San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT

HEALTHY AIR LIVING™

APR 17 2012

Michael Brasil
Michael Brasil Dairy
18254 First Ave
Stevinson, CA 95374

Re: Notice of Preliminary Decision - Authority to Construct
Project Number: N-1112698

Dear Mr. Brasil:

Enclosed for your review and comment is the District's analysis of Michael Brasil Dairy's application for an Authority to Construct for the expansion of an existing dairy operation, at 18254 First Ave in Stevinson.

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

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

Sincerely,

Mark Keast for

David Warner
Director of Permit Services

DW:jka

Enclosures

Seyed Sadredin
Executive Director/Air Pollution Control Officer

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

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1990 E. Gettysburg Avenue
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www.valleyair.org www.healthyairliving.com

San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT

HEALTHY AIR LIVING™

APR 17 2012

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

Re: Notice of Preliminary Decision - Authority to Construct
Project Number: N-1112698

Dear Mr. Tollstrup:

Enclosed for your review and comment is the District's analysis of Michael Brasil Dairy's application for an Authority to Construct for the expansion of an existing dairy operation, at 18254 First Ave in Stevinson.

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Merced Sun-Star

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

NOTICE IS HEREBY GIVEN that the San Joaquin Valley Unified Air Pollution Control District solicits public comment on the proposed issuance of Authority to Construct to Michael Brasil Dairy for the expansion of an existing dairy operation, at 18254 First Ave in Stevinson.

The analysis of the regulatory basis for this proposed action, Project #N-1112698, is available for public inspection at http://www.valleyair.org/notices/public_notices_idx.htm and the District office at the address below. Written comments on this project must be submitted within 30 days of the publication date of this notice to **DAVID WARNER, DIRECTOR OF PERMIT SERVICES, SAN JOAQUIN VALLEY UNIFIED AIR POLLUTION CONTROL DISTRICT, 1990 EAST GETTYSBURG AVENUE, FRESNO, CA 93726.**

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

Facility Name:	Michael Brasil Dairy	Date:	April 2, 2012
Mailing Address:	18254 First Avenue	Engineer:	Jonah Aiyabei
	Stevinson, CA 95374	Lead Engineer:	Martin Keast
Contact Person:	Michael Brasil, Owner		
Telephone:	(209) 668-2469		
Application #s:	N-6258-1-0 through 5-0.		
Project #:	N-1112698		
Deemed Complete:	March 30, 2012		

I. Proposal

Michael Brasil Dairy has requested Authority to Construct (ATC) permits to expand an existing dairy operation from the current 'as-built' capacity of 1,265 milk cows and 235 dry cows to a maximum capacity of 1,879 milk cows and 334 dry cows. A new 800-cow freestall barn will be constructed as part of the expansion.

The project will result in an increase in VOC, NH_3, PM_{10}, and H2S emissions at the site, including increases of more than 2.0 lb/day from the milking operation, cow housing, and the liquid manure handling system. Therefore, BACT is triggered for VOC, NH_3, PM_{10}, and H2S emissions from these permit units.

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 proposed dairy is a discretionary project subject to the requirements of the California Environmental Quality Act (CEQA). As a public agency with discretionary authority, the District must determine that the requirements of the California Environmental Quality Act (CEQA) have been properly satisfied prior to the issuance of any dairy permits. The project is located in Merced County, which has discretionary approval authority on dairy projects. Merced County is therefore considered the Lead Agency, while the District will serve as a Responsible Agency in the CEQA review process. As a responsible agency, the District must decide on the adequacy of the environmental documents prepared by the Lead Agency, make appropriate findings, and file the required notices. The District has determined that the Environmental Impact Report (EIR) (State Clearinghouse (SCH) No. 2003051002) prepared by Merced County adequately addresses environmental concerns resulting from the project. The District has also made

appropriate findings regarding the project, and will file a Notice of Determination with Merced County upon issuance of the Authority to Construct (ATC) permits.

II. Applicable Rules

Rule 1070 Inspections (12/17/92)
Rule 2010 Permits Required (12/17/92)
Rule 2201 New and Modified Stationary Source Review Rule (4/21/11)
Rule 2520 Federally Mandated Operating Permits (6/21/01)
Rule 2550 Federally Mandated Preconstruction Review for Major Sources of Air Toxics (6/18/98)
Rule 4101 Visible Emissions (2/17/05)
Rule 4102 Nuisance (12/17/92)
CH&SC 41700 Health Risk Assessment
Rule 4550 Conservation Management Practices (CMP) (8/19/04)
Rule 4570 Confined Animal Facilities (CAF) (4/21/10)
CH&SC 42301.6 School Notice
Senate Bill 700 (SB 700)
California Environmental Quality ACT (CEQA)

III. Project Location

The facility is located at 18254 First Avenue in Stevinson, Merced County. The equipment is not located within 1,000 feet of the outer boundary of a K-12 school. Therefore, the public notification requirement of California Health and Safety Code 42301.6 is not applicable to this project.

IV. Process Description

The primary function of Michael Brasil Dairy is the production of milk, which is used to make various 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 will be different ages and types of cows at the dairy, including calves, heifers, lactating cows, dry cows, and mature bulls.

The milk cows at a dairy usually generate anywhere from 130 to 150 pounds of manure per day. Manure accumulates in confinement areas such as barns, open corrals (dry lots), and the milking center. Manure is primarily deposited in areas where the herd is fed and given water. How the manure is collected, stored and treated depends directly on the manure management techniques used at a particular dairy.

Dairy manure is collected and managed as a liquid, a semi-solid or slurry, and a solid. Manure with a total solids or dry matter content of 20% or higher usually can be handled as a solid

while manure with a total solids content of 10% or less can be handled as a liquid.

Cow Housing

The cattle will be housed in freestall barns with flushed manure lanes. In freestall barns, cows are grouped in large pens with free access to feed bunks, water, and stalls for resting. A standard freestall barn design has a feed alley in the center of the barn separating two feed bunks on each side.

Special Needs Housing

The special needs area serves the gestating cows at the dairy or any cows that are in need of medical condition. This area acts as a veterinary area. It is also the area in which cows are given special attention as they progress from dry cow, a mature cow that is gestating and not lactating, to maternity, to milking status or until their health improves.

Milking Parlor

The milking parlor is a separate building, apart from the lactating cow confinement. The milking parlor is designed to facilitate changing the groups of cows milked and to allow workers access to the cows during milking. A holding area confines the cows that are ready for milking. The holding area is covered with open sides and is part of the milking parlor, which in turn, is located in the immediate vicinity of the cow housing. The milking parlor has concrete floors sloped towards a drainage system. Manure that is deposited in the milking parlor is sprayed or flushed into the drainage using fresh water after each milking. The effluent from the milking parlor is carried through pipes into the liquid manure treatment system.

Liquid Manure Management System

The liquid manure management system includes solids separation (settling basins) and a storage lagoon.

Solids Separation

Solids separation removes material from the waste stream that would prematurely fill a lagoon or storage pond. The efficiency of treatment would be significantly lower without separation, resulting in more odors and potentially more VOC emissions from the liquid manure handling system. Most of the separated solids are fibrous material that leads to excessive sludge buildup or the formation of crusts on the surface of the storage ponds, both of which interfere with pumping operations. Separation reduces the land area required when designing a liquid manure treatment system since the volume to be treated is less. As a final benefit, the separated solids may be recycled and used for soil amendments, re-feeding, bedding, etc.

Settling basins are structures designed to separate solids from liquid manure by sedimentation. The inflow of manure is restricted to allow some of the solids to settle out. The liquid from the settling basins will gradually drain to the treatment lagoon. Solids remaining in the settling basins are left to dry and then are removed. The separated solids will either be immediately incorporated into cropland or stored for use as fertilizer or bedding in the freestalls.

Storage Lagoon

The storage lagoon is designed to hold the dairy's wastewater until it can be applied to cropland for irrigation purposes. The storage lagoon is a source of VOC, Ammonia, and Hydrogen Sulfide emissions. Emissions rates of these pollutants are influenced by factors such as nutrient loading, lagoon pH, and temperature. Emissions can be mitigated in part by feeding the animals per NRC guidelines to limit quantities of excess nutrients in the manure stream and by separating solids out of the waste stream before the liquid manure is discharged into the storage lagoon.

Solid manure Management System - Manure Stock Piles (Storage)

Any solid manure scraped from unflushed corral areas is stockpiled for use as fertilizer at a later time. Once applied to land, it is promptly incorporated into the soil to limit emission into the atmosphere.

V. Equipment Listing

N-6258-1-1: MODIFICATION OF 1,265 COW MILKING OPERATION: INCREASE MAXIMUM NUMBER OF MILK COWS TO 1,879.

N-6258-2-1: MODIFICATION OF COW HOUSING - 1,265 MILK COWS, NOT TO EXCEED A COMBINED TOTAL OF 1,500 MATURE COWS (MILK AND DRY), AND 200 TOTAL SUPPORT STOCK (HEIFERS, CALVES, AND BULLS): INCREASE THE MAXIMUM NUMBER OF COWS TO 1,879 MILK COWS AND 334 DRY COWS (NOT TO EXCEED A COMBINED TOTAL OF 2,213 MATURE COWS; NO SUPPORT STOCK); CONSTRUCT ONE NEW 800-COW FREESTALL BARN.

N-6258-3-1: MODIFICATION OF LIQUID MANURE MANAGEMENT SYSTEM CONSISTING OF SETTLING BASINS AND A STORAGE LAGOON: ALLOW INCREASE IN LIQUID MANURE THROUGHPUT DUE TO HERD SIZE EXPANSION.

N-6258-4-1: MODIFICATION OF SOLID MANURE MANAGEMENT SYSTEM CONSISTING OF MANURE STOCKPILES: ALLOW INCREASE IN SOLID MANURE THROUGHPUT DUE TO HERD SIZE EXPANSION.

N-6258-5-1: MODIFICATION OF FEED AND STORAGE CONSISTING OF SILAGE PILES: ALLOW INCREASE IN FEED THROUGHPUT DUE TO HERD SIZE EXPANSION.

VI. Emission Control Technology Evaluation

PM_{10}, VOC, NH_3, and H2S are the major pollutants of concern from dairy operations. Gaseous pollutant emissions from a dairy are due to the ruminant digestive processes (enteric emissions), the decomposition and fermentation of feed, and the decomposition of organic material in dairy manure. Volatile Organic Compounds (VOCs) are formed as intermediate metabolites when organic matter in manure degrades. Ammonia volatilization is the result of the microbial

decomposition of nitrogenous compounds in manure. H2S emission result from the anaerobic decomposition of sulfates 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 are discussed below:

Milking Parlor

Flushing with fresh water is the primary method used to wash out the manure from the milking parlor after each group of cows is milked. Since the milking parlor is frequently flushed, it is not a significant source of particulate matter emissions. Manure, which is a source of VOC emissions, is removed from the milking parlor many times a day by flushing after each milking. Because of Ammonia's high affinity for and solubility in water, volatilization of Ammonia from the milking parlor will also be reduced by flushing after each milking.

Paved Surfaces and Frequent Flushing

Particulate matter emissions from freestall barns are significantly reduced because the cows will be on a paved surface rather than on dry dirt. Additionally, flushing of the freestall lanes creates a moist environment, which further decreases particulate matter emissions.

Manure will be removed from the freestall and corral lanes by flushing. Because of ammonia's high affinity for and solubility in water, flushing the lanes and walkways will also reduce volatilization of ammonia from the manure deposited in the corral lanes. The lanes and walkways in the freestall barns will be flushed four times per day and the lanes and walkways in the corrals for the heifers will be flushed twice per day.

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. Refused feed will be removed from the feed lanes on a daily basis to minimize gaseous emissions from decomposition. The surface area of silage exposed to the atmosphere will be minimized by enclosing silage or covering it with tarps, except for the face of the pile from which feed is being withdrawn.

Solids Separation

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

Liquid Manure Land Application

Liquid manure from the lagoon will be applied to the dairy's forage production land through flood 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.

Rapid Incorporation of Solid Manure Applied to Land:

Based on the information currently available, emissions from solid manure applied to cropland are expected to be small. However, to ensure that any possible emissions are minimized, this dairy will be required to incorporate solid manure applied to cropland soon as possible (within no more than 72 hours) after application. Immediate incorporation of the manure into the soil will reduce any volatilization of gaseous pollutants, including ammonia and VOC. Reduction in gaseous emissions is achieved by minimizing the amount of time that the manure is exposed to the atmosphere. Once manure has been incorporated into the soil, VOC is absorbed onto particles of soil providing the opportunity for the VOC to be oxidized into carbon dioxide and water[1].

Feed Handling and Storage

The proposed emission reduction measures for feed handling and storage include best management practices such as minimizing the surface area of silage exposed to the atmosphere. This can be done by covering the silage pile securely with a tarp and removing feed only from a small area of the pile (face of pile). Leftover feed at the feed bunks will also be cleaned up and disposed of appropriately to avoid decomposition that can result in increased emissions.

VII. General Calculations

A. Assumptions

- Potential to Emit for the dairy will be based on the maximum design capacity of the number and types of cows at the dairy.
- Only emissions from the IC engines and lagoon will be used to determine if the facility is a major source since these units are considered to be the only sources of non-fugitive emissions at dairies, as discussed in section VII.C.5.
- 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.

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

- Because of the moisture content of the separated solids, PM_{10} emissions from solid manure handling are considered negligible.
- The settling basins remove at least 50% of solids prior to the manure entering the anaerobic treatment lagoon[2].
- The PM_{10} emission factors for the dairy animals 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 basis of the Emission Factors used in this evaluation is 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).
- All Rule 4570 mitigation measures are expected to result in VOC emission reductions. A conservative 10% control efficiency will be applied to all mitigation measures unless specifically noted.
- The Rule 4570 mitigation measures chosen will also have a reduction in Ammonia emissions; however, due to limited data, these reductions will not be quantified in this evaluation.
- For BACT analysis purposes, the liquid manure handling permit unit will be considered to consist 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 5% will be applied to the overall dairy EF.
- Flushing or hosing down the milking parlor immediately prior to, immediately after, or during each milking has the potential of reducing a significant amount of emissions since many of the compounds emitted from the fresh manure, such as alcohols (ethanol and methanol) and many Volatile Fatty Acids (VFAs), are highly soluble in water and the fresh excreted manure is almost immediately flushed out of the milk barn. However, 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).
- 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

[2] 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.

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 flushing 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.

- 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

Pre-Project:

VOC:

Uncontrolled Dairy Emission Factors (lb-VOC/hd-yr)				
		Milk Cow	**Dry Cow**	**Support Stock***
N-6258-1-0: **Milking Parlor**	Enteric Emissions in Milking Parlors	0.41	-	-
	Milking Parlor Floor	0.03	-	-
	Milking Parlor Total	**0.44**	-	-
N-6258-2-0: **Cow Housing**	Enteric Emissions in Cow Housing	3.69	2.23	1.71
	Corrals/Pens	6.6	3.59	2.76
	Bedding	1.0	0.54	0.42
	Lanes	0.8	0.44	0.33
	Cow Housing Total	**12.09**	**6.8**	**5.22**
N-6258-3-0: **Liquid Manure Handling**	Lagoons/Storage Ponds	1.3	0.71	0.54
	Liquid Manure Land Application	1.4	0.76	0.58
	Liquid Manure Handling Total	**2.7**	**1.47**	**1.12**
N-6258-4-0: **Solid Manure**	Solid Manure Storage	0.15	0.08	0.06
	Separated Solids Piles	0.06	0.03	0.03

Uncontrolled Dairy Emission Factors (lb-VOC/hd-yr)				
		Milk Cow	**Dry Cow**	**Support Stock***
Handling	Solid Manure Land Application	0.33	0.18	0.14
	Solid Manure Handling Total	**0.54**	**0.29**	**0.23**

*In order to calculate worst case emissions, the emission factor for the large heifers will be used.

Silage and TMR (Total Mixed Ration) Emission Factors (N-6258-5-0)		
Type of Silage	**VOC EF (µg/m^2-min)**	**Source**
Corn Silage[1]	34,681	SJVAPCD
Alfalfa Silage[1]	17,458	SJVAPCD
Wheat Silage[1]	43,844	SJVAPCD
TMR[2]	13,056	SJVAPCD

[1] Assuming pile is completely covered except for the front face
[2] Assuming rations are fed within 48 hours

PM10:

Cow Housing PM_{10} Emission Factor (EF) (lb- PM_{10}/hd-yr) (N-6258-2-0)			
Type of Cow	**Type of Housing**	**EF**	**Source**
Milk cows, dry cows and large heifers	Freestalls barns	1.37	SJVAPCD
Milk cows and dry cows	Open corrals	5.46	SJVAPCD

Ammonia:

The following emission factors will be used to calculate the emissions:

Milk Barn		
Category	Open Corral Housing ($lb\text{-}NH_3/hd\text{-}yr$)	Freestall Housing ($lb\text{-}NH_3/hd\text{-}yr$)
Milk cows	1.3	1.2

Cow Housing		
Category	Open Corral Housing ($lb\text{-}NH_3/cow\text{-}yr$)	Freestall Housing ($lb\text{-}NH_3/cow\text{-}yr$)
Milk cows	32.3	28
Dry cows	20.6	17.9
Heifers (15 - 24 mon)	14.4	12.6

Lagoon/Storage Pond		
Category	Open Corral Housing ($lb\text{-}NH_3/cow\text{-}yr$)	Freestall Housing ($lb\text{-}NH_3/cow\text{-}yr$)
Milk cows	15.5	15.7
Dry cows	9.5	9.6
Heifers (15 - 24 mon)	6.7	6.7

Land Application of Liquid Manure		
Category	Open Corral Housing ($lb\text{-}NH_3/cow\text{-}yr$)	Freestall Housing ($lb\text{-}NH_3/cow\text{-}yr$)
Milk cows	24.9	29.1
Dry cows	15.3	17.9
Heifers (15 - 24 mon)	10.7	12.5

Solid Manure NH_3 EF1 ($lbs\text{-}NH_3/hd\text{-}yr$)			
Type of Cow	**Type of Housing**	**EF**	**Source**
Milk Cow	Freestalls	3.4	SJVAPCD
Dry Cow	Open Corral	1.7	SJVAPCD
Support Stock	Open Corrals/Individual Pens	0.9	SJVAPCD

Post-Project:

VOC:

Where applicable, the VOC emission factors reflect the following mitigation measures which have been selected by the applicant:

Milking Parlor

Enteric Emissions Mitigations		
Apply	**Mitigation**	**CE (%)**
1	Feed according to National Research Council (NRC) guidelines.	10
	Total CE	10

Milking Parlor Floor Mitigations		
Apply	**Mitigation**	**CE (%)**
1	Feed according to National Research Council (NRC) guidelines.	5
1	Flush or hose milk parlor immediately prior to, immediately after, or during each milking NOTE: Control efficiency already included in EF2	0
	Total CE	5

Cow Housing

Enteric Emissions Mitigations		
Apply	**Mitigation**	**CE (%)**
1	Feed according to National Research Council (NRC) guidelines. NOTE: Control efficiency already partially included in EF2	5
	Total CE	5

Corrals/Pens Mitigations		
Apply	**Mitigation**	**CE (%)**
1	Feed according to National Research Council (NRC) guidelines.	5
1	BACT: Flush lanes four times per day for mature cows and two times per day for support stock (18.2%)	10

Corrals/Pens Mitigations		
Apply	**Mitigation**	**CE (%)**
	Rule 4570 equivalent measure: Scrape, vacuum, or flush concrete lanes in corrals at least once every day for mature cows and every seven (7) days for support stock, or clean concrete lanes such that the depth of manure does not exceed twelve (12) inches at any point or time (10%).	
1	Install shade structure such that they are constructed with a light permeable roofing material NOTE: If selected, for dairies greater than 999 milk cows, the control efficiency will be 5% since the EF used includes a partial control for this measure.	5
	Total CE	18.8

Bedding Mitigations		
Apply	**Mitigation**	**CE (%)**
1	Feed according to National Research Council (NRC) guidelines. NOTE: Control efficiency already partially included in EF2	5
1	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.	10
	Total CE	14.5

Lanes Mitigations		
Apply	**Mitigation**	**CE (%)**
1	Feed according to National Research Council (NRC) guidelines. NOTE: Control efficiency already partially included in EF2	5
1	Flush, scrape, or vacuum freestall flush lanes immediately prior to or after, or during each milking; or flush or scrape freestall flush lanes at least three (3) times per day.	10
	Total CE	14.5

Liquid Manure Handling

Lagoons/Storage Ponds Mitigations		
Apply	**Mitigation**	**CE (%)**
1	Feed according to National Research Council (NRC) guidelines. NOTE: Control efficiency already partially included in EF2	5
	Total CE	5

Liquid Manure Land Application Mitigations		
Apply	**Mitigation**	**CE (%)**
1	Feed according to National Research Council (NRC) guidelines. NOTE: Control efficiency already partially included in EF2	5
	Total CE	5

Solid Manure Handling

Solid Manure Storage Mitigations		
Apply	**Mitigation**	**CE (%)**
1	Feed according to National Research Council (NRC) guidelines. NOTE: Control efficiency already partially included in EF2	5
1	Within 72 hours of removal from housing, either a) remove dry manure from the facility, or b) cover dry manure outside the housing with a weatherproof covering from October through May, except for times when wind events remove the covering, not to exceed 24 hours per event.	10
	Total CE	14.5

Separated Solids Piles Mitigations		
Apply	**Mitigation**	**CE (%)**
1	Feed according to National Research Council (NRC) guidelines. NOTE: Control efficiency already partially included in EF2	5
	Total CE	5

Solid Manure Land Application Mitigations		
Apply	**Mitigation**	**CE (%)**
1	Feed according to National Research Council (NRC) guidelines. NOTE: Control efficiency already partially included in EF2	5
	Total CE	5

N-7056-5: Silage & TMR

Corn/Alfalfa/Wheat Silage Mitigations		
Apply	**Mitigation**	***CE (%)**
1	1. Utilize a sealed feed storage system (e.g. Ag-Bag) for bagged silage. < or > 2. Cover the surface of silage piles, except for the area where feed is being removed from the pile, with a plastic tarp that is at least 5 mils thick (0.005 inches), multiple plastic tarps with a cumulative thickness of at least 5 mils (0.005 inches), or an oxygen barrier film covered with a UV resistant material within 72 hours of last delivery of material to the pile, and Implement one of the following: a) build silage piles such that the average bulk density is at least 44 lb/cu-ft for corn silage and 40 lb/cu-ft for other silage types, as measured in accordance with Section 7.10 of Rule 4570, b) when creating a silage pile, adjust filling parameters to assure a calculated average bulk density of at least 44 lb/cu ft for corn silage and at least 40 lb/cu-ft for other silage types, using a spreadsheet approved by the District; c) harvest silage crop at > or = 65% moisture for corn; and > = 60% moisture for alfalfa/grass and other silage crops; manage silage material delivery such that no more than 6 inches of materials are uncompacted on top of the pile; and incorporate the applicable Theoretical Length of Chop (TLC) and roller opening for the crop being harvested	39

Corn/Alfalfa/Wheat Silage Mitigations		
Apply	**Mitigation**	***CE (%)**
	Manage exposed silage Implement two of the following: <u>Manage Exposed Silage</u>. a) manage silage piles such that only one silage pile has an uncovered face and the uncovered face has a total exposed surface area of less than 2,150 sq. ft., or b) manage multiple uncovered silage piles such that the total exposed surface area of all silage piles is less than 4,300 sq.ft. <u>Maintain Silage Working Face</u>. a) use a shaver/facer to remove silage from the silage pile, or b) maintain a smooth vertical surface on the working face of the silage pile <u>Silage additive</u>. a) inoculate silage with homolactic acid bacteria in accordance with manufacturer recommendations to achieve a concentration of at least 100,000 colony forming units per gram of wet forage or apply proprionic acid, benzoic acid, sorbic acid, sodium benzoate, or potassium sorbate at a rate specified by the manufacturer to reduce yeast counts when forming silage pile; or b) apply other additives at specified rates that have been demonstrated to reduce alcohol concentrations in silage and/or VOC emissions from silage and have been approved by the District and EPA.	
	*Total CE:	39

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

TMR Mitigations		
Apply	**Mitigation**	**CE (%)**
1	Push feed so that it is within 3 feet of feedlane fence within 2 hours of putting out the feed or use a feed trough or other feeding structure designed to maintain feed within reach of the cows.	10
1	Feed stream-flaked, dry rolled, cracked or ground corn or other ground cereal grains.	10
	Total CE	19

Emission Factors (lb-VOC/hd-yr)				
		Milk Cow	**Dry Cow**	**Support Stock***
Milking Parlor	Enteric Emissions in Milking Parlors	0.37	-	-
	Milking Parlor Floor	0.03	-	-
	Milking Parlor Total	**0.40**	-	-
Cow Housing	Enteric Emissions in Cow Housing	3.51	2.12	1.62
	Corrals/Pens	5.36	2.92	2.24
	Bedding	0.86	0.46	0.36
	Lanes	0.68	0.38	0.28
	Cow Housing Total	**10.41**	**5.88**	**4.50**
Liquid Manure Handling	Lagoons/Storage Ponds	1.24	0.67	0.51
	Liquid Manure Land Application	1.33	0.72	0.55
	Liquid Manure Handling Total	**2.57**	**1.39**	**1.06**

Emission Factors (lb-VOC/hd-yr)				
		Milk Cow	**Dry Cow**	**Support Stock***
Solid Manure Handling	Solid Manure Storage	0.13	0.07	0.05
	Separated Solids Piles	0.06	0.03	0.03
	Solid Manure Land Application	0.31	0.17	0.13
	Solid Manure Handling Total	**0.50**	**0.27**	**0.21**

*In order to calculate worst case emissions, the emission factor for the large heifers will be used.

Silage and TMR (Total Mixed Ration) EF2		
Type of Silage	**VOC EF (µg/m^2-min)**	**Source**
Corn Silage[1]	21,155	SJVAPCD
Alfalfa Silage[1]	10,649	SJVAPCD
Wheat Silage[1]	26,745	SJVAPCD
TMR[2]	10,575	SJVAPCD

[1] Assuming pile is completely covered except for the front face
[2] Assuming rations are fed within 48 hours

Ammonia and PM10:

Post-project emission factors for Ammonia and PM10 are the same as the pre-project emission factors.

C. Calculations

1. Pre-Project Potential to Emit (PE1)

VOC:

The VOC emissions for the proposed project are as summarized in the following calculation tables:

Milking Parlor				
Category	**Number**	**Emission Factor**	**Annual Emissions (lb/yr)**	**Daily Emissions (lb/day)**
Milk cows	1,265	0.44	557	1.5

Cow Housing				
Category	**Number**	**Emission Factor**	**Annual Emissions (lb/yr)**	**Daily Emissions (lb/day)**
Milk cows	1,265	12.09	15,294	41.9
Dry cows	235	6.8	1,598	4.4
Support stock	200	5.22	1,044	2.9
Total:			**17,936**	**49.2**

Liquid Manure - Lagoons				
Category	**Number**	**Emission Factor**	**Annual Emissions (lb/yr)**	**Daily Emissions (lb/day)**
Milk cows	1,265	1.3	1,645	4.5
Dry cows	235	0.71	167	0.5
Support stock	200	0.54	108	0.3
Total:			**1,920**	**5.3**

Liquid Manure – Land Application				
Category	**Number**	**Emission Factor**	**Annual Emissions (lb/yr)**	**Daily Emissions (lb/day)**
Milk cows	1,265	1.4	1,771	4.9
Dry cows	235	0.76	179	0.5

Liquid Manure – Land Application				
Category	**Number**	**Emission Factor**	**Annual Emissions (lb/yr)**	**Daily Emissions (lb/day)**
Support stock	200	0.58	116	0.3
Total:			**2,066**	**5.7**

Solid Manure				
Category	**Number**	**Emission Factor**	**Annual Emissions (lb/yr)**	**Daily Emissions (lb/day)**
Milk cows	1,265	0.54	683	1.9
Dry cows	235	0.29	68	0.2
Support stock	200	0.23	46	0.1
Total:			**797**	**2.2**

Feed:

Silage:

Total Open Face Area:

= [#open face piles] x [height] x
([width] + ([width]/(0.1667 x ([width]/[height]) + 1.111)))/2)

Corn Area
= 1 x 40 ft x ((120 ft + (120 ft / (0.1667 x (120 ft /40 ft) + 1.111 ft))) / 2)
= 3,890 ft^2

Wheat Area
= 1 x 40 ft x ((100 ft + (100 ft / (0.1667 x 100 ft /40 ft) + 1.111 ft)) / 2)
= 3309.1147 ft^2

Silage Annual PE:

Corn Emissions
=emission factor x area x 0.0929 m^2/ft^2 x 8,760 hr/yr x 60 min/hr x 2.20E-9 lb/µg
= 34,681 x 3,890x 0.0929 x 8760 x 60 x 2.20E-9 lb/µg
= **14,492 lb/yr**
Daily PE = (14,492 lb/yr) / (365 days/yr) = **39.7 lb/day**

Wheat Emissions
=emission factor x area x 0.0929 m^2/ft^2 x 8,760 hr/yr x 60 min/hr x 2.20E-9 lb/µg
= 43,844 x 3309.1147x 0.0929 x 8760 x 60 x 2.20E-9 lb/µg
= **15,585 lb-VOC/yr**
Daily PE = (15,585 lb/yr) / (365 days/yr) = **42.7 lb/day**

TMR:

TMR emissions should not include calves. However, the number of calves will be included in the total cow count as a worst-case scenario since the number of calves can vary.

TMR Annual PE:

= [# of cows] x [emission factor] x [area] x [min/yr] x [lb/µg]
= 1,700 x 13,056 µg/m^2-min x 0.658 m^2 x 525,600 min/yr x 2.20E-9 lb/µg
= **16,887 lb-VOC/yr**
Daily PE = (16,887 lb/yr) / (365 days/yr) = **46.3 lb/day**

Total:

Total Annual PE = Corn Emission + Wheat Emissions + TMR Emissions
= 14,492 lb/yr + 15,585 lb/yr + 16,887
= 46,964 lb/yr
Daily PE = (46,964 lb/yr) / (365 days/yr) = **128.7 lb/day**

Ammonia:

The Ammonia emissions for the proposed project are as summarized in the following calculation tables:

Milking Parlor				
Category	**Number**	**Emission Factor**	**Annual Emissions (lb/yr)**	**Daily Emissions (lb/day)**
Milk cows in freestalls	1,200	1.2	1,440	3.9
Milk cows in corrals	65	1.3	85	0.2
Total:			**1,525**	**4.1**

Cow Housing				
Category	**Number**	**Emission Factor**	**Annual Emissions (lb/yr)**	**Daily Emissions (lb/day)**
Milk cows in freestalls	1,200	28	33,600	92.1
Milk cows in corrals	65	32.3	2,100	5.8
Dry cows in freestalls	200	17.9	3,580	9.8
Dry cows in corrals	35	20.6	721	2.0

Cow Housing				
Category	**Number**	**Emission Factor**	**Annual Emissions (lb/yr)**	**Daily Emissions (lb/day)**
Large heifers in freestalls	200	12.6	2,520	6.9
Total:			**42,521**	**116.6**

Liquid Manure Lagoons				
Category	**Number**	**Emission Factor**	**Annual Emissions (lb/yr)**	**Daily Emissions (lb/day)**
Milk cows in freestalls	1,200	15.7	18,840	51.6
Milk cows in corrals	65	15.5	1,008	2.8
Dry cows in freestalls	200	9.6	1,920	5.3
Dry cows in corrals	35	9.5	333	0.9
Large heifers in freestalls	200	6.7	1,340	3.7
Total:			**23,441**	**64.3**

Liquid Manure Land Application				
Category	**Number**	**Emission Factor**	**Annual Emissions (lb/yr)**	**Daily Emissions (lb/day)**
Milk cows in freestalls	1,200	29.1	34,920	95.7
Milk cows in corrals	65	24.9	1,619	4.4
Dry cows in freestalls	200	17.9	3,580	9.8
Dry cows in corrals	35	15.3	536	1.5
Large heifers in freestalls	200	12.5	2,500	6.8
Total:			**43,155**	**118.2**

Solid Manure				
Category	**Number**	**Emission Factor**	**Annual Emissions (lb/yr)**	**Daily Emissions (lb/day)**
Milk cows	1,265	3.4	4,301	11.8
Dry cows	235	1.7	400	1.1
Support stock	200	0.9	180	0.5
Total:			**4,881**	**13.4**

H2S:

Hydrogen Sulfide (H_2S) is produced as a result of the decomposition of sulfur compounds under anaerobic conditions. Therefore, the lagoons and storage ponds will be the primary source of H_2S emissions at a dairy. Several studies have indicated that the average ammonia emissions from lagoons and ponds treating or storing liquid manure are more than ten times greater than the H_2S emissions from the source[3]. Therefore, the annual H_2S emissions from the liquid manure handling system will be conservatively estimated as 10% of the annual NH_3 emissions from the lagoons and storage ponds. Average daily H_2S emissions from the liquid manure handling system are equal to the annual H_2S emissions divided by 365 days. However, these studies and others have also indicated substantial variation in daily H_2S emission rates; therefore the maximum daily H_2S rate is estimated to be five times the average daily H_2S rate.

The H_2S emissions for this project are as summarized in the following table:

Lagoons				
Category	**Annual NH3 Emissions (lb/yr)**	**Annual H2S Emissions (10% of Annual NH3 Emissions) (lb/yr)**	**Daily Average H2S Emissions (Annual H2S/365 days/yr) (lb/day)**	**Maximum Daily H2S Emissions (Annual H2S/365 days/yr x 5) (lb/day)**
Milk cows in freestalls	18,840	1,884	5.2	25.8
Milk cows in corrals	1,008	101	0.3	1.4
Dry cows in freestalls	1,920	192	0.5	2.6
Dry cows in corrals	333	33	0.1	0.5

[3] Examples include: 1.) L. Y. Zhao, M. Darr, X. Wang, R. Manuzon, M. Brugger, E. Imerman, G. Arnold, H. Keener, A. J. Heber, Temporal variations in gas and odor emissions from a dairy manure storage pond, Proceedings of the 6th International Dairy Housing Conference2007St. Joseph, MIASABEASABE Paper No. 701P0507e. 2.) Ron E. Sheffield and Bruce Louks, Diurnal Variations of Ammonia and Hydrogen Sulfide Flux from a Dairy Manure Storage Pond in Idaho. 3) Blunden, J., and V. P. Aneja, 2008, "Characterizing ammonia and hydrogen sulfide emissions from a swine waste treatment lagoon in North Carolina", *Atmospheric Environment*, vol. 42, No. 14, pp. 3277-3290]

Lagoons				
Category	**Annual NH3 Emissions (lb/yr)**	**Annual H2S Emissions (10% of Annual NH3 Emissions) (lb/yr)**	**Daily Average H2S Emissions (Annual H2S/365 days/yr) (lb/day)**	**Maximum Daily H2S Emissions (Annual H2S/365 days/yr x 5) (lb/day)**
Large heifers in freestalls	1,340	134	0.4	1.8
Total:	**23,440**	**2,344**	**6.5**	**32.1**

PM10:

N-6258-2-0

Annual PE = [# cows in freestall barns] x [EF] + [# cows in corrals] x [EF]
= [1,600 x 1.37] + [100 x 5.46]
= **2,738 lb-PM10/yr**

Daily PE = Annual PE/365 days/yr
= (2,738 lb/yr) / 365 days/yr
= **7.5 lb/day**

2. Post Project Potential to Emit (PE2)

VOC:

The VOC emissions for the proposed project are as summarized in the following calculation tables:

Milking Parlor				
Category	**Number**	**Emission Factor**	**Annual Emissions (lb/yr)**	**Daily Emissions (lb/day)**
Milk cows	1,879	0.4	752	2.1

Cow Housing				
Category	**Number**	**Emission Factor**	**Annual Emissions (lb/yr)**	**Daily Emissions (lb/day)**
Milk cows	1,879	10.41	19,560	53.6
Dry cows	334	5.88	1,964	5.4
Total:			**21,524**	**59.0**

Liquid Manure - Lagoons				
Category	**Number**	**Emission Factor**	**Annual Emissions (lb/yr)**	**Daily Emissions (lb/day)**
Milk cows	1,879	1.24	2,330	6.4
Dry cows	334	0.67	224	0.6
Total:			**2,554**	**7.0**

Liquid Manure – Land Application				
Category	**Number**	**Emission Factor**	**Annual Emissions (lb/yr)**	**Daily Emissions (lb/day)**
Milk cows	1,879	1.33	2,499	6.8
Dry cows	334	0.72	240	0.6
Total:			**2,739**	**7.4**

Solid Manure				
Category	**Number**	**Emission Factor**	**Annual Emissions (lb/yr)**	**Daily Emissions (lb/day)**
Milk cows	1,879	0.50	940	2.6
Dry cows	334	0.27	90	0.2
Total:			**1,030**	**2.8**

Feed:

Silage:

Total Open Face Area:

= [#open face piles] x [height] x
([[width] + ([width]/(0.1667 x ([width]/[height]) + 1.111)))/2)

Corn Area
= 1 x 40 ft x ((120 ft + (120 ft / (0.1667 x (120 ft /40 ft) + 1.111 ft))) / 2)
= 3,890 ft^2

Wheat Area
= 1 x 40 ft x ((100 ft + (100 ft / (0.1667 x 100 ft /40 ft) + 1.111 ft)) / 2)
= 3309.1147 ft^2

Silage Annual PE:

Corn Emissions
=emission factor x area x 0.0929 m^2/ft^2 x 8,760 hr/yr x 60 min/hr x 2.20E-9 lb/µg
= 21,155 x 3,890 x 0.0929 x 8760 x 60 x 2.20E-9 lb/µg

= **8,840 lb/yr**
Daily PE = (8,840 lb/yr) / (365 days/yr) = **24.2 lb/day**

Wheat Emissions
=emission factor x area x 0.0929 m^2/ft^2 x 8,760 hr/yr x 60 min/hr x 2.20E-9 lb/µg
= 26,745 x 3309.1147 x 0.0929 x 8760 x 60 x 2.20E-9 lb/µg
= **9,507 lb-VOC/yr**
Daily PE = (9,507 lb/yr) / (365 days/yr) = **26.0 lb/day**

TMR:

TMR emissions should not include calves. However, the number of calves will be included in the total cow count as a worst-case scenario since the number of calves can vary.

TMR Annual PE:
= [# of cows] x [emission factor] x [area] x [min/yr] x [lb/µg]
= 2,213 x 10,575 µg/m^2-min x 0.658 m^2 x 525,600 min/yr x 2.20E-9 lb/µg
= **17,806 lb-VOC/yr**
Daily PE = (17,806 lb/yr) / (365 days/yr) = **48.8 lb/day**

Total:

Total Annual PE = Corn Emission + Wheat Emissions + TMR Emissions
= 8,840 lb/yr + 9,507 lb/yr + 17,806
= 36,153 lb/yr
Daily PE = (36,370 lb/yr) / (365 days/yr) = **99.0 lb/day**

Ammonia:

The Ammonia emissions for the proposed project are as summarized in the following calculation tables:

Milking Parlor				
Category	**Number**	**Emission Factor**	**Annual Emissions (lb/yr)**	**Daily Emissions (lb/day)**
Milk cows in freestalls	1,879	1.2	2,255	6.2

Cow Housing				
Category	**Number**	**Emission Factor**	**Annual Emissions (lb/yr)**	**Daily Emissions (lb/day)**
Milk cows in freestalls	1,879	28	52,612	144.1

Cow Housing				
Category	**Number**	**Emission Factor**	**Annual Emissions (lb/yr)**	**Daily Emissions (lb/day)**
Dry cows in freestalls	334	17.9	5,979	16.4
Total:			**58,591**	**160.5**

Liquid Manure Lagoons				
Category	**Number**	**Emission Factor**	**Annual Emissions (lb/yr)**	**Daily Emissions (lb/day)**
Milk cows in freestalls	1,879	15.7	29,500	80.8
Dry cows in freestalls	334	9.6	3,206	8.8
Total:			**32,706**	**89.6**

Liquid Manure Land Application				
Category	**Number**	**Emission Factor**	**Annual Emissions (lb/yr)**	**Daily Emissions (lb/day)**
Milk cows in freestalls	1,879	29.1	54,679	149.8
Dry cows in freestalls	334	17.9	5,979	16.4
Total:			**60,658**	**166.2**

Solid Manure				
Category	**Number**	**Emission Factor**	**Annual Emissions (lb/yr)**	**Daily Emissions (lb/day)**
Milk cows	1,879	3.4	6,389	17.5
Dry cows	334	1.7	568	1.6
Total:			**6,957**	**19.1**

H2S:

Hydrogen Sulfide (H_2S) is produced as a result of the decomposition of sulfur compounds under anaerobic conditions. Therefore, the lagoons and storage ponds will be the primary source of H_2S emissions at a dairy. Several studies have indicated that the average ammonia emissions from lagoons and ponds treating or storing liquid manure are more than ten times greater than the H_2S emissions from

the source[4]. Therefore, the annual H_2S emissions from the liquid manure handling system will be conservatively estimated as 10% of the annual NH_3 emissions from the lagoons and storage ponds. Average daily H_2S emissions from the liquid manure handling system are equal to the annual H_2S emissions divided by 365 days. However, these studies and others have also indicated substantial variation in daily H_2S emission rates; therefore the maximum daily H_2S rate is estimated to be five times the average daily H_2S rate.

The H_2S emissions for this project are as summarized in the following table:

Liquid Manure Lagoons				
Category	**Annual NH3 Emissions (lb/yr)**	**Annual H2S Emissions (10% of Annual NH3 Emissions) (lb/yr)**	**Daily Average H2S Emissions (Annual H2S/365 days/yr) (lb/day)**	**Maximum Daily H2S Emissions (Annual H2S/365 days/yr x 5) (lb/day)**
Milk cows in freestalls	29,500	2,950	8.1	40.4
Dry cows in freestalls	3,206	321	0.9	4.4
Total:	**32,706**	**3,271**	**9.0**	**44.8**

PM10:

N-6258-2-1

Annual PE = [# cows in freestall barns] x [EF] + [# cows in corrals] x [EF]
= [2,213 x 1.37] + [0 x 5.46]
= 3,032 lb-PM10/yr

Daily PE = Annual PE/365 days/yr
= 3,032 lb/yr / 365 days/yr
= 8.3 lb/day

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

Pursuant to Section 4.9 of District Rule 2201, the Pre-Project Stationary Source Potential to Emit (SSPE1) is the Potential to Emit (PE) from all units with valid Authorities to Construct (ATC) or Permits to Operate (PTO) at the Stationary Source and the quantity of emission reduction credits (ERC) which have been banked since

[4] Examples include: 1.) L. Y. Zhao, M. Darr, X. Wang, R. Manuzon, M. Brugger, E. Imerman, G. Arnold, H. Keener, A. J. Heber, Temporal variations in gas and odor emissions from a dairy manure storage pond, Proceedings of the 6th International Dairy Housing Conference2007St. Joseph, MIASABEASABE Paper No. 701P0507e. 2.) Ron E. Sheffield and Bruce Louks, Diurnal Variations of Ammonia and Hydrogen Sulfide Flux from a Dairy Manure Storage Pond in Idaho. 3) Blunden, J., and V. P. Aneja, 2008, "Characterizing ammonia and hydrogen sulfide emissions from a swine waste treatment lagoon in North Carolina", *Atmospheric Environment*, vol. 42, No. 14, pp. 3277-3290]

September 19, 1991 for Actual Emissions Reductions that have occurred at the source, and which have not been used on-site.

The SSPE1 for this facility is as shown in the following table:

Pre-Project Stationary Source Potential to Emit (SSPE2)							
Permit Unit	NO_X (lb/yr)	SO_X (lb/yr)	PM_{10} (lb/yr)	CO (lb/yr)	VOC (lb/yr)	NH_3 (lb/yr)	H2S (lb/yr)
N-6258-1: Milk Barn	0	0	0	0	557	1,525	0
N-6258-2: Cow housing	0	0	2,738	0	17,936	42,521	0
N-6258-3: Liquid manure	0	0	0	0	3,986	66,596	2,344
N-6258-4: Solid manure	0	0	0	0	797	4,881	0
N-6258-5: Feed	0	0	0	0	46,964	0	0
N-6258-6: ICE	694	0	33	211	79	0	0
SSPE1:	**694**	**0**	**2,771**	**211**	**70,319**	**115,523**	**2,344**

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

Pursuant to Section 4.10 of District Rule 2201, the Post Project Stationary Source Potential to Emit (SSPE2) is the Potential to Emit (PE) from all units with valid Authorities to Construct (ATC) or Permits to Operate (PTO) at the Stationary Source and the quantity of emission reduction credits (ERC) which have been banked since September 19, 1991 for Actual Emissions Reductions that have occurred at the source, and which have not been used on-site.

The SSPE2 for this facility is as shown in the following table:

Post-Project Stationary Source Potential to Emit (SSPE2)							
Permit Unit	NO_X (lb/yr)	SO_X (lb/yr)	PM_{10} (lb/yr)	CO (lb/yr)	VOC (lb/yr)	NH_3 (lb/yr)	H2S (lb/yr)
N-6258-1: Milk Barn	0	0	0	0	752	2,255	0
N-6258-2: Cow housing	0	0	3,032	0	21,524	58,591	0
N-6258-3: Liquid manure	0	0	0	0	5,293	93,364	3,271
N-6258-4: Solid manure	0	0	0	0	1,030	6,957	0
N-6258-5: Feed	0	0	0	0	36,153	0	0
N-6258-6: ICE	694	0	33	211	79	0	0
SSPE2:	**694**	**0**	**3,065**	**211**	**64,831**	**161,167**	**3,271**

5. 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 following threshold values. However, Section 3.25.2 states "for the purposes of determining major source status, the SSPE2 shall not include 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."

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.*" The District has researched this issue and concurs with the CAPCOA assessment, as discussed in more detail below.

Milk Barns:

A mechanical ventilation system can be utilized to capture the gases emitted from the milk barns. 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 barns 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, or 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, or vent for the purpose of reducing emissions.

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, or vent for the purpose of reducing emissions. 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, or vent for the purpose of reducing emissions.

Feed Handling and Storage:

Although there are potentially significant emissions from the feed handling and storage operation, an emission factor has not been established. 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 capture any of the emissions from these piles. A system has not been designed to extract the gases from the face of the pile to capture them. Therefore, the District cannot reasonably demonstrate that these emissions can pass through a stack, chimney, or vent for the purpose of reducing emissions.

Liquid Manure Storage Lagoons/Ponds:

The District has determined that control technology to capture emissions from lagoons (biogas collection systems, for instance) is in use; therefore, these emissions can be reasonably collected and are not fugitive. Therefore, only emissions from the lagoons, storage ponds, and IC engines will be used to determine if this facility is a major source.

The following table shows the non-fugitive Post-Project Stationary Source Potential to Emit for the dairy:

Major Source Determination					
	NO_X (lb/yr)	**SO_X** (lb/yr)	**PM_{10}** (lb/yr)	**CO** (lb/yr)	**VOC** (lb/yr)
N-6258-1: Milk Barn	0	0	0	0	0
N-6258-2: Cow Housing	0	0	0	0	0
N-6258-3: Liquid Manure	0	0	0	0	2,554
N-6258-4: Solid Manure	0	0	0	0	0
N-6258-5: Feed	0	0	0	0	0
N-6258-6: ICE	694	0	33	211	79
Non-Fugitive SSPE	**694**	**0**	**33**	**211**	**2,633**
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, the facility is not a major source.

6. 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 criteria pollutant. Therefore, BE = PE1 = 0 for all pollutants and emission units.

7. SB 288 Major Modification

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

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

8. 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 pollutants, this 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).

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 A.

VIII. Compliance

Rule 1070 Inspections

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

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

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

Rule 2010 Permits Required

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

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

Rule 2201 New and Modified Stationary Source Review Rule

A. Best Available Control Technology (BACT)

1. BACT Applicability

BACT requirements are triggered on a pollutant-by-pollutant basis and on an emissions unit-by-emissions unit basis for the following*:

a. Any new emissions unit with a potential to emit exceeding two pounds per day,
b. The relocation from one Stationary Source to another of an existing emissions unit with a potential to emit exceeding two pounds per day,

c. Modifications to an existing emissions unit with a valid Permit to Operate resulting in an AIPE exceeding two pounds per day, and/or
d. Any new or modified emissions unit, in a stationary source project, which results in 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 emissions units – PE > 2 lb/day

The project involves the modification of existing permit units, hence BACT is not triggered under this category.

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

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

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

Since the project involves modification of existing emission units, AIPE calculations are required.

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. 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

AIPE = PE2 – (PE1 * (EF2 / EF1))

The AIPE calculations are summarized in the following tables:

VOC:

Milk Barn						
	PE2	PE1	EF2	EF1	HAPE	**AIPE**
Milk cows	2.1	1.5	0.4	0.44	1.4	**0.7**

Cow Housing						
	PE2	PE1	EF2	EF1	HAPE	**AIPE**
Milk Cows	53.6	41.9	9.92	12.09	34.4	19.2
Dry cows	5.1	4.4	5.61	6.8	3.6	1.5
Support stock	0.0	2.9	4.3	5.22	2.4	-2.4
Total:						**18.3**

Liquid Manure - Lagoons						
	PE2	PE1	EF2	EF1	HAPE	**AIPE**
Milk cows	6.4	4.5	1.24	1.3	4.3	2.1
Dry cows	0.6	0.5	0.67	0.71	0.5	0.1
Support stock	0.0	0.3	0.51	0.54	0.3	-0.3
Total:						**2.0**

Liquid Manure - Land Application						
	PE2	PE1	EF2	EF1	HAPE	**AIPE**
Milk cows	6.8	4.9	1.33	1.4	4.7	2.1
Dry cows	0.6	0.5	0.72	0.76	0.5	0.1
Support stock	0.0	0.3	0.55	0.58	0.3	-0.3
Total:						**2.0**

Solid Manure						
	PE2	PE1	EF2	EF1	HAPE	**AIPE**
Milk cows	2.6	1.9	0.5	0.54	1.8	0.8
Dry cows	0.2	0.2	0.27	0.29	0.2	0.0
Support stock	0.0	0.1	0.21	0.23	0.1	-0.1
Total:						**0.8**

Feed						
	PE2	PE1	EF2	EF1	HAPE	**AIPE**
Corn silage	24.2	39.7	21155	34681	24.2	0.0
Wheat silage	26.0	42.7	26745	43844	26.0	0.0
TMR	48.8	46.3	10575	13056	37.5	**11.3**

NH3:

Note: F = Freestall barns; C = Corrals

Milk Barn						
	PE2	PE1	EF2	EF1	HAPE	**AIPE**
Milk cows - F	6.2	3.9	1.2	1.2	3.9	2.3
Milk cows - C	0.0	0.2	1.3	1.3	0.2	-0.2
Total:						**2.1**

Cow Housing						
	PE2	PE1	EF2	EF1	HAPE	**AIPE**
Milk cows - F	144.1	92.1	28	28	92.1	52.0
Milk cows - C	0.0	5.8	32.3	32.3	5.8	-5.8
Dry cows - F	16.4	9.8	17.9	17.9	9.8	6.6
Dry cows - C	0.0	2.0	20.6	20.6	2.0	-2.0
Heifers - F	0.0	6.9	12.6	12.6	6.9	-6.9
Total:						**43.9**

Liquid Manure - Lagoons						
	PE2	PE1	EF2	EF1	HAPE	**AIPE**
Milk cows - F	80.8	51.6	15.7	15.7	51.6	29.2
Milk cows - C	0.0	2.8	15.5	15.5	2.8	-2.8
Dry cows - F	8.8	5.3	9.6	9.6	5.3	3.5
Dry cows - C	0.0	0.9	9.5	9.5	0.9	-0.9
Heifers - F	0.0	3.7	6.7	6.7	3.7	-3.7
Total:						**25.3**

Liquid Manure - Land Application						
	PE2	PE1	EF2	EF1	HAPE	**AIPE**
Milk cows - F	149.8	95.7	29.1	29.1	95.7	54.1
Milk cows - C	0.0	4.4	24.9	24.9	4.4	-4.4
Dry cows - F	16.4	9.8	17.9	17.9	9.8	6.6
Dry cows - C	0.0	1.5	15.3	15.3	1.5	-1.5
Heifers - F	0.0	6.8	12.5	12.5	6.8	-6.8
Total:						**48.0**

Solid Manure						
	PE2	PE1	EF2	EF1	HAPE	**AIPE**
Milk cows	17.5	11.8	3.4	3.4	11.8	5.7
Dry cows	1.6	1.1	1.7	1.7	1.1	0.5
Support stock	0.0	0.5	0.9	0.9	0.5	-0.5
Total:						**5.7**

H2S:

Note: F = Freestall barns; C = Corrals

H2S - Lagoons						
	PE2	PE1	EF2*	EF1*	HAPE	**AIPE**
Milk cows - F	40.4	25.8	0.022	0.022	25.8	14.6
Milk cows - C	0.0	1.4	0.022	0.022	1.4	-1.4
Dry cows - F	4.4	2.6	0.013	0.013	2.6	1.8
Dry cows - C	0.0	0.5	0.014	0.014	0.5	-0.5
Heifers - F	0.0	0.4	0.002	0.002	0.4	-0.4
Total:						**14.1**

*Back-calculated from maximum daily PE and number of cows.

PM10:

Note: F = Freestall barns; C = Corrals

Cow Housing						
	PE2	PE1	EF2	EF1	HAPE	**AIPE**
Freestalls	8.3	6.0	1.37	1.37	6.0	2.3
Corrals	0.0	1.5	5.46	5.46	1.5	-1.5
Total:						**0.8**

As shown in the tables above, AIPE is greater than 2 lb/day and hence BACT is triggered for the following emission units:

- Milk Barn: NH3
- Cow Housing: VOC and NH3
- Lagoons: NH3 and H2S
- Land application: NH3
- Solid Manure: NH3
- 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:

Milk Barns:

NH_3: Flush/Spray down milking parlor after each group of cows is milked

Cow Housing and TMR:

VOC: 1) Feed lanes and walkways constructed of concrete.
2) Feed lanes and walkways flushed, scraped or vacuumed four times per day.
3) All animals fed in accordance with National Research Council (NRC) or other District-approved guidelines utilizing routine nutritional analysis for rations.
4) VOC mitigation measures required by District Rule 4570.

Cow Housing:

NH_3: 1) Concrete feed lanes and walkways.
2) Feed lanes and walkways flushed, scraped or vacuumed four times per day.
3) All animals fed in accordance with National Research Council (NRC) or other District-approved guidelines utilizing routine nutritional analysis for rations.

Liquid Manure Handling System:

Lagoon/Storage Pond:

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

H2S: 1) All animals fed in accordance with National Research Council (NRC) or other District-approved guidelines utilizing routine nutritional analysis for rations.

2) Separation of solids from liquid manure stream prior to treatment in the lagoons.

Land Application:

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

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. Any new Major Source, which is a new facility that is also a Major Source,

b. Major Modifications,

c. Any new emissions unit with a Potential to Emit greater than 100 pounds during any one day for any one pollutant,

d. Any project which results in the offset thresholds being surpassed, and/or

e. Any project with an SSIPE of greater than 20,000 lb/year for any pollutant.

a. New Major Source

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

b. Major modification

As demonstrated in VII.C.7, this project does not constitute a major modification. Public noticing for major modification purposes is therefore not required.

c. 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 emission units, public notice is not triggered under this category.

d. 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:

Offset Threshold				
Pollutant	SSPE1 (lb/year)	SSPE2 (lb/year)	Offset Threshold	Public Notice Required?
NO_X	694	694	20,000 lb/year	No
SO_X	0	0	54,750 lb/year	No
PM_{10}	2,771	3,065	29,200 lb/year	No
CO	211	211	200,000 lb/year	No
VOC	70,319	64,831	20,000 lb/year	No
NH3	115,523	161,167	N/A	No
H2S	2,344	3,271	N/A	No

As shown above, there were no thresholds surpassed with this project; therefore public noticing is not required for offset purposes.

e. SSIPE > 20,000 lb/year

Public notice 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/yr)	SSPE1 (lb/yr)	SSIPE (lb/yr)	Public Notice Threshold (lb/yr)	Public Notice Required?
NO_x	694	694	0	20,000	No
SO_x	0	0	0	20,000	No
PM_{10}	3,065	2,771	294	20,000	No
CO	211	211	0	20,000	No
VOC	64,831	70,319	-5,488	20,000	No
NH_3	161,167	115,523	45,644	20,000	Yes
H2S	3,271	2,344	927	20,000	No

As demonstrated in the preceding table, the SSIPE for NH_3 is greater than 20,000 lb/year. Public notice for SSIPE purposes is therefore required.

2. Public Notice Action

As discussed above, public notice is required for this project. 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 Tulare County prior to the issuance of the ATCs for the project.

D. Daily Emission Limits (DELs)

Daily Emission Limits (DELs) and other enforceable conditions are required 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 by the number and types of cows listed in the permit equipment description for the Cow Housing (Permit N-7056-2). The following conditions will be placed on the permit to enforce these requirements:

Cow Housing:

- The total number of cattle housed at the dairy at any one time shall not exceed any of the following limits: 1,879 milk cows and 334 dry cows (not to exceed a combined total of 2,213 mature cows). [District Rule 2201]

Liquid Manure Handling System:

- The liquid manure handling system shall handle flush manure from no more than 1,879 milk cows and 334 dry cows (not to exceed a combined total of 2,213 mature cows). [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 University of Idaho in a document entitled "*Dairy Odor Management & Control Practices*"[5], the following conditions will be placed on the permit to ensure that emissions from the dairy are minimized:

- Inspection for potholes and other sources of emissions shall be done on a monthly basis. [District Rule 2201] N
- Firm, stable, and not easily eroded soils shall be used for the exercise pens. [District Rule 2201] N
- A supply of fill soil shall be kept on site in order to fill areas where erosion and gouging occurs. This will help fill areas where puddles may form. This fill soil shall be covered with a tarp. [District Rule 2201] N
- Clean rainfall runoff shall be diverted around exercise pens to reduce the amount of water that is potentially detained on the corral surface. [District Rule 2201] N

3. Recordkeeping

Recordkeeping is required to demonstrate compliance with the offset, public notification and daily emission limit requirements of Rule 2201. Recordkeeping for the Milk Barns, the Liquid Manure Management System, and the Solid Manure Management System is satisfied with the records that must be kept to demonstrate compliance with the numbers and types of cows listed on the permit equipment description for the Cow Housing. The following conditions will be added to the permit for the Cow Housing:

- 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

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

invoices, ration sheets or periodic inventory records. [District Rules 2201 and 4570] N

- Permittee shall maintain records of: (1) number of times feed lanes and feed aprons are flushed per day; and (2) a log of pothole inspections performed at the dairy. [District Rules 1070, 2201 and 4570] N

- {3246} All records shall be maintained and retained on-site for a period of at least 5 years and shall be made available for District inspection upon request. [District Rule 1070]

Additional recordkeeping requirements are shown under the Rule 4570 compliance section.

4. Reporting

No reporting is required to demonstrate compliance with Rule 2201.

F. Ambient Air Quality Analysis

Section 4.14.1 of this Rule requires that an ambient air quality analysis (AAQA) 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 Technical Services Division of the SJVAPCD conducted the required analysis. Refer to Appendix B of this document for the AAQA summary sheet.

The proposed location is in a non-attainment area for PM_{10} and $PM_{2.5}$ standards. The increase in the ambient air concentrations of these pollutants due to the proposed dairy expansion is shown on the table titled Calculated Contribution. The District's Interim Significance Level for the AAQS, is shown in the table titled Significance Levels.

Significance Levels

Pollutant	Significance Levels ($\mu g/m^3$) – District's Interim Significance Level for the State's AAQS				
	Annual Avg.	24 hr Avg.	8 hr Avg.	3 hr Avg.	1 hr Avg.
PM_{10}	N/A	10.4	N/A	N/A	N/A
$PM_{2.5}$	N/A	2.5	N/A	N/A	N/A

Calculated Contribution

Pollutant	Calculated Contributions ($\mu g/m^3$)			
	24 hr Avg.	8 hr Avg.	3 hr Avg.	1 hr Avg.
PM_{10}	**0.75**	N/A	N/A	N/A
$PM_{2.5}$	**0.11**	N/A	N/A	N/A

As shown in the preceding tables, modeling results indicated that the calculated increase in the ambient PM concentrations due to the proposed dairy project did not exceed the District's significance level. The project is therefore approved.

Rule 2520 Federally Mandated Operating Permits

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

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

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

Under Section 112(g) of the Clean Air Act (administered locally through SJVAPCD Rule 2550, *Federally Mandated Preconstruction Review for Major Sources of Air Toxics*), newly constructed facilities or reconstructed units or sources at existing facilities would be subject to preconstruction review requirements if they have the potential to emit hazardous air pollutants (air toxics) in "major" amounts (10 tons or more of an individual pollutant or 25 tons or more of a combination of pollutants) and the new units are not already subject to a standard promulgated under Section 112(d), 112(j), or 112(h) of the Clean Air Act." Facilities or sources subject to Rule 2550 would be subject to stringent air pollution control requirements, referred to as Maximum Achievable Control Technology (MACT).

The federal Clean Air Act lists 189 substances as potential HAPs (Clean Air Act Section 112(b)(1)). Based on the current emission factor for dairies, the following table outlines the HAPs expected to be emitted at dairies. Since this dairy is complying with Best Available Control Technology (BACT) emissions control requirements, many of the pollutants listed below are expected to be reduced significantly; however, no control is being applied in the emissions estimates in order to calculate worst-case emissions. A conclusion that MACT requirements are triggered would necessarily involve consideration of controlled emissions levels:

Dairy Hazardous Air Pollutant Emissions		
HAP	lb/milk cow-yr	Source
Methanol	1.35	UC Davis - *VOC Emission from Dairy Cows and their Excreta,* 2005
Carbon disulfide	0.027	Dr. Schmidt - *Dairy Emissions using Flux Chambers (Phase I & II)*, 2005
Eythylbenzene	0.003	
o-Xylene	0.005	
1,2-Dibromo-3chloropropane	0.011	

Dairy Hazardous Air Pollutant Emissions		
HAP	lb/milk cow-yr	Source
1,2,4-Trichlorobenzene	0.025	
Napthalene	0.012	
Hexachlorobutadiene	0.012	
Formaldehyde	0.005	
Acetaldehyde	0.029	
Chloroform	0.017	California State University Fresno (CSUF) - *Monitoring and Modeling of ROG at California Dairies*, 2005
Styrene	0.01	
Vinyl acetate	0.08	Dr. Schmidt - *Dairy Emissions using Flux Chambers (Phase I & II)* & California State University Fresno (CSUF) - *Monitoring and Modeling of ROG at California Dairies*, 2005
Toluene	0.162	
Cadmium	0.009	Air Resources Board's Profile No. 423, Livestock Operations Dust
Hexavalent Chromium	0.004	
Nickel	0.026	
Arsenic	0.005	
Cobalt	0.003	
Lead	0.033	
Total	**1.828**	

The emission calculations for HAPs from the proposed dairy are as shown below:

HAP Emissions					
Category	**Number of cows**		**Emission Factor * lb/hd-yr**		**lb/yr (tons/yr)**
Milk cows	1,879	x	1.828	=	3,435 (1.7)
Dry cows and bulls	334	x	1.123	=	375 (0.2)
				Total:=	**3,810 (1.9)**

* The emission factor has been adjusted for each category of cows using the ratio of amount of manure generated by that category to the amount generated by milk cows.

As shown in the table above, total HAP emissions from this facility are less than 10 tons/year. This demonstrates that the facility is below the 10 tons/year individual HAP threshold as well as the 25 tons/year total HAPs threshold. This facility is therefore not a major air toxics source and the provisions of Rule 2550 do not apply.

There are several recently completed and ongoing research studies that will be considered in future revisions of the current emission factors for dairies. These studies have not been fully vetted or reviewed in the context of establishing standardized emission factors. For instance, although some studies indicate a high methanol emissions rate from fresh manure, the same

studies also indicate that the flushing of manure may significantly reduce alcohol emissions, including methanol.

Future review of these studies may indeed result in a change in the current emission factors and/or control efficiencies for various practices and controls, but not until the scientific review process is complete and the District has had an opportunity to consider public comment on any proposed changes.

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 B), the total facility

prioritization score, including this project, was not greater than 1.0. Therefore, a health risk assessment was not required.

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 1.0 and a cancer risk greater than 10 in a million). As outlined by the RMR Summary in Appendix B 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-6258-CMPP-0) and is therefore in compliance with the requirements of this rule.

Rule 4570 Confined Animal Facilities (CAF)

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

Section 5.0 Requirements

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

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

The applicant has submitted an application containing all the requirements above. Since public noticing is required for this project, a public notice will be published in a local newspaper of general circulation prior to the issuance of these ATC's.

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

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

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

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

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

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

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] N

Section 7.0 Administrative Requirements

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

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

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

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

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] N

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

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

General Conditions

- {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] N

- {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] N

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] N

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] N

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] N

- {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] N

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] N

- {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] N

- {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] N

- {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] N

- {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] N

- {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] N

- {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] N

- {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] N

- {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] N

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] N

- {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] N

- {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] N

- {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] N

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] N

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

Freestall Barn

Required

Pave feed lanes, where present, for a width of at least 8 feet along the corral side of the feedlane fence for milk and dry cows and at least 6 feet along the corral side of the feedlane for heifers.

- {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] N

Optional

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

- {4487} Permittee shall flush, scrape or vacuum freestall lanes immediately prior to, immediately after or during each milking. [District Rule 4570] N

- {4488} Permittee shall maintain records sufficient to demonstrate that freestall lanes are flushed, scraped or vacuumed immediately prior to, immediately after or during each milking. [District Rule 4570] N

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] N

- {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] N

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] N

- {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] N

{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] N

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] N

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] N

- {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] N

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] N

- {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] N

Therefore this facility is in compliance with this Rule.

California Health and Safety Code 42301.6 (School Notice)

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

California Senate Bill 700 (SB 700)

Michael Brasil Dairy is an agricultural operation that raises dairy cows for the production of milk for human consumption. Pursuant to Senate Bill (SB) 700, all agricultural operations, including Confined Animal Facilities (CAF), with emissions greater than ½ the major source emissions threshold levels (12.5 ton/year of NO_X or VOC), are required to obtain a District permit.

Both the pre-project and post-project emissions from the dairy exceed the 10 ton-VOC/year threshold and the dairy is classified as a large CAF by the California Air Resources Board (ARB) and is therefore subject to District permit requirements.

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.

Greenhouse Gas (GHG) Significance Determination

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

District CEQA Findings

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

The District is a Responsible Agency for the project because of its discretionary approval power over the project via its Permits Rule (Rule 2010) and New Source Review Rule (Rule 2201), (CEQA Guidelines §15381) Rule 2010 requires operators of emission sources to obtain an Authority to Construct (ATC) and Permit to Operate (PTO) from the District. Rule 2201 requires that new and modified stationary sources of emissions mitigate their emissions using best available control technology (BACT) and for non-agricultural sources offsetting emissions when above certain thresholds (SB 700). As a responsible agency the District complies with CEQA by considering the EIR prepared by the Lead Agency, and by reaching its own conclusion on whether and how to approve the project involved (CEQA Guidelines §15096).

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

IX. Recommendation

Compliance with all applicable rules and regulations is expected. Pending a successful Public Noticing period, issue Authorities to Construct N-6258-1-1, 2-1, 3-1, 4-1, and 5-1 subject to the permit conditions on the attached draft Authorities to Construct in Appendix D.

X. Billing Information

Annual Permit Fees			
Permit Number	Fee Schedule	Fee Description	Annual Fee
N-6258-1-1	3020-06	Milking Parlor	$105.00
N-6258-2-1	3020-06	Cow Housing	$105.00
N-6258-3-1	3020-06	Liquid Manure Handling System	$105.00
N-6258-4-1	3020-06	Solid Manure Handling System	$105.00
N-6258-5-1	3020-06	Feed Storage and Handling	$105.00

Appendices

A: Quarterly Net Emissions Change (QNEC) Calculations
B: Summary of Risk Management Review (RMR) and Ambient Air Quality Analysis (AAQA)
C: BACT Analysis
D: Draft ATCs

APPENDIX A

Quarterly Net Emissions Change (QNEC) Calculations

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 - BE, where:

QNEC = Quarterly Net Emissions Change for each emissions unit, lb/qtr.
PE2 = Post Project Potential to Emit for each emissions unit, lb/qtr.
BE = Baseline Emissions (per Rule 2201) for each emissions unit, lb/qtr.

Using the values in Sections VII.C in the main section of this evaluation, the QNEC values for each emission unit are as summarized in the following tables:

Milking Barn

Quarterly PE1					
Pollutant	PE1 (lb/year)	÷	4 qtr/year	=	PE1 (lb/qtr)
NO_X	0	÷	4 qtr/year	=	0.0
SO_X	0	÷	4 qtr/year	=	0.0
PM_{10}	0	÷	4 qtr/year	=	0.0
CO	0	÷	4 qtr/year	=	0.0
VOC	557	÷	4 qtr/year	=	139.25
NH_3	1,525	÷	4 qtr/year	=	381.25

Quarterly PE2					
Pollutant	PE2 (lb/year)	÷	4 qtr/year	=	PE2 (lb/qtr)
NO_X	0	÷	4 qtr/year	=	0.0
SO_X	0	÷	4 qtr/year	=	0.0
PM_{10}	0	÷	4 qtr/year	=	0.0
CO	0	÷	4 qtr/year	=	0.0
VOC	752	÷	4 qtr/year	=	188.0
NH_3	2,255	÷	4 qtr/year	=	563.75

QNEC					
Pollutant	PE2 (lb/qtr)	-	BE (lb/qtr)	=	QNEC (lb/qtr)
NO_X	0.0	-	0.0	=	0.0
SO_X	0.0	-	0.0	=	0.0
PM_{10}	0.0	-	0.0	=	0.0
CO	0.0	-	0.0	=	0.0
VOC	188.0	-	139.25	=	48.75
NH_3	563.75	-	381.25	=	182.5

Cow Housing

Quarterly PE1					
Pollutant	PE1 (lb/year)	÷	4 qtr/year	=	PE1 (lb/qtr)
NO_X	0	÷	4 qtr/year	=	0.0
SO_X	0	÷	4 qtr/year	=	0.0
PM_{10}	2,738	÷	4 qtr/year	=	684.5
CO	0	÷	4 qtr/year	=	0.0
VOC	17,936	÷	4 qtr/year	=	4,484.0
NH_3	42,521	÷	4 qtr/year	=	10,630.25

Quarterly PE2					
Pollutant	PE2 (lb/year)	÷	4 qtr/year	=	PE2 (lb/qtr)
NO_X	0	÷	4 qtr/year	=	0.0
SO_X	0	÷	4 qtr/year	=	0.0
PM_{10}	3,032	÷	4 qtr/year	=	758.0
CO	0	÷	4 qtr/year	=	0.0
VOC	21,524	÷	4 qtr/year	=	5,381.0
NH_3	58,591	÷	4 qtr/year	=	14,647.75

QNEC					
Pollutant	PE2 (lb/qtr)	-	BE (lb/qtr)	=	NEC (lb/qtr)
NO_X	0.0	-	0.0	=	0.0
SO_X	0.0	-	0.0	=	0.0
PM_{10}	758.0	-	684.5	=	73.5
CO	0.0	-	0.0	=	0.0
VOC	5,381.0	-	4,484.0	=	897.0
NH_3	14,647.75	-	10,630.25	=	4,017.5

Liquid Manure Handling System

Quarterly PE1					
Pollutant	PE1 (lb/year)	÷	4 qtr/year	=	PE1 (lb/qtr)
NO_X	0	÷	4 qtr/year	=	0.0
SO_X	0	÷	4 qtr/year	=	0.0
PM_{10}	0	÷	4 qtr/year	=	0.0
CO	0	÷	4 qtr/year	=	0.0
VOC	3,986	÷	4 qtr/year	=	996.5
NH_3	66,596	÷	4 qtr/year	=	16,649.0
H2S	2,344	÷	4 qtr/year	=	586.0

Quarterly PE2					
Pollutant	PE2 (lb/year)	÷	4 qtr/year	=	PE2 (lb/qtr)
NO_X	0	÷	4 qtr/year	=	0.0
SO_X	0	÷	4 qtr/year	=	0.0
PM_{10}	0	÷	4 qtr/year	=	0.0
CO	0	÷	4 qtr/year	=	0.0
VOC	5,293	÷	4 qtr/year	=	1,323.25
NH_3	93,364	÷	4 qtr/year	=	23,341.0
H2S	3,271	÷	4 qtr/year	=	817.75

QNEC					
Pollutant	PE2 (lb/qtr)	-	BE (lb/qtr)	=	NEC (lb/qtr)
NO_X	0.0	-	0.0	=	0.0
SO_X	0.0	-	0.0	=	0.0
PM_{10}	0.0	-	0.0	=	0.0
CO	0.0	-	0.0	=	0.0
VOC	1,323.25	-	996.5	=	326.75
NH_3	23,341.0	-	16,649.0	=	6,692.0
H2S	817.75	-	586.0	=	231.75

Solid Manure Handling System

Quarterly PE1					
Pollutant	PE1 (lb/year)	÷	4 qtr/year	=	PE1 (lb/qtr)
NO_X	0	÷	4 qtr/year	=	0.0
SO_X	0	÷	4 qtr/year	=	0.0
PM_{10}	0	÷	4 qtr/year	=	0.0
CO	0	÷	4 qtr/year	=	0.0
VOC	797	÷	4 qtr/year	=	199.25
NH_3	4,881	÷	4 qtr/year	=	1,220.25

Quarterly PE2					
Pollutant	PE2 (lb/year)	÷	4 qtr/year	=	PE2 (lb/qtr)
NO_X	0	÷	4 qtr/year	=	0.0
SO_X	0	÷	4 qtr/year	=	0.0
PM_{10}	0	÷	4 qtr/year	=	0.0
CO	0	÷	4 qtr/year	=	0.0
VOC	1,030	÷	4 qtr/year	=	257.5
NH_3	6,957	÷	4 qtr/year	=	1,739.25

QNEC					
Pollutant	PE2 (lb/qtr)	-	BE (lb/qtr)	=	NEC (lb/qtr)
NO_X	0.0	-	0.0	=	0.0
SO_X	0.0	-	0.0	=	0.0
PM_{10}	0.0	-	0.0	=	0.0
CO	0.0	-	0.0	=	0.0
VOC	257.5	-	199.25	=	58.25
NH_3	1,739.25	-	1,220.25	=	519.0

Feed Storage and Handling

Quarterly PE1					
Pollutant	PE1 (lb/year)	÷	4 qtr/year	=	PE1 (lb/qtr)
NO_X	0	÷	4 qtr/year	=	0.0
SO_X	0	÷	4 qtr/year	=	0.0
PM_{10}	0	÷	4 qtr/year	=	0.0
CO	0	÷	4 qtr/year	=	0.0
VOC	46,964	÷	4 qtr/year	=	11,741.0

Quarterly PE2					
Pollutant	PE2 (lb/year)	÷	4 qtr/year	=	PE2 (lb/qtr)
NO_X	0	÷	4 qtr/year	=	0.0
SO_X	0	÷	4 qtr/year	=	0.0
PM_{10}	0	÷	4 qtr/year	=	0.0
CO	0	÷	4 qtr/year	=	0.0
VOC	36,153	÷	4 qtr/year	=	9,038.25

QNEC					
Pollutant	PE2 (lb/qtr)	-	BE (lb/qtr)	=	NEC (lb/qtr)
NO_X	0.0	-	0.0	=	0.0
SO_X	0.0	-	0.0	=	0.0
PM_{10}	0.0	-	0.0	=	0.0
CO	0.0	-	0.0	=	0.0
VOC	9,038.25	-	11,741.0	=	-2702.75

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....*".[6] 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

1. VOC Formation and Emissions:

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.[7] 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.

Cattle feed is also a significant source of VOC emissions. VOCs are emitted directly from silage piles during the fermentation process, as well as from feed that has been mixed and

[6] 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

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

spread out in the feed alleys (Total Mixed Ration or TMR) for consumption.

2. 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.[8] Exposure to high levels of ammonia can cause irritation to the skin, throat, lungs, and eyes.

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

The potential for ammonia volatilization exists wherever manure is present, and ammonia will be emitted from confinement buildings, open lots, stockpiles, anaerobic lagoons, and land application from both wet and dry handling systems. The rate of ammonia volatilization is influenced by a number of factors including the concentrations of nitrogenous compounds in the manure, temperature, air velocity, surface area, moisture, and pH. Because of its high solubility in water, the loss of ammonia to the atmosphere will be more rapid when drying of manure occurs. However, there 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.[9]

3. 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).

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

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

In a dairy, the conditions for the production of Hydrogen Sulfide exist in many areas 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 Milking Parlor

BACT Analysis for NH_3 Emissions from the Milking Parlor:

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.

Flushing or spraying down the milk parlor after milking each group of cows has been identified as a possible control for the NH_3 emissions from the milking parlor. No other control technologies that meet the definition of Achieved-in-Practice have been identified for NH_3 emissions from the milking parlors.

1) Flush/spray after each group of cows is milked

Description of Control Technology

1) Milking Parlor Flushed/Sprayed down after each Group of Cows is milked

Almost all dairy operations utilize some type of flush or spray system to wash out the manure that dairy cows deposit in the milking parlors. The primary purpose of the flush or spray system is to maintain the minimum level of sanitation required in the milking parlors. However, this system also serves as an emission control for reducing VOC and ammonia emissions. The manure deposited in the milking parlor, which is a source of NH_3 emissions, is removed from the milking parlor many times a day by flushing after each milking. Ammonia has a high affinity for water and is highly soluble in water. Therefore, a large proportion of ammonia will dissolve in the flush water and will not be emitted from the milking parlors.

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) Flush/spray down milking parlors after each group of cows is milked

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 flush or spray down the milking parlor after each group of cows is milked, 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 the milk parlor.

III. Top Down BACT Analysis for the Cow Housing

1. BACT Analysis for 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 joint with BACT for housing as it would not be practical to control emissions 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):

1) Enclosed freestalls vented to an incinerator (≈ 93%; 95% Capture, 98% Control of 100% of cow housing emissions)
2) Enclosed freestalls vented to a biofilter (≈ 76%; 95% Capture, 80% Control of 100% of cow housing emissions)
3) Feed and Manure Management Practices (≈ 22%)

- Concrete feed lanes and walkways for all cows
- Freestall feed lanes and walkways for milk cows and dry cows flushed four times per day (≈ 18% for total emissions from cow housing; 47% for emissions from 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)

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 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; 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

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

Increased Flushing for feed lanes and walkways

Many dairy operations use a flush system to remove manure from the corral and freestall feed lanes and walkways. The flush system introduces a large volume of water at the head of the paved area of the corrals or freestalls, and the cascading water removes the manure. The required volume of flush water varies with the size and slope of the area to be flushed. The freestall and corral lanes are for milk and dry cows are typically flushed twice per day, but the flushing frequency can vary between one to four times per day. The lanes for support stock are usually flushed once per day or less frequently.

In addition to cleaning the corral and freestall feed lanes and walkways, the flush system also serves as an emission control for reducing 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 area by the flush system. Many of the VOCs emitted from fresh cow manure, such as alcohols (ethanol and methanol) and many Volatile Fatty Acids (VFAs), are highly soluble in water. Therefore, a large percentage of these compounds will dissolve in the flush water and will not be emitted from the cow housing permit unit. The flush water can then carry the manure and the dissolved volatile compounds to an anaerobic treatment lagoon or other manure stabilization process for treatment.

It must be noted that the flush system will only control the VOCs emitted from the manure it will have little or no effect on enteric emissions produced from the cows'

digestive processes. As stated above, the feed lanes and walkways in the cow housing areas are typically flushed twice per day. Flushing the lanes four times per day will increase the frequency that manure is removed from the cow housing permit unit and should result in a higher percentage of soluble volatile compounds being dissolved in the flush. Based on calculations given in the final DPAG report[10], 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 compose approximately 61% of the VOC emissions from the cow housing permit unit 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%.

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[11]. This undigested protein also produces ammonia 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.

[10] "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).

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

b. Step 2 - Eliminate technologically infeasible options

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

c. Step 3 - Rank remaining options by control effectiveness

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

1) Enclosed freestalls vented to an incinerator (≈ 93%; 95% Capture, 98% Control)
2) Enclosed freestalls vented to a biofilter (≈ 76%; 95% Capture, 80% Control)
3) Feed and Manure Management Practices (≈ 22%)
   - Concrete feed lanes and walkways for all cows
   - Freestall feed lanes and walkways for milk cows and dry cows flushed four times per day (≈ 18% for total emissions from cow housing; 47% for emissions from 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)

d. Step 4 - Cost Effectiveness Analysis

Thermal and 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.[12]

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 worst-case calculation purposes, a year round airflow requirement of 335 cfm/cow (average of 170 and 500 cfm per cow) will be assumed for mature cows.

The analysis below is for the entire herd:

As discussed in the evaluation, the project consists of the following: 1,879 milk cows and 334 dry cows. Enclosed freestalls will be evaluated as a housing alternative for all animals at this dairy.

The total required airflow rate for housing for these animals in freestalls is calculated as follows:

Category	# of cows	cfm/cow	min/hr	ft^3/hr
Milk cow	1,879	335	60	37,767,900
Dry cow	334	335	60	6,713,400
Total:				**44,481,300**

Fuel Requirement for Thermal 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

[12] 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)

Natural Gas Requirement for Thermal Incineration

= (44,481,300 scf/hr)(0.0194 Btu/scf - °F)(600 °F - 100 °F)(1-0.7)
= **129,440,583 Btu/hr**

Fuel Cost for Thermal Incineration:

The cost for natural gas will be based upon the average spot market contract price (industrial) for August 2011 taken from the Energy Information Administration website (http://tonto.eia.doe.gov/dnav/ng/ng_sum_lsum_dcu_SCA_m.htm).

Average Cost for natural gas = $7.37/MMBtu

The oxidizer is assumed to operate 12 hours per day and 365 days per year.

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

129,440,583 Btu/hr x 1 MMBtu/10^6 Btu x 12 hr/day x 365 day/year x $7.37/MMBtu
= **$4,178,419/year**

VOC Emission Reductions for Thermal 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:

[Number of cows] x [Uncontrolled Cow Housing VOC EF (lb/cow-year)] x [Capture Efficiency] x [Thermal Incinerator Control Efficiency]

Category	# of cows	EF- lbs/hd-yr	CE	lbs-VOC/yr
Milk cow	1,879	9.92	93%	17,335
Dry cow	334	5.61	93%	1,743
TMR	2,213	8.046	93%	16,559
Total:				**35,637**

Cost of VOC Emission Reductions

Cost of reductions = ($4,178,419/year)/((35,637 lb-VOC/year)(1 ton/2000 lb))
= **$234,499/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. Additional costs such as the cost of constructing freestalls for all support stock, enclosing all freestalls, and the cost of installing and operating a cooling system for cow comfort would make it even less cost effective to install this technology. 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"[13]. 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 in the thermal/catalytic incineration section, the following average year-round airflow requirements will be assumed for worst-case purposes (based on the averages from the Minnesota's publication "Improving Mechanical Ventilation in Dairy Barns"[13]. (See discussion on page 8 of this BACT analysis): mature cows – 335 cfm/cow (average of 170 and 500 cfm per cow).

The analysis below is for the entire herd:

As previously discussed, the dairy will house 1,879 milk cows and 334 dry cows. Enclosed freestalls will be evaluated as a housing alternative for all animals at this dairy.

The total maximum airflow entering the biofilter from the enclosed freestalls for these animals is calculated as follows:

Category	# of cows	cfm/cow	cfm
Milk cows	1,879	335	629,465
Dry cows	334	335	111,890
Total:			**741,355**

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

[13] "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

be assumed in this cost analysis.
The capital cost of the biofilter is calculated as follows:

$2.35 cfm x 741,355 cfm = $1,742,184

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.

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

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

$$A = [\$1,742,184 \times 0.1(1.1)^{10}]/[(1.1)^{10}-1]$$
$$= \textbf{\$283,532/year}$$

VOC Emission Reductions for Biofiltration

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

[Number of cows] x [Uncontrolled Cow Housing VOC EF (lb/cow-year)] x [Overal Control Efficiency]

Category	# of cows	EF- lbs/hd-yr	CE	lbs-VOC/yr
Milk cow	1,879	9.92	76%	14,166
Dry cow	334	5.61	76%	1,424
TMR	2,213	8.046	76%	13,532
Total:				**29,123**

Cost of VOC Emission Reductions

Cost of reductions = ($283,532/year)/((29,123 lb-VOC/year)(1 ton/2000 lb))
= **$19,471/ton of VOC reduced**

As shown above, the capital cost alone for a biofilter would cause the cost of the VOC reductions to be greater than the $17,500/ton cost effectiveness threshold of the District BACT policy. Additional costs such as the cost of constructing freestalls for all support stock, enclosing all freestalls, and the cost of installing and operating a cooling system for cow comfort would make it even less cost effective to install this technology. 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 for all cows
- Freestall feed lanes and walkways for milk cows and dry cows flushed four times per day
- All animals fed in accordance with National Research Council (NRC) or other District-approved guidelines utilizing routine nutritional analysis for rations.

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

e. Step 5 - Select BACT

The facility is proposing concrete feed lanes and walkways; to flush the freestall feed lanes and walkways for the milk and dry cows four times per day; and to feed all animals in accordance with National Research Council (NRC) or other District-approved guidelines utilizing routine nutritional analysis for rations; which satisfies the BACT requirements.

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.

3. BACT Analysis for NH_3 Emissions from the Cow Housing Permit Unit:

a. Step 1 - Identify all control technologies

A cost effectiveness threshold has not been established for ammonia. Therefore, only options that meet the District's definition of Achieved-in-Practice controls will be evaluated in this project. However, for purposes of the Dairy BACT Guideline, the District will not deem any control options Achieved-in-Practice until after the final Dairy BACT Guideline has been established

The following management practices have been identified as possible control options for the 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 for all cows

- Feed lanes and walkways for milk cows and dry cows flushed four times per
- 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) Feed and Manure Management Practices

Concrete Feed Lanes and Walkways

Dairy animals spend a large amount of time on the feed lanes and walkways. Constructing these areas of concrete will reduce particulate matter emissions by having the animals spend more time on a paved surface rather than dry dirt. The concrete lanes and walkways create an avenue for the flush system. The flush system will further reduce particulate matter emissions and will also reduce VOC and ammonia emissions (see below).

Increased Flushing for feed lanes and walkways

Many dairy operations use a flush system to remove manure from the corral and freestall feed lanes and walkways. The flush system introduces a large volume of water at the head of the paved area of the corrals or freestalls, and the cascading water removes the manure. The required volume of flush water varies with the size and slope of the area to be flushed. The freestall and corral lanes for milk and dry cows are typically flushed twice per day, but the flushing frequency can vary between one to four times per day. The lanes for support stock are usually flushed once per day or less frequently.

In addition to cleaning the corral and freestall feed lanes and walkways, the flush system also serves as an emission control for reducing PM_{10}, VOC, and ammonia emissions. The manure deposited in the lanes, which is also a source of NH_3 emissions, is removed from the cow housing area by the flush system. Ammonia has a high affinity for water and is highly soluble in water. Therefore, a large portion of ammonia will be flushed away with the flush water and will not be emitted from the cow housing permit unit.

Animals fed in accordance with (NRC) or other District-approved Guidelines

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

A diet that is formulated to feed proper amounts of ruminantly degradable protein will result in improved nitrogen utilization by the animal and corresponding reduction in urea and organic nitrogen content of the manure, which will reduce the production of VOCs

and Ammonia. The latest National Research Council (NRC) guidelines for the selection of an optimal bovine diet should be followed to the maximum extent possible. The diet recommendations made in this publication seek to achieve the maximum uptake of protein by the animal and the minimum carryover of nitrogen into the manure.

b. Step 2 - Eliminate technologically infeasible options

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

c. Step 3 - Rank remaining options by control effectiveness

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

1) Feed and Manure Management Practices
   - Concrete feed lanes and feed walkways for all cows
   - Freestall feed lanes and walkways for milk cows and dry cows flushed four times per day
   - All animals fed in accordance with National Research Council (NRC) or other District-approved guidelines 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 concrete feed lanes and feed walkways; to flush the freestall feed lanes and walkways for the milk and dry cows four times per day; and to feed all animals in accordance with National Research Council (NRC) or other District-approved guidelines utilizing routine nutritional analysis for rations; which satisfies the BACT requirements.

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.

IV. Top-Down BACT Analysis for the Liquid Manure Handling System – Lagoon/Storage Pond

1. BACT Analysis for NH_3 Emissions from the Lagoon/Storage Pond:

a. Step 1 - Identify all control technologies

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

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 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 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 lagoons/storage ponds.

2. BACT Analysis for H2S Emissions from the Lagoon/Storage Pond:

a. Step 1 - Identify all control technologies

A cost effectiveness threshold has not been established for H2S. 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 options were identified as possible controls for H2S emissions from the Lagoon/Storage Pond:

1. Lagoon PH maintained at a minimum of 7.8, with monitoring and recordkeeping, and adjustment with lime (or similar base) as needed

2. Feeding per NRC Guidelines

3. Solids Separation

4. Reduce or Eliminate the Use of Copper Sulfate as a Footbath Disinfectants

Description of Control Technologies

1) Lagoon pH Maintained at a Minimum of 7.8

Hydrogen Sulfide in the lagoon exists in both aqueous and vapor phases. The aqueous phase is represented by hydrogen sulfide (HS^-) and sulfide (S^{2-}) ions, whereas the vapor phase is represented by Hydrogen Sulfide gas. The determining factor of the proportion of each phase is pH. If the pH is low enough, virtually all Hydrogen Sulfide while exist in the vapor phase, and Hydrogen Sulfide gas emissions from the surface of the lagoon will be maximized. On the other hand, if the pH is high enough, virtually all the Hydrogen Sulfide with exist in the aqueous phase, and Hydrogen Sulfide gas emissions will be virtually non-existent.

While a pH high enough to eliminate emissions completely is probably not feasible in a large body of liquid such as a dairy manure lagoon, emissions may still be significantly reduced by maintaining the pH of the lagoon in the basic range. Modeling results indicate that significant reductions can be achieved cost effectively at a minimum pH of 7.8. This pH will be achieved by the addition of lime (or similar salts) to the lagoon. Monitoring and record keeping will be required to ensure that the pH is maintained above the recommended value.

2) Feeding per NRC Guidelines

H_2S is produced as a result of the decomposition of sulfur compounds in the manure under anaerobic conditions. The presence of these Sulfur compounds in the manure is primarily due to excretion of excess Sulfur from the digestive tract, as well as other inorganic sources[14].

Because both organic Nitrogen and Sulfur compounds are primarily components of amino acids, they tend to occur in set ratios and strategies to reduce the excretion of undigested protein and Nitrogen will also reduce the amount of Sulfur in the manure. A diet that is formulated to feed proper amounts of ruminantly-degradable protein will result in improved protein utilization by the animal and corresponding reduction in sulfur content of the manure, which will reduce the potential for production of H_2S.

3) Solids Separation

Solids separation will reduce loading and the amount of organic Sulfur compounds that are stored under anaerobic conditions, thereby reducing the potential for production of H_2S.

[14] http://www.epa.gov/ttnchie1/ap42/ch09/draft/draftanimalfeed.pdf

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

In addition to mechanical separators, settling basins can also be used to remove solids; however, they must be frequently emptied so the removed solids do not remain in an anaerobic.

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

Some researchers recommended reducing or eliminating the use of Copper Sulfate as a means of reducing H_2S emissions from lagoons. This will reduce the amount of inorganic sulfur compounds that are stored under anaerobic conditions, thereby reducing the potential for production of H_2S. Copper Sulfate can also be detrimental to purple sulfur bacteria and other anaerobic microbes that reduce VOC and H_2S[15].

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

b. Step 2 - Eliminate technologically infeasible options

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

1) Lagoon pH Maintained at a Minimum of 7.8

This measure should not be considered because it would result in increased Ammonia emissions. Under pH conditions close to neutral or acidic (pH 7 or lower) Ammonia exists primarily as the soluble Ammonium ion, which is retained in the lagoon[16]. When the pH increases toward the basic range, the Ammonium ion is increasingly converted into the insoluble Ammonia phase and emitted into the atmosphere. Since under normal circumstances lagoon pH is close to neutral or is slightly acidic, it is reasonable to assume that the balance between H2S and NH3 emissions is somewhat optimal. Further, since NH3 is generally present in significantly larger quantities than H2S, leaving the pH in a natural range that may slightly favor H2S emission is more beneficial than influencing it into the basic range that will favor NH3 emissions.

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

[16] http://pubs.ext.vt.edu/442/442-110/442-110.html

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

Copper Sulfate is one of the main disinfectants used in dairy footbaths to prevent the occurrence and spread digital dermatitis (aka hairy foot warts) on the hooves of dairy cattle. Digital dermatitis is a health concern that can result in lameness in dairy cattle. Further research is needed to better quantify the effect that the use of copper sulfate has on H_2S emissions and to additional research is needed regarding the effectiveness and practicality of the use of alternative disinfectants for the prevention of digital dermatitis. Therefore, this practice will not be required at this time but may be revaluated later.

c. Step 3 - Rank remaining options by control effectiveness

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

1) Feeding per NRC Guidelines

2) Solids Separation

d. Step 4 - Cost Effectiveness Analysis

Since the remaining control measures are achieved in practice, a cost effectiveness analysis is not required.

e. Step 5 - Select BACT

The facility is proposing to feed all animals per NRC guidelines and separate solids from the manure stream prior to treatment in the lagoon. Therefore, the BACT requirements are satisfied.

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

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 for ammonia at this time. (Although these options must meet the District definition of Achieved-in-Practice, pursuant to the Settlement Agreement (9/20/2004) between the District and Western United Dairyman and Alliance of Western Milk Producers 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 liquid manure land application. No other control technologies that

meet the definition of Achieved-in-Practice have been identified for liquid manure land application.

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

Description of Control Technologies

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

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

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

b. Step 2 - Eliminate technologically infeasible options

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

c. Step 3 - Rank remaining options by control effectiveness

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

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

d. Step 4 - Cost Effectiveness Analysis

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

e. Step 5 - Select BACT

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

Additionally, District Rule 2201 defines BACT as including the most stringent emission limitation or control technique, including process and equipment changes, that has been found by the APCO to be cost effective and technologically feasible for such class or category of sources or for a specific source. The District has found that the 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.

VI. Top-Down BACT Analysis for the Solid Manure

Solid manure refers to manure that has a solid content of 20% or greater. The manure produced by the dry cows and heifers will be scraped from the feed lanes and walkways in the partial house corrals. This manure will be primarily handled as a solid. This BACT analysis will be performed from the solid manure that will be scraped from the feed lanes and walkways in the partial house corrals

BACT Analysis for NH_3 Emissions from Solid Manure:

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 amount of undigested nitrogen compounds in the manure. The level of microbial action in the manure corresponds to the level of organic nitrogen content in the manure; the lower the level of nitrogen the lower the level of microbial action and the lower the production of ammonia and VOCs.

A diet that is formulated to feed proper amounts of ruminantly degradable protein will

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

b. Step 2 - Eliminate technologically infeasible options

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

c. Step 3 - Rank remaining options by control effectiveness

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

2) 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 B

Summary of Risk Management Review (RMR)
and
Ambient Air Quality Analysis (AAQA)

San Joaquin Valley Air Pollution Control District
Risk Management Review

To:	Jonah Aiyabei – Permit Services
From:	Cheryl Lawler – Technical Services
Date:	March 27, 2012
Facility Name:	Michael Brasil Dairy
Location:	18254 First Avenue, Stevinson
Application #(s):	N-6258-1-1 thru 5-1
Project #:	N-1112698

A. RMR SUMMARY

RMR Summary					
Categories	**Milk Parlor (Unit 1-1)**	**Cow Housing (Unit 2-1)**	**Lagoon (Unit 3-1)**	**Project Totals**	**Facility Totals**
Prioritization Score	**0.00***	**0.16***	0.15	0.31	0.31
Acute Hazard Index	N/A	N/A	**1.00****	1.00**	1.00**
Chronic Hazard Index	N/A	N/A	N/A	N/A	0.00
Maximum Individual Cancer Risk	N/A	N/A	N/A	N/A	0.00
T-BACT Required?	**No**	**No**	**No**		
Special Permit Conditions?	**No**	**No**	**Yes**		

*The unit passed on prioritization with a score of less than 1; therefore, no further analysis was required.
**H2S analysis was required for this unit which resulted in an Acute Hazard Index of 1.0. The facilitywide cumulative total for the Acute Hazard Index is now at its maximum allowed total of 1.0. No future projects are allowed for this facility without first re-examining this project.

Proposed Permit Conditions

To ensure that human health risks will not exceed District allowable levels; the following permit conditions must be included for:

Unit 3-1

1. The pH value cannot be any lower than 7.5.
2. The quarterly H2S concentration cannot exceed 5 mg/L.

B. RMR REPORT

I. Project Description

Technical Services performed an Ambient Air Quality Analysis and a Risk Management Review for an existing dairy expansion from the current "as-built" capacity of 1,265 milk cows and 235 dry cows, to a maximum capacity of 1,879 milk cows and 334 dry cows. The project results in an increase in PM10, PM2.5, and NH3 emissions; but due to the control measures applied, there is a decrease in overall project VOC emissions.

II. Analysis

Units 1-1 thru 3-1

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 units were prioritized using the procedures in the 1990 CAPCOA Facility Prioritization Guidelines and incorporated in the District's HEART's database. The prioritization scores for each unit were each less than one (see RMR Summary Table); therefore, no further analysis was necessary.

Units 4-1 & 5-1

No prioritization or further review was required for Units 4-1 & 5-1 (solid manure handling & feed and storage piles).

The following parameters were used for the review:

Analysis Parameters N-6258, Project N-1112698			
Total Expansion of Cows		713	
Annual Increase of NH3 (lb/yr)	45,644	**Hourly Increase of NH3 (lb/hr)**	5.211
Annual Increase of PM10 (lb/yr)	294	**Hourly Increase of PM10 (lb/hr)**	0.034
Annual Increase of PM2.5 (lb/yr)*	44.1	**Hourly Increase of PM2.5 (lb/hr)***	0.005

*Per the processing engineer, the increase in PM2.5 is 15 percent of the PM10 increase amounts.

In addition to the above, H2S emissions analysis was required for Unit 3-1 (lagoon). This analysis was performed using District approved programs and calculations, and resulted in an Acute Hazard Index of 1.0.

Technical Services also performed Ambient Air Quality Analysis for Unit 2-1 (cow housing). The modeling was performed for the criteria pollutants PM_{10} and $PM_{2.5}$ using AERMOD. The emission rates used were 294 lb PM_{10}/year and 44.1 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
Proposed Dairy Increase	0.75
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_{10} Pollutant Modeling Results
Values are in $\mu g/m^3$

Category $PM_{2.5}$	24 Hours
Proposed Dairy Increase	0.11
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

Unit 1-1

The prioritization score for this unit is not above 1.0. In accordance with the District's Risk Management Policy, the unit is approved **without** Toxic Best Available Control Technology (T-BACT).

Unit 2-1

The ambient air quality impacts from the increase in PM_{10} and $PM_{2.5}$ emissions at the dairy do not exceed the District's 24-hour interim thresholds for fugitive dust sources.

The prioritization score for this unit is not above 1.0. In accordance with the District's Risk Management Policy, the unit is approved **without** Toxic Best Available Control Technology (T-BACT).

Unit 3-1

The impact from the increase in H2S emissions at the dairy results in an Acute Hazard Index of 1.0. The facilitywide cumulative total for the Acute Hazard Index is now at its maximum allowed total of 1.0. No future projects are allowed for this facility without first re-examining this project.

The prioritization score for this unit is not above 1.0. In accordance with the District's Risk Management Policy, the unit is approved **without** Toxic Best Available Control Technology (T-BACT).

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

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

APPENDIX D

Draft ATCs

San Joaquin Valley
Air Pollution Control District

AUTHORITY TO CONSTRUCT

DRAFT

PERMIT NO: N-6258-1-1

ISSUANCE DATE: DRAFT

LEGAL OWNER OR OPERATOR: MICHAEL BRASIL DAIRY
MAILING ADDRESS: 18246 FIRST AVE
STEVINSON, CA 95374

LOCATION: 18254 FIRST AVE
STEVINSON, CA 95374

EQUIPMENT DESCRIPTION:
MODIFICATION OF 1,265 COW MILKING OPERATION: INCREASE MAXIMUM NUMBER OF MILK COWS TO 1,879.

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 flush or hose down milk parlor immediately after each milking. [District Rules 2201 and 4570]
5. Permittee shall provide verification that milk parlor is flushed or hosed down after each milking. [District Rules 2201 and 4570]
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]

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-6258-1-1 : Apr 3 2012 9:19AM -- AIYABEIJ : Joint Inspection NOT Required

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. [District Rules 2070 and 2080, and Public Resources Code 21000-21177: California Environmental Quality Act]

San Joaquin Valley
Air Pollution Control District

AUTHORITY TO CONSTRUCT

DRAFT

PERMIT NO: N-6258-2-1

ISSUANCE DATE: DRAFT

LEGAL OWNER OR OPERATOR: MICHAEL BRASIL DAIRY
MAILING ADDRESS: 18246 FIRST AVE
STEVINSON, CA 95374

LOCATION: 18254 FIRST AVE
STEVINSON, CA 95374

EQUIPMENT DESCRIPTION:
MODIFICATION OF COW HOUSING - 1,265 MILK COWS, NOT TO EXCEED A COMBINED TOTAL OF 1,500 MATURE COWS (MILK AND DRY), AND 200 TOTAL SUPPORT STOCK (HEIFERS, CALVES, AND BULLS): INCREASE THE MAXIMUM NUMBER OF COWS TO 1,879 MILK COWS AND 334 DRY COWS (NOT TO EXCEED A COMBINED TOTAL OF 2,213 MATURE COWS; NO SUPPORT STOCK); CONSTRUCT ONE NEW 800-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. The total number of cattle housed at this dairy at any one time shall not exceed any of the following limits: 1,879 milk cows and 334 dry cows (not to exceed a combined total of 2,213 mature cows); no support stock. All cattle shall be housed in freestall barns. [District Rule 2201]
5. Permittee shall flush freestall barn lanes at least four (4) times per day. [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

DRAFT

DAVID WARNER, Director of Permit Services
N-6258-2-1 : Apr 3 2012 9:19AM – AIYABEIJ : Joint Inspection NOT Required

6. Permittee shall keep records or maintain an operating plan that requires freestall flush lanes to be flushed at least four times per day. [District Rules 2201 and 4570]
7. {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]
8. {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]
9. Inspection for potholes or other sources of emissions shall be performed on a monthly basis. [District Rule 2201]
10. Permittee shall maintain records of pothole inspections performed at the dairy. [District Rule 2201]
11. Firm, stable, and not easily eroded soils shall be used for the exercise pens. [District Rule 2201]
12. A supply of fill soil shall be kept on site in order to fill areas where erosion and gouging occurs. This will help fill areas where puddles may form. This fill soil shall be covered with a tarp. [District Rule 2201]
13. Clean rainfall runoff shall be diverted around exercise pens to reduce the amount of water that is potentially detained on the corral surface. [District Rule 2201]
14. 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]
15. {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]
16. {3658} This permit does not authorize the violation of any conditions established for this facility in the Conditional Use Permit (CUP), Special Use Permit (SUP), Site Approval, Site Plan Review (SPR), or other approval documents issued by a local, state, or federal agency. [District Rules 2070 and 2080, and Public Resources Code 21000-21177: California Environmental Quality Act]

San Joaquin Valley
Air Pollution Control District

AUTHORITY TO CONSTRUCT

DRAFT

PERMIT NO: N-6258-3-1

ISSUANCE DATE: DRAFT

LEGAL OWNER OR OPERATOR: MICHAEL BRASIL DAIRY
MAILING ADDRESS: 18246 FIRST AVE
STEVINSON, CA 95374

LOCATION: 18254 FIRST AVE
STEVINSON, CA 95374

EQUIPMENT DESCRIPTION:
MODIFICATION OF LIQUID MANURE MANAGEMENT SYSTEM CONSISTING OF SETTLING BASINS AND A STORAGE PONDS: ALLOW INCREASE IN LIQUID MANURE THROUGHPUT DUE TO HERD SIZE 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 system shall handle flush manure from no more than 1,879 milk cows and 334 dry cows (not to exceed a combined total of 2,213 mature cows); no support stock. [District Rule 2201]
5. {4538} Permittee shall remove solids with a solid separator system, prior to the manure entering the lagoon. [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-6258-3-1 : Apr 3 2012 9:19AM – AIYABEIJ : Joint Inspection NOT Required

6. {4550} Permittee shall not allow liquid manure to stand in the fields for more than twenty-four (24) hours after irrigation. [District Rule 4570]

7. {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]

8. {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]

9. {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. [District Rules 2070 and 2080, and Public Resources Code 21000-21177: California Environmental Quality Act]

San Joaquin Valley
Air Pollution Control District

AUTHORITY TO CONSTRUCT

DRAFT

PERMIT NO: N-6258-4-1

ISSUANCE DATE: DRAFT

LEGAL OWNER OR OPERATOR: MICHAEL BRASIL DAIRY
MAILING ADDRESS: 18246 FIRST AVE
STEVINSON, CA 95374

LOCATION: 18254 FIRST AVE
STEVINSON, CA 95374

EQUIPMENT DESCRIPTION:
MODIFICATION OF SOLID MANURE MANAGEMENT SYSTEM CONSISTING OF MANURE STOCKPILES: ALLOW INCREASE IN SOLID MANURE THROUGHPUT DUE TO HERD SIZE 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

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-6258-4-1: Apr 3 2012 9:19AM -- AIYABEIJ : Joint Inspection NOT Required

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. [District Rules 2070 and 2080, and Public Resources Code 21000-21177: California Environmental Quality Act]

San Joaquin Valley
Air Pollution Control District

AUTHORITY TO CONSTRUCT

PERMIT NO: N-6258-5-1

ISSUANCE DATE: DRAFT

LEGAL OWNER OR OPERATOR: MICHAEL BRASIL DAIRY
MAILING ADDRESS: 18246 FIRST AVE
STEVINSON, CA 95374

LOCATION: 18254 FIRST AVE
STEVINSON, CA 95374

EQUIPMENT DESCRIPTION:
MODIFICATION OF FEED AND STORAGE CONSISTING OF SILAGE PILES: : ALLOW INCREASE IN FEED THROUGHPUT DUE TO HERD SIZE 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]

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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. Permittee shall maintain records of feed content, formulation, and quantity of feed additive utilized, to demonstrate compliance with National Research Council (NRC) guidelines. Records such as feed company guaranteed analyses (feed tags), ration sheets, or feed purchase records may be used to meet this requirement. [District Rules 2201 and 4570]

6. {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]

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20. {4474} For each silage pile that Option 3 (Moisture, TLC, Roller Opening, & Material Delivery) is chosen as a mitigation measure for building the pile, the permittee shall harvest corn used for the pile at an average moisture content of at least 65% and harvest other silage crops for the pile at an average moisture content of at least 60%. [District Rule 4570]

21. {4475} For each silage pile that Option 3 (Moisture, TLC, Roller Opening, & Material Delivery) is chosen as a mitigation measure for building the pile, records of the average percent moisture of crops harvested for silage shall be maintained. [District Rule 4570]

22. {4476} For each silage pile that Option 3 (Moisture, TLC, Roller Opening, & Material Delivery) is chosen as a mitigation measure for building the pile, the permittee shall adjust setting of equipment used to harvest crops for the pile to incorporate the following parameters for Theoretical Length of Chop (TLC) and roller opening, as applicable: 1) Corn with no processing: TLC not exceeding 1/2 inch, 2) Processed Corn: TLC not exceeding 3/4 inch and roller opening of 1-4 mm, 3) Alfalfa/Grass: TLC not exceeding 1.0 inch, 4) Other silage crops: TLC not exceeding 1/2 inch. [District Rule 4570]

23. {4477} For each silage pile that Option 3 (Moisture, TLC, Roller Opening, & Material Delivery) is chosen as a mitigation measure for building the pile, records that equipment used to harvest crops for the pile was set to the required TLC and roller opening for the type of crop harvested shall be maintained. [District Rule 4570]

24. {4478} For each silage pile that Option 3 (Moisture, TLC, Roller Opening, & Material Delivery) is chosen as a mitigation measure for building the pile, the permittee shall manage silage material delivery such that the thickness of the layer of un-compacted material delivered on top of the pile is no more than six (6) inches. [District Rule 4570]

25. {4479} For each silage pile that Option 3 (Moisture, TLC, Roller Opening, & Material Delivery) is chosen as a mitigation measure for building the pile, the permittee shall maintain a plan that requires that the thickness of the layer of un-compacted material delivered on top of the pile is no more than six (6) inches. [District Rule 4570]

26. {4480} Permittee shall select and implement at least two of the following mitigation measures for management of silage piles at the facility: Option 1) manage silage piles such that only one silage pile has an uncovered face and the total exposed surface area is less than 2,150 square feet, or manage multiple uncovered silage piles such that the total exposed surface area of all uncovered silage piles is less than 4,300 square feet; Option 2) use a shaver/facer to remove silage from the silage pile, or shall use another method to maintain a smooth vertical surface on the working face of the silage pile; or Option 3) inoculate silage with homolactic lactic acid bacteria in accordance with manufacturer recommendations to achieve a concentration of at least 100,000 colony forming units per gram of wet forage, apply propionic acid, benzoic acid, sorbic acid, sodium benzoate, or potassium sorbate at the rate specified by the manufacturer to reduce yeast counts when forming silage piles, or apply other additives at rates that have been demonstrated to reduce alcohol concentrations in silage and/or VOC emissions from silage and have been approved by the District and EPA. Records of the options chosen for managing each silage pile shall be maintained. [District Rule 4570]

27. {4481} If Option 1 (Limiting Exposed Area of Silage) is chosen as a mitigation measure for managing silage piles, the permittee shall calculate and record the maximum (largest part of pile) total exposed area of each silage pile. Records of the maximum calculated area shall be maintained. [District Rule 4570]

28. {4482} For each silage pile that Option 2 (Shaver/Facer or Smooth Face) is chosen as a mitigation measure for building the pile, the permittee shall maintain records that a shaver/facer was used to remove silage from the pile or shall visually inspect the pile at least daily to verify that the working face was smooth and maintain records of the visual inspections. [District Rule 4570]

29. {4483} For each silage pile that Option 3 (Silage Additives) is chosen as a mitigation measure for building the pile, records shall be maintained of the type additive (e.g. inoculants, preservative, other District & EPA-approved additive), the quantity of the additive applied to the pile, and a copy of the manufacturers instructions for application of the additive. [District Rule 4570]

30. {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]

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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. [District Rules 2070 and 2080, and Public Resources Code 21000-21177: California Environmental Quality Act]