following sections:

Milk Barn:

This dairy uses a flush/spray system to wash out the manure from the milk barn after each group of cows is milked. The manure is flushed into the liquid manure treatment system. This reduces VOC emissions from the manure deposited in the milk barn. Also, frequent flushing makes the barn predominantly moist environment with no significant particulate matter emissions. In addition, because NH3 has a high affinity for and solubility in water, its volatilization from the milk barn is also significantly reduced by the frequent flushing.

Cow Housing:

All milk cows, the majority of dry cows, and some heifers will be housed in freestall barns or bedpack barns. The freestall barn consists primarily of paved surfaces that are cleaned by

flushing, scraping, or vacuuming. A freestall barn is designed to ensure that most of the manure and urine will be deposited on a paved flush lane. Frequent cleaning of the lane is a primary emissions control method. When flushing is used for cleaning, the high moisture environment minimizes dust or other particulate matter that could potentially be entrained into the air. In addition, Ammonia is highly soluble in water and is thus arrested in the aqueous state when manure is managed as a liquid. The liquid manure is transported into the storage pond for treatment. When vacuuming or scraping is used as the cleaning method, it is imperative that the manure is stabilized promptly by being spread out and dried on an appropriate drying pad. Once dried, the stabilized manure can be stored in covered stockpiles until ready to be applied to land or exported offsite.

Shade structures and frequent corral scraping:

Some of the dry cows and heifers are housed in open corrals with shade structures. Providing shade for the animals reduces movement and unnecessary activity during hot weather, which reduces PM_{10} emissions. Corral surfaces will be scraped in the morning hours on a weekly basis except during wet conditions. Frequent scraping of these loose dirt surfaces will reduce the amount of dry manure that may be pulverized by the cows' hooves and emitted as PM_{10}. This practice will also reduce the chance of anaerobic conditions developing in the manure pack, potentially reducing VOC emissions.

Feeding Animals in Accordance with the NRC Guidelines:

All animals 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 NH_3 and VOCs upon decomposition.

Liquid Manure Management System:

Solids Separation:

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

Anaerobic Treatment Lagoon:

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. The proposed anaerobic treatment lagoon meets the required design requirements (see design check in Appendix E).

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[1]. The applicant has agreed to install a lagoon cover if it is required. 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.

Liquid manure land application:

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

Solid Manure Management System:

Based on the information currently available, emissions from solid manure applied to cropland are expected to be low. However, to ensure that any possible emissions are minimized, this dairy will be required to incorporate solid manure applied to cropland immediately 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, VOC is adsorbed onto particles of soil providing the opportunity for the VOC to be oxidized into carbon dioxide and water[2].

Feed Storage and Handling System:

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 (face) of the pile. Leftover feed at the feed bunks will

[1] Settlement Agreement. Western United Dairymen, 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)

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

also be cleaned up and disposed of appropriately to avoid decomposition that can result in increased emissions.

In addition, loose feed material such as grain will be stored in commodity barns. Sheltering the feed material from wind reduces the entrainment of particulate matter from the surface of the material into the atmosphere. Keeping the feed dry eliminates the possibility of VOC and NH3 emissions that may otherwise be generated by microbial activity in wet feed.

VII. General Calculations

A. Assumptions

- Potential to Emit will be based on the dairy's maximum design capacity (i.e. maximum number and age categories of cows that can potentially be housed).
- Emissions from the lagoons and storage ponds are non-fugitive emissions and will therefore be counted towards the dairy's major source status determination. Emissions from the rest of the dairy operation (milking, housing, liquid manure land application, solid manure storage and handling, and feed storage and handling) are considered fugitive and will not be counted towards the major source status determination.
- The PM_{10} control efficiencies for the proposed practices and mitigation measures are based on the SJVAPCD memo – *Dairy and Feedlot PM_{10} Mitigation Practices and their Control Efficiencies.*
- All PM_{10} emissions from the dairy will be allocated to the cow housing permit unit.
- All H_2S emissions from the dairy will be associated with the lagoons and storage ponds.
- Because of the moisture content of the separated solids, PM_{10} emissions from solid manure handling are considered negligible.
- The PM_{10} emission factors are based on a District document entitled "Dairy and Feedlot PM_{10} 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 Ammonia (NH3) emission factors for milk cows are based on a District document entitled "Breakdown of Dairy VOC Emission Factor into Permit Units". The NH3 emission factors for the other categories of cows were calculated from the milk cow emission factor, based on the ratio of the quantity of manure generated by each category to the quantity of manure generated by milk cows.
- The VOC Emission Factors used in this evaluation are from the "APCO's Revision to the Dairy VOC Emission Factor", dated January 2010. These emission factors are controlled Emission Factors and contain mitigation measures from Rule 4570 (as adopted in 2010).

- For BACT analysis purposes, a permit unit may consist of more than one emissions unit, e.g. the liquid manure handling permit unit consists of two emissions units: lagoons/storage ponds and 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 feed 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 10% 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, a conservative control efficiency estimate of 75% will be applied at this time. This control efficiency does not apply to the enteric emissions generated from the cows themselves. Taking that into account, the overall control efficiency for the milk barn is approximately 16.7%. (EF from milk barn is = 0.9 lb/hd-yr. EF from fresh waste is equal to 0.2 lb/hd-yr. 75% of 0.2 lb/hd-yr = 0.15 lb/hd-yr. 0.15 lb/hd-yr/0.9 lb/hd-yr = 16.7% control).
- The feed lanes for all mature cows will be cleaned (by flushing, vacuuming, or scraping) at least 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. Based on calculations in the Final Dairy Permitting Advisory Group's (DPAG) Report - "Recommendations to the San Joaquin Valley Air Pollution Control Officer Regarding Best Available Control Technology for Dairies in the San Joaquin Valley" dated January 31, 2006 (http://www.valleyair.org/busind/pto/dpag/dpag_idx.htm), a 47% control will be applied to cleaning the corral lanes four times per day, until better data becomes available. This control efficiency only applies to the manure and does not apply to the enteric emissions generated from the cows themselves. However, in order to be conservative, a 10% control efficiency will be applied at this time.
- 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

The emission factors used for all calculations are as shown in Appendix B.

C. Calculations

1. Pre-project Potential to Emit (PE1) and Post Project Potential to Emit (PE2) calculations

PE1 and PE2 calculations are as shown in Appendix B.

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

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. This facility does not have any banked ERCs. The SSPE1 is therefore the sum of the PE1 for all valid emission units, as shown in the following table:

Pre-Project Stationary Source Potential to Emit (lb/year)							
Permit unit	**NO_X**	**SO_X**	**PM_{10}**	**CO**	**VOC**	**NH_3**	**H_2S**
N-7145-1-4 Milking	0	0	0	0	804	382	0
N-7145-2-2 Cow Housing	0	0	12,931	0	26,113	131,253	0
N-7145-3-2 Liquid manure	0	0	0	0	5,618	38,878	2,789
N-7145-4-2 Solid Manure	0	0	0	0	1,220	8,399	0
N-7145-5-0 GDO	0	0	0	0	156	0	0
N-7145-6-0 GDO	0	0	0	0	156	0	0
N-7145-7-0 ICE	992	17	50	302	113	0	0
N-7145-8-1 Feed	0	0	0	0	49,157	0	0
SSPE1	**992**	**17**	**12,981**	**302**	**83,337**	**178,912**	**2,789**

3. 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. This facility does not have any banked ERCs. The SSPE2 is therefore the sum of the PE2 for all valid emission units, as shown in the following table:

Post-Project Stationary Source Potential to Emit (lb/year)							
Permit unit	**NO_X**	**SO_X**	**PM_{10}**	**CO**	**VOC**	**NH_3**	**H_2S**
N-7145-1-5 Milking	0	0	0	0	1,200	570	0
N-7145-2-4 Cow Housing	0	0	14,986	0	38,285	191,520	0
N-7145-3-3 Liquid manure	0	0	0	0	5,130	58,102	2,789
N-7145-4-3 Solid Manure	0	0	0	0	1,793	12,267	0
N-7145-5-0 GDO	0	0	0	0	156	0	0
N-7145-6-0 GDO	0	0	0	0	156	0	0
N-7145-7-0 ICE	992	17	50	302	113	0	0
N-7145-8-2 Feed	0	0	0	0	56,473	0	0
SSPE2	**992**	**17**	**15,036**	**302**	**103,306**	**262,459**	**2,789**

4. Major Source Determination

Rule 2201 Major Source Determination:

Pursuant to Section 3.25 of District Rule 2201, a major source is a stationary source with post-project emissions or a Post Project Stationary Source Potential to Emit (SSPE2), equal to or exceeding one or more of the threshold values.

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 in the following sections.

Milking Barn

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 dry summer. Collection and control of the exhaust including the large amounts of airflow have not yet been achieved by any facility. Due to this difficultly, 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 and storage ponds will be used to determine if this facility is a major source.

The post-project emissions from the lagoons and storage ponds are as shown in Appendix B. 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)					
Permit unit	**NO_X**	**SO_X**	**PM_{10}**	**CO**	**VOC**
N-7145-1 Milking	0	0	0	0	0
N-7145-2 Cow Housing	0	0	0	0	0
N-7145-3 Liquid manure	0	0	0	0	2,459
N-7145-4 Solid Manure	0	0	0	0	0
N-7145-5-0 GDO	0	0	0	0	156
N-7145-6-0 GDO	0	0	0	0	156
N-7145-7-0 ICE	992	17	50	302	113
N-7145-8 Feed	0	0	0	0	0
Non Fugitive SSPE	**992**	**17**	**50**	**302**	**2,884**

Major Source Determination (lb/year)					
	NO_X	**SO_X**	**PM_{10}**	**CO**	**VOC**
Post Project SSPE (SSPE2)	992	17	50	302	2,884
Major Source Threshold	20,000	140,000	140,000	200,000	20,000
Major Source?	No	No	No	No	No

As shown in the table above, this facility is not a major source.

Rule 2410 Major Source Determination:

The facility or the equipment evaluated under this project is not listed as one of the

categories specified in 40 CFR 52.21 (b)(1)(i). Therefore the following PSD Major Source thresholds are applicable:

PSD Major Source Determination (tons/year)							
	NO2	**VOC**	**SO2**	**CO**	**PM**	**PM10**	**CO2e[3]**
Estimated Facility PE before Project Increase	0.5	1.6	0	0.2	0	0	8,096
PSD Major Source Thresholds	250	250	250	250	250	250	100,000
PSD Major Source?	N	N	N	N	N	N	N

As shown in the preceding table, the facility is not an existing major source for PSD for any pollutant.

5. Baseline Emissions (BE)

BE = Pre-project Potential to Emit for:

- Any unit located at a non-Major Source,
- Any Highly-Utilized Emissions Unit, located at a Major Source,
- Any Fully-Offset Emissions Unit, located at a Major Source, or
- Any Clean Emissions Unit, located at a Major Source.

otherwise,

BE = Historic Actual Emissions (HAE), calculated pursuant to Section 3.23

As shown in Section VII.C.5 above, the facility is not a major source for any of the pollutants involved in this project, hence BE = PE1 for these pollutants.

6. 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."

[3] See GHG calculations in Appendix F.

Since this facility is not a major source for any of the pollutants involved in this project, the project does not constitute an SB288 major modification.

7. Federal Major Modification

As shown above, this project does not constitute a Major Modification. Therefore, in accordance with District Rule 2201, Section 3.17, this project does not constitute a Federal Major Modification and no further discussion is required.
District Rule 2201, Section 3.17 states that Federal Major Modifications are the same as "Major Modification" as defined in 40 CFR 51.165 and part D of Title I of the CAA.

Since this facility is not a major source for any of the pollutants involved in this project, the project does not constitute a Federal Major Modification. Additionally, since the facility is not a major source for PM_{10} (140,000 lb/year), it is not a major source for PM2.5 (200,000 lb/year).

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

Rule 2410 applies to pollutants for which the District is in attainment or for unclasssified, pollutants. The pollutants addressed in the PSD applicability determination are listed as follows:

- NO2 (as a primary pollutant)
- SO2 (as a primary pollutant)
- CO
- PM
- PM10
- Greenhouse gases (GHG): CO2, N2O, CH4, HFCs, PFCs, and SF6

The first step of this PSD evaluation consists of determining whether the facility is an existing PSD Major Source or not (See Section VII.C.5 of this document).

In case the facility is an existing PSD Major Source, the second step of the PSD evaluation is to determine if the project results in a PSD significant increase.

In case the facility is NOT an existing PSD Major Source but is an existing source, the second step of the PSD evaluation is to determine if the project, by itself, would be a PSD major source.

Potential to Emit for New or <u>Modified</u> Emission Units vs PSD Major Source Thresholds

As a screening tool, the project potential to emit from all new and modified units is compared to the PSD major source threshold, and if total project potential to emit

from all new and modified units is below this threshold, no futher analysis will be needed.

The facility or the equipment evaluated under this project is not listed as one of the categories specified in 40 CFR 52.21 (b)(1)(i). Therefore the following PSD Major Source thresholds are applicable:

PSD Major Source Determination: Potential to Emit (tons/year)							
	NO2	**VOC**	**SO2**	**CO**	**PM**	**PM10**	**CO2e**
Total PE from New and Modified Units	0	1.2	0	0	0	0	20,202
PSD Major Source threshold	250	250	250	250	250	250	100,000
New PSD Major Source?	N	N	N	N	N	N	N

As shown in the preceding table, the project potential to emit, by itself, does not exceed any of the PSD major source thresholds. Therefore Rule 2410 is not applicable and no further discussion is required.

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 Appendix B.

VIII. Compliance

Rule 1070 Inspections

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

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 an SB288 Major Modification or a Federal Major Modification, as defined by the rule.

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

a. New emission units – PE > 2 lb/day

The proposed project involves the modification of existing emission units. Since there are no new emission unit, BACT is not triggered under this category.

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

As discussed in Section I above, there are no emission units being relocated from one stationary source to another; therefore BACT is not triggered due to relocation of an emission unit.

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

AIPE = PE2 – HAPE

Where,
AIPE = Adjusted Increase in Permitted Emissions, (lb/day)
PE2 = Post-Project Potential to Emit, (lb/day)
HAPE = Historically Adjusted Potential to Emit, (lb/day)

HAPE = PE1 x (EF2/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 (lb/hd-yr). If EF2 is greater than EF1 then EF2/EF1 shall be set to 1

HAPE = PE1 x (EF2/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 (lb/hd-yr). 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 (lb/hd-yr)

AIPE = PE2 – (PE1 x (EF2 / EF1))

AIPE calculations for each emissions unit are as shown in Appendix B.

Based on the AIPE values in Appendix B, BACT is triggered for the following emission units:

- Cow housing: VOC and NH3
- Cow housing – freestall barns: PM10
- Liquid manure - lagoons: VOC and NH3
- Liquid manure - land application: VOC and NH3
- Solid manure - storage: NH3
- Solid manure - land application: NH3
- Feed - TMR: VOC

d. SB 288/Federal Major Modification

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

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 in Appendix C, BACT has been satisfied with the following:

Cow Housing and TMR:

VOC: 1) Concrete feed lanes and walkways

2) Feed lanes and walkways flushed, vacuumed, or scraped at least four times per day for mature cows and at least two times per day for support stock; prompt stabilization of vacuumed or scraped manure

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

4) All open corrals adequately sloped to promote drainage (minimum of 3% slope where the available space for each animal is 400 square feet or less and minimum of 1.5% where the available space for each animal is more than 400 square feet per animal

5) Weekly scraping of exercise pens and open corrals using pull-type scraper in the morning hours except when prevented by wet conditions

6) VOC mitigation measures required by District Rule 4570.

NH3: 1) Concrete feed lanes and walkways

7) Feed lanes and walkways flushed, vacuumed, or scraped at least four times per day for mature cows and at least two times per day for support stock; prompt stabilization of vacuumed or scraped manure.

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

3) All open corrals adequately sloped to promote drainage (minimum of 3% slope where the available space for each animal is 400 square feet or less and minimum of 1.5% where the available space for each animal is more than 400 square feet per animal

4) Weekly scraping of exercise pens and open corrals using pull-type scraper in the morning hours except when prevented by wet conditions

PM10: Concrete feed lanes and walkways

Liquid Manure Handling System:

Lagoon/Storage Pond:

VOC: 1) Two-stage anaerobic treatment lagoon designed according to NRCS guidelines

2) Installation of an anaerobic digester contingent upon the final dairy BACT guideline

NH_3: 1) All animals fed in accordance with National Research Council (NRC) or other District-approved guidelines utilizing routine nutritional analysis for rations

Land Application:

VOC: 1) Irrigation of crops using liquid and slurry manure from a holding/storage pond after an Anaerobic Treatment Lagoon

NH_3: 1) All animals fed in accordance with National Research Council (NRC) or other District-approved guidelines utilizing routine nutritional analysis for rations

Solid Manure:

NH3: 1) All animals fed in accordance with National Research Council (NRC) or other District-approved guidelines utilizing routine nutritional analysis for rations

2) Incorporation of manure promptly (within no more than 72 hours) upon land application

B. Offsets

Sources that are subject to federal NSR are required to offset the emissions they increase by providing emission reductions. This is generally done with emission reduction credits, or ERCs. There are strict federal requirements for ERCs that can be used to offset emissions increases under NSR. The emission reductions must be (1) real, (2) permanent, (3) quantifiable, (4) enforceable, and (5) surplus. Over time, EPA policies and court determinations have established fairly rigorous definitions and tests for each of these terms.

For certain agricultural operations, 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, 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, California air districts have not succeeded in gaining EPA approval to issue ERCs 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.

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.

As demonstrated in VII.C.7, this project does not constitute an SB 288 or Federal Major Modification; therefore, public noticing for SB 288 or Federal Major Modification purposes is not required.

b. PE > 100 lb/day

Applications which include a new emissions unit with a Potential to Emit greater than 100 pounds during any one day for any pollutant will trigger public noticing requirements. Since this project does not include any new emission units, public notice is not triggered under this category.

c. Offset Threshold

The following table compares the SSPE1 and the SSPE2 to the offsets thresholds in order to determine if any thresholds have been surpassed due to this project:

Offsets Thresholds				
Pollutant	SSPE1 (lb/year)	SSPE2 (lb/year)	Offset Threshold	Public Notice Required?

Offsets Thresholds				
Pollutant	SSPE1 (lb/year)	SSPE2 (lb/year)	Offset Threshold	Public Notice Required?
NO_X	992	992	20,000 lb/year	No
SO_X	17	17	54,750 lb/year	No
PM_{10}	12,981	15,036	29,200 lb/year	No
CO	302	302	200,000 lb/year	No
VOC	83,337	103,306	20,000 lb/year	No
NH3	178,912	262,459	N/A	No
H2S	2,789	2,789	N/A	No

As shown in the table above, no offsets thresholds have been surpassed due to this project; therefore public noticing is not required under this category.

d. SSIPE > 20,000 lb/year

Public notification is required for any permitting action that results in a Stationary Source Increase in Permitted Emissions (SSIPE) of more than 20,000 lb/year of any affected pollutant. According to District policy, the SSIPE is calculated as the Post Project Stationary Source Potential to Emit (SSPE2) minus the Pre-Project Stationary Source Potential to Emit (SSPE1), i.e. SSIPE = SSPE2 – SSPE1. The values for SSPE2 and SSPE1 are calculated according to Rule 2201, Sections 4.9 and 4.10, respectively.

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	992	992	0	20,000 lb/year	No
SO_x	17	17	0	20,000 lb/year	No
PM_{10}	15,036	12,981	2,055	20,000 lb/year	No
CO	302	302	0	20,000 lb/year	No
VOC	103,306	83,337	19,969	20,000 lb/year	No
NH_3	262,459	178,912	83,547	20,000 lb/year	Yes
H2S	2,789	2,789	0	20,000 lb/year	No

As demonstrated above, the SSIPE for NH_3 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. 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 San Joaquin County prior to the issuance of the ATCs for the dairy expansion.

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. The number and types of cows are listed in the permit equipment description for the Cow Housing (N-7145-2).

The following conditions will also be placed on the permits to enforce the DELs:

Cow Housing

- The total number of cattle housed at this dairy at any one time shall not exceed any of the following limits: 3,000 milk cows, not to exceed a combined total of 3,430 mature cows (milk and dry); 1,580 support stock (heifers and bulls), and 150 calves (0 - 3 months). [District Rule 2201]

Liquid Manure Handling System

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

- The liquid manure handling system shall handle flush manure from no more than 3,000 milk cows, not to exceed a combined total of 3,430 mature cows (milk and dry); 1,580 support stock (heifers and bulls), and 150 calves (0 - 3 months). [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

Cow Housing:

Based on guidelines from the University of Idaho in a document entitled "*Dairy Odor Management and Control Practices*"[4] and the requirements of District Rule 4570, the following conditions will be placed on the permit to ensure that emissions from the dairy are minimized:

- Inspection for potholes and similar sources of emissions shall be performed on a monthly basis. A record of these inspections shall be maintained. [District Rule 2201]
- Firm, stable soil that is not easily eroded shall be used for the exercise pen and corral surfaces. [District Rule 2201]
- A supply of dry fill soil shall be kept on site in order to fill areas where erosion and gouging occurs. [District Rule 2201]
- Clean rainfall runoff shall be diverted around exercise pen and corral surfaces to reduce the amount of water that is potentially retained on these surfaces. [District Rule 2201]

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 and the liquid manure handling system are satisfied with the records that must be kept to demonstrate compliance with the numbers and types of cows listed in the permit equipment description for the cow housing. The following conditions will be placed on the ATC permits:

Cow Housing

The following condition will be placed on the ATC for the Cow Housing Permit:

- 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 Rules 2201 and 4570]

[4] http://courses.ag.uidaho.edu/bae/bae404/Dairy%20Odor%20Mgmt.pdf

Additional recordkeeping conditions are included under the Rule 4570 compliance section.

Liquid Manure Handling System

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 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 2201 and 4570]

Additional recordkeeping conditions are included under the Rule 4570 compliance section.

4. Reporting

No reporting is required to demonstrate compliance with Rule 2201.

F. Ambient Air Quality Analysis (AAQA)

Section 4.14.1 of this rule requires that an AAQA shall be conducted for the purpose of determining whether a new or modified stationary source will cause or make worse a violation of an air quality standard. The District's Technical Services Division conducted the required analysis. Refer to Appendix D of this document for the AAQA summary sheet.

The project location is in an attainment area for NO_X, CO, and SO_X. The project will not result in any NO_X, CO, or SO_X emissions; hence it will not cause a violation of an air quality standard for NO_X, CO, or SO_X.

The proposed location is in a non-attainment area for the state's PM_{10} as well as federal and state $PM_{2.5}$ thresholds. As shown by the AAQA summary sheet the proposed equipment will not cause a violation of an air quality standard for PM_{10} and $PM_{2.5}$.

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 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.

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 & 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 1.0. According to the Technical Services Memo for this project (Appendix D), the total facility prioritization score including this project was greater than 1.0. Therefore, a health risk assessment was required to determine the short-term acute and long-term chronic exposure from this project. The health risk indices for this project are as shown in the following table:

RMR Summary					
Categories	**Dairy Milking Parlor (Unit 1-5)**	**Dairy Cow Housing (Unit 2-4)**	**Dairy Lagoons & Solid Manure (Unit 3-3)**	**Land Application (Unit 4-3)**	**Facility Totals**
Prioritization Score	0.42	8.42	8.10	1.06	>1.0
Acute Hazard Index	0.013	0.538	0.064	0.019	0.63
Chronic Hazard Index	0.001	0.143	0.008	0.009	0.16
Maximum Individual Cancer Risk	**1.25E-07**	**2.34E-06**	**4.21E-07**	N/A*	2.89E-06
T-BACT Required?	No	Yes	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 any of the Hazardous Air Pollutants (HAPs) under analysis.

T-BACT:

BACT for toxic emission control (T-BACT) is required if the cancer risk exceeds 1.0 in one million. As demonstrated above, T-BACT is required for this project because the HRA indicates that the risk is above the District's thresholds for triggering T-BACT requirements.

For this project T-BACT is triggered for VOC, NH3 and PM10 emissions from the cow housing facilities. T-BACT is satisfied with BACT for VOC, NH3 and PM10 (see Appendix C). 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 by the HRA Summary in Appendix D of this report, the emissions increases for this project were 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. The facility currently has a valid CMP Plan (N-7145-CMPP-1). Continued compliance with District Rule 4550 is therefore 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). The facility recently submitted an updated Rule 4570 Phase II application indicating the mitigation measures selected for compliance with the rule requirements. The application was submitted

under project #N-1111054), and there are no mitigation measure changes proposed in the current project. The proposed measures discussed in the following sections:

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

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

The following condition will be placed on each permit:

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

Section 7.0 Administrative Requirements

Section 7.2 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, and 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.

General Conditions

- {4452} If a licensed veterinarian or a certified nutritionist determines that any VOC mitigation measure will be required to be suspended as a detriment to animal health or necessary for the animal to molt, the owners/operators must notify the District in writing within forty-eight (48) hours of the determination including the duration and the specific health condition requiring the mitigation measure to be suspended. If the situation is expected to exist longer than a thirty-day (30) period, the permittee shall submit a new emission mitigation plan designating a mitigation measure to be implemented in lieu of the suspended mitigation measure. [District Rule 4570]
- {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 Rule 4570] N

- {4455} Permittee shall maintain records of feed content, formulation, and quantity of feed additive utilized, to demonstrate compliance with National Research Council (NRC) guidelines. Records such as feed company guaranteed analyses (feed tags), ration sheets, or feed purchase records may be used to meet this requirement. [District Rule 4570] N

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 Rule 4570] N

- {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 Rule 4570] N

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 Rule 4570] N

- {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] N

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

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

- {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] N

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 Rule 4570] N

- {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]

Silage

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

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

Cover the surface of silage piles, except for the area where feed is being removed from the pile, with a plastic tarp that is at least 5 mils thick (0.005 inches), multiple plastic tarps with a cumulative thickness of at least 5 mils (0.005 inches), or an oxygen barrier film covered with a UV resistant material within 72 hours of last delivery of material to the pile.

- {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 Rule 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 Rule 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 ≥ 65% moisture for corn; and ≥ 60% moisture for alfalfa/grass and other silage crops; and

- Manage silage material delivery such that no more than six (6) inches of materials are un-compacted on top of the pile.

- Incorporate the following parameters for Theoretical Length of Chop (TLC) and roller opening, as applicable, for the crop being harvested:

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

- {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]

- {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]

- {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]

- {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]

- {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]

- {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]

- {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]

- {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]

- {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]

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 Rule 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 Rule 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 Rule 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 Rule 4570]

Milking Parlor

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

- {4484} Permittee shall flush or hose milk parlor immediately prior to, immediately prior to, immediately after or during each milking. [District Rule 4570]

- {4485} Permittee shall provide verification that milk parlors are flushed or hosed prior to, immediately after, or during each milking. [District Rule 4570]

Freestall Barns

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.

- {4486} Permittee shall pave feedlanes, where present, for a width of at least 8 feet along the corral side of the feedlane fence for milk and dry cows and at least 6 feet along the corral side of the feedlane for heifers. [District Rule 4570]

Optional

Flush or scrape freestall flush lanes at least three times per day.

- {4489} Permittee shall flush or scrape freestall flush lanes at least three (3) times per day. [District Rule 4570]

- {4490} Permittee shall keep records or maintain an operating plan that requires freestall flush lanes to be flushed or scraped at least three times per day. [District Rule 4570]

For a LARGE dairy only (1000 milk cows or larger) - Remove manure that is not dry from individual cow freestall beds or rake, harrow, scrape, or grade freestall bedding at least once every seven (7) days.

- {4492} Permittee shall remove manure that is not dry from individual cow freestall beds or rake, harrow, scrape, or grade freestall bedding at least once every seven (7) days. [District Rule 4570]

- {4493} Permittee shall record the date that manure that is not dry is removed from individual cow freestall beds or raked, harrowed, scraped, or freestall bedding is graded at least once every seven (7) days. [District Rule 4570]

Corrals

Required

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 feed along the corral side of the feedlane for heifers.

- {4486} Permittee shall pave feedlanes, where present, for a width of at least 8 feet along the corral side of the feedlane fence for milk and dry cows and at least 6 feet along the corral side of the feedlane for heifers. [District Rule 4570]

Inspect water pipes and troughs and repair leaks at least once every seven (7) days.

- {4499} Permittee shall inspect water pipes and troughs and repair leaks at least once every seven (7) days. [District Rule 4570]

- {4500} Permittee shall maintain records demonstrating that water pipes and troughs are inspected and leaks are repaired at least once every seven (7) days. [District Rule 4570]

Clean manure from corrals at least four (4) times per year with at least sixty (60) days between cleaning, or clean corrals at least once between April and July and at least once between September and December.

- {4501} Permittee shall clean manure from corrals at least four (4) times per year with at least sixty (60) days between each cleaning, or permittee shall clean corrals at least once between April and July and at least once between September and December. [District Rule 4570]

- {4502} Permittee shall record the date that animal waste is cleaned from corrals or demonstrate that manure from corrals are cleaned at least four (4) times per year with at least sixty (60) days between each cleaning. [District Rule 4570]

Implement one of the following three mitigation measures: 1) slope the surface of the corrals at least 3% where the available space for each animal is 400 square feet or less, and slope the surface of the corrals at least 1.5% where the available space for each animal is more than 400 square feet per animal; 2) maintain corrals to ensure proper drainage preventing water from standing more than forty-eight hours; or 3) harrow, rake, or scrape pens sufficiently to maintain a dry surface.

- {4554} Permittee shall implement at least one of the following corral mitigation measures: 1) slope the surface of the corrals at least 3% where the available space for each animal is 400 square feet or less and shall slope the surface of the corrals at least 1.5% where the available space for each animal is more than 400 square feet per animal; 2) maintain corrals to ensure proper drainage preventing water from standing more than forty-eight hours; or 3) harrow, rake, or scrape pens sufficiently to maintain a dry surface except during periods of rainy weather. [District Rule 4570]

- {4555} Permittee shall either 1) maintain sufficient records to demonstrate that corrals are maintained to ensure proper drainage preventing water from standing for more than forty-eight hours or 2) maintain records of dates pens are groomed (i.e., harrowed, raked, or scraped, etc.). [District Rule 4570]

Optional

Scrape, vacuum or flush concrete lanes in corrals at least once every day for mature cows and every seven (7) days for support stock.

- {4508} Permittee shall scrape, vacuum or flush concrete lanes in corrals at least once every day for mature cows and every seven (7) days for support stock. [District Rule 4570]

- {4556} Permittee shall maintain records demonstrating that concrete lanes in corrals are scraped, vacuumed, or flushed at least once every day for mature cows and at least once every seven (7) days for support stock. [District Rule 4570]

Clean manure from under corral shades at least once every fourteen (14) days, when weather permits access into the corral

- {4515} Permittee shall clean manure from under corral shades at least once every fourteen (14) days, when weather permits access into the corral. [District Rule 4570]
- {4516} Permittee shall maintain records demonstrating that manure is cleaned from under the shades at least once every fourteen (14) days, as long as weather permits access to corrals. [District Rule 4570]

Manage corrals such that the manure depth in the corral does not exceed twelve (12) inches at any time or point, except for in-corral mounding. Manure depth may exceed 12 inches when corrals become inaccessible due to rain events. The facility must resume management of the manure depth of 12 inches or lower immediately upon the corral becoming accessible.

- {4518} Permittee shall manage corrals such that the manure depth in the corral does not exceed twelve (12) inches at any time or point, except for in-corral mounding. Manure depth may exceed 12 inches when corrals become inaccessible due to rain events. However, permittee must resume management of the manure depth of 12 inches or lower immediately upon the corral becoming accessible. [District Rule 4570]

- {4519} Permittee shall measure and document the depth of manure in the corrals at least once every ninety (90) days. [District Rule 4570]

Solid Manure

Remove dry manure from the facility within seventy-two (72) hours of removal from housing.

Within seventy two (72) hours of solid manure removal from housing, cover dry manure outside the housing with a weatherproof covering from October through May, except for times when wind events remove the covering, not to exceed twenty-four (24) hours per event.

- {4526} Within seventy two (72) hours of removal of solid manure from housing, permittee shall either 1) remove dry manure from the dairy, or 2) cover dry manure outside the housing with a weatherproof covering from October through May, except for times when wind events remove the covering, not to exceed twenty-four (24) hours per event. [District Rule 4570]

- {4527} Permittee shall keep records of dates when manure is removed from the dairy or permittee shall maintain records to demonstrate that dry manure piles outside the pens are covered with a weatherproof covering from October through May. [District Rule 4570]

- {4528} Permittee shall maintain records, such as manufacturer warranties or other documentation, demonstrating that the weatherproof covering over dry manure 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]

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. [District Rule 4570]

Land Application

Solid

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

- {4541} Permittee shall incorporate all solid manure within seventy-two (72) hours of land application. [District Rule 4570]

- {4542} Permittee shall maintain records to demonstrate that all solid manure has been incorporated within seventy-two (72) hours of land application. [District Rule 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 Rule 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 Rule 4570]

Based on the preceding analysis, compliance with this rule is expected.

California Health & Safety Code 42301.6 (School Notice)

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)

Frank N. Rocha 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 tons/year of NO_X or VOC), are required to obtain a District permit.

The post-project emissions from this dairy exceed the 5 tons-VOC/year threshold and the dairy is classified as a large CAF by the California Air Resources Board (ARB). The dairy is currently under District permit requirements, as required by SB 700.

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 County of San Joaquin (County) is the public agency having principal responsibility for approving the project. As such, the County served as the Lead Agency (CCR §15367). In approving the project, the Lead Agency prepared and adopted a Negative Declaration. The Lead agency filed a Notice of Determination, stating that the environmental document was adopted pursuant to the provisions of CEQA and concluding that the project would not have a significant effect on the environment.

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), (CCR §15381). As a Responsible Agency the District complies with CEQA by considering the environmental document prepared by the Lead Agency, and by reaching its own conclusion on whether and how to approve the project (CCR §15096).

The District has considered the Lead Agency's environmental document. Furthermore, the District has conducted an engineering evaluation of the project, this document, which demonstrates that Stationary Source emissions from the project would be below the District's thresholds of significance for criteria pollutants. Thus, the District finds that through a combination of project design elements, compliance with applicable District rules and regulations, and compliance with District air permit conditions, project specific stationary source emissions will have a less than significant impact on air quality. The District does not have authority over any of the other project impacts and has, therefore, determined that no additional findings are required (CEQA Guidelines §15096(h)).

IX. Recommendation

Compliance with all applicable rules and regulations is expected. Pending a successful Public Noticing period, issue Authorities to Construct N-7145-1-5, 2-4, 3-3, 4-3 and 8-2 subject to the permit conditions on the attached draft Authorities to Construct in Appendix F and file a Notice of Determination with San Joaquin County.

X. Billing Information

Annual Permit Fees			
Permit Number	**Fee Schedule**	**Fee Description**	**Annual Fee**
N-7145-1-5	3020-06	Milk Barn	$105.00
N-7145-2-4	3020-06	Cow Housing	$105.00
N-7145-3-3	3020-06	Liquid Manure Handling System	$105.00
N-7145-4-3	3020-06	Solid Manure Handling System	$105.00
N-7145-8-2	3020-06	Feed Storage and Handling	$105.00

XI. Appendices

A: Current Permit to Operate
B: Emissions Calculations
C: BACT Analysis
D: Summary of Health Risk Assessment (HRA) and Ambient Air Quality Analysis (AAQA)
E: Anaerobic Treatment Lagoon Design Check
F: Draft ATCs

APPENDIX A

Current Permit to Operate

San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT

HEALTHY AIR LIVING™

Permit to Operate

FACILITY: N-7145 **EXPIRATION DATE:** 12/31/2014

LEGAL OWNER OR OPERATOR: FRANK N. ROCHA DAIRY
MAILING ADDRESS: 23125 E LONE TREE RD
ESCALON, CA 95320

FACILITY LOCATION: 23125 E LONE TREE RD
ESCALON, CA 95320

FACILITY DESCRIPTION: AGRICULTURAL CROP PRODUCTION, DAIRY

The Facility's Permit to Operate may include Facility-wide Requirements as well as requirements that apply to specific permit units.

This Permit to Operate remains valid through the permit expiration date listed above, subject to payment of annual permit fees and compliance with permit conditions and all applicable local, state, and federal regulations. This permit is valid only at the location specified above, and becomes void upon any transfer of ownership or location. Any modification of the equipment or operation, as defined in District Rule 2201, will require prior District approval. This permit shall be posted as prescribed in District Rule 2010.

Seyed Sadredin
Executive Director / APCO

David Warner
Director of Permit Services

Jan 13 2014 4:18PM – AIYABEIJ

San Joaquin Valley
Air Pollution Control District

PERMIT UNIT: N-7145-1-4 **EXPIRATION DATE:** 12/31/2014

EQUIPMENT DESCRIPTION:
2,010 COW MILKING OPERATION WITH A DOUBLE-40 (80 STALL) PARALLEL MILKING PARLOR AND A 60 STALL FLAT HOSPITAL MILKING BARN

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. Permittee shall implement and maintain all the Mitigation Measures contained in this permit on and after September 21, 2012. [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 or necessary for the animal to molt, the owners/operators must notify the District in writing within forty-eight (48) hours of the determination including the duration and the specific health condition requiring the mitigation measure to be suspended. If the situation is expected to exist longer than a thirty-day (30) period, the owner/operator shall submit a new emission mitigation plan designating a mitigation measure to be implemented in lieu of the suspended mitigation measure. [District Rule 4570]
5. Permittee shall flush or hose milk parlor immediately prior to, immediately after, or during each milking. [District Rule 4570]
6. Permittee shall provide verification that milk parlors are flushed or hosed prior to, immediately after, or during each milking. [District Rule 4570]
7. Permittee shall keep and maintain all records for a minimum of five (5) years and shall make records available to the APCO and EPA upon request. [District Rule 4570]
8. 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]

San Joaquin Valley
Air Pollution Control District

PERMIT UNIT: N-7145-2-2 **EXPIRATION DATE:** 12/31/2014

EQUIPMENT DESCRIPTION:
COW HOUSING - 2,010 MILK COWS, NOT TO EXCEED A COMBINED TOTAL OF 2,440 MATURE COWS (MILK AND DRY); 1,220 SUPPORT STOCK (HEIFERS, CALVES AND BULLS); AND FREESTALLS WITH A 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. Permittee shall implement and maintain all the Mitigation Measures contained in this permit on and after September 21, 2012. [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 or necessary for the animal to molt, the owners/operators must notify the District in writing within forty-eight (48) hours of the determination including the duration and the specific health condition requiring the mitigation measure to be suspended. If the situation is expected to exist longer than a thirty-day (30) period, the owner/operator shall submit a new emission mitigation plan designating a mitigation measure to be implemented in lieu of the suspended mitigation measure. [District Rule 4570]
5. Permittee shall pave feedlanes, where present, for a width of at least 8 feet along the corral side of the feedlane fence for milk and dry cows and at least 6 feet along the corral side of the feedlane for heifers. [District Rule 4570]
6. Permittee shall flush or scrape freestall flush lanes at least three (3) times per day. [District Rule 4570]
7. Permittee shall keep records or maintain an operating plan that requires freestall flush lanes to be flushed or scraped at least three times per day. [District Rule 4570]
8. Permittee shall remove manure that is not dry from individual cow freestall beds or rake, harrow, scrape, or grade freestall bedding at least once every seven (7) days. [District Rule 4570]
9. Permittee shall record the date that manure that is not dry is removed from individual cow freestall beds or raked, harrowed, scraped, or freestall bedding is graded at least once every seven (7) days. [District Rule 4570]
10. Permittee shall inspect water pipes and troughs and repair leaks at least once every seven (7) days. [District Rule 4570]
11. Permittee shall maintain records demonstrating that water pipes and troughs are inspected and leaks are repaired at least once every seven (7) days. [District Rule 4570]
12. Permittee shall clean manure from corrals at least four (4) times per year with at least sixty (60) days between each cleaning, or permittee shall clean corrals at least once between April and July and at least once between September and December. [District Rule 4570]
13. Permittee shall demonstrate that manure from corrals are cleaned at least four (4) times per year with at least sixty (60) days between each cleaning or demonstrate that corrals are cleaned at least once between April and July and at least once between September and December. [District Rule 4570]

PERMIT UNIT REQUIREMENTS CONTINUE ON NEXT PAGE

14. Permittee shall implement at least one of the following corral mitigation measures: 1) slope the surface of the corrals at least 3% where the available space for each animal is 400 square feet or less and shall slope the surface of the corrals at least 1.5% where the available space for each animal is more than 400 square feet per animal; 2) maintain corrals to ensure proper drainage preventing water from standing more than forty-eight hours; or 3) harrow, rake, or scrape pens sufficiently to maintain a dry surface except during periods of rainy weather. [District Rule 4570]
15. Permittee shall either 1) maintain sufficient records to demonstrate that corrals are maintained to ensure proper drainage preventing water from standing for more than forty-eight hours or 2) maintain records of dates pens are groomed (i.e., harrowed, raked, or scraped, etc.). [District Rule 4570]
16. Permittee shall scrape, vacuum or flush concrete lanes in corrals at least once every day for mature cows and every seven (7) days for support stock. [District Rule 4570]
17. Permittee shall maintain records demonstrating that concrete lanes in corrals are scraped, vacuumed, or flushed at least once every day for mature cows and at least once every seven (7) days for support stock. [District Rule 4570]
18. Shade structures shall be installed in any of the following ways: 1) constructed with a light permeable roofing material; 2) uphill of any slope in the corral; 3) installed so that the structure has a North/South orientation. OR Permittee shall clean manure from under corral shades at least once every fourteen (14) days, when weather permits access into the corral. [District Rule 4570]
19. If Permittee has selected to comply using shades constructed with a light permeable roofing material, then permittee shall maintain records, such as design specifications, demonstrating that the shade structures are equipped with such roofing material or if Permittee has selected to comply by cleaning the manure from under the corral shades, then Permittee shall maintain records demonstrating that manure is cleaned from under the shades at least once every fourteen (14) days, as long as weather permits access to corrals. [District Rule 4570]
20. Permittee shall manage corrals such that the manure depth in the corral does not exceed twelve (12) inches at any time or point, except for in-corral mounding. Manure depth may exceed 12 inches when corrals become inaccessible due to rain events. However, permittee must resume management of the manure depth of 12 inches or lower immediately upon the corral becoming accessible. [District Rule 4570]
21. Permittee shall measure and document the depth of manure in the corrals at least once every ninety (90) days. [District Rule 4570]
22. 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]
23. 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]
24. 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]

San Joaquin Valley
Air Pollution Control District

PERMIT UNIT: N-7145-3-2 **EXPIRATION DATE:** 12/31/2014

EQUIPMENT DESCRIPTION:
LIQUID MANURE HANDLING SYSTEM CONSISTING OF 3 SETTLING BASINS, 1 TREATMENT LAGOON AND 1 STORAGE POND; 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. Permittee shall implement and maintain all the Mitigation Measures contained in this permit on and after September 21, 2012. [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 or necessary for the animal to molt, the owners/operators must notify the District in writing within forty-eight (48) hours of the determination including the duration and the specific health condition requiring the mitigation measure to be suspended. If the situation is expected to exist longer than a thirty-day (30) period, the owner/operator shall submit a new emission mitigation plan designating a mitigation measure to be implemented in lieu of the suspended mitigation measure. [District Rule 4570]
5. Permittee shall remove solids with a solid separator system, prior to the manure entering the lagoon. [District Rule 4570]
6. Permittee shall not allow liquid manure to stand in the fields for more than twenty-four (24) hours after irrigation. [District Rule 4570]
7. Permittee shall maintain records to demonstrate liquid manure did not stand in the fields for more than twenty-four (24) hours after irrigation. [District Rule 4570]
8. Permittee shall keep and maintain all records for a minimum of five (5) years and shall make records available to the APCO and EPA upon request. [District Rule 4570]
9. 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]

San Joaquin Valley
Air Pollution Control District

PERMIT UNIT: N-7145-4-2 **EXPIRATION DATE:** 12/31/2014

EQUIPMENT DESCRIPTION:
SOLID MANURE HANDLING CONSISTING OF OPEN MANURE STOCK PILES WITH SOLID MANURE APPLICATION TO LAND

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. Permittee shall implement and maintain all the Mitigation Measures contained in this permit on and after September 21, 2012. [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 or necessary for the animal to molt, the owners/operators must notify the District in writing within forty-eight (48) hours of the determination including the duration and the specific health condition requiring the mitigation measure to be suspended. If the situation is expected to exist longer than a thirty-day (30) period, the owner/operator shall submit a new emission mitigation plan designating a mitigation measure to be implemented in lieu of the suspended mitigation measure. [District Rule 4570]
5. Within seventy two (72) hours of removal of solid manure from housing, permittee shall either 1) remove dry manure from the facility, or 2) cover dry manure outside the housing with a weatherproof covering from October through May, except for times when wind events remove the covering, not to exceed twenty-four (24) hours per event. [District Rule 4570]
6. Permittee shall keep records of dates when manure is removed from the facility or permittee shall maintain records to demonstrate that dry manure piles outside the pens are covered with a weatherproof covering from October through May. [District Rule 4570]
7. If weatherproof coverings are used, permittee shall maintain records, such as manufacturer warranties or other documentation, demonstrating that the weatherproof covering over dry manure are installed, used, and maintained in accordance with manufacturer recommendations and applicable standards listed in NRCS Field Office Technical Guide Code 313 or 367, or any other applicable standard approved by the APCO, ARB, and EPA. [District Rule 4570]
8. Permittee shall incorporate all solid manure within seventy-two (72) hours of land application. [District Rule 4570]
9. Permittee shall maintain records to demonstrate that all solid manure has been incorporated within seventy-two (72) hours of land application. [District Rule 4570]
10. 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]
11. 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]

San Joaquin Valley
Air Pollution Control District

PERMIT UNIT: N-7145-5-0 **EXPIRATION DATE:** 12/31/2014

EQUIPMENT DESCRIPTION:
AGRICULTURAL GASOLINE DISPENSING OPERATION WITH ONE 500 GALLON PHASE I EXEMPT ABOVEGROUND STORAGE TANK AND 1 FUELING POINT WITH 1 PHASE II EXEMPT GASOLINE DISPENSING NOZZLE USED (IMPLEMENTS OF HUSBANDRY)

PERMIT UNIT REQUIREMENTS

1. Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to enter the permittee's premises where a permitted source is located or emissions related activity is conducted, or where records must be kept under condition of the permit. [District Rule 1070]
2. Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to have access to and copy, at reasonable times, any records that must be kept under the conditions of the permit. [District Rule 1070]
3. This permit does not authorize the violation of any conditions established for this facility in the Conditional Use Permit (CUP), Special Use Permit (SUP), Site Approval, Site Plan Review (SPR), or other approval documents issued by a local, state, or federal agency. [Public Resources Code 21000-21177: California Environmental Quality Act]
4. No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]
5. The storage tank(s) shall be equipped with submerged fill pipes. [District Rule 4621]
6. The storage tank shall be used primarily for the fueling of implements of husbandry. [District Rule 4621]
7. The storage tank shall be maintained, and operated such that it is leak-free. [District Rule 4621]

San Joaquin Valley
Air Pollution Control District

PERMIT UNIT: N-7145-6-0 **EXPIRATION DATE:** 12/31/2014

EQUIPMENT DESCRIPTION:
AGRICULTURAL GASOLINE DISPENSING OPERATION WITH ONE 500 GALLON PHASE I EXEMPT ABOVEGROUND STORAGE TANK AND 1 FUELING POINT WITH 1 PHASE II EXEMPT GASOLINE DISPENSING NOZZLE (IMPLEMENTS OF HUSBANDRY)

PERMIT UNIT REQUIREMENTS

1. Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to enter the permittee's premises where a permitted source is located or emissions related activity is conducted, or where records must be kept under condition of the permit. [District Rule 1070]
2. Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to have access to and copy, at reasonable times, any records that must be kept under the conditions of the permit. [District Rule 1070]
3. This permit does not authorize the violation of any conditions established for this facility in the Conditional Use Permit (CUP), Special Use Permit (SUP), Site Approval, Site Plan Review (SPR), or other approval documents issued by a local, state, or federal agency. [Public Resources Code 21000-21177: California Environmental Quality Act]
4. No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]
5. The storage tank(s) shall be equipped with submerged fill pipes. [District Rule 4621]
6. The storage tank shall be used primarily for the fueling of implements of husbandry. [District Rule 4621]
7. The storage tank shall be maintained, and operated such that it is leak-free. [District Rule 4621]

San Joaquin Valley
Air Pollution Control District

PERMIT UNIT: N-7145-7-0 **EXPIRATION DATE:** 12/31/2014

EQUIPMENT DESCRIPTION:
450 BHP CUMMINS MODEL NTA855G2 DIESEL-FIRED EMERGENCY IC ENGINE POWERING AN ELECTRICAL GENERATOR

PERMIT UNIT REQUIREMENTS

1. The exhaust stack shall vent vertically upward. The vertical exhaust flow shall not be impeded by a rain cap (flapper ok), roof overhang, or any other obstruction. [District Rule 4102]
2. This IC engine shall only be used for the growing and harvesting of crops or the raising of fowl or animals for the primary purpose of making a profit, providing a livelihood, or conducting agricultural research or instruction by an educational institution. [17 CCR 93115]
3. No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]
4. Particulate matter emissions shall not exceed 0.1 grains/dscf in concentration. [District Rule 4201]
5. No air contaminant shall be discharged into the atmosphere for a period or periods aggregating more than three minutes in any one hour which is as dark as, or darker than, Ringelmann 1 or 20% opacity. [District Rule 4101]
6. This engine shall be equipped with an operational non-resettable elapsed time meter or other APCO approved alternative. [District Rule 4702, 17 CCR 93115, and 40 CFR 60 Subpart IIII]
7. This engine shall be operated and maintained in proper operating condition as recommended by the engine manufacturer or emissions control system supplier. [District Rule 4702 and 40 CFR 60 Subpart IIII]
8. Only CARB certified diesel fuel containing not more than 0.0015% sulfur by weight is to be used. [District Rule 4801, 17 CCR 93115, and 40 CFR Part 60 Subpart IIII]
9. An emergency situation is an unscheduled electrical power outage caused by sudden and reasonably unforeseen natural disasters or sudden and reasonably unforeseen events beyond the control of the permittee. [District Rule 4702]
10. This engine shall not be used to produce power for the electrical distribution system, as part of a voluntary utility demand reduction program, or for an interruptible power contract. [District Rule 4702]
11. This engine shall be operated only for testing and maintenance of the engine, required regulatory purposes, and during emergency situations. Operation of the engine for maintenance, testing, and required regulatory purposes shall not exceed 100 hours per calendar year. [District Rule 4702 and 17 CCR 93115]
12. During periods of operation for maintenance, testing, and required regulatory purposes, the permittee shall monitor the operational characteristics of the engine as recommended by the manufacturer or emission control system supplier (for example: check engine fluid levels, battery, cables and connections; change engine oil and filters; replace engine coolant; and/or other operational characteristics as recommended by the manufacturer or supplier). [District Rule 4702]

PERMIT UNIT REQUIREMENTS CONTINUE ON NEXT PAGE

13. The permittee shall maintain monthly records of emergency and non-emergency operation. Records shall include the number of hours of emergency operation, the date and number of hours of all testing and maintenance operations, the purpose of the operation (for example: load testing, weekly testing, rolling blackout, general area power outage, etc.) and records of operational characteristics monitoring. For units with automated testing systems, the operator may, as an alternative to keeping records of actual operation for testing purposes, maintain a readily accessible written record of the automated testing schedule. [District Rule 4702 and 17 CCR 93115]
14. The operator shall document the use of CARB certified diesel fuel through the retention of fuel purchase records. [District Rule 4801 and 17 CCR 93115]
15. All records shall be maintained and retained on-site for a minimum of five (5) years, and shall be made available for District inspection upon request. [District Rule 4702 and 17 CCR 93115]

San Joaquin Valley
Air Pollution Control District

PERMIT UNIT: N-7145-8-1 **EXPIRATION DATE:** 12/31/2014

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

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. Permittee shall implement and maintain all the Mitigation Measures contained in this permit on and after September 21, 2012. [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 or necessary for the animal to molt, the owners/operators must notify the District in writing within forty-eight (48) hours of the determination including the duration and the specific health condition requiring the mitigation measure to be suspended. If the situation is expected to exist longer than a thirty-day (30) period, the owner/operator shall submit a new emission mitigation plan designating a mitigation measure to be implemented in lieu of the suspended mitigation measure. [District Rule 4570]
5. Permittee shall feed all animals according to National Research Council (NRC) guidelines. [District Rule 4570]
6. Permittee shall maintain records of feed content, formulation, and quantity of feed additive utilized, to demonstrate compliance with National Research Council (NRC) guidelines. Records such as feed company guaranteed analyses (feed tags), ration sheets, or feed purchase records may be used to meet this requirement. [District Rule 4570]
7. Permittee shall push feed so that it is within three feet of feedlane fence within two hours of putting out the feed or use a feed trough or other feeding structure designed to maintain feed within reach of the animals. [District Rule 4570]
8. Permittee shall maintain an operating plan/record that requires feed to be pushed within three feet of feedlane fence within two hours of putting out the feed, or use of a feed trough or other structure designed to maintain feed within reach of the animals. [District Rule 4570]
9. Permittee shall begin feeding total mixed rations within two hours of grinding and mixing rations. [District Rule 4570]
10. Permittee shall maintain an operating plan/record of when feeding of total mixed rations began within two hours of grinding and mixing rations. [District Rule 4570]
11. Permittee shall store grain in a weatherproof storage structure or under a weatherproof covering from October through May. [District Rule 4570]
12. Permittee shall maintain records demonstrating grain is/was stored in a weatherproof storage structure or under a weatherproof covering from October through May. [District Rule 4570]
13. Permittee shall feed steam-flaked, dry rolled, cracked or ground corn or other steam-flaked, dry rolled, cracked or ground cereal grains. [District Rule 4570]

PERMIT UNIT REQUIREMENTS CONTINUE ON NEXT PAGE

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

PERMIT UNIT REQUIREMENTS CONTINUE ON NEXT PAGE

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

27. Permittee shall select and implement at least two of the following mitigation measures for management of silage piles at the facility: Option 1) manage silage piles such that only one silage pile has an uncovered face and the total exposed surface area is less than 2,150 square feet, or manage multiple uncovered silage piles such that the total exposed surface area of all uncovered silage piles is less than 4,300 square feet; Option 2) use a shaver/facer to remove silage from the silage pile, or shall use another method to maintain a smooth vertical surface on the working face of the silage pile; or Option 3) inoculate silage with homolactic lactic acid bacteria in accordance with manufacturer recommendations to achieve a concentration of at least 100,000 colony forming units per gram of wet forage, apply propionic acid, benzoic acid, sorbic acid, sodium benzoate, or potassium sorbate at the rate specified by the manufacturer to reduce yeast counts when forming silage piles, or apply other additives at rates that have been demonstrated to reduce alcohol concentrations in silage and/or VOC emissions from silage and have been approved by the District and EPA. Records of the options chosen for managing each silage pile shall be maintained. [District Rule 4570]

28. If Option 1 (Limiting Exposed Area of Silage) is chosen as a mitigation measure for managing silage piles, the permittee shall calculate and record the maximum (largest part of pile) total exposed area of each silage pile. Records of the maximum calculated area shall be maintained. [District Rule 4570]

29. For each silage pile that Option 2 (Shaver/Facer or Smooth Face) is chosen as a mitigation measure for 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]

30. 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]

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

32. 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]

APPENDIX B

Emissions Calculations

lb/hd-yr Dairy Emissions Factors

			Milk Cows				Dry Cows				Large Heifers (15 to 24 months)				Medium Heifers (7 to 14 months)				Small Heifers (3 to 6 months)				Calves (0 - 3 months)				Bulls			
			Uncontrolled		EF1	EF2	Uncontrolled		EF1	EF2	Uncontrolled		EF1	EF2	Uncontrolled		EF1	EF2	Uncontrolled		EF1	EF2	Uncontrolled		EF1	EF2	Uncontrolled		EF1	EF2
			<1000 milk cows	≥1000 milk cows			<1000 milk cows	≥1000 milk cows			<1000 milk cows	≥1000 milk cows			<1000 milk cows	≥1000 milk cows			<1000 milk cows	≥1000 milk cows			<1000 milk cows	≥1000 milk cows			<1000 milk cows	≥1000 milk cows		
Milking Parlor	VOC	Enteric Emissions in Milking Parlors	0.43	0.41	0.37	0.37	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-		-	-	-		-	-	-
		Milking Parlor Floor	0.04	0.03	0.03	0.03	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-		-	-	-		-	-	-
		Total	**8.47**	**8.44**	**0.40**	**8.40**	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-		-	-	-		-	-	-
	NH3	**Total**	**8.19**	**8.19**	**8.19**	**8.19**	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-		-	-	-		-	-	-
Cow Housing	VOC	Enteric Emissions in Cow Housing	3.89	3.69	3.32	3.32	2.33	2.23	2.01	2.01	1.81	1.71	1.54	1.54	1.23	1.17	1.05	1.05	0.69	0.65	0.58	0.58	0.32	0.31	0.28	0.28	1.10	1.04	0.94	0.94
		Corrals/Pens	10.00	6.60	5.08	5.08	5.40	3.59	2.76	2.76	4.20	2.76	2.12	2.12	2.85	1.88	1.45	1.45	1.60	1.04	0.80	0.80	0.75	0.50	0.39	0.39	2.55	1.67	1.29	1.29
		Bedding	1.05	1.00	0.90	0.90	0.57	0.54	0.49	0.49	0.44	0.42	0.38	0.38	0.30	0.28	0.26	0.26	0.17	0.16	0.14	0.14	0.08	0.08	0.07	0.07	0.27	0.25	0.23	0.23
		Lanes	0.84	0.80	0.65	0.65	0.45	0.44	0.35	0.35	0.35	0.33	0.27	0.27	0.24	0.23	0.18	0.18	0.13	0.13	0.10	0.10	0.06	0.06	0.05	0.05	0.21	0.20	0.16	0.16
		Total	**15.78**	**12.09**	**9.95**	**9.95**	**8.75**	**6.80**	**5.62**	**5.62**	**6.81**	**5.22**	**4.31**	**4.31**	**4.62**	**3.56**	**2.94**	**2.94**	**2.69**	**1.88**	**1.63**	**1.63**	**1.22**	**8.95**	**0.78**	**0.78**	**4.13**	**3.15**	**2.61**	**2.61**
	NH3	**Total**	**53.38**	**63.30**	**53.30**	**53.30**	**27.00**	**27.00**	**27.00**	**27.00**	**14.00**	**14.00**	**14.08**	**14.00**	**10.00**	**18.00**	**10.00**	**10.00**	**7.60**	**7.60**	**7.60**	**7.68**	**2.20**	**2.20**	**2.20**	**2.20**	**18.40**	**19.40**	**19.40**	**19.40**
Liquid Manure Handling	VOC	Lagoons/Storage Ponds	1.52	1.30	1.17	0.70	0.82	0.71	0.64	0.38	0.64	0.54	0.49	0.29	0.43	0.37	0.33	0.20	0.24	0.21	0.19	0.11	0.11	0.10	0.09	0.05	0.40	0.33	0.30	0.18
		Liquid Manure Land Application	1.64	1.40	1.26	0.76	0.89	0.76	0.69	0.41	0.69	0.58	0.53	0.32	0.47	0.40	0.36	0.22	0.26	0.22	0.20	0.12	0.12	0.11	0.10	0.06	0.42	0.35	0.32	0.19
		Total	**3.16**	**2.70**	**2.43**	**1.46**	**1.71**	**1.47**	**1.33**	**0.78**	**1.33**	**1.13**	**1.02**	**8.61**	**0.90**	**0.77**	**8.69**	**8.42**	**0.51**	**0.43**	**0.38**	**8.23**	**0.24**	**8.21**	**0.18**	**0.11**	**8.82**	**0.68**	**0.61**	**0.37**
	NH3	Lagoons/Storage Ponds	8.20	8.20	8.20	8.20	4.20	4.20	4.20	4.20	2.20	2.20	2.20	2.20	1.50	1.50	1.50	1.50	1.20	1.20	1.20	1.20	0.35	0.35	0.35	0.35	3.00	3.00	3.00	3.00
		Liquid Manure Land Application	8.90	8.90	8.90	8.90	4.50	4.50	4.50	4.50	2.30	2.30	2.30	2.30	1.70	1.70	1.70	1.70	1.30	1.30	1.30	1.30	0.37	0.37	0.37	0.37	3.23	3.23	3.23	3.23
		Total	**17.18**	**17.10**	**17.10**	**17.18**	**8.70**	**8.70**	**8.78**	**8.70**	**4.50**	**4.50**	**4.58**	**4.50**	**3.20**	**3.20**	**3.20**	**3.20**	**2.50**	**2.58**	**2.50**	**2.50**	**8.72**	**8.72**	**0.72**	**0.72**	**6.23**	**6.23**	**6.23**	**8.23**
Solid Manure Handling	VOC	Solid Manure Storage	0.16	0.15	0.12	0.12	0.09	0.08	0.07	0.07	0.07	0.06	0.05	0.05	0.05	0.04	0.03	0.03	0.03	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.04	0.04	0.03	0.03
		Separated Solids Piles	0.06	0.06	0.05	0.05	0.03	0.03	0.03	0.03	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.02	0.02	0.02	0.02
		Solid Manure Land Application	0.39	0.33	0.30	0.30	0.21	0.18	0.16	0.16	0.16	0.14	0.12	0.12	0.11	0.09	0.08	0.08	0.06	0.05	0.05	0.05	0.03	0.03	0.02	0.02	0.10	0.08	0.07	0.07
		Total	**8.61**	**0.54**	**0.47**	**8.47**	**0.33**	**8.29**	**0.28**	**0.26**	**8.28**	**0.23**	**0.20**	**8.28**	**8.17**	**8.15**	**0.13**	**8.13**	**0.10**	**8.09**	**0.87**	**0.07**	**0.05**	**0.04**	**0.04**	**8.04**	**0.16**	**0.14**	**0.12**	**8.12**
	NH3	Solid Manure Storage	0.95	0.95	0.95	0.95	0.48	0.48	0.48	0.48	0.25	0.25	0.25	0.25	0.18	0.18	0.18	0.18	0.13	0.13	0.13	0.13	0.04	0.04	0.04	0.04	0.35	0.35	0.35	0.35
		Separated Solids Piles	0.38	0.38	0.38	0.38	0.19	0.19	0.19	0.19	0.10	0.10	0.10	0.10	0.07	0.07	0.07	0.07	0.05	0.05	0.05	0.05	0.02	0.02	0.02	0.02	0.14	0.14	0.14	0.14
		Solid Manure Land Application	2.09	2.09	2.09	2.09	1.06	1.06	1.06	1.06	0.55	0.55	0.55	0.55	0.39	0.39	0.39	0.39	0.30	0.30	0.30	0.30	0.09	0.09	0.09	0.09	0.76	0.76	0.76	0.76
		Total	**3.42**	**3.42**	**3.42**	**3.42**	**1.73**	**1.73**	**1.73**	**1.73**	**8.90**	**0.90**	**0.90**	**0.90**	**0.64**	**0.64**	**0.64**	**0.64**	**0.48**	**8.48**	**0.48**	**8.48**	**0.15**	**8.15**	**0.15**	**0.16**	**1.25**	**1.25**	**1.25**	**1.26**

Silage and TMR (Total Mixed Ration) Emissions (µg/m^2-min)

		Silage Type	Uncontrolled	EF1	EF2
Feed Storage and Handling	VOC	Corn Silage	34,681	21,155	21,155
		Alfalfa Silage	17,458	10,649	10,649
		Wheat Silage	43,844	26,745	26,745
		TMR	13,056	10,575	10,575

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

PM_{10} Emission Factors (lb/hd-yr)

Type of Cow	Dairy EF	Source
Cows in Freestalls	1.37	Based on a Summer 2003 study by Texas A&M ASAE at a West Texas Dairy
Milk/Dry in Corrals	5.46	Based on a Summer 2003 study by Texas A&M ASAE at a West Texas Dairy
Heifers/Bulls in Open Corrals	10.55	Based on a USDA/UC Davis report quantifying dairy and feedlot emissions in Tulare & Kern Counties (April '01)
Calf (under 3 mo.) open corrals	1.37	SJVAPCD
Calf on-ground hutches	0.343	SJVAPCD (75% control efficiency)
Calf above-ground flushed	0.069	SJVAPCD (95% control efficiency)
Calf above-ground scraped	0.206	SJVAPCD (85% control efficiency)

Pre-Project Potential to Emit (PE1)

Pre-Project Herd Size								
Herd	Flushed Freestall Barns	Scraped Freestall Barns	Flushed Corrals	Scraped Corrals	Total # of Animals	% of Corrals That are Shaded		
Milk Cows	2,010	0	0	0	2,010	0		
Dry Cows	360	0	40	30	430	100		
Support Stock (Heifers and Bulls)	0	0	0	0	0	0		
Large Heifers	0	0	0	460	460	100		
Medium Heifers	0	0	170	290	460	100		
Small Heifers	120	0	30	0	150	100		
Bulls	0	0	0	0	0	0		
	Calf Hutches				Calf Corrals			
	Aboveground Flushed	Aboveground Scraped	On-Ground Flushed	On-Ground Scraped	Flushed	Scraped	Total # of Calves	% of Corrals That are Shaded
Calves	150	0	0	0	0	0	150	100

Silage Information				
Feed Type	Maximum # Open Piles	Maximum Height (ft)	Maximum Width (ft)	Open Face Area (ft^2)
Corn	3	30	80	5,914
Alfalfa	1	15	50	600
Wheat	3	20	50	2,482

Milking Parlor				
Cow	VOC		NH3	
	lb/day	lb/yr	lb/day	lb/yr
Milk Cows	2.2	804	1.0	382

Cow Housing						
Cow	VOC		NH3		PM10	
	lb/day	lb/yr	lb/day	lb/yr	lb/day	lb/yr
Milk Cows	54.8	20,000	293.5	107,133	7.5	2,754
Dry Cows	6.6	2,417	31.8	11,610	2.2	812
Support Stock (Heifers and Bulls)	0.0	0	0.0	0	0.0	0
Large Heifers	5.4	1,983	17.6	6,440	12.2	4,450
Medium Heifers	3.7	1,352	12.6	4,600	12.2	4,450
Small Heifers	0.7	245	3.1	1,140	1.2	455
Calves	0.3	117	0.9	330	0.0	10
Bulls	0.0	0	0.0	0	0.0	0
Total	71.5	26,113	359.5	131,253	35.3	12,931

Liquid Manure Handling						
Cow	VOC		NH3		H2S*	
	lb/day	lb/yr	lb/day	lb/yr	lb/day	lb/yr
Milk Cows	13.4	4,884	94.2	34,371	6.7	2,460
Dry Cows	1.5	532	9.5	3,480	0.5	168
Support Stock (Heifers and Bulls)	0.0	0	0.0	0	0	0
Large Heifers	0.0	0	0.0	0	0.3	112
Medium Heifers	0.3	117	1.5	544	0.1	26
Small Heifers	0.2	57	1.0	375	0	18
Calves	0.1	27	0.3	108	0	5
Bulls	0.0	0	0.0	0	0	0
Total	15.5	5,618	106.5	38,878	7.6	2,789

Solid Manure Handling				
Cow	VOC		NH3	
	lb/day	lb/yr	lb/day	lb/yr
Milk Cows	2.6	945	18.8	6,874
Dry Cows	0.3	112	2.0	744
Support Stock (Heifers and Bulls)	0.0	0	0.0	0
Large Heifers	0.3	92	1.1	414
Medium Heifers	0.2	60	0.8	294
Small Heifers	0.0	11	0.2	72
Calves	0.0	0	0.0	0
Bulls	0.0	0	0.0	0
Total	3.4	1,220	22.9	8,399

Feed Handling and Storage		
	Daily PE (lb-VOC/day)	Annual PE (lb-VOC/yr)
Corn Emissions	36.8	13,441
Alfalfa Emissions	0.9	343
Wheat Emissions	19.5	7,130
TMR	77.4	28,243
Total	134.6	49,157

Calculations for milking parlor:

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

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

Calculations for all other permits:

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

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

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

For milk and dry cows, shade structures for corrals are assumed to provide a PM10 control efficiency of 16.7%. For all other animals, shade structures for corrals are assumed to provide a PM10 control efficiency of 8.3%.

Calculations for silage emissions:

Annual PE = (EF1) x (area ft^2) x (0.0929 m^2/ft^2) x (8,760 hr/yr) x (60 min/hr) x 2.20E-9 lb/µg

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

Calculation for TMR emissions:

Annual PE = (# cows) x (EF1) x (0.658 m^3) x (525,600 min/yr) x (2.20E-9 lb/µg)

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

Calves are not included in TMR calculation.

Notes:

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

Total Daily Pre-Project Potential to Emit (lb/day)							
Permit	NOx	SOx	PM10	CO	VOC	NH3	H2S
Milking Parlor	0.0	0.0	0.0	0.0	2.2	1.0	0.0
Cow Housing	0.0	0.0	35.3	0.0	71.5	359.5	0.0
Liquid Manure	0.0	0.0	0.0	0.0	15.5	106.5	7.6
Solid Manure	0.0	0.0	0.0	0.0	3.4	22.9	0.0
Feed Handling	0.0	0.0	0.0	0.0	134.6	0.0	0.0
Total	0.0	0.0	35.3	0.0	227.2	489.9	7.6

Major Source Emissions (lb/yr)						
Permit	NOx	SOx	PM10	CO	VOC	NH3
Milk Parlor	0	0	0	0	0	0
Cow Housing	0	0	0	0	0	0
Liquid Manure	0	0	0	0	2,705	0
Solid Manure	0	0	0	0	0	0
Feed Handling	0	0	0	0	0	0
Total	0	0	0	0	2,705	0

Total Annual Pre-Project Potential to Emit (lb/yr)							
Permit	NOx	SOx	PM10	CO	VOC	NH3	H2S
Milking Parlor	0	0	0	0	804	382	0
Cow Housing	0	0	12,931	0	26,113	131,253	0
Liquid Manure	0	0	0	0	5,618	38,878	2,789
Solid Manure	0	0	0	0	1,220	8,399	0
Feed Handling	0	0	0	0	49,157	0	0
Total	0	0	12,931	0	82,911	178,911	2,789

Post-Project Potential to Emit (PE2)

Post-Project Herd Size

Herd	Flushed Freestall or Bedpack Barns	Scraped Freestall Barns	Flushed Corrals	Scraped Corrals	Total # of Animals	% of Corrals That are Shaded
Milk Cows	3,000	0	0	0	3,000	100
Dry Cows	360	0	40	30	430	100
Support Stock (Heifers and Bulls)	0	0	0	0	0	0
Large Heifers	510	0	0	550	1,060	100
Medium Heifers	0	0	170	200	370	100
Small Heifers	120	0	30	0	150	100
Bulls	0	0	0	0	0	0

	Calf Hutches				Calf Corrals			
	Aboveground Flushed	Aboveground Scraped	On-Ground Flushed	On-Ground Scraped	Flushed	Scraped	Total # of Calves	% of Corrals That are Shaded
Calves	150	0	0	0	0	0	150	100

Silage Information

Feed Type	Maximum # Open Piles	Maximum Height (ft)	Maximum Width (ft)	Open Face Area (ft^2)
Corn	3	30	80	5,914
Alfalfa	1	15	50	600
Wheat	1	20	50	827

Milking Parlor

Cow	VOC		NH3	
	lb/day	lb/yr	lb/day	lb/yr
Milk Cows	3.3	1,200	1.6	570

Cow Housing

Cow	VOC		NH3		PM10	
	lb/day	lb/yr	lb/day	lb/yr	lb/day	lb/yr
Milk Cows	81.8	29,850	438.1	159,900	11.3	4,110
Dry Cows	6.6	2,417	31.8	11,610	2.2	812
Support Stock (Heifers and Bulls)	0.0	0	0.0	0	0.0	0
Large Heifers	12.5	4,569	40.7	14,840	16.5	6,020
Medium Heifers	3.0	1,088	10.1	3,700	9.8	3,580
Small Heifers	0.7	245	3.1	1,140	1.2	455
Calves	0.3	117	0.9	330	0.0	10
Bulls	0.0	0	0.0	0	0.0	0
Total	104.9	38,285	524.7	191,520	41.0	14,986

Liquid Manure Handling

Cow	VOC		NH3		H2S	
	lb/day	lb/yr	lb/day	lb/yr	lb/day	lb/yr
Milk Cows	12.0	4,380	140.5	51,300	6.7	2,460
Dry Cows	0.9	316	9.5	3,480	0.5	168
Support Stock (Heifers and Bulls)	0.0	0	0.0	0	0	0
Large Heifers	0.9	311	6.3	2,295	0.3	112
Medium Heifers	0.2	71	1.5	544	0.1	26
Small Heifers	0.1	35	1.0	375	0	18
Calves	0.0	17	0.3	108	0	5
Bulls	0.0	0	0.0	0	0	0
Total	14.1	5,130	159.1	58,102	7.6	2,789

Solid Manure Handling

Cow	VOC		NH3	
	lb/day	lb/yr	lb/day	lb/yr
Milk Cows	3.9	1,410	28.1	10,260
Dry Cows	0.3	112	2.0	744
Support Stock (Heifers and Bulls)	0.0	0	0.0	0
Large Heifers	0.6	212	2.6	954
Medium Heifers	0.1	48	0.6	237
Small Heifers	0.0	11	0.2	72
Calves	0.0	0	0.0	0
Bulls	0.0	0	0.0	0
Total	4.9	1,793	33.5	12,267

Feed Handling and Storage

	Daily PE (lb-VOC/day)	Annual PE (lb-VOC/yr)
Corn Emissions	36.8	13,441
Alfalfa Emissions	0.9	343
Wheat Emissions	6.5	2,377
TMR	110.4	40,312
Total	154.6	56,473

Calculations for milking parlor:

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

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

Calculations for all other permits:

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

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

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

For milk and dry cows, shade structures for corrals are assumed to provide a PM10 control efficiency of 16.7%. For all other animals, shade structures for corrals are assumed to provide a PM10 control efficiency of 8.3%.

Calculations for silage emissions:

Annual PE = (EF2) x (area ft^2) x (0.0929 m^2/ft^2) x (8,760 hr/yr) x (60 min/hr) x 2.20E-9 lb/µg

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

Calculation for TMR emissions:

Annual PE = (# cows) x (EF2) x (0.658 m^2) x (525,600 min/yr) x (2.20E-9 lb/µg)

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

Calves are not included in TMR calculation.

Total Daily Post-Project Potential to Emit (lb/day)

Permit	NOx	SOx	PM10	CO	VOC	NH3	H2S
Milking Parlor	0.0	0.0	0.0	0.0	3.3	1.6	0.0
Cow Housing	0.0	0.0	41.0	0.0	104.9	524.7	0.0
Liquid Manure	0.0	0.0	0.0	0.0	14.1	159.1	7.6
Solid Manure	0.0	0.0	0.0	0.0	4.9	33.5	0.0
Feed Handling	0.0	0.0	0.0	0.0	154.6	0.0	0.0
Total	0.0	0.0	41.0	0.0	281.8	718.9	7.6

Major Source Emissions (lb/yr)

Permit	NOx	SOx	PM10	CO	VOC	NH3
Milk Parlor	0	0	0	0	0	0
Cow Housing	0	0	0	0	0	0
Liquid Manure	0	0	0	0	2,459	0
Solid Manure	0	0	0	0	0	0
Feed Handling	0	0	0	0	0	0
Total	0	0	0	0	2,459	0

Total Annual Post-Project Potential to Emit (lb/yr)

Permit	NOx	SOx	PM10	CO	VOC	NH3	H2S
Milking Parlor	0	0	0	0	1,200	570	0
Cow Housing	0	0	14,986	0	38,285	191,520	0
Liquid Manure	0	0	0	0	5,130	58,102	2,789
Solid Manure	0	0	0	0	1,793	12,267	0
Feed Handling	0	0	0	0	56,473	0	0
Total	0	0	14,986	0	102,880	262,459	2,789

Quarterly Net Emissions Change (QNEC)

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

QNEC = PE2 - PE1, where:

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

Using the values in Sections VII.C.1 and VII.C.2 in the evaluation above, quarterly PE1 and quarterly PE2 can be calculated as follows:

Milking Parlor					
	PE2 (lb/yr)	PE2 (lb/qtr)	PE1 (lb/yr)	PE1 (lb/qtr)	QNEC (lb/qtr)
NOx	0	0.0	0	0.0	0.0
SOx	0	0.0	0	0.0	0.0
PM10	0	0.0	0	0.0	0.0
CO	0	0.0	0	0.0	0.0
VOC	1,200	300.0	804	201.0	99.0
NH3	570	142.5	382	95.5	47.0

Cow Housing					
	PE2 (lb/yr)	PE2 (lb/qtr)	PE1 (lb/yr)	PE1 (lb/qtr)	QNEC (lb/qtr)
NOx	0	0.0	0	0.0	0.0
SOx	0	0.0	0	0.0	0.0
PM10	14,986	3746.4	12,931	3232.7	513.75
CO	0	0.0	0	0.0	0.0
VOC	38,285	9571.1	26,113	6528.2	3043.0
NH3	191,520	47880.0	131,253	32813.3	15066.8

Liquid Manure					
	PE2 (lb/yr)	PE2 (lb/qtr)	PE1 (lb/yr)	PE1 (lb/qtr)	QNEC (lb/qtr)
NOx	0	0.0	0	0.0	0.0
SOx	0	0.0	0	0.0	0.0
PM10	0	0.0	0	0.0	0.0
CO	0	0.0	0	0.0	0.0
VOC	5,130	1282.4	5,618	1404.4	-122.0
NH3	58,102	14525.5	38,878	9719.5	4806.0
H2S	2,789	697.2	2,789	697.2	0.0

Solid Manure					
	PE2 (lb/yr)	PE2 (lb/qtr)	PE1 (lb/yr)	PE1 (lb/qtr)	QNEC (lb/qtr)
NOx	0	0.0	0	0.0	0.0
SOx	0	0.0	0	0.0	0.0
PM10	0	0.0	0	0.0	0.0
CO	0	0.0	0	0.0	0.0
VOC	1,793	448.3	1,220	305.0	143.25
NH3	12,267	3066.7	8,399	2099.6	967.05

Feed Storage and Handling					
	PE2 (lb/yr)	PE2 (lb/qtr)	PE1 (lb/yr)	PE1 (lb/qtr)	QNEC (lb/qtr)
NOx	0	0.0	0	0.0	0.0
SOx	0	0.0	0	0.0	0.0
PM10	0	0.0	0	0.0	0.0
CO	0	0.0	0	0.0	0.0
VOC	56,473	14118.2	49,157	12289.2	1829.0
NH3	0	0.0	0	0.0	0.0

Adjusted Increase in Permitted Emissions

Milking Parlor

VOC Emissions

	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
Milk Cows	3.3	2.2	0.40	0.40	1.1
				Total	1.1

NH3 Emissions

	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
Milk Cows	1.6	1.0	0.19	0.19	0.6
				Total	0.6

Cow Housing

VOC Emissions

	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
Milk Cows	81.8	54.8	9.95	9.95	27.0
Dry Cows	6.6	6.6	5.62	5.62	0.0
Support Stock (Heifers and Bulls)	0.0	0.0	4.31	4.31	0.0
Large Heifers	12.5	5.4	4.31	4.31	7.1
Medium Heifers	3.0	3.7	2.94	2.94	-0.7
Small Heifers	0.7	0.7	1.63	1.63	0.0
Calves	0.3	0.3	0.78	0.78	0.0
Bulls	0.0	0.0	2.61	2.61	0.0
				Total	33.4

NH3 Emissions

NH3	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
Milk Cows	438.1	293.5	53.30	53.30	144.6
Dry Cows	31.8	31.8	27.00	27.00	0.0
Support Stock (Heifers and Bulls)	0.0	0.0	14.00	14.00	0.0
Large Heifers	40.7	17.6	14.00	14.00	23.1
Medium Heifers	10.1	12.6	10.00	10.00	-2.5
Small Heifers	3.1	3.1	7.60	7.60	0.0
Calves	0.9	0.9	2.20	2.20	0.0
Bulls	0.0	0.0	19.40	19.40	0.0
				Total	165.2

PM10 Emissions

PM10	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
Milk Cows (Freestalls)	11.3	7.5	1.37	1.37	3.7
Milk Cows (Shaded Corrals)	0.0	0.0	4.55	4.55	0.0
Milk Cows (Unshaded Corrals)	0.0	0.0	5.46	5.46	0.0
Dry Cows (Freestalls)	1.0	1.0	1.37	1.37	0.0
Dry Cows (Shaded Corrals)	0.9	0.9	4.55	4.55	0.0
Dry Cows (Unshaded Corrals)	0.0	0.0	5.46	5.46	0.0
Support Stock (Freestalls)	0.0	0.0	1.37	1.37	0.0
Support Stock (Shaded Corrals)	0.0	0.0	9.67	9.67	0.0
Support Stock (Unshaded Corrals)	0.0	0.0	10.55	10.55	0.0
Large Heifers (Freestalls)	1.4	0.0	1.37	1.37	1.4
Large Heifers (Shaded Corrals)	14.6	12.2	9.67	9.67	2.4
Large Heifers (Unshaded Corrals)	0.0	0.0	10.55	10.55	0.0
Medium Heifers (Freestalls)	0.0	0.0	1.37	1.37	0.0
Medium Heifers (Shaded Corrals)	9.8	12.2	9.67	9.87	-2.4
Medium Heifers (Unshaded Corrals)	0.0	0.0	10.55	10.55	0.0
Small Heifers (Freestalls)	0.3	0.3	1.37	1.37	0.0
Small Heifers (Shaded Corrals)	0.8	0.8	9.67	9.67	0.0
Small Heifers (Unshaded Corrals)	0.0	0.0	10.55	10.55	0.0
Calves (Shaded Corrals)	0.0	0.0	1.26	1.26	0.0
Calves (Unshaded Corrals)	0.0	0.0	1.37	1.37	0.0
Calves (O-G Hutches)	0.0	0.0	0.343	0.343	0.0
Calves (A-G Flushed)	0.0	0.0	0.069	0.069	0.0
Calves (A-G Scraped)	0.0	0.0	0.206	0.206	0.0
Bulls (Freestalls)	0.0	0.0	1.37	1.37	0.0
Bulls (Shaded Corrals)	0.0	0.0	9.67	9.67	0.0
Bulls (Unshaded Corrals)	0.0	0.0	10.55	10.55	0.0
				Total	6.1

Liquid Manure Handling

VOC Emissions - Lagoon/Storage Pond(s)

	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
Milk Cows	5.8	6.4	0.70	1.17	2.0
Dry Cows	0.4	0.7	0.38	0.64	0.0
Support Stock (Heifers and Bulls)	0.0	0.0	0.29	0.49	0.0
Large Heifers	0.4	0.0	0.29	0.49	0.4
Medium Heifers	0.1	0.2	0.20	0.33	0.0
Small Heifers	0.0	0.1	0.11	0.19	-0.1
Calves	0.0	0.0	0.05	0.09	0.0
Bulls	0.0	0.0	0.18	0.30	0.0
				Total	2.3

VOC Emissions - Land Application

	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
Milk Cows	6.2	8.9	0.76	1.26	2.1
Dry Cows	0.5	0.8	0.41	0.69	0.0
Support Stock (Heifers and Bulls)	0.0	0.0	0.32	0.53	0.0
Large Heifers	0.4	0.0	0.32	0.53	0.4
Medium Heifers	0.1	0.2	0.22	0.36	0.0
Small Heifers	0.0	0.1	0.12	0.28	-0.1
Calves	0.0	0.0	0.06	0.10	0.0
Bulls	0.0	0.0	0.19	0.32	0.0
				Total	2.4

NH3 Emissions - Lagoon/Storage Pond(s)

	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
Milk Cows	67.4	45.2	8.20	8.20	22.2
Dry Cows	4.6	4.6	4.20	4.20	0.0
Support Stock (Heifers and Bulls)	0.0	0.0	2.20	2.20	0.0
Large Heifers	3.1	0.0	2.20	2.20	3.1
Medium Heifers	0.7	0.7	1.50	1.50	0.0
Small Heifers	0.5	0.5	1.20	1.20	0.0
Calves	0.1	0.1	0.35	0.35	0.0
Bulls	0.0	0.0	3.00	3.00	0.0
				Total	25.3

NH3 Emissions - Land Application

	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
Milk Cows	73.2	49.0	8.90	8.90	24.2
Dry Cows	4.9	4.9	4.50	4.50	0.0
Support Stock (Heifers and Bulls)	0.0	0.0	2.30	2.30	0.0
Large Heifers	3.2	0.0	2.30	2.30	3.2
Medium Heifers	0.8	0.8	1.70	1.70	0.0
Small Heifers	0.5	0.5	1.30	1.30	0.0
Calves	0.2	0.2	0.37	0.37	0.0
Bulls	0.0	0.0	3.23	3.23	0.0
				Total	27.4

H2S Emissions - Lagoon/Storage Pond(s)

	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
Milk Cows	6.7	6.7	0.82	0.82	0.0
Dry Cows	0.5	0.5	0.42	0.42	0.0
Support Stock (Heifers and Bulls)	0.0	0.0	0.22	0.22	0.0
Large Heifers	0.3	0.3	0.22	0.22	0.0
Medium Heifers	0.1	0.1	0.15	0.15	0.0
Small Heifers	0.0	0.0	0.12	0.12	0.0
Calves	0.0	0.0	0.04	0.04	0.0
Bulls	0.0	0.0	0.30	0.30	0.0
				Total	0.0

Solid Manure Handling

VOC Emissions - Solid Manure Storage

	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
Milk Cows	1.0	0.7	0.12	0.12	0.3
Dry Cows	0.1	0.1	0.07	0.07	0.0
Support Stock (Heifers and Bulls)	0.0	0.0	0.05	0.05	0.0
Large Heifers	0.1	0.1	0.05	0.05	0.0
Medium Heifers	0.0	0.0	0.03	0.03	0.0
Small Heifers	0.0	0.0	0.02	0.02	0.0
Calves	0.0	0.0	0.01	0.01	0.0
Bulls	0.0	0.0	0.03	0.03	0.0
				Total	0.3

VOC Emissions - Separated Solids Piles

	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
Milk Cows	0.4	0.3	0.05	0.05	0.1
Dry Cows	0.0	0.0	0.03	0.03	0.0
Support Stock (Heifers and Bulls)	0.0	0.0	0.02	0.02	0.0
Large Heifers	0.1	0.1	0.02	0.02	0.0
Medium Heifers	0.0	0.0	0.02	0.02	0.0
Small Heifers	0.0	0.0	0.01	0.01	0.0
Calves	0.0	0.0	0.00	0.00	0.0
Bulls	0.0	0.0	0.02	0.02	0.0
				Total	0.1

VOC Emissions - Land Application

	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
Milk Cows	2.4	1.6	0.30	0.30	0.8
Dry Cows	0.2	0.2	0.16	0.16	0.0
Support Stock (Heifers and Bulls)	0.0	0.0	0.12	0.12	0.0
Large Heifers	0.4	0.2	0.12	0.12	0.2
Medium Heifers	0.1	0.1	0.08	0.08	0.0
Small Heifers	0.0	0.0	0.05	0.05	0.0
Calves	0.0	0.0	0.02	0.02	0.0
Bulls	0.0	0.0	0.07	0.07	0.0
				Total	1.0

NH3 Emissions - Solid Manure Storage

	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
Milk Cows	7.8	5.2	1.0	1.0	2.6
Dry Cows	0.6	0.6	0.5	0.5	0.0
Support Stock (Heifers and Bulls)	0.0	0.0	0.3	0.3	0.0
Large Heifers	0.7	0.3	0.3	0.3	0.4
Medium Heifers	0.2	0.2	0.2	0.2	0.0
Small Heifers	0.1	0.1	0.1	0.1	0.0
Calves	0.0	0.0	0.0	0.0	0.0
Bulls	0.0	0.0	0.4	0.4	0.0
				Total	3.0

NH3 Emissions - Separated Solids Piles

	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
Milk Cows	3.1	2.1	0.4	0.4	1.0
Dry Cows	0.2	0.2	0.2	0.2	0.0
Support Stock (Heifers and Bulls)	0.0	0.0	0.1	0.1	0.0
Large Heifers	0.3	0.1	0.1	0.1	0.2
Medium Heifers	0.1	0.1	0.1	0.1	0.0
Small Heifers	0.0	0.0	0.1	0.1	0.0
Calves	0.0	0.0	0.0	0.0	0.0
Bulls	0.0	0.0	0.1	0.1	0.0
				Total	1.2

NH3 Emissions - Land Application

	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
Milk Cows	17.2	11.5	2.1	2.1	5.7
Dry Cows	1.2	1.2	1.1	1.1	0.0
Support Stock (Heifers and Bulls)	0.0	0.0	0.6	0.6	0.0
Large Heifers	1.6	0.7	0.8	0.8	0.9
Medium Heifers	0.4	0.5	0.4	0.4	-0.1
Small Heifers	0.1	0.1	0.3	0.3	0.0
Calves	0.0	0.0	0.1	0.1	0.0
Bulls	0.0	0.0	0.8	0.8	0.0
				Total	6.5

Feed Storage and Handling

VOC Emissions - Silage

	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
Corn Silage	36.8	36.8	21,155	21,155	0.0
Alfalfa Silage	0.9	0.9	10,649	10,649	0.0
Wheat Silage	6.5	19.5	26,745	26,745	-13.0
				Total	-13.0

VOC Emissions - TMR

	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
TMR	110.4	77.4	10,575	10,575	33.0
				Total	33.0

Total Change in Emissions

Total Daily Change in Emissions (lb/day)

	NOx	SOx	PM10	CO	VOC	NH3	H2S
Milking Parlor	0.0	0.0	0.0	0.0	1.1	0.6	0.0
Cow Housing	0.0	0.0	5.7	0.0	33.4	165.2	0.0
Liquid Manure	0.0	0.0	0.0	0.0	-1.4	52.8	0.0
Solid Manure	0.0	0.0	0.0	0.0	1.5	10.8	0.0
Feed Handling	0.0	0.0	0.0	0.0	20.0	0.0	0.0
Total	0.0	0.0	5.7	0.0	54.6	229.0	0.0

Total Annual Change in Emissions (lb/yr)

	NOx	SOx	PM10	CO	VOC	NH3	H2S
Milking Parlor	0	0	0	0	396	188	0
Cow Housing	0	0	2,055	0	12,172	60,287	0
Liquid Manure	0	0	0	0	-488	19,224	0
Solid Manure	0	0	0	0	573	3,868	0
Feed Handling	0	0	0	0	7,316	0	0
Total	0	0	2,055	0	10,869	83,547	0

Total Annual Change in Non-Fugitive Emissions (Major Source Emissions) (lb/yr)

	NOx	SOx	PM10	CO	VOC	NH3	H2S
Milking Parlor	0	0	0	0	0	0	0
Cow Housing	0	0	0	0	0	0	0
Liquid Manure	0	0	0	0	-246	0	0
Solid Manure	0	0	0	0	0	0	0
Feed Handling	0	0	0	0	0	0	0
Total	0	0	0	0	-249	0	0

Greenhouse Gas Emissions - CEQA

Uncontrolled GHG Emission Factors (lbs-hd/yr)						
Animal Type	CH4 (Anaerobic Treatment Lagoon)	CH4 (Lagoon)	CH4 (manure spreading)	CH4 (solid manure storage)	CH4 (enteric)	CO2 equivalent multiplier for CH4
Milk Cows	513	307.8	3.5	27.7	271.5	21
Dry Cows	513	307.8	3.5	27.7	271.5	21
Support Stock*	110.4	110.4	1.6	--	151.6	21
Large Heifers	110.4	110.4	1.6	--	151.6	21
Medium Heifers	110.4	110.4	1.6	--	100.5	21
Small Heifers	110.4	110.4	1.6	--	100.5	21
Calves	--	--	--	--	--	--
Bulls*	110.4	110.4	1.6	--	151.6	21

Uncontrolled GHG Emission Factors (lbs-hd/yr)					
Animal Type	N2O (Anaerobic Treatment Lagoon	N2O (manure spreading)	N2O (solid manure storage)	N2O (enteric)	N2O equivalent multiplier for N2O
Milk Cows	1.5	0	2.6	0	310
Dry Cows	1.5	0	2.6	0	310
Support Stock*	1.4	0	--	0	310
Large Heifers	1.4	0	--	0	310
Medium Heifers	1.4	0	--	0	310
Small Heifers	1.4	0	--	0	310
Calves	--	0	--	0	--
Bulls	1.4	0	--	0	310

*Emission factors for Suppot Stock and Bulls assumed to be the same as Large Heifers.

1 short ton = 0.9072 metric ton

CO2e from CH4 = [CH4 (anaerobic treatment) lagoon + CH4 manure spreading + CH4 solid manure storage + CH4 enteric] x 21 x 0.9072 metric tons/short tons ÷ 2000 lb/ton

CO2e from N2O= [N20 anearobic treatment lagoon + N2O manure spreading + N20 solid manure storage + N2O enteric] x 310 x 0.9072 metric tons/short tons ÷ 2000 lb/ton

Pre-Project: Does the facility have an anaerobic treatment lagoon? no
Post-Project: Does the facility have an anaerobic treatment lagoon? yes

Pre-Project CO2 Equivalent Emission Factors from Animal Type (metric tons-hd/yr)			
Animal Type	CO2e for CH4	CO2e for N2O	CO2e Total
Milk Cows	5.8	0.4	6.2
Dry Cows	5.8	0.4	6.2
Support Stock	2.5	0.0	2.5
Large Heifers	2.5	0.0	2.5
Medium Heifers	2.0	0.0	2.0
Small Heifers	2.0	0.0	2.0
Calves	0.0	0.0	0.0
Bulls	2.5	0.0	2.5

Post-Project CO2 Equivalent Emission Factors from Animal Type (metric tons-hd/yr)			
Animal Type	CO2e for CH4	CO2e for N2O	CO2e Total
Milk Cows	7.8	0.6	8.4
Dry Cows	7.8	0.6	8.4
Support Stock	2.5	0.2	2.7
Large Heifers	2.5	0.2	2.7
Medium Heifers	2.0	0.2	2.2
Small Heifers	2.0	0.2	2.2
Calves	0.0	0.0	0.0
Bulls	2.5	0.2	2.7

Pre-Project Total GHG Emissions			
Animal Type	Herd Size (hd)	CO2e (metric tons-hd/yr)	CO2e Total (metric tons/yr)
Milk Cows	2,010	6.2	12,462
Dry Cows	400	6.2	2,480
Support Stock	0	2.5	0
Large Heifers	0	2.5	0
Medium Heifers	170	2.0	340
Small Heifers	150	2.0	300
Calves	150	0.0	0
Bulls	0	2.5	0
		Total	**15,582**

Post-Project Total GHG Emissions			
Animal Type	Herd Size (hd)	CO2e (metric tons-hd/yr)	CO2e Total (metric tons/yr)
Milk Cows	3,000	8.4	25,200
Dry Cows	400	8.4	3,360
Support Stock	0	2.7	0
Large Heifers	510	2.7	1,377
Medium Heifers	170	2.2	374
Small Heifers	150	2.2	330
Calves	150	0.0	0
Bulls	0	2.7	0
		Total	**30,641**

Change in Project GHG Emissions			
Animal Type	Pre-Project CO2e (metric tons/yr)	Post-Project CO2e (metric tons/yr)	Change (metric tons/yr)
Milk Cows	12,462	25,200	12,738
Dry Cows	2,480	3,360	880
Support Stock	0	0	0
Large Heifers	0	1,377	1,377
Medium Heifers	340	374	34
Small Heifers	300	330	30
Calves	0	0	0
Bulls	0	0	0
		Total	**15,059**

Greenhouse Gas Emissions - PSD

Uncontrolled GHG Emission Factors (lbs-hd/yr)						
Animal Type	CH4 (Anaerobic Treatment Lagoon)	CH4 (Lagoon)	CH4 (manure spreading)**	CH4 (solid manure storage)**	CH4 (enteric)**	CO2 equivalent multiplier for CH4
Milk Cows	513	307.8	0	0	0	21
Dry Cows	513	307.8	0	0	0	21
Support Stock*	110.4	110.4	0	--	0	21
Large Heifers	110.4	110.4	0	--	0	21
Medium Heifers	110.4	110.4	0	--	0	21
Small Heifers	110.4	110.4	0	--	0	21
Calves	--	--	--	--	--	--
Bulls*	110.4	110.4	0	--	0	21

Uncontrolled GHG Emission Factors (lbs-hd/yr)					
Animal Type	N2O (Anaerobic Treatment Lagoon	N2O (manure spreading)	N2O (solid manure storage)**	N2O (enteric)	N2O equivalent multiplier for N2O
Milk Cows	1.5	0	0	0	310
Dry Cows	1.5	0	0	0	310
Support Stock*	1.4	0	--	0	310
Large Heifers	1.4	0	--	0	310
Medium Heifers	1.4	0	--	0	310
Small Heifers	1.4	0	--	0	310
Calves	--	0	--	0	--
Bulls	1.4	0	--	0	310

*Emission factors for Suppot Stock and Bulls assumed to be the same as Large Heifers.

**Fugitive emissions from dairies shall be excluded in determining if a source is a major source for PSD.

CO2e from CH4 = CH4 (anaerobic treatment) lagoon x 21 ÷ 2000 lb/ton

CO2e from N2O= N20 anearobic treatment lagoon x 310 ÷ 2000 lb/ton

Pre-Project: Does the facility have an anaerobic treatment lagoon? no
Post-Project: Does the facility have an anaerobic treatment lagoon? yes

Pre-Project CO2 Equivalent Emission Factors from Animal Type (metric tons-hd/yr)			
Animal Type	CO2e for CH4	CO2e for N2O	CO2e Total
Milk Cows	3.2	0.0	3.2
Dry Cows	3.2	0.0	3.2
Support Stock	1.2	0.0	1.2
Large Heifers	1.2	0.0	1.2
Medium Heifers	1.2	0.0	1.2
Small Heifers	1.2	0.0	1.2
Calves	0.0	0.0	0.0
Bulls	1.2	0.0	1.2

Post-Project CO2 Equivalent Emission Factors from Animal Type (metric tons-hd/yr)			
Animal Type	CO2e for CH4	CO2e for N2O	CO2e Total
Milk Cows	5.4	0.2	5.6
Dry Cows	5.4	0.2	5.6
Support Stock	1.2	0.2	1.4
Large Heifers	1.2	0.2	1.4
Medium Heifers	1.2	0.2	1.4
Small Heifers	1.2	0.2	1.4
Calves	0.0	0.0	0.0
Bulls	1.2	0.2	1.4

Pre-Project Total GHG Emissions			
Animal Type	Herd Size (hd)	CO2e (short tons-hd/yr)	CO2e Total (short tons/yr)
Milk Cows	2,010	3.2	6,432
Dry Cows	400	3.2	1,280
Support Stock	0	1.2	0
Large Heifers	0	1.2	0
Medium Heifers	170	1.2	204
Small Heifers	150	1.2	180
Calves	150	0.0	0
Bulls	0	1.2	0
		Total (short tons/yr)	**8,096**

Post-Project Total GHG Emissions			
Animal Type	Herd Size (hd)	CO2e (short tons-hd/yr)	CO2e Total (short tons/yr)
Milk Cows	3,000	5.6	16,800
Dry Cows	400	5.6	2,240
Support Stock	0	1.4	0
Large Heifers	510	1.4	714
Medium Heifers	170	1.4	238
Small Heifers	150	1.4	210
Calves	150	0.0	0
Bulls	0	1.4	0
		Total	**20,202**

Change in Project GHG Emissions			
Animal Type	Pre-Project CO2e (short tons/yr)	Post-Project CO2e (short tons/yr)	Change (short tons/yr)
Milk Cows	6,432	16,800	10,368
Dry Cows	1,280	2,240	960
Support Stock	0	0	0
Large Heifers	0	714	714
Medium Heifers	204	238	34
Small Heifers	180	210	30
Calves	0	0	0
Bulls	0	0	0
		Total (short tons/yr)	**12,106**

APPENDIX C

BACT Analysis

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....*".[1] 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. PM_{10} Emissions

The National Ambient Air Quality Standards currently regulate concentrations of particulate matter with a mass median diameter of 10 micrometers or less (PM_{10}). Studies have shown that particles in the smaller size fractions contribute most to human health effects. A $PM_{2.5}$ standard was published in 1997, but has not been implemented pending the results of ongoing litigation.

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 animal dander, feed, bedding materials, dry manure, and unpaved soil surfaces.

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. Mechanically ventilated buildings will emit more PM at higher ventilation rates. Therefore, confinement facilities located in warmer climates will tend to emit more PM because of the higher ventilation rates needed for cooling.

Open feedlots and storage facilities for dry manure from dairy open corrals also are potential sources of particulate matter emissions. The rate of emission depends on whether or not the manure is covered. Open sites are intermittent sources of particulate matter emissions, because of the variable nature of wind direction and speed and precipitation. Thus, the moisture content of the manure and the resulting emissions will be highly variable. The PM emissions from covered manure storage facilities depend on the degree

of exposure to wind[5].

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[6]. 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. Ammonia Emissions

When sulfur dioxide and nitrogen oxides are present ammonia is a precursor for the secondary formation of $PM_{2.5}$ in the atmosphere. Ammonia reacts with sulfuric and nitric acids, which are produced from sulfur dioxide and nitrogen oxides in the ambient air, to form ammonium sulfate, ammonium nitrate, and other fine particulates[7]. 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 manures handled as liquids and semi-solids or slurries, but will volatize rapidly with drying from manures handled as solids.

The potential for ammonia volatilization exists wherever manure is present, and ammonia

[5] Emissions From Animal Feeding Operations – Draft, pgs. 2-11 to 2-13
[6] EPA Document "Emissions from Animal Feeding Operations" (Draft, August 15, 2001), pg. 2-10
[7] Workshop Review Draft for EPA Regional Priority AFO Science Question Synthesis Document - Air Emission Characterization and Management, pg. 2

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 may be little difference in total ammonia emissions between solid and liquid manure handling systems if liquid manure is stored over extended periods of time prior to land application[8].

4. Hydrogen Sulfide Emissions

Hydrogen Sulfide (H2S) is produced from the decomposition of organic matter under anaerobic conditions. In the absence of Oxygen, sulfur reducing bacteria in the manure lagoons reduce Sulfate ions in the manure into Sulfide. Aqueous sulfide exists in three different forms: molecular (un-dissociated) hydrogen sulfide (H2S) and the bisulfide (HS-) and sulfide (S2-) ions. In aqueous solutions molecular H2S exists in equilibrium with the bisulfide (HS-) and sulfide (S2-) ions but only molecular H2S, not the ionized forms, can be transferred across the gas-liquid interface and emitted to the atmosphere. The fractional amount of the form of sulfide present in solution is largely influenced by pH; with the molecular H2S form being favored in acidic conditions (pH <7) and ionic forms being favored in basic conditions (pH >7).

In a dairy, the conditions for the production of Hydrogen Sulfide exist in small amounts such as wet spots in corrals, manure piles and separated solids piles. However, the most significant source is the liquid manure lagoons and storage ponds.

II. Top Down BACT Analysis for the Cow Housing

1. VOC Emissions from the Cow Housing and Feed (Total Mixed Ration):

Total Mixed Ration (TMR) refers to feed (silage, grains, oils, minerals, and other additives) that has been mixed per the applicable feeding guidelines and spread out in the feed bunks for consumption by the cattle. Because cattle are fed in the housing areas, BACT for TMR emissions must be considered jointly with BACT for housing as it would not be practical to control emissions from TMR separately.

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 listed are 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):

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

1) Enclosed freestalls vented to an incinerator - Entire herd (≈ 93%; 95% Capture, 98% Control of 100% of cow housing emissions)
2) Enclosed freestalls vented to an incinerator - Mature cows only (≈ 78% overall; 95% capture, 98% control of 84% of cow housing emissions[9])
3) Enclosed freestalls vented to a biofilter - Entire herd (≈ 76%; 95% Capture, 80% Control of 100% of cow housing emissions)
4) Enclosed freestalls vented to a biofilter - Mature cows only (≈ 64% overall; 95% capture, 80% control of 84% of cow housing emissions[10])
5) Feed and Manure Management Practices (≈ 22%)
   - Concrete feed lanes and walkways
   - Feed lanes and walkways flushed, vacuumed, or scraped at least four times per day for mature cows (≈ 18% for total emissions from cow housing; 47% for emissions from manure) and at least two times per day for support stock; prompt stabilization of vacuumed or scraped manure
   - All animals fed in accordance with National Research Council (NRC) or other District-approved guidelines utilizing routine nutritional analysis for rations. (5% of total emissions from dairy cows)
   - All open corrals adequately sloped to promote drainage (minimum of 3% slope where the available space for each animal is 400 square feet or less and minimum of 1.5% where the available space for each animal is more than 400 square feet per animal
   - Weekly scraping of exercise pens and open corrals using pull-type scraper in the morning hours except when prevented by wet conditions
   - Rule 4570 mitigation measures

Description of Control Technologies

1) Enclosed Freestall Barns vented to an incinerator capable of achieving 98% control

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 in turn keeps the cows cool. No enclosed freestall barns that were installed at a California dairy could be identified. However, partially enclosed freestall barns are

[9] Emissions from cow housing = 38,285 lb/yr for all cows, while emissions from mature cows = 32,267 lb/yr. Therefore, mature cows represent 84% of the emissions from the cow housing (32,267 lb/yr/38,285 lb/yr). The overall control efficiency can then be calculated as follows: 95% Capture x 98% Control x 84% of emissions = 78% overall control efficiency.

[10] The overall control efficiency can be calculated as follows: 95% Capture x 80% Control x 84% of emissions = 64% overall control efficiency.

available. These include tunnel-ventilated freestall barns, which are fairly common in the southern and eastern parts of the United States, and greenhouse barns. Greenhouse barns use a lightweight, galvanized steel tube frame to support one or two layers of a commercial-grade plastic film as covering. The most common use for these structures is as heated chambers for growing plants. Although the potential to enclose cows in a barn exist, the feasibility of reasonably collecting the biogas 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 will be even higher in the San Joaquin valley, where temperatures reach in excess of 110 degrees in the dry summer. Although the feasibility of such a technology is in question, it will be considered in this analysis. If the gases can be properly captured and sent to a control device, then those gases may be either incinerated or treated in a biofilter (see biofilter discussed in the option below). It is assumed that 95% of the gasses emitted from the freestall barns will be captured by the mechanical ventilation system and that 98% of the captured VOCs will be eliminated by thermal incineration[26]; therefore the total control for VOCs from the freestall barns = 0.95 x 0.98 = 93.1%.

2) Enclosed Freestall Barns vented to a biofilter capable of achieving 80% control

As stated above, the mechanical ventilation system of a completely enclosed freestall barn may be utilized to capture the gases emitted from the cow housing permit unit. The captured VOC emissions may then be sent to a biofilter. 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 the pollutants are degraded by biological oxidation. In the biofiltration process, live bacteria biodegrade organic contaminants and ammonia into carbon dioxide, nitrogen and water. Bacterial cultures (microorganisms that typically consist of several species coexisting in a colony) that use oxygen to biodegrade organics are called aerobic cultures. These bacteria are found in soil, peat, compost and natural water bodies including ponds, lakes, rivers and oceans. They are environmentally friendly and non-harmful to humans unless ingested.

Since biofilters rely on living organisms to function, the temperature, moisture content, and pH of the filter media should be monitored to ensure optimum operating conditions. The filter media also needs to be replaced periodically because of deterioration. It is assumed that 95% of the gasses emitted from the cow housing area will be captured by the mechanical ventilation system and that a properly functioning biofilter will eliminate 80% of the captured VOCs; therefore, the total control for VOCs from the cow housing permit unit = 0.95 x 0.80 = 76%.

3) Feed and Manure Management Practices

Concrete feed lanes and walkways

Concrete feed lanes and walkways aid in emissions control by creating and effective channel for collection and removal of manure. Manure deposited on paved surfaces can easily and effectively be removed by flushing, vacuuming, or scraping. The frequent removal of manure, followed by transfer into a treatment of stabilization system, is an effective emissions mitigation measure.

Increased cleaning of feed lanes and walkways

Many dairies use a flush system to remove manure from paved feed lanes and walkways. The flush system introduces a large volume of water at the head of the paved area, and the cascading water carries the manure downslope. The required volume of flush water varies with the size and slope of the area to be flushed. The lanes may also be cleaned by mechanical means such as vacuuming or scraping. The lanes are for milk and dry cow housing areas are typically cleaned twice per day, but the cleaning frequency can vary between one to four times per day. The lanes for support stock areas are usually cleaned once per day or less frequently.

In addition to general hygiene for animal welfare, frequent cleaning also serves as an emission control for reducing PM_{10}, VOC, and ammonia emissions. The manure deposited in the lanes, which is a source of VOC emissions, is removed from the cow housing during cleaning. 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, if cleaning is done by flushing, a large percentage of these compounds will dissolve in the flush water and will not be emitted from the cow housing. Removed manure and the dissolved/entrained volatile compounds can then be conveyed to an anaerobic treatment lagoon or other manure stabilization process for treatment.

It must be noted that cleaning will only control the VOCs emitted from the manure. It will have little or no effect on enteric emissions produced from the cows' digestive processes. As stated above, the feed lanes and walkways in the cow housing areas are typically cleaned twice per day. Cleaning the lanes four times per day will increase the frequency with which manure is removed and, where flushing is used, should result in a higher percentage of soluble volatile compounds being dissolved in the flush water. Based on calculations given in the final DPAG report[11], flushing the freestall lanes four times per day will be assumed to have a control efficiency of 47% for VOCs emitted from manure until better data becomes available. Enteric emissions constitute approximately 61% of the VOC emissions from the cow housing and VOC emissions from the manure make up the remaining 39%; therefore the total VOC control for flushing the feed lanes and walkways in the cow housing areas four times per day is calculated as follows: 0.47 x 0.39 =18%. A lower control efficiency is to be expected when vacuuming of scraping is used for manure removal.

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[12]. This undigested protein also produces ammonia

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

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

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 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.

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

Weekly scraping of exercise pens and open corrals with a pull-type scraper

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

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, as follows:

1) Enclosed freestalls vented to an incinerator (≈ 93%; 95% Capture, 98% Control)
2) Enclosed freestalls vented to an incinerator - Mature cows only (≈ 78%; 95% capture, 98% Control of 84% of cow housing emissions)
3) Enclosed freestalls vented to a biofilter (≈ 76%; 95% Capture, 80% Control)
4) Enclosed freestalls vented to a biofilter - Mature cows only (≈ 64%; 95% Capture, 80% Control of 84% of cow housing emissions)
5) Feed and Manure Management Practices (≈ 22%)
    - Concrete feed lanes and walkways

- Feed lanes and walkways flushed, vacuumed, or scraped at least four times per day for mature cows (≈ 18% for total emissions from cow housing; 47% for emissions from manure) and at least two times per day for support stock; prompt stabilization of vacuumed or scraped manure
- All animals fed in accordance with National Research Council (NRC) or other District-approved guidelines utilizing routine nutritional analysis for rations (5% of total emissions from dairy cows)
- All open corrals adequately sloped to promote drainage (minimum of 3% slope where the available space for each animal is 400 square feet or less and minimum of 1.5% where the available space for each animal is more than 400 square feet per animal.
- Weekly scraping of exercise pens and open corrals using pull-type scraper in the morning hours except when prevented by wet conditions.
- Rule 4570 mitigation measures.

d. Step 4 - Cost Effectiveness Analysis

Thermal & Catalytic Incineration:

The following cost analysis demonstrates that the cost of natural gas alone, not including any capital costs, causes catalytic incineration to exceed the District VOC cost effective threshold. The temperature required for catalytic incineration is 600 °F. The temperature required for thermal incineration is 1,400 °F. Since the fuel requirements and fuel cost for thermal incineration are greater than catalytic incineration, the following analysis also demonstrates that thermal incineration would not be cost effective.

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", gives minimum ventilation rates for dairy cattle, which are listed in the table below.

Minimum Ventilation Rates for Dairy Cows (cfm/cow)			
Category	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

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?", the required airflow rate in the summer increases to 1,000 cfm per cow if tunnel ventilation is used to provide additional cooling[13].

The climate in the San Joaquin Valley is characterized by relatively 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, which operate with negative pressure inside the freestall barns, are more representative of the types of systems that would be required to capture and control emissions. Although the summer air requirement of 1,000 cfm per cow for tunnel ventilation is more representative of the airflow requirements in a completely enclosed freestall barn located in the San Joaquin Valley, for calculation purposes the following average year round airflow requirement will be assumed: mature cows - 335 cfm/cow (average of 170 and 500 cfm per cow); large heifers - 130 cfm/cow (average of 80 and 180 cfm per cow); small and medium heifers - 95 cfm/cow (average of 60 and 130 cfm per cow); baby calves - 75 cfm (average of 50 and 100 cfm per cow).

The analysis below is for the entire herd:

After the proposed modifications, the dairy will house a maximum of 3,000 Holstein milk cows; 430 dry cows; 1,060 large heifers (15-24 months); 370 medium heifers (7-14 months); 150 small heifers (3-6 months), and 150 calves. Enclosed freestalls will be evaluated as a housing alternative for all cows.

The total required airflow rate for housing all cows in freestall barns is calculated as follows:

Category	# of cows	cfm/cow	min/hr	ft^3/hr
Milk cow	3,000	335	60	60,300,000
Dry cow	430	335	60	8,643,000
Heifer (15-24 mo)	1,060	130	60	8,268,000
Heifer (7-14 mo)	370	95	60	2,109,000
Heifer (3-6 mo)	150	95	60	855,000
Calves (0-3 mo)	150	75	60	675,000
Total				**80,850,000**

Fuel Requirement for Catalytic Incineration

The gas leaving the freestall barns will be principally air, with a volumetric specific heat of 0.0194 Btu/scf - °F under standard conditions.

Natural Gas Requirement = (flow)(Cp_{Air})(ΔT)(1-HEF)
Where:

Flow (Q) = exhaust flow rate of VOC the freestall barns

[13] Improving Mechanical Ventilation in Dairy Barns, J.P. Chastain, http://www.bae.umn.edu/extens/aeu/aeu3.html and Natural or Tunnel Ventilation of Freestall Structures: What is Right for Your Dairy Facility?, C.A. Gooch, http://www.ansci.cornell.edu/tmplobs/doc225.pdf)

Cp_{Air} = specific heat of air: 0.0194 Btu/scf - °F

ΔT = increase in the temperature of the contaminated air stream required for catalytic oxidation to occur (It will be assumed that the air stream would increase in temperature from 100 °F to 600 °F.)

HEF = heat exchanger factor: 0.7

Natural Gas Requirement for Catalytic Incineration:

= (80,850,000 scf/hr)(0.0194 Btu/scf - °F)(600 °F - 100 °F)(1-0.7)
= **235,273,500 Btu/hr**

Fuel Cost for Catalytic Incineration:

The cost for natural gas shall be based upon the average industrial price reported by the Energy Information Administration (EIA), taken from the EIA website at http://tonto.eia.doe.gov/dnav/ng/ng_sum_lsum_dcu_SCA_m.htm. The most recent average price reported is for December 2013.

Average cost for natural gas = $7.14/MMBtu

The oxidizer is assumed to operate 24 hours per day and 365 days per year.

The fuel costs to operate the incinerator are calculated as follows:

235,273,500 Btu/hr x 1 MMBtu/10^6 Btu x 24 hr/day x 365 day/year x $7.14/MMBtu
= **$14,715,511/year**

VOC Emission Reductions for Catalytic Incineration:

The annual VOC Emission Reductions for housing all animals in enclosed freestall barns and venting the barns to an incinerator are calculated as follows:

[Uncontrolled Cow Housing VOC Emissions (lb/yr)] x [Capture Efficiency] x [Thermal Incinerator Control Efficiency]

= 38,285 lb/yr[14] x 0.95 x 0.98

= 35,643 lb/yr

Cost of VOC Emission Reductions:

Cost of reductions = ($14,715,511/yr)/((35,643 lb/yr)(1 ton/2000 lb))
= **$825,717/ton of VOC reduced**

As shown above, the natural gas cost alone for thermal or catalytic incineration would cause the cost of the VOC reductions to be greater than the $17,500/ton cost effectiveness threshold of the District BACT policy. The equipment is therefore not cost effective and is being removed from consideration at this time.

[14] Refer to Appendix B for uncontrolled emissions calculations.

The analysis below is for mature cows only:

As discussed in the evaluation, after completion of the project, the dairy will have a total of 3,430 mature cows (3,000 Holstein milk cows and 430 dry cows). Enclosed freestall barns will be evaluated as a housing alternative for the mature cows.

The total required air flow rate for mature cows in freestall barns is calculated as follows:

Category	# of cows	cfm/cow	min/hr	ft^3/hr
Milk cow	3,000	335	60	60,300,000
Dry cow	430	335	60	8,643,000
Total				**68,943,000**

Fuel Requirement for Catalytic Incineration:

The gas leaving the freestall barns will be principally air, with a volumetric specific heat of 0.0194 Btu/scf - °F under standard conditions.

Natural Gas Requirement = (flow)(Cp_{Air})(ΔT)(1-HEF)

Where:

Flow (Q) = exhaust flow rate of VOC the freestall barns

Cp_{Air} = specific heat of air: 0.0194 Btu/scf - °F

ΔT = increase in the temperature of the contaminated air stream required for catalytic oxidation to occur (It will be assumed that the air stream would increase in temperature from 100 °F to 600 °F.)

HEF = heat exchanger factor: 0.7

Natural Gas Requirement for Thermal Incineration:

= (68,943,000 scf/hr)(0.0194 Btu/scf - °F)(600 °F - 100 °F)(1-0.7)
= **200,624,130 Btu/hr**

Fuel Cost for Thermal Incineration:

The cost for natural gas shall be based upon the average industrial price reported by the Energy Information Administration (EIA), taken from the EIA website at http://tonto.eia.doe.gov/dnav/ng/ng_sum_lsum_dcu_SCA_m.htm. The most recent average price reported is for December 2013.

Average cost for natural gas = $7.14/MMBtu

The oxidizer is assumed to operate 24 hours per day and 365 days per year.
The fuel costs to operate the incinerator are calculated as follows:

200,624,130 Btu/hr x 1 MMBtu/10^6 Btu x 24 hr/day x 365 day/year x $7.14/MMBtu
= **$12,548,317/year**

VOC Emission Reductions for Catalytic Incineration:

The annual VOC Emission Reductions for housing mature cows in enclosed freestall barns and venting the barns to an incinerator are calculated as follows:

[Uncontrolled Mature Cow VOC Emission (lb/yr)] x [Capture Efficiency] x [Thermal Incinerator Control Efficiency]
= 32,267 lb/yr x 0.95 x 0.93
= 28,508 lb/yr

Cost of VOC Emission Reductions:

Cost of reductions = ($12,548,317/yr)/((28,508 lb/yr)(1 ton/2000 lb))
= **$880,337/ton of VOC reduced**

As shown above, the natural gas cost alone for thermal or catalytic incineration would cause the cost of the VOC reductions to be greater than the $17,500/ton cost effectiveness threshold of the District BACT policy. The equipment is therefore not cost effective and is being removed from consideration at this time.

Biofiltration:

Biofiltration is a method of reducing pollutants in which exhaust air that contains contaminants is blown through a media (e.g., soil, compost, wood chips) that supports a microbial population. The microbes utilize the pollutants such as VOCs and ammonia as nutrients and oxidize the compounds as they pass through the filter.

The following cost analysis demonstrates that the cost of biofiltration exceeds the District cost effective threshold. Biofiltration can control both VOC and ammonia emissions. Although this technology can control both pollutants, a cost effectiveness threshold has not been established for ammonia. Therefore, only achieved-in-practice options will be considered for ammonia at this time and a multi-pollutant cost effective analysis for VOC and ammonia will not be performed.

Cost of Biofiltration:

The cost estimate for a biofiltration system is taken from the United States EPA Report "Using Bioreactors to Control Air Pollution"[15]. The cost is largely dependent on the airflow rate that the filter must handle. According to University of Minnesota, Biofilters used to treat ventilating air exhausted from a livestock building should be sized to treat the maximum ventilation rate, which is typically the warm weather rate. The EPA report gives a range of $2.35 - $37.06 per cfm for the initial construction of a biofilter. As shown above, the University of Minnesota's publication "Improving Mechanical Ventilation in Dairy Barns" gives the following summer ventilation rates for dairy cattle[15]: mature cow - 1,000 cfm; heifer (12-24 mo.) – 180 cfm; heifer (2-12 mo.) – 130 cfm; and baby calves - 100 cfm.

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

The analysis below is for the entire herd:

After the proposed modifications, the dairy will house a maximum of 3,000 milk cows, 430 dry cows, 1,060 large heifers (15-24 months), 370 medium heifers (7-14 months), 150 small heifers (3-6 months), and 150 calves. Enclosed freestall barns vented to a biofilter will be evaluated as a housing alternative for all cows.

The total maximum airflow entering the biofilter from the enclosed freestall barns is calculated as follows:

Category	# of cows	cfm/cow	cfm
Milk cow	3,000	1,000	3,000,000
Dry cow	430	1,000	430,000
Heifer (15-24 mo)	1,060	180	190,800
Heifer (7-14 mo)	370	130	48,100
Heifer (3-6 mo)	150	130	19,500
Calf (0-3 mo)	150	130	19,500
Total			**3,707,900**

Capital Cost:

The cost estimate for the biofilter includes the costs of the fans, media, plenum, engineering, and labor but does not include installation of the required ductwork. As stated above, the United States EPA Report gives a capital cost range of between $2.35 per cfm and $37.06 per cfm. In general, the lower cost per cfm is associated with a higher flow rate. To be conservative, the lowest cost in the report of $2.35 per cfm will be assumed in this cost analysis.

The capital cost of the biofilter is calculated as follows:

$2.35 cfm x 3,707,900 cfm = $8,713,565

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 biofilter media (e.g., soil, compost, wood chips) must be replaced after 3-5 years in order to remain effective. This is an additional cost that is not being considered in this cost analysis. Therefore, 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
i = Interest Rate (10%)
n = Equipment Life (10 years)

$$A = \$8,713,565 \times [0.1(1.1)^{10}]/[(1.1)^{10}-1]$$
$$= \mathbf{\$1,418,093/year}$$

VOC Emission Reductions for Biofiltration:

The annual VOC Emission Reductions for enclosed freestall barns vented to a biofilter are calculated as follows:

[Uncontrolled Cow Housing VOC Emissions (lb/yr)] x [Capture Efficiency] x [Biofilter Control Efficiency]
= 38,285 lb/yr x 0.95 x 0.80
= 29,097 lb/yr

Cost of VOC Emission Reductions:

Cost of reductions = ($1,418,093/year)/((29,097 lb/yr)(1 ton/2000 lb))
= **$97,473/ton of VOC reduced**

As shown above, the capital cost alone for a biofilter not including the cost of enclosing freestalls would cause the cost of the VOC reductions to be greater than the $17,500/ton cost effectiveness threshold of the District BACT policy. Therefore, this option is not cost effective and is being removed from consideration at this time.

The analysis below is for mature cows only:

After the proposed modifications, the dairy will house a maximum of 3,430 mature cows (3,000 milk cows and 430 dry cows). Enclosed freestall barns vented to a biofilter will be evaluated for both the milk and dry cows.

The total maximum airflow entering the biofilter from the enclosed freestall barns is calculated as follows:

Category	# of cows	cfm/cow	cfm
Milk cow	3,000	1,000	3,000,000
Dry cow	430	1,000	430,000
Total			**3,430,000**

Capital Cost:

The cost estimate for the biofilter includes the costs of the fans, media, plenum, engineering, and labor but does not include installation of the required ductwork. As stated above, the United States EPA Report gives a capital cost range of between $2.35 per cfm and $37.06 per cfm. In general, the lower cost per cfm is associated with a higher flow rate. To be conservative, the lowest cost in the report of $2.35 per cfm will be assumed in this cost analysis.

The capital cost of the biofilter is calculated as follows:

$2.35/cfm x 3,430,000 cfm = $8,060,500

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. Although the biofilter media (e.g., soil, compost, wood chips) must be replaced after 3-5 years, this does not constitute a significant cost of the system. Therefore, the expected life of the system (fans, media, ductwork, plenum, etc.) is 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
I = Interest Rate (10%)
N = Equipment Life (10 years)

$$A = \$8,060,500 \times [0.1(1.1)^{10}]/[(1.1)^{10}-1]$$
$$= \mathbf{\$1,311,809/year}$$

VOC Emission Reductions for Biofiltration:

The annual VOC emission reductions for enclosed freestall barns vented to a biofilter are calculated as follows:

[Uncontrolled Mature Cow VOC Emission (lb/yr)] x [Capture Efficiency] x [Biofilter Control Efficiency]
= 32,267 lb/yr x 0.95 x 0.80
= 24,523 lb/yr

Cost of VOC Emission Reductions:

Cost of reductions = ($1,311,809/yr)/((24,523 lb/yr)(1 ton/2000 lb))
= **$106,986/ton of VOC reduced**

As shown above, the capital cost alone for a biofilter not including the cost of constructing (for dry cows) and enclosing freestall barns would cause the cost of the VOC reductions to be greater than the $17,500/ton cost effectiveness threshold of the District BACT policy. Therefore, this option is not cost effective and is being removed from consideration at this time.

Feed and Manure Management Practices:

- Concrete feed lanes and walkways
- Feed lanes and walkways flushed at least four times per day for milk cows and at least two times per day for support stock; prompt stabilization of vacuumed or scraped manure
- All animals fed in accordance with National Research Council (NRC) or other District-approved guidelines utilizing routine nutritional analysis for rations.
- All open corrals adequately sloped to promote drainage (minimum of 3% slope

where the available space for each animal is 400 square feet or less and minimum of 1.5% where the available space for each animal is more than 400 square feet per animal
- Weekly scraping of exercise pens and open corrals using pull-type scraper in the morning hours except when prevented by wet conditions
- Rule 4570 mitigation measures

The applicant has proposed this option; therefore a cost-effectiveness analysis is not required.

e. Step 5 - Select BACT

The facility is proposing to use concrete feed lanes and walkways; flush, vacuum, or scrape the feed lanes and walkways four times per day for mature cows and two times per day for the support stock, and promptly stabilize any vacuumed or scraped manure; adequately slope open corrals to promote drainage; feed all animals in accordance with National Research Council (NRC) or other District-approved guidelines utilizing routine nutritional analysis for rations; and scrape exercise pens and open corrals weekly with a pull-type scraper except during wet conditions.

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 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.

2. BACT Analysis for NH_3 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 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 NH_3 emissions from the cow housing permit unit and have been proposed by the applicant:

1) Feed and Manure Management Practices
   - Concrete feed lanes and feed walkways

- Feed lanes and walkways flushed, vacuumed, or scraped four times per day for milk cows and dry cows and at least two times per day for the support stock; prompt stabilization of vacuumed or scraped manure
- All animals fed in accordance with National Research Council (NRC) or other District-approved guidelines utilizing routine nutritional analysis for rations
- All open corrals adequately sloped to promote drainage (minimum of 3% slope where the available space for each animal is 400 square feet or less and minimum of 1.5% where the available space for each animal is more than 400 square feet per animal
- Weekly scraping of freestall exercise pens and open corrals using pull-type scraper in the morning hours except when prevented by wet conditions

Description of Control Technologies:

1) Feed and Manure Management Practices

Concrete feed lanes and walkways:

Concrete feed lanes and walkways aid in emissions control by creating and effective channel for collection and removal of manure. Manure deposited on paved surfaces can easily and effectively be removed by flushing, vacuuming, or scraping. The frequent removal of manure, followed by transfer into a treatment of stabilization system, is an effective emissions mitigation measure.

Increased cleaning of feed lanes and walkways:

Many dairies use a flush system to remove manure from paved feed lanes and walkways. The flush system introduces a large volume of water at the head of the paved area, and the cascading water carries the manure downslope. The required volume of flush water varies with the size and slope of the area to be flushed. The lanes may also be cleaned by mechanical means such as vacuuming or scraping. The lanes are for milk and dry cow housing areas are typically cleaned twice per day, but the cleaning frequency can vary between one to four times per day. The lanes for support stock areas are usually cleaned once per day or less frequently.

In addition to general hygiene for animal welfare, frequent cleaning also serves as an emission control for reducing PM_{10}, VOC, and ammonia emissions. Ammonia emissions are generated when urine and manure mix, due to the reaction between urease in the manure and urea in the urine. Frequent cleaning out of the manure reduces the time available for this reaction to occur. Ammonia is also soluble in water. Therefore, if cleaning is done by flushing, a large percentage of ammonia will dissolve in the flush water and will not be emitted into the air.

As stated above, the feed lanes and walkways in the cow housing areas are typically cleaned twice per day. Cleaning the lanes four times per day will increase the frequency with which manure is removed and, where flushing is used, should result in a higher percentage of ammonia being dissolved in the flush water..

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.

Weekly scraping of exercise pens and open corrals with a pull-type scraper:

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

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
   - Feed lanes and walkways flushed, vacuumed, or scraped four times per day for milk cows and dry cows and at least two times per day for the support stock; prompt stabilization of vacuumed or scraped manure
   - All animals fed in accordance with National Research Council (NRC) or other District-approved guidelines utilizing routine nutritional analysis for rations
   - All open corrals adequately sloped to promote drainage (minimum of 3% slope where the available space for each animal is 400 square feet or less and minimum of 1.5% where the available space for each animal is more than 400 square feet per animal
   - Weekly scraping of freestall exercise pens and open corrals using pull-type scraper in the morning hours except when prevented by wet conditions

d. Step 4 - Cost Effectiveness Analysis

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

e. Step 5 - Select BACT

The facility is proposing to use concrete feed lanes and walkways; flush, vacuum, or scrape the feed lanes and walkways four times per day for mature cows and two times per day for the support stock, and promptly stabilize any vacuumed or scraped manure; adequately slope open corrals to promote drainage; feed all animals in accordance with National Research Council (NRC) or other District-approved guidelines utilizing routine nutritional analysis for rations; and scrape exercise pens and open corrals on a weekly using a pull-type scraper except during wet conditions.

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 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 NH_3 emissions from the cow housing permit.

3. BACT Analysis for PM_{10} Emissions from Freestall and Bedpack Barns:

a. Step 1 - Identify all control technologies

The following options were identified as controls for PM_{10} emissions:

1) Design and Management Practices
   - Freestall or bedpack barn housing
   - Concrete feed lanes and walkways
   - Frequent flushing, vacuuming, or scraping of feed lanes and walkways

Description of Control Technologies:

Freestall or bedpack barn housing is an effective PM10 control measure because cows will spend majority of their time on paved surfaces and moist resting surfaces under the barn. This housing method eliminates the dry and loose dirt conditions that are usually associated with open corral housing. Frequent cleaning of the paved areas also limits the accumulation of any manure that could subsequently be pulverized by animal movement activities an entrained into the air.

b. Step 2 - Eliminate technologically infeasible options

All the proposed control measures are technologically feasible.

c. Step 3 - Rank remaining options by control effectiveness

1) Design and Management Practices
   - Freestall or bedpack barn housing
   - Concrete feed lanes and walkways
   - Frequent flushing vacuuming, or scraping of feed lanes and walkways

d. Step 4 - Cost Effectiveness Analysis

The applicant has proposed all the control options listed above; hence a cost-effectiveness analysis is not required.

e. Step 5 - Select BACT

The facility is proposing to house all the additional milk cows in freestall or bedpack barns. The proposed control measures satisfy BACT for PM10 emission.

III. Top Down BACT Analysis for the Liquid Manure Handling System - Lagoon & Storage Ponds

1. BACT Analysis for VOC Emissions from the Lagoon & Storage Ponds:

a. Step 1 - Identify all control technologies

Since specific control efficiencies have not been identified in the literature for VOC emissions from dairy lagoons and storage ponds, the control efficiencies listed are based on the control efficiencies of similar processes and engineering judgment.

The following options were identified as possible controls for VOC emissions from the Lagoon and Storage Pond:

1) Aerobic Treatment Lagoon – mechanical aeration to achieve a dissolved oxygen concentration of 2.0 mg/L (≈ 95%; based information provided by Dr. Ruihong Zhang of UC Davis)

2) Covered Lagoon Anaerobic Digester with biogas collected and vented to a destruction device such as an internal combustion engine or flare, and treated waste discharged into a secondary lagoon or storage pond. (≈ 75%) (Note: not applicable unless required by the final Dairy BACT Guideline)

3) Anaerobic Treatment Lagoon designed to meet Natural Resources Conservation Service (NRCS) standards (≈ 40%)

Description of Control Technologies

1) Aerobic Treatment Lagoon – mechanical aeration to achieve a dissolved oxygen concentration of 2.0 mg/L

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

Sufficient Oxygen must be provided to sustain the aerobic microorganisms in completely aerated lagoons. Lagoons can be considered completely aerobic if sufficient Oxygen is provided to achieve a dissolved Oxygen (DO) content of 2.0 mg/L or more. Oxygen is typically provided by mechanical aerators. These aerators may float on the lagoon surface or be submerged in the lagoon. Aeration can also be performed by injection of tiny air bubbles into the lagoon water, mixing of the lagoon water, or spraying of the water into the air. According to Dr. Ruihong Zhang, a researcher at the University of California, Davis, at least 95% VOC control can be achieved if the dissolved oxygen (DO) content of the liquid manure is 2.0 mg/L or more. A major disadvantage of completely aerated lagoons is the enormous cost of the energy required to run the aerators continuously. Because of this, it has been determined that completely aerated lagoons are not cost effective options for dairy facilities at the present time.

2) 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[1].

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

sent to a boiler or internal combustion engine, where the gas can be used to generate useful heat or electrical energy.

As stated above, the gas generated in the covered lagoon can be captured and then sent to a suitable combustion device. Combustion (thermal incineration) is a generally accepted, well-established VOC control technique. During combustion, gaseous hydrocarbons are oxidized to form CO_2 and water. The VOCs emitted from the liquid manure in the covered lagoon can be reduced by 95% with the use of an appropriate combustion device. Therefore, installation of the digester will lower the total VOCs emitted from the liquid manure from the liquid manure handling system. Although the control efficiency of the gas captured from the primary lagoon is expected to be 95% or more, the overall control efficiency is expected to be less since VOCs will also be emitted from the storage pond and as fugitive emissions. The overall control efficiency is assumed to be 75% of the emissions that would have been emitted from the lagoon and storage pond.

3) Anaerobic Treatment Lagoon

An anaerobic treatment lagoon is a waste treatment lagoon that is designed to facilitate the decomposition of manure by microbes in the absence of Oxygen. The process of anaerobic decomposition results in the preferential conversion of organic compounds in the wastewater into Methane (CH_4), Carbon Dioxide (CO_2), and water rather than intermediate metabolites (VOCs). The Natural Resources Conservation Service (NRCS) California Field Office Technical Guide Code 359 - Waste Treatment Lagoon specifies criteria for the design of anaerobic treatment lagoons. A properly designed anaerobic treatment lagoon will reduce the Volatile Solids (VS) by at least 50% and will reduce the Biological Oxygen Demand (BOD), which will result in greater efficiency in degrading compounds that contain carbon into Methane and Carbon Dioxide rather than VOCs. Although, the VS reduction is expected to be at least 50%, a conservative control efficiency of 40% will be assumed for anaerobic treatment lagoons, until better data becomes available.

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) Aerobic Treatment Lagoon – mechanical aeration to achieve a dissolved Oxygen concentration of 2.0 mg/L (≈ 95%)

2) Covered Lagoon Anaerobic Digester with biogas collected and vented to a destruction device such as an internal combustion engine or flare, and treated waste discharged into a secondary lagoon or storage pond. (≈ 75%)

3) Anaerobic Treatment Lagoon designed to meet Natural Resources Conservation

Service (NRCS) standards (≈ 40%)

d. Step 4 - Cost Effectiveness Analysis

Aerobic Treatment Lagoon:

The following cost analysis demonstrates that the energy costs alone, not including any capital costs, cause complete aeration to exceed the District VOC cost effectiveness threshold.

Energy Requirement for Complete Aeration:

In order to effectively calculate the costs of this control option, the energy requirement for complete aeration must be determined. 1.5 to 2.5 pounds of Oxygen is required to digest 1 pound of Biological Oxygen Demand (BOD_5) with additional oxygen required for conversion of Ammonia to nitrate (nitrification)[16]. It is generally accepted that at least twice the BOD should be provided for complete aeration[17]. According to Dr. Ruihong Zhang of the University of California, Davis, 2.4 lbs (1.1 kg) of Oxygen (O_2) per cow must be provided each day for removal of BOD and an additional 3 lbs (1.4 kg) for oxidation of 70% of the Nitrogen[18]. Based on the data gathered in a UC Davis study on aerator performance for wastewater lagoons, aeration efficiencies for mechanical aerators range from 0.10 to 0.68 kg of Oxygen provided per kW-hr of energy consumed[19]. For this analysis it will be assumed that twice the BOD is required for complete aeration and that mechanical aerators will provide 1.0 kg of Oxygen per kW-hr. This efficiency is very conservative since it is greater than the efficiency of the most efficient aerator tested in the UC Davis study (0.68 kg-O_2/kW-hr) and more than twice the efficiency of the most efficient aerator tested that had been installed in dairy lagoons (0.49 kg-O_2/kW-hr). Additionally, the efficiency tests were performed in clean water and lower aeration efficiencies are expected in liquid dairy manure that contains a significant amount of solids. The yearly energy requirement per cow is calculated as follows:

2 x (1.1 kg/cow-day) ÷ (1.0 kg/kW-hr) x (365 day/year) = 803 kW/cow-year

The total yearly energy requirement is calculated below. Based on animal units (AU), it is assumed that the BOD loading (and the energy requirement) for the dry cows will be 80% of the milk cows', the BOD loading from the large heifers will be 73% of the milk cows'; and the BOD loading from the small and medium heifers will be 35% of the milk cows'[20].

[16] An Assessment of Technologies for Management and Treatment of Dairy Manure in California's San Joaquin Valley, December 2005, page 34 (http://www.arb.ca.gov/ag/caf/dairypnl/dmtfaprprt.pdf)

[17] See http://www.extension.org/faq/27574 and http://www.omafra.gov.on.ca/english/engineer/facts/04-033.htm

[18] An Assessment of Technologies for Management and Treatment of Dairy Manure in California's San Joaquin Valley, December 2005, page 35 (http://www.arb.ca.gov/ag/caf/dairypnl/dmtfaprprt.pdf

[19] Aerator Performance for Wastewater Lagoon Application, September 2007, UC Davis, R.H. Zhang (http://asae.frymulti.com/abstract.asp?aid=23832&t=2)

[20] Animal Unit (AU) factors are taken from the California Regional Water Quality Control Board Central Valley Region Annual Report for Dairies Subject to Monitoring and Reporting (http://www.waterboards.ca.gov/centralvalley/available_documents/dairies/genorderwdrform.pdf)

As previously stated, the dairy will house a maximum of 3,000 milk cows; 430 dry cows; 1,060 large heifers (15-24 months); 370 medium heifers (7-14 months); 150 small heifers (3-6 months), and 150 calves. The amount of electricity required for complete aeration of the lagoon system is calculated below:

(3,000 milk cows x 803 kW/cow-year) + (430 dry cows x 0.8 x 803 kW/cow-year) + (1,060 large heifers x 0.73 x 803 kW/cow-year) + (370 medium heifers x 0.35 x 803 kW/cow-year) + (150 small heifers x 0.35 x 803 kW/cow-year) + (150 calves x 0.21 x 803 kW/cow-year)

= 3,478,034 kW-hr/year

Cost of Electricity for Complete Aeration:

The cost for electricity is based upon on an average retail price of industrial electricity in California for 2013, from the Energy Information Administration (EIA) Website: http://www.eia.doe.gov/cneaf/electricity/epm/table5_6_b.html.

Average Cost for electricity = $0.099/kW-hr.

The electricity cost for complete aeration is calculated as follows:

3,478,034 kW-hr/year x $0.099/kW-hr
= $344,325/year

VOC Emission Reductions for Complete Aeration:

In addition to controlling 95% of the emissions from the lagoon and storage pond, complete aeration will also control 95% of the emissions from liquid manure land application. Therefore, these emissions reductions will also be included in the analysis. The annual VOC Emission Reductions for the lagoon, storage pond, and liquid manure land application unit are calculated as follows:

[Uncontrolled Lagoon/Storage Pond Emissions (lb/y)] x [Complete Aeration Control Efficiency]
= 8,550 lb/yr[21] x 0.95
= 8,123 lb/yr

Cost of VOC Emission Reductions:

Cost of reductions = ($344,325/year)/((8,123 lb-VOC/year)(1 ton/2000 lb))
= **$84,778/ton of VOC reduced**

As shown above, the electricity cost alone for complete aeration would cause the cost of the VOC reductions to be greater than the $17,500/ton cost effectiveness threshold of the District BACT policy. The equipment is therefore not cost effective and is being removed from consideration at this time.

[21] Liquid manure Emissions shown in Appendix B include 40% control for anaerobic treatment, hence uncontrolled emissions = 5,130 lb/yr /0.6 = 8,550 lb/yr.

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.

The applicant has proposed to install an anaerobic digester if this technology is proven effective in reducing emissions and is required by the final Dairy BACT Guideline. Since the applicant has proposed this option in accordance with the Settlement Agreement, a cost effectiveness analysis is not required. If an anaerobic digester is required in the final Dairy BACT Guideline, the applicant will be required to install the system in accordance with the timeframes and procedures established by the APCO in the final Dairy BACT Guideline.

Anaerobic Treatment Lagoon:

The applicant has proposed this option; therefore a cost effectiveness analysis is not required.

e. Step 5 - Select BACT

The facility is proposing a two-stage Anaerobic Treatment Lagoon designed according to Natural Resources Conservation Service (NRCS) Guidelines. Additionally, the facility is proposing to install an anaerobic digester if determined to be an effective emissions control in the final Dairy BACT guideline. Therefore, the BACT requirements are satisfied.

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 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 lagoons/storage ponds.

2. BACT Analysis for NH_3 Emissions from the Lagoon & Storage Ponds

a. Step 1 - Identify all control technologies

A cost effectiveness threshold has not been established for NH_3. Therefore, only options that meet the District's definition of Achieved-in-Practice controls will be considered 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 Inc., 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 NH_3 emissions from the lagoon and storage pond. No other control technologies that meet the definition of Achieved-in-Practice have been identified.

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 NH_3 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 NH_3 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 NH_3. 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 NH_3 emissions from the liquid manure in the lagoon and 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 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 NH_3 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 NH_3 emissions from the lagoons/storage ponds.

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

1. BACT Analysis for VOC Emissions from Liquid Manure Land Application:

a. Step 1 - Identify all control technologies

Since specific control efficiencies have not been identified in the literature for VOC emissions from land application of liquid manure, the control efficiencies listed are based on the control efficiencies of similar processes and engineering judgment.

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

1) Aerobic Treatment Lagoon – mechanical aeration to achieve a dissolved oxygen concentration of 2.0 mg/L (≈ 95%)

2) Covered Lagoon Anaerobic Digester with treated waste discharged into a secondary lagoon or storage pond. (≈ 60%) (Note: not applicable unless required by the final Dairy BACT Guideline)

3) Anaerobic Treatment Lagoon designed to meet Natural Resources Conservation Service (NRCS) standards (≈ 40%)

4) Injection of Liquid and Slurry Manure (≈ 50%)

Description of Control Technologies:

1) Aerobic Treatment Lagoon - mechanical aeration to achieve a dissolved oxygen concentration of 2.0 mg/L

An aerobic treatment lagoon is a waste treatment lagoon that is designed to facilitate the decomposition of wastewater by microbes in the presence of Oxygen (O_2). The process of aerobic decomposition results in the conversion of organic compounds in the wastewater into Carbon Dioxide (CO_2), water, nitrates, sulfates and inert biomass (sludge). The process of aerobic digestion is sometimes referred to as nitrification (especially when discussing NH_3 transformation). Complete aerobic digestion (100% aeration) removes nearly all malodors and also virtually eliminates VOCs, H_2S, and NH_3 emissions from liquid waste. Because these compounds would be removed from the liquid manure, emissions from liquid manure land application would also be eliminated.

Sufficient Oxygen must be provided to sustain the aerobic microorganisms in completely aerated lagoons. Lagoons can be considered completely aerobic if sufficient Oxygen is provided to achieve a Dissolved Oxygen (DO) content of 2.0 mg/L or more. Oxygen is typically provided by mechanical aerators. These aerators may float on the lagoon surface or be submerged in the lagoon. Aeration can also be performed by injection of tiny air bubbles into the lagoon water, mixing of the lagoon water, or spraying of the water into the air. According to Dr. Ruihong Zhang, a researcher at the University of California, Davis, at least 95% VOC control can be achieved if the DO content of the liquid manure is 2.0 mg/L or more. A major disadvantage of completely aerated lagoons is the enormous cost of the energy required to run the aerators continuously. Because of this, it has been determined that completely aerated lagoons are not cost effective options for dairy facilities at the present time.

2) Covered Lagoon Anaerobic Digester

As previously discussed, 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.

Covered treatment lagoons are one type of anaerobic digester. An anaerobic digester is an enclosed basin or tank that is designed to facilitate the decomposition of wastewater by microbes in the absence of Oxygen. The process of anaerobic decomposition results in the preferential conversion of organic compounds in the wastewater into Methane (CH_4), Carbon Dioxide (CO_2), and water rather than intermediate metabolites (VOCs). The gas generated by this process is known as biogas, waste gas or digester gas. In addition to Methane and Carbon Dioxide, biogas also contains small amounts of Nitrogen (N_2), Oxygen (O_2), Hydrogen Sulfide (H_2S), and Ammonia (NH_3). Biogas will also include trace amounts of VOCs that remain from incomplete digestion of the volatile solids in the incoming wastewater. The small amounts of undigested solids that remain after digestion are removed from the digester as sludge. A properly designed and operated anaerobic digester will result in volatile solids reductions of at least 60%. Since the quantity of VOC emitted is proportional to the quantity of volatile solids, a corresponding 60% control will be applied for this control measure.

3) Anaerobic Treatment Lagoon

An anaerobic treatment lagoon is a waste treatment lagoon that is designed to facilitate the decomposition of manure by microbes in the absence of Oxygen. The process of anaerobic decomposition results in the preferential conversion of organic compounds in the wastewater into Methane (CH_4), Carbon Dioxide (CO_2), and water rather than intermediate metabolites (VOCs). The Natural Resources Conservation Service (NRCS) California Field Office Technical Guide Code 359 - Waste Treatment Lagoon specifies criteria for the design of anaerobic treatment lagoons. A properly designed anaerobic treatment lagoon will reduce the volatile solids by at least 50% and will reduce the Biological Oxygen Demand (BOD), which will result in greater efficiency in degrading compounds that contain carbon into Methane and Carbon Dioxide rather than VOCs. Since quantity of VOC emitted is proportional to the quantity of volatile solids, a corresponding control efficiency of at least 50% is expected. However, in order to be conservative, a 40% control will be applied.

4) Injection of Liquid and Slurry Manure

Liquid and slurry manure is used to irrigate fodder crops for the dairy. Manure can either be injected into the soil or left on the surface of the soil and allowed to soak in. Because the liquid and slurry manure is high in Nitrogen, Phosphorus, and Potassium (N-P-K), it supplies nutrients needed by crops. Dairies have nutrient management programs to regulate the amount of liquid and slurry manure applied to cropland. This program is used to balance the specific nutrients applied to the crops, such as Nitrogen, with the amount of nutrients that the crops can utilize. Balancing the needs of the crop with what is supplied helps to minimize contamination of ground water due to leaching and runoff of excess nutrients. During the process of liquid and slurry manure application to the crops VOC and NH_3 are emitted. Injecting manure hinders volatilization and speeds the uptake of nutrients that would degrade into gaseous pollutants. It is estimated that injection of manure will reduce VOC emissions from land application of manure by 50%.

The manure can only be injected before the crop is planted and for a brief period during the initial growth stages. This is because a tractor must be used to pull a cultivator with the liquid and slurry manure shanks. Once the crop has grown to a certain height, it is no longer possible for the tractor to get into the field due to the potential of damaging the crop.

b. Step 2 - Eliminate technologically infeasible options

Option 4 - Injection of Liquid and Slurry Manure:

The Dairy Permitting Advisory Group (DPAG) found that injection of flushed manure was not a feasible BACT option in their report of BACT options for dairies in the San Joaquin Valley.[22] Injection is typically restricted to slurry manure that has been vacuumed from the cow housing or that has been removed from settling basins and/or

[22] Page 150 of the Final DPAG Report - "Recommendations to the San Joaquin Valley Air Pollution Control Officer Regarding Best Available Control Technology for Dairies in the San Joaquin Valley" January 31, 2006 (http://www.valleyair.org/busind/pto/dpag/dpag_idx.htm)

weeping walls. Because the liquid manure handling system at Frank N. Rocha Dairy includes the use of solids separation, there are no significant sources of slurry manure at this dairy.

Injection of flushed liquid manure from the lagoons is not considered feasible because the additional water from flushing increases the amount of liquid that must be transported by the trucks or honeywagons, which will generate more emissions. Because of the added time and expense, injection is not used for flushed liquid manure. This option will therefore be removed from consideration at this time.

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) Aerobic Treatment Lagoon – mechanical aeration to achieve a dissolved oxygen concentration of 2.0 mg/L (≈ 95%)

2) Covered Lagoon Anaerobic Digester with treated waste discharged into a secondary lagoon or storage pond. (≈ 60%) (Note: not applicable unless required by the Dairy BACT Guideline)

3) Anaerobic Treatment Lagoon designed to meet Natural Resources Conservation Service (NRCS) standards (≈ 40%)

d. Step 4 - Cost Effectiveness Analysis

Aerobic Treatment Lagoon:

The preceding cost effectiveness analysis performed for the BACT analysis for VOC emissions from the lagoon and storage ponds demonstrated that the energy costs alone, not including any capital costs, caused complete aeration to exceed the District VOC cost effectiveness threshold. This analysis included VOC reductions from liquid manure land application as well as the lagoon and storage pond, since complete aeration reduces emissions from both sources. Therefore, no further cost effectiveness analysis is required for complete aeration.

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.

The applicant has proposed to install an anaerobic digester if this technology is proven effective in reducing emissions and is required by the final Dairy BACT Guideline. Since the applicant has proposed this option in accordance with the Settlement Agreement, a

cost effectiveness analysis is not required. If an anaerobic digester is required in the final Dairy BACT Guideline, the applicant will be required to install the system in accordance with the timeframes and procedures established by the APCO in the final Dairy BACT Guideline.

Anaerobic Treatment Lagoon:

The applicant has proposed this option; therefore a cost effectiveness analysis is not required.

e. Step 5 - Select BACT

The facility is proposing an Anaerobic Treatment Lagoon designed according to Natural Resources Conservation Service (NRCS) Guidelines. Additionally, the facility is proposing to install an anaerobic digester if determined to be an effective emissions control in the final Dairy BACT guideline. Therefore, the BACT requirements are satisfied.

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 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 liquid manure land application.

2. BACT Analysis for NH_3 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 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, 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 Ammonia emissions from the liquid manure land application. No other control technologies that meet the definition of Achieved-in-Practice have been identified.

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 effectiveness 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 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 NH_3 emissions from liquid manure land application.

V. Top Down BACT Analysis for the Solid Manure

BACT Analysis for NH_3 Emissions from Solid Manure Handling & 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 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 practice has been identified as a possible control option for the increase of NH_3 emissions from solid manure handling and land application.

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

Nutritional management of dairy feed is routinely practiced to improve milk production and herd health. The potential for ammonia emissions can be reduced by reducing the protein by the animal and the minimum carryover of nitrogen into the manure, which will reduce ammonia emissions from solid manure.

b. Step 2 - Eliminate technologically infeasible options

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

c. Step 3 - Rank remaining options by control effectiveness

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

1) All animals fed in accordance with National Research Council (NRC) or other District-approved guidelines 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 at the dairy 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 sources or for a specific source. The District has found that the 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 NH_3 emissions from solid manure handling and land application.

APPENDIX D

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

San Joaquin Valley Air Pollution Control District
Risk Management Review

To:	Jonah Aiyabei – Permit Services
From:	Suzanne Medina – Technical Services
Date:	June 18, 2013
Facility Name:	Frank N. Rocha Dairy LLP
Location:	23243 Lone Tree Rd, Escalon
Application #(s):	N-7145-1-5, 2-4, 3-3, 4-3 and 8-2
Project #:	N-1130483

A. RMR SUMMARY

RMR Summary					
Categories	**Dairy Milking Parlor (Unit 1-5)**	**Dairy Cow Housing (Unit 2-4)**	**Dairy Lagoons & Solid Manure (Unit 3-3)**	**Land Application (Unit 4-3)**	**Facility Totals**
Prioritization Score	0.42	8.42	8.10	1.06	>1.0
Acute Hazard Index	0.013	0.538	0.064	0.019	0.63
Chronic Hazard Index	0.001	0.143	0.008	0.009	0.16
Maximum Individual Cancer Risk	**1.25E-07**	**2.34E-06**	**4.21E-07**	N/A*	2.89E-06
T-BACT Required?	**No**	**Yes**	**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 any of the Hazardous Air Pollutants (HAPs) under analysis.

B. RMR REPORT

I. Project Description

Technical Services performed an Ambient Air Quality Analysis and a Risk Management Review for an existing dairy proposing to increase their permitted herd size by 990 milk cows and 510 large heifers. The facility total will be 3,000 milk cows, not to exceed a combined total of 3,430 mature (milk and dry cows) and 1,580 supports stock (heifers and bulls) and 150 calves.

II. Analysis

Technical Services performed prioritizations using the District's HEARTs database. Emissions were calculated using District-developed spreadsheets for dairies and were input into the HEARTs database. In accordance with the District's *Risk Management Policy for Permitting New and Modified Sources* (APR 1905-1, March 2, 2001), risks from the proposed project were prioritized using the procedures in the 1990 CAPCOA Facility Prioritization Guidelines and incorporated in the District's HEART's database.

Because the facility's cumulative prioritization scores totaled to over 1.0, a refined health risk assessment was required and performed for each unit. AERMOD was used, with area source parameters and meteorological data from Modesto to determine maximum dispersion factors at the nearest on-site residential and off-site receptors. These dispersion factors were input into the HARP model to calculate the chronic and acute hazard indices and the carcinogenic risk for each unit.

At this time no evaluation was required for Unit 8-2 (feed storage & handling).

The following parameters were used for the review:

Analysis Parameters N-7145, 1130483			
Total Increase of Milk Cows	1,500	**Receptor Distance (m)**	60.96
Total Annual Increase of NH3 (lbs)	81817.9	**Total Hourly Increase of NH3 (lbs)**	9.34
Total Annual Increase of PM10 (lbs)	2055*	**Total Hourly Increase of PM10 (lbs)**	0.23

*Per District policy, PM2.5 is 15 percent of the PM10 amounts.

H2S emissions analysis was not required for Unit 3-3 (lagoons), because the surface area of the existing lagoons is not changing.

Technical Services also performed Ambient Air Quality Analysis for Unit 2-4 (cow housing). The modeling was performed for the criteria pollutants PM_{10} and $PM_{2.5}$ using AERMOD. The emission rates used were 2,055 lb PM_{10}/year and 308.25 lb $PM_{2.5}$/year. The results from the Criteria Pollutant Modeling are as follows:

PM_{10} Pollutant Modeling Results
Values are in $\mu g/m^3$

Category PM_{10}	24 Hours
Project Concentration	7.78
Interim Significance Level	10.4[1]
Result	Pass

[1]The District has decided on an interim basis to use a threshold for fugitive dust sources of 10.4 $\mu g/m^3$ for the 24-hour average concentration.

$PM_{2.5}$ Pollutant Modeling Results
Values are in $\mu g/m^3$

Category $PM_{2.5}$	24 Hours
Project Concentration	1.16
Interim Significance Level	2.5[1]
Result	Pass

[1]The District has decided on an interim basis to use a threshold for fugitive dust sources of 2.5 $\mu g/m^3$ for the 24-hour average concentration.

III. Conclusions

The ambient air quality impacts at the dairy do not exceed the District's 24-hour interim threshold for fugitive dust sources or cause/contribute significantly to a violation of the State or National AAQS.

Unit 1-3

The acute and chronic indices are below 1.0; and the maximum individual cancer risk associated with the unit is **1.25E-07**, which is less than the 1 in a million threshold. In accordance with the District's Risk Management Policy, the unit is approved **without** Toxic Best Available Control Technology (T-BACT).

Unit 2-2

The acute and chronic indices are below 1.0; and the maximum individual cancer risk associated with the unit is **2.34E-06**, which is greater than the 1 in a million threshold. In accordance with the District's Risk Management Policy, the unit is approved **with** Toxic Best Available Control Technology (T-BACT).

Unit 3-2

The acute and chronic indices are below 1.0; and the maximum individual cancer risk associated with the unit is **4.21E-07**, which is greater than the 1 in a million threshold. In accordance with the District's Risk Management Policy, the unit is approved **without** Toxic Best Available Control Technology (T-BACT).

Unit 4-2

The acute and chronic indices are below 1.0; and there is no Cancer Risk associated with any of the HAPs under review. In accordance with the District's Risk Management Policy, the unit 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.

Attachments:

RMR Request Form & Related Documents
Dairy Operations Emissions Worksheets
Prioritizations
Risk Results
AAQA Results
Facility Summary

APPENDIX E

Anaerobic Treatment Lagoon Design Check

Lagoon Design Check in Accordance with NRCS Guideline #359

Proposed Lagoon Volume

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	1450	ft
Width	132	ft
Depth	7	ft
Slope	2	ft

Primary Lagoon Volume	**1,186,593 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**	% Manure in Flush[2]	**x**	(1 - % VS Removed in Separation[3])	**=**	**Net VS Loading (lb/day)**
Milk Cows - Freestalls (FS)	1,800	x	17	x	53%	x	50%	=	**8,147**
Milk Cows - Bedpacks	1,200	x	17	x	25%		50%	=	**2,550**
Dry Cows - Freestalls	360	x	9.2	x	53%	x	50%	=	**882**
Dry Cows - Flushed corrals (FC)	40	x	9.2	x	48%	x	50%	=	**88**
Heifer (15 to 24 months) - FS	510	x	7.1	x	36%	x	50%	=	**652**
Heifer (7 to 14 months) - FC	170	x	4.9	x	36%	x	50%	=	**150**
Heifer (3 to 6 months) - FS	120	x	2.7	x	53%	x	50%	=	**86**
Heifer (3 to 6 months) - FC	30	x	2.7	x	36%	x	50%		**15**
Calf (under 3 months)	150	x	1.0	x	100%	x	50%	=	**75**
Bulls	0	x	9.2	x	48%	x	50%	=	**0**
Total for Dairy	**4,380**								**12,645**

[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] The % manure was taken from Table 3-1 of the California Regional Water Quality Control Board Document "Managing Dairy Manure in the Central Valley of California", UC Davis, June 2005 (http://groundwater.ucdavis.edu/Publications/uc-committee-of-experts-final-report%202006.pdf). This document estimated that up to 48% of the manure in open corral housing could potentially be handled in liquid form. However, in order to comply with Regional Water Quality Control Board for storage and disposal of liquid waste, this facility will handle a minimum of 25% of corral housing manure in solid form (by vacuuming or scraping). The percentage of corral housing manure potentially handled as liquid is thus 0.75 x 48 = 36%. The document also estimates that 42 - 100% of manure in freestall barn housing could potentially be handled as liquid; 100% representing freestall barns with no exercise pens. For typical freestall barns with exercise pens, the District used the average value of 71% ((100+42)/2) as the proportion of manure that could potentially be handled as liquid. As already stated, this facility will handle a minimum of 25% of manure in feed lanes in solid form (by vacuuming or scraping). The percentage potentially handled as liquid is thus 0.75 x 71 = 53%. The available literature indicates that approximately 25% of manure in bedpacks barns will be deposited in the paved areas and therefore potentially handled in liquid form.

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

Lagoon Design Check in Accordance with NRCS Guideline #359

Minimum Treatment Volume Calculation

MTV = TVS/VSLR

Where:

MTV = Minimum Treatment Volume (ft^3)

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

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

Minimum Treatment Volume in Primary Lagoon					
Breed: Holstein **Type of Cow**	**Net VS Loading (lb/day)**		**VSLR (lb/ft3-day)[1]**		**MTV (ft^3)**
Milk Cows - Freestalls (FS)	8,147	÷	0.011	=	**740,659**
Milk Cows - Bedpacks	2,550	÷	0.011	=	**231,818**
Dry Cow - Freestalls	882	÷	0.011	=	**80,165**
Dry Cow - Flushed Corrals (FC)	88	÷	0.011	=	**8,029**
Heifer (15 to 24 months) - FS	652	÷	0.011	=	**59,253**
Heifer (7 to 14 months) - FC	150	÷	0.011	=	**13,631**
Heifer (3 to 6 months) - FS	86	÷	0.011	=	**7,842**
Heifer (3 to 6 months) - FC	15	÷	0.011	=	**1,325**
Calf (under 3 months)	75	÷	0.011	=	**6,818**
Bulls	0	÷	0.011	=	**0**
Total for Dairy					**1,149,541**

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

Lagoon Design Check in Accordance with NRCS Guideline #359

Sludge Accumulation Volume

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

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

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

SAV = VPL - MTV

Where:

SAV = Sludge Accumulation Volume (ft^3)
VPL = total Volume of Primary Lagoon (ft^3)
MTV = Minimum Treatment Volume (ft^3)

SAV =	**VPL**	**-**	**MTV**	
SAV =	**1,186,593**	**1,149,541**	**=**	**37,052 (ft3)**

Lagoon Design Check in Accordance with NRCS Guideline #359

Hydraulic Retention Time (HRT) Calculation

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

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

HRT = MTV/HFR

where:
HFR = Hydraulic flow rate (1000ft^3/day)
HRT = Hydraulic Retention Time (day)

The Hydraulic Flow Rate is Calculated below

Type	# of cows		Amount of Manure*			HFR	
Milk Cows	1,800	x	2.40	ft^3	=	4,320	ft^3/day
Milk Cows	1,200		2.40	ft^3	=	2,880	ft^3/day
Dry Cows	360	x	1.30	ft^3	=	468	ft^3/day
Dry Cows	40		1.30	ft^3	=	52	ft^3/day
Heifers (15-24 mo)	510	x	0.78	ft^3	=	398	ft^3/day
Heifers (7-14 mo)	170	x	0.78	ft^3	=	133	ft^3/day
Heifers (3-6 mo)	120	x	0.30	ft^3	=	36	ft^3/day
Heifers (3-6 mo)	30		0.30	ft^3	=	9	ft^3/day
Calves	150	x	0.15	ft^3	=	23	ft^3/day
Bulls	0	x	1.30	ft^3	=	-	ft^3/day
Total	**4,380**					**8,318**	**ft^3/day**
Fresh water per milk cow used in flush at milk parlor			**50**	gal/day			

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

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

Formula:

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

Total HFR:

⇨

50 gal	3000 milk cows	x	ft3	+	8,318	ft3		
milk cow * day			7.48 gal			day		
				=	**28,371.4**	**ft3/day**		

Formula:

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

HRT:

⇨

1,149,541 ft3	day	=		=	**40.5176459**	**days**
	28,371.4 ft3					

APPENDIX F

Draft ATCs

San Joaquin Valley
Air Pollution Control District

AUTHORITY TO CONSTRUCT

DRAFT

PERMIT NO: N-7145-1-5 **ISSUANCE DATE:** DRAFT

LEGAL OWNER OR OPERATOR: FRANK N. ROCHA DAIRY
MAILING ADDRESS: 23125 E LONE TREE RD
ESCALON, CA 95320

LOCATION: 23125 E LONE TREE RD
ESCALON, CA 95320

EQUIPMENT DESCRIPTION:
MODIFICATION OF 2,010 COW MILKING OPERATION WITH A DOUBLE-40 (80 STALL) PARALLEL MILKING PARLOR AND A 60 STALL FLAT HOSPITAL MILKING BARN: INCREASE MAXIMUM NUMBER OF MILK COWS TO 3,000.

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. {4452} If a licensed veterinarian or a certified nutritionist determines that any VOC mitigation measure will be required to be suspended as a detriment to animal health or necessary for the animal to molt, the owners/operators must notify the District in writing within forty-eight (48) hours of the determination including the duration and the specific health condition requiring the mitigation measure to be suspended. If the situation is expected to exist longer than a thirty-day (30) period, the owner/operator shall submit a new emission mitigation plan designating a mitigation measure to be implemented in lieu of the suspended mitigation measure. [District Rule 4570]
4. {4484} Permittee shall flush or hose milk parlor immediately prior to, immediately after, or during each milking. [District Rule 4570]
5. {4485} Permittee shall provide verification that milk parlors are flushed or hosed prior to, immediately after, or during each milking. [District Rule 4570]

CONDITIONS CONTINUE ON NEXT PAGE

YOU MUST NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (209) 557-6400 WHEN CONSTRUCTION IS COMPLETED AND PRIOR TO OPERATING THE EQUIPMENT OR MODIFICATIONS AUTHORIZED BY THIS AUTHORITY TO CONSTRUCT. This is NOT a PERMIT TO OPERATE. Approval or denial of a PERMIT TO OPERATE will be made after an inspection to verify that the equipment has been constructed in accordance with the approved plans, specifications and conditions of this Authority to Construct, and to determine if the equipment can be operated in compliance with all Rules and Regulations of the San Joaquin Valley Unified Air Pollution Control District. Unless construction has commenced pursuant to Rule 2050, this Authority to Construct shall expire and application shall be cancelled two years from the date of issuance. The applicant is responsible for complying with all laws, ordinances and regulations of all other governmental agencies which may pertain to the above equipment.

Seyed Sadredin, Executive Director / APCO

DRAFT

DAVID WARNER, Director of Permit Services
N-7145-1-5 : Mar 6 2014 10:35AM – AIYABEIJ : Joint Inspection NOT Required

6. {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]

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]

San Joaquin Valley
Air Pollution Control District

AUTHORITY TO CONSTRUCT

PERMIT NO: N-7145-2-4 **ISSUANCE DATE:** DRAFT

LEGAL OWNER OR OPERATOR: FRANK N. ROCHA DAIRY
MAILING ADDRESS: 23125 E LONE TREE RD
ESCALON, CA 95320

LOCATION: 23125 E LONE TREE RD
ESCALON, CA 95320

EQUIPMENT DESCRIPTION:
MODIFICATION OF COW HOUSING - 2,010 MILK COWS, NOT TO EXCEED A COMBINED TOTAL OF 2,440 MATURE COWS (MILK AND DRY); 1,220 SUPPORT STOCK (HEIFERS, CALVES AND BULLS); AND FREESTALLS WITH A FLUSH SYSTEM: EXPAND MAXIMUM HERD SIZE TO 3,000 MILK COWS, NOT TO EXCEED A COMBINED TOTAL OF 3,430 MATURE COWS (MILK AND DRY); 1,580 SUPPORT STOCK (HEIFERS AND BULLS); AND 150 CALVES (0 - 3 MONTHS); AND CONSTRUCT ONE 600-COW FREESTALL BARN AND ONE 300-COW FREESTALL BARN

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. {4452} If a licensed veterinarian or a certified nutritionist determines that any VOC mitigation measure will be required to be suspended as a detriment to animal health or necessary for the animal to molt, the owners/operators must notify the District in writing within forty-eight (48) hours of the determination including the duration and the specific health condition requiring the mitigation measure to be suspended. If the situation is expected to exist longer than a thirty-day (30) period, the owner/operator shall submit a new emission mitigation plan designating a mitigation measure to be implemented in lieu of the suspended mitigation measure. [District Rule 4570]
4. Permittee shall pave feedlanes, where present, for a width of at least 8 feet along the corral side of the feedlane fence for milk and dry cows and at least 6 feet along the corral side of the feedlane for support stock. [District Rules 2201 and 4570]

CONDITIONS CONTINUE ON NEXT PAGE

YOU MUST NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (209) 557-6400 WHEN CONSTRUCTION IS COMPLETED AND PRIOR TO OPERATING THE EQUIPMENT OR MODIFICATIONS AUTHORIZED BY THIS AUTHORITY TO CONSTRUCT. This is NOT a PERMIT TO OPERATE. Approval or denial of a PERMIT TO OPERATE will be made after an inspection to verify that the equipment has been constructed in accordance with the approved plans, specifications and conditions of this Authority to Construct, and to determine if the equipment can be operated in compliance with all Rules and Regulations of the San Joaquin Valley Unified Air Pollution Control District. Unless construction has commenced pursuant to Rule 2050, this Authority to Construct shall expire and application shall be cancelled two years from the date of issuance. The applicant is responsible for complying with all laws, ordinances and regulations of all other governmental agencies which may pertain to the above equipment.

Seyed Sadredin, Executive Director / APCO

DAVID WARNER, Director of Permit Services
N-7145-2-4 : Mar 17 2014 9:04AM – KEASTMD : Joint Inspection NOT Required

5. Permittee shall flush, vacuum, or scrape feed lanes and walkways at least four times per day for mature cows and at least two times per day for support stock. [District Rules 2201and 4570]

6. Permittee shall keep records or maintain an operating plan that requires feed lanes and walkways to be flushed, vacuumed, or scraped at least four times per day for mature cows and at least two times per day for support stock. [District Rules 2201 and 4570]

7. At least 25% of manure in feedlanes shall be removed by vacuuming or scraping. Vacuumed or scraped manure shall be promptly stabilized by drying; incorporation into cropland, or an equivalent method. [District Rule 2201]

8. {4492} Permittee shall remove manure that is not dry from individual cow freestall beds or rake, harrow, scrape, or grade freestall bedding at least once every seven (7) days. [District Rule 4570]

9. {4493} Permittee shall record the date that manure that is not dry is removed from individual cow freestall beds or raked, harrowed, scraped, or freestall bedding is graded at least once every seven (7) days. [District Rule 4570]

10. {4499} Permittee shall inspect water pipes and troughs and repair leaks at least once every seven (7) days. [District Rule 4570]

11. {4500} Permittee shall maintain records demonstrating that water pipes and troughs are inspected and leaks are repaired at least once every seven (7) days. [District Rule 4570]

12. {4501} Permittee shall clean manure from corrals at least four (4) times per year with at least sixty (60) days between each cleaning, or permittee shall clean corrals at least once between April and July and at least once between September and December. [District Rule 4570]

13. {4502} Permittee shall demonstrate that manure from corrals are cleaned at least four (4) times per year with at least sixty (60) days between each cleaning or demonstrate that corrals are cleaned at least once between April and July and at least once between September and December. [District Rule 4570]

14. Permittee shall implement all of the following corral mitigation measures: 1) slope the surface of the corrals at least 3% where the available space for each animal is 400 square feet or less and shall slope the surface of the corrals at least 1.5% where the available space for each animal is more than 400 square feet per animal; 2) maintain corrals to ensure proper drainage preventing water from standing more than forty-eight hours; or 3) scrape corral and exercise pen surfaces using a pull-type scraper during morning hours on a weekly basis, except when prevented by wet weather. [District Rules 2201 and 4570]

15. Permittee shall: 1) maintain sufficient records to demonstrate that corrals are maintained to ensure proper drainage preventing water from standing for more than forty-eight hours; 2) maintain records of dates pens are groomed (i.e., harrowed, raked, or scraped, etc.). [District Rules 2201 and 4570]

16. {4515} Shade structures shall be installed in any of the following ways: 1) constructed with a light permeable roofing material; 2) uphill of any slope in the corral; 3) installed so that the structure has a North/South orientation. OR Permittee shall clean manure from under corral shades at least once every fourteen (14) days, when weather permits access into the corral. [District Rule 4570]

17. {4516} If Permittee has selected to comply using shades constructed with a light permeable roofing material, then permittee shall maintain records, such as design specifications, demonstrating that the shade structures are equipped with such roofing material or if Permittee has selected to comply by cleaning the manure from under the corral shades, then Permittee shall maintain records demonstrating that manure is cleaned from under the shades at least once every fourteen (14) days, as long as weather permits access to corrals. [District Rule 4570]

18. {4518} Permittee shall manage corrals such that the manure depth in the corral does not exceed twelve (12) inches at any time or point, except for in-corral mounding. Manure depth may exceed 12 inches when corrals become inaccessible due to rain events. However, permittee must resume management of the manure depth of 12 inches or lower immediately upon the corral becoming accessible. [District Rule 4570]

19. {4519} Permittee shall measure and document the depth of manure in the corrals at least once every ninety (90) days. [District Rule 4570]

20. Inspection for potholes and similar sources of emissions shall be performed on a monthly basis. A record of these inspections shall be maintained. [District Rule 2201]

CONDITIONS CONTINUE ON NEXT PAGE

21. Firm, stable soil that is not easily eroded shall be used for the exercise pen and corral surfaces. [District Rule 2201]
22. A supply of dry fill soil shall be kept on site in order to fill areas where erosion and gouging occurs. [District Rule 2201]
23. Clean rainfall runoff shall be diverted around exercise pen and corral surfaces to reduce the amount of water that is potentially retained on these surfaces. [District Rule 2201]
24. The total number of cows at this facility shall not exceed any of the following limits: 3,000 milk cows; not to exceed a combined total of 3,430 mature cows (milk and dry cows); 1,580 support stock (heifers and bulls); and 150 calves (0 - 3 months old). [District Rule 2201]
25. The number of calves may exceed the value stated in the equipment description as long as the total support stock (heifers, bulls, and calves) does not exceed the combined value stated in the equipment description. [District Rule 2201]
26. 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]
27. Permittee shall keep and maintain all records for a minimum of five (5) years and shall make records available to the APCO and EPA upon request. [District Rules 2201 and 4570]
28. {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]

San Joaquin Valley
Air Pollution Control District

AUTHORITY TO CONSTRUCT

PERMIT NO: N-7145-3-3 **ISSUANCE DATE:** DRAFT

LEGAL OWNER OR OPERATOR: FRANK N. ROCHA DAIRY
MAILING ADDRESS: 23125 E LONE TREE RD
ESCALON, CA 95320

LOCATION: 23125 E LONE TREE RD
ESCALON, CA 95320

EQUIPMENT DESCRIPTION:
MODIFICATION OF LIQUID MANURE HANDLING SYSTEM CONSISTING OF 3 SETTLING BASINS, 1 TREATMENT LAGOON AND 1 STORAGE POND; MANURE IS LAND APPLIED THROUGH FLOOD IRRIGATION AND FURROW IRRIGATION: ADD ANAEROBIC TREATMENT REQUIREMENT; INCREASE IN THROUGHPUT DUE TO HERD EXPANSION.

CONDITIONS

1. {3215} Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to enter the permittee's premises where a permitted source is located or emissions related activity is conducted, or where records must be kept under condition of the permit. [District Rule 1070]
2. {3216} Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to have access to and copy, at reasonable times, any records that must be kept under the conditions of the permit. [District Rule 1070]
3. {4452} If a licensed veterinarian or a certified nutritionist determines that any VOC mitigation measure will be required to be suspended as a detriment to animal health or necessary for the animal to molt, the owners/operators must notify the District in writing within forty-eight (48) hours of the determination including the duration and the specific health condition requiring the mitigation measure to be suspended. If the situation is expected to exist longer than a thirty-day (30) period, the owner/operator shall submit a new emission mitigation plan designating a mitigation measure to be implemented in lieu of the suspended mitigation measure. [District Rule 4570]
4. The liquid manure handling system shall handle flush manure from no more than 3,000 milk cows; not to exceed a combined total of 3,430 mature cows (milk and dry cows); 1,580 total support stock (heifers and bulls); and 150 calves (0 - 3 months old). [District Rule 2201]

CONDITIONS CONTINUE ON NEXT PAGE

YOU MUST NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (209) 557-6400 WHEN CONSTRUCTION IS COMPLETED AND PRIOR TO OPERATING THE EQUIPMENT OR MODIFICATIONS AUTHORIZED BY THIS AUTHORITY TO CONSTRUCT. This is NOT a PERMIT TO OPERATE. Approval or denial of a PERMIT TO OPERATE will be made after an inspection to verify that the equipment has been constructed in accordance with the approved plans, specifications and conditions of this Authority to Construct, and to determine if the equipment can be operated in compliance with all Rules and Regulations of the San Joaquin Valley Unified Air Pollution Control District. Unless construction has commenced pursuant to Rule 2050, this Authority to Construct shall expire and application shall be cancelled two years from the date of issuance. The applicant is responsible for complying with all laws, ordinances and regulations of all other governmental agencies which may pertain to the above equipment.

Seyed Sadredin, Executive Director / APCO

DAVID WARNER, Director of Permit Services
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5. The liquid manure lagoon shall be designed, constructed and operated according to the anaerobic treatment lagoon requirements of NCRCS Guideline No. 359. A minimum liquid manure depth of 7 feet shall be retained in the lagoon at all times. [District Rule 2201]
6. Permittee shall maintain design specifications, calculations, including Minimum Treatment Volume (MTV), Hydraulic Retention Time (HRT) demonstrating that the anaerobic treatment lagoon meets the requirements listed in the NRCS Field Office Technical Guide Code 359. [District Rule 2201]
7. Permittee shall remove solids with a solid separator system, prior to the manure entering the lagoon. [District Rules 2201 and 4570]
8. {4550} Permittee shall not allow liquid manure to stand in the fields for more than twenty-four (24) hours after irrigation. [District Rule 4570]
9. {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 Rule 4570]
10. {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]
11. 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]
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]

San Joaquin Valley
Air Pollution Control District

AUTHORITY TO CONSTRUCT

PERMIT NO: N-7145-4-3

ISSUANCE DATE: DRAFT

LEGAL OWNER OR OPERATOR: FRANK N. ROCHA DAIRY
MAILING ADDRESS: 23125 E LONE TREE RD
ESCALON, CA 95320

LOCATION: 23125 E LONE TREE RD
ESCALON, CA 95320

EQUIPMENT DESCRIPTION:
MODIFICATION OF SOLID MANURE HANDLING CONSISTING OF OPEN MANURE STOCK PILES WITH SOLID MANURE APPLICATION TO LAND: INCREASE IN THROUGHPUT DUE TO HERD EXPANSION.

CONDITIONS

1. {3215} Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to enter the permittee's premises where a permitted source is located or emissions related activity is conducted, or where records must be kept under condition of the permit. [District Rule 1070]
2. {3216} Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to have access to and copy, at reasonable times, any records that must be kept under the conditions of the permit. [District Rule 1070]
3. {4452} If a licensed veterinarian or a certified nutritionist determines that any VOC mitigation measure will be required to be suspended as a detriment to animal health or necessary for the animal to molt, the owners/operators must notify the District in writing within forty-eight (48) hours of the determination including the duration and the specific health condition requiring the mitigation measure to be suspended. If the situation is expected to exist longer than a thirty-day (30) period, the owner/operator shall submit a new emission mitigation plan designating a mitigation measure to be implemented in lieu of the suspended mitigation measure. [District Rule 4570]
4. {4526} Within seventy two (72) hours of removal of solid manure from housing, permittee shall either 1) remove dry manure from the facility, or 2) cover dry manure outside the housing with a weatherproof covering from October through May, except for times when wind events remove the covering, not to exceed twenty-four (24) hours per event. [District Rule 4570]

CONDITIONS CONTINUE ON NEXT PAGE

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DAVID WARNER, Director of Permit Services
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5. {4527} Permittee shall keep records of dates when manure is removed from the facility or permittee shall maintain records to demonstrate that dry manure piles outside the pens are covered with a weatherproof covering from October through May. [District Rule 4570]

6. {4528} If weatherproof coverings are used, permittee shall maintain records, such as manufacturer warranties or other documentation, demonstrating that the weatherproof covering over dry manure 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]

7. {4541} Permittee shall incorporate all solid manure within seventy-two (72) hours of land application. [District Rule 4570]

8. {4542} Permittee shall maintain records to demonstrate that all solid manure has been incorporated within seventy-two (72) hours of land application. [District Rule 4570]

9. {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]

10. {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]

San Joaquin Valley
Air Pollution Control District

AUTHORITY TO CONSTRUCT

PERMIT NO: N-7145-8-2

ISSUANCE DATE: DRAFT

LEGAL OWNER OR OPERATOR: FRANK N. ROCHA DAIRY
MAILING ADDRESS: 23125 E LONE TREE RD
ESCALON, CA 95320

LOCATION: 23125 E LONE TREE RD
ESCALON, CA 95320

EQUIPMENT DESCRIPTION:
MODIFICATION OF FEED STORAGE AND HANDLING CONSISTING OF COMMODITY BARNS AND SILAGE PILES: INCREASE IN THROUGHPUT DUE TO HERD EXPANSION.

CONDITIONS

1. {3215} Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to enter the permittee's premises where a permitted source is located or emissions related activity is conducted, or where records must be kept under condition of the permit. [District Rule 1070]
2. {3216} Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to have access to and copy, at reasonable times, any records that must be kept under the conditions of the permit. [District Rule 1070]
3. {4452} If a licensed veterinarian or a certified nutritionist determines that any VOC mitigation measure will be required to be suspended as a detriment to animal health or necessary for the animal to molt, the owners/operators must notify the District in writing within forty-eight (48) hours of the determination including the duration and the specific health condition requiring the mitigation measure to be suspended. If the situation is expected to exist longer than a thirty-day (30) period, the owner/operator shall submit a new emission mitigation plan designating a mitigation measure to be implemented in lieu of the suspended mitigation measure. [District Rule 4570]
4. Permittee shall feed all animals according to National Research Council (NRC) guidelines. [District Rules 2201 and 4570]
5. Permittee shall maintain records of feed content, formulation, and quantity of feed additive utilized, to demonstrate compliance with National Research Council (NRC) guidelines. Records such as feed company guaranteed analyses (feed tags), ration sheets, or feed purchase records may be used to meet this requirement. [District Rules 2201 and 4570]

CONDITIONS CONTINUE ON NEXT PAGE

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6. {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 Rule 4570]

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

15. {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 Rule 4570]

16. {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 Rule 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]

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]

CONDITIONS CONTINUE ON NEXT PAGE

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. {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]

31. {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]