San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT

HEALTHY AIR LIVING™

JUN 21 2012

Philip Verwey
Philip Verwey Farms #2
19765 13th Ave
Hanford, CA 93230

Re: Notice of Preliminary Decision - Authority to Construct
Project Number: C-1120348

Dear Mr. Verwey:

Enclosed for your review and comment is the District's analysis of Philip Verwey Farms #2's application for an Authority to Construct for expanding their existing dairy operation, at 19765 13th Ave in Hanford, CA.

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

Thank you for your cooperation in this matter. If you have any questions regarding this matter, please contact Mr. Juscelino Siongco of Permit Services at (559) 230-5891.

Sincerely,

David Warner
Director of Permit Services

DW:jms

Enclosures

Seyed Sadredin
Executive Director/Air Pollution Control Officer

Northern Region
4800 Enterprise Way
Modesto, CA 95356-8718
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www.valleyair.org www.healthyairliving.com

San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT

HEALTHY AIR LIVING™

JUN 21 2012

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

Re: Notice of Preliminary Decision - Authority to Construct
Project Number: C-1120348

Dear Mr. Tollstrup:

Enclosed for your review and comment is the District's analysis of Philip Verwey Farms #2's application for an Authority to Construct for expanding their existing dairy operation, at 19765 13th Ave in Hanford, CA.

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Hanford Sentinel
Hanford Sentinel

**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 Philip Verwey Farms #2 for expanding their existing dairy operation, at 19765 13th Ave in Hanford, CA.

The analysis of the regulatory basis for this proposed action, Project #C-1120348, 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
Expansion of a Dairy

Facility Name:	Philip Verwey Farms #2	Date:	June 13, 2012
Mailing Address:	19765 13th Ave	Engineer:	Juscelino Siongco
	Hanford, CA 93230	Lead Engineer:	Martin Keast
Contact Person:	Jason Pausma		
Telephone:	(559) 587-2800		
Application #s:	C-6817-1-3, -2-3, -3-3, -4-2, and -5-2		
Project #:	C-1120348		
Deemed Complete:	March 27, 2019		

I. Proposal

Philip Verwey Farms #2 requests Authorities to Construct (ATC) permits to expand their existing 4,800 milk cows (10,944 total head) dairy operation to 10,000 milk cows (19,508 total head). In addition, the dairy will construct an additional double 60 (120 stall) parallel milking parlor. The additional animals can be accommodated within the current cow milking, cow housing, and liquid manure handling system.

The dairy will have a post-project herd of 10,000 milk cows, 2,000 dry cows, and 7,508 support stocks. The support stock consists of 2,923 large heifers (15-24 months), 1,780 medium heifers (7-14 months), 814 small heifers (3-6 months), 1,971 calves (under 3 months), and 20 mature bulls.

II. Applicable Rules,

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

III. Project Location

The facility is located 19765 13th Ave, Hanford, in Kings 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 Philip Verwey Farms #2 is the production of milk, which is used to make products for human consumption. Production of milk requires a herd of mature dairy cows that are lactating. In order to produce milk, the cows must be bred and give birth. The gestation period for a cow is 9 months, and dairy cows are bred again 4 months after calving. Thus, a mature dairy cow produces a calf every 12 to 14 months, which is why there will be different ages and types of cows at a typical 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 existing dairy currently houses 4,800 milk cows in ten freestalls with flush 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. All support stocks are housed in open corrals with flushed lanes. An open corral is a large open area where cows are confined with unlimited access to feed and water. The open corrals at this dairy include structures that provide shade for all animals except the dry cows. The dairy proposes to increase the herd size at the dairy without changing the housing and manure management practices.

Maternity Housing

The maternity housing is an area where cows can be closely monitored during the period immediately before and after they give birth.

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 cows at this dairy are milked in one double 52 (104-stalls) parallel milking parlor, one double 60 (120-stalls) parallel milking parlor, and one 80-stall hospital barn. The lactating cows will be milked twice per day in the milking parlors. Each milking parlor will have concrete floors sloped to a drain. Manure that is deposited in the milking parlor will be sprayed or flushed into the drain using fresh water after each milking. The effluent from the milking parlor will be carried through pipes to the lagoon system.

Processing Pits

The existing dairy has two processing pits. A processing pit is a small basin that temporarily stores the flush water from the milking parlors, the freestalls, and the open corrals. The processing pit allows this water to be reused to flush the concrete feed lanes in the freestall barns and the open corrals. After each flush, the flush water, including the waste from the feed lanes, is returned to the processing pit to be recycled in the next flush. As the volume of flush water in the processing pit increases, pumps and agitators are turned on. The agitators mix the contents in the processing pit so that the solids in the processing pit do not settle. The stored flush water is then pumped over a mechanical separator to remove the fibrous solids prior to the lagoon. This is done daily or several times a day to prevent excessive solids buildup and to ensure that the water used for flushing the freestalls and open corrals are relatively clean. The processing pit decreases the amount of piping and energy required by recycling the flush water and pumping water from a central location. The dairy will have one processing pit and will be constructed to have a maximum retention time of one day. When the volume of liquid in the processing pit exceeds the preset levels, the liquid manure from that pit will be pumped to the mechanical separators, which are located near the treatment lagoon and storage pond.

Solids Separation (Mechanical Separator and Settling Basins)

The liquid manure handling system at this dairy includes four mechanical separators for solids separation. The facility proposes to flush the freestalls four times a day and the open corrals twice a day. Flush water will be collected in the processing pit where it will pumped through a mechanical separator before entering one of four gravity separation basins. 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 liquids from the settling basins will gradually drain to the treatment lagoons. Solids remaining in the settling basins are left to dry and then are removed. Because the mechanical separator removes the majority of solids from the liquid manure stream prior to the settling basins, removal of solids from the settling basins is rarely required. The separated solids from the mechanical separators will be stacked on a concrete pad to promote drainage. The separated solids from the mechanical separators and the settling basins will either be immediately incorporated into cropland or stored for use as fertilizer or bedding in the freestalls.

Solids separation removes material from the waste stream that would prematurely fill a lagoon or storage pond. A settling basin achieves a solids removal rate of 40-70% and a mechanical separator achieves a solids removal rate of 20-50%. The efficiency of treatment would decrease 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.

Manure Stock Piles (Storage)

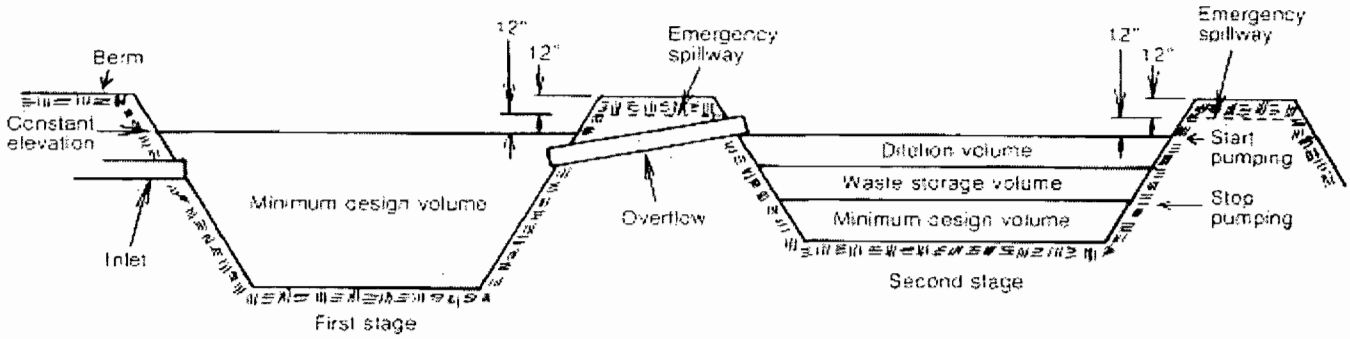
The solid manure stockpiled at this dairy will include the separated solids from the mechanical separator and the manure from the corrals. The scraped manure will either be immediately applied and incorporated into cropland at the dairy or will be dried and stockpiled for use as fertilizer at a later time. The separated solids will be dried and used as fertilizer or as bedding in the freestalls. The applicant proposes to cover the separated solid piles with weatherproof coverings from October through May, so that the solids will remain dry until it is ready to be used.

Anaerobic Treatment Lagoon

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

1) Minimum treatment volume – The minimum design volume must account for all potential sludge, treatment, precipitation, and runoff volumes;
2) Minimum hydraulic retention time – The retention time of the material in the lagoon must be adequate to provide environmentally safe utilization of waste;
3) Maximum Volatile Solids (VS) loading rate – The VS loading rate shall be based on maximum daily loading considering all waste sources that will be treated by the lagoon. The suggested loading rate for the San Joaquin Valley is 6.5-11 lb-VS/1000 ft^3/day depending on the type of system and solids separation; and
4) Minimum operating depth of at least 12 feet – Maximizing the depth of the lagoon has the following advantages: 1) The surface area in contact with the atmosphere is minimized, which will reduce volatilization of air pollutants; 2) The smaller surface area reduces the effects of the environment on the lagoon, which provides a more stable and favorable environment for anaerobic bacteria; 3) There is better mixing of lagoon due to rising gas bubbles; 4) and A deeper lagoon requires less land for the required treatment volume.

The liquid manure handling system consists of an anaerobic treatment lagoon system designed in accordance with the specifications set forth in NRCS practice standard 359. The anaerobic treatment lagoon system consists of two stages, a treatment lagoon (primary lagoon) and a storage pond (secondary lagoon). The effluent from the treatment lagoon (2,280 ft x 255 ft x 15 ft) overflows into the storage pond/secondary lagoon (2,280 ft x 420 ft x 15 ft), which is designed for liquid storage. The liquid level of the storage pond/secondary lagoon fluctuates and can be emptied when necessary. Effluent from the storage pond is used for the irrigation of cropland. All the liquid manure at the dairy is pumped to the anaerobic treatment lagoon system.



Storage Pond/Secondary Lagoon

The existing dairy currently has one storage pond designed for temporary collection and storage of organic waste. Storage ponds are designed to have a storage period of about 90 to 180 days and may be completely emptied when pumped. Storage ponds are designed to have sufficient volume to hold all of the following: all manure and wastewater accumulated at the dairy for a period of 120 days; normal precipitation and any drainage to the lagoon system minus evaporation from the surface of lagoons; and precipitation during a 25 year, 24 hour storm event.

Covered Lagoon Anaerobic Digester

Pursuant to Section 5.3 of the Settlement Agreement (9/20/2004) between the District and the Western United Dairyman and the Alliance of Western Milk Producers Inc., installation of an anaerobic digester will only be required if this technology is proven effective in reducing emissions and is required by the final Dairy BACT Guideline[1]. The applicant is not proposing to install a lagoon cover at this time.

V. Equipment Listing

C-6817-1

Pre-Project Equipment Description:

C-6817-1-2: 4,800 COW MILKING OPERATION WITH ONE DOUBLE 52 (104 STALLS) PARALLEL MILKING PARLOR AND ONE HOSPITAL BARN MILKING PARLOR

Proposed Modification:

Add 5,200 milk cows for a total of 10,000 milk cows and construct an additional double 60 (120 stalls) parallel milking parlor.

Post Project Equipment Description:

C-6817-1-3: 10,000 COW MILKING OPERATION WITH ONE DOUBLE 52 (104 STALLS) PARALLEL MILKING PARLOR; ONE DOUBLE 60 (120 STALLS) PARALLEL MILKING PARLOR; AND ONE 80 STALL HOSPITAL MILKING BARN

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

C-6817-2

Pre-Project Equipment Description:

C-6817-2-2: COW HOUSING - 4,800 MILK COWS NOT TO EXCEED A COMBINED TOTAL OF 5,760 MATURE COWS (MILK AND DRY); 5,184 TOTAL SUPPORT STOCK (HEIFERS AND CALVES); AND 10 FREESTALLS WITH FLUSH/SCRAPE SYSTEM

Proposed Modification:

Increase herd size to 10,000 milk cows, 2,000 dry cows, and 7,508 support stock.

Post Project Equipment Description:

C-6817-2-3: COW HOUSING – 10,000 MILK COWS NOT TO EXCEED A COMBINED TOTAL OF 12,000 MATURE COWS (MILK AND DRY); 7,508 TOTAL SUPPORT STOCK (HEIFERS, CALVES, AND BULLS); AND 10 FREESTALLS WITH FLUSH/SCRAPE SYSTEM

C-6817-3

Pre-Project Equipment Description:

C-6817-3-2: LIQUID MANURE HANDLING SYSTEM CONSISTING OF FOUR MECHANICAL SEPARATORS; TWO LIFT STATION FLUSH WATER RECYCLING SUMPS; ONE ANAEROBIC TREATMENT LAGOON (2,280' X 255' X 15') AND ONE STORAGE POND; MANURE IS LAND APPLIED THROUGH FLOOD IRRIGATION AND FURROW IRRIGATION

Proposed Modification:

Increase herd size to 10,000 milk cows, 2,000 dry cows, and 7,508 support stock.

Post Project Equipment Description:

C-6817-3-3: LIQUID MANURE HANDLING SYSTEM CONSISTING OF FOUR MECHANICAL SEPARATORS; TWO LIFT STATION FLUSH WATER RECYCLING SUMPS; ONE ANAEROBIC TREATMENT LAGOON (2,280' X 255' X 15') AND ONE STORAGE POND; MANURE IS LAND APPLIED THROUGH FLOOD IRRIGATION AND FURROW IRRIGATION

C-6817-4

Pre-Project Equipment Description:

C-6817-4-1: SOLID MANURE HANDLING CONSISTING OF MANURE STOCK PILES; SOLID MANURE APPLICATION TO LAND WITH IMMEDIATE INCORPORATION AND MANURE HAULED OFFSITE

Proposed Modification:

Increase herd size to 10,000 milk cows, 2,000 dry cows, and 7,508 support stock. Add windrow composting.

Post Project Equipment Description:

C-6817-4-2: SOLID MANURE HANDLING CONSISTING OF MANURE STOCK PILES; WINDROW COMPOSTING; SOLID MANURE APPLICATION TO LAND WITH IMMEDIATE INCORPORATION AND MANURE HAULED OFFSITE

C-6817-5

Pre-Project Equipment Description:

C-6817-5-1: FEED STORAGE AND HANDLING CONSISTING OF COMMODITY BARNS, AG BAGS, DRY GRAIN TANKS, SILOS, AND SILAGE PILES

Proposed Modification:

Increase herd size to 10,000 milk cows, 2,000 dry cows, and 7,508 support stock.

Post Project Equipment Description:

C-6817-5-2: FEED STORAGE AND HANDLING CONSISTING OF COMMODITY BARNS, AG BAGS, DRY GRAIN TANKS, SILOS, AND SILAGE PILES

VI. Emission Control Technology Evaluation

PM_{10}, VOC, NH_3, and H_2S are the major pollutants of concern from dairy operations. Gaseous pollutant emissions at a dairy result from the ruminant digestive processes (enteric emissions), decomposition, and fermentation of feed and decomposition of organic material in the manure. Volatile Organic Compounds (VOCs) are formed as intermediate metabolites when organic matter in manure degrades. Ammonia volatilization is the result of the microbial decomposition of nitrogenous compounds in manure. The quantity of enteric emissions depends directly on the number and types of cows. Hydrogen sulfide and other reduced sulfur compounds are produced as manure decomposes anaerobically. There are two primary sources of sulfur in animal manures. One is the sulfur amino acids contained in the feed. The other is inorganic sulfur compounds, such as copper sulfate and zinc sulfate, which are used as feed additives to supply trace minerals and serve as growth stimulants. A possible third source of sulfur in some locations is trace minerals in drinking water. 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. These practices include frequent flushing, frequent scraping of open corrals, and removal of manure from paved areas such as the milk parlor, feed lanes, and walkways.

Milking Parlor (C-6817-1)

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

Cow Housing (C-6817-2)

All of the milk cows will be housed in freestall barns with concrete lanes. Particulate matter emissions from freestall barns are greatly reduced because the cows will be on a paved surface rather than on dry dirt. Additionally, the flushing of the freestall lanes creates a moist environment, which further decreases particulate matter emissions. The dry cows and heifers will all be housed in open corrals with concrete flush lanes. The open corrals at this dairy are equipped with shades. Providing shade for the animals reduces movement and unnecessary activity during hot weather, which reduces PM_{10} emissions. The surfaces of exercise corrals for the freestalls and the corrals will be scraped in the morning hours on a weekly basis except during wet conditions. Frequent scraping of the corrals will reduce the amount of dry manure on the corral surfaces that may be pulverized by the cows' hooves and emitted as PM_{10}. This practice will also reduce the chance of anaerobic conditions developing in the manure pack of the corral surface, potentially reducing VOC emissions. In addition, the applicant has proposed to sprinkle water over 48% of the heifer corral area to match the evaporation rate.

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

All animals housed at this dairy will be fed in accordance with National Research Council (NRC) guidelines using routine nutritional analysis for rations. Feeding the cows in accordance with NRC guidelines minimizes undigested protein and other undigested nutrients in the manure, which would emit 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 where feed is being removed.

Windbreaks/shelterbelts are established on the entire perimeter of the heifer corrals and on the entire east and south boundaries of the dairy. Windbreaks/shelterbelts are single or multiple rows of trees in linear configurations planted on the windward or downwind side of a given site. The windbreaks are proposed in accordance with the National Research Conservation Service (NRCS) standard #380. Guidelines from this standard in conjunction with guidelines discussed with the local NRCS office are summarized as follows:

- Windbreak density on the leeward side of the source and windward of the area to be protected should be 60-65%. This density will provide the optimum PM interception.

"Density," when viewing through the windbreak from 60 feet to 100 feet away upwind of the rows, is the percentage of the background view that is obscured or hidden.

- In order to reach a density of 60-65%, three rows are required consisting of the following:

Row	Type of tree/shrub	Spacing[2]	Height
First Row	Low shrubs Tall shrubs	3' to 5' apart 8' to 12' apart	5' +
Second Row	Tall shrubs or medium size trees	8' to 12' apart	8'-25'
Third Row	Large Evergreens	Varies	35' +

- Spacing between rows should be sufficient to accommodate cultivation equipment.
- Windbreaks should be irrigated to provide the greatest survivability and the most rapid growth of the trees and shrubs.
- Weed control in the windbreak must be completed as well as rapid replacement of any dead trees or shrubs.
- Each row should plant trees that are offset of one another.

The applicant shall establish windbreaks adjacent to and along the entire east side (2,500 ft) of the heifer corrals and 875 ft of windbreaks adjacent to and along the south side of the heifer corrals of the dairy. East windbreaks shall consist of the following rows with the first row closest to the heifer corrals: first row shall consist of Arizona Cypress trees, planted 10 feet apart; and the second row shall consist of Chinese Pistache trees, planted 14 feet apart. South windbreaks shall consist of the following rows with the first row closest to the heifer corrals: first row shall consist of Arizona Cypress trees, planted 10 feet apart; and the second row shall consist of Interior Live Oak trees, planted 20 feet apart. Each row should be offset from the adjacent row. Spacing between rows shall be sufficient to accommodate cultivation equipment, not to exceed 24 feet.

Liquid Manure Handling System (C-6817-2)

All emissions from the liquid manure handling system are the result of manure decomposition. Because of the amount of liquid manure being flushed to the liquid manure handling system, there will be emissions from the liquid manure handling system.

The liquid manure handling system for the dairy includes a two-stage anaerobic lagoon treatment system designed in accordance with the specifications set forth in NRCS practice standard 359. A properly designed and operated anaerobic treatment lagoon system will reduce VOC emissions because the organic compounds in the manure will be mostly converted into methane, carbon dioxide, and water rather than a significant amount of VOCs. A two-stage anaerobic treatment lagoon system also has an air pollution benefit over single lagoon systems. Odorous emissions are reduced with a two-stage system since the primary lagoon has a constant treatment volume, which promotes more efficient anaerobic digestion.

[2] These are general spacing requirements and vary depending on type of tree.

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 emergency IC engine (C-6817-9), and lagoons/storage ponds (C-6817-3) at the dairy 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.
- Currently, 4,800 milk cows and 960 dry cows at the dairy are housed in freestall barns with flushed lanes; and 960 dry cows and 5,184 support stocks are housed in open corrals with flushed lanes.
- After completion of this project, all 10,000 milk cows will be housed in freestall barns with flushed lanes. 2,000 dry cows and 7,508 support stock will be housed in open corrals with flushed lanes.
- The mechanical separators will remove at least 40% of solids prior to the manure entering the anaerobic treatment lagoon.
- All PM_{10} emissions from the dairy will be allocated to the cow housing permit unit (C-6817-2).
- Because of the moisture content of the separated solids, PM_{10} emissions from solid manure handling are considered negligible.
- 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 VOC and NH_3 emission factors for milk cows are based on an internal document entitled "*Breakdown of Dairy VOC Emission Factor into Permit Units.*" The VOC and NH_3 emission factors for the other cows were developed by taking the ratio of manure generated by the different types of cows to the milk cow and multiplying it by the milk cow emission factor.
- For BACT analysis purposes, each permit unit at a dairy will also be treated as an emissions unit, except for the liquid manure handling permit unit. For BACT analysis purposes, the liquid manure handling permit unit will contain two 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 after 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 lbs/hd-yr. EF from fresh waste is equal to 0.2 lbs/hd-yr. 75% of 0.2 lbs/hd-yr = 0.15 lbs/hd-yr. 0.15 lbs/hd-yr/0.9 lbs/hd-yr = 16.7% control).

- The milking parlor is currently flushed or sprayed down after each group of cows is milked, therefore the VOC control for this practice will be applied to both pre-project and post-project emissions.
- Flushing the freestall feed lanes and walkways for milk cows four times per day is expected to reduce emissions since manure degradation and decomposition in the feed lanes is reduced. Increasing the frequency of the flush will remove manure, which is a source of VOC emissions. Many of the compounds emitted from the fresh manure, such as alcohols (ethanol and methanol) and many Volatile Fatty Acids (VFAs) are highly soluble in water. Based on calculations in the Final Dairy Permitting Advisory Group's (DPAG) Report–"Recommendations to the San Joaquin Valley Air Pollution Control Officer Regarding Best Available Control Technology for Dairies in the San Joaquin Valley"[3] dated January 31, 2006, a 47% control will be applied to flushing the freestall feed lanes and walkways 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. Taking that into account, the overall control efficiency for the cow housing is approximately 18.2%. (Milk Cow EF from cow housing is = 12.4 lbs/hd-yr. EF from fresh waste is equal to 4.8 lbs/hd-yr. 47% x 4.8/12.4 lbs/hd-yr = 18.2% control)
- The District is currently applying a 50% PM10 control efficiency for sprinkling of the heifer corrals as long as the amount of water applied meets the evaporation rates and 100% of the corral area is being covered by the sprinklers. The applicant has proposed to sprinkle water over 48% of the total heifer corral area, which matches the evaporation rate. Therefore, a control efficiency of 24% will be applied (CE of 50% x 48% = 24%).
- An anaerobic treatment lagoon designed in accordance with the NRCS Guideline (359) has the potential of reducing significant amount of emissions, since the system is designed to promote the conversion of Volatile Solids (VS) into methane by methanogenic bacteria. Although VOC emission reductions are expected to be high, to be conservative, a control efficiency of 40% will be applied to this mitigation measure for both the lagoon(s) and land application until better data becomes available.
- All other mitigation measures required are expected to result in VOC emission reductions, however, lacking emissions reductions data, the emissions reductions will not be quantified in this evaluation.
- 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.

[3] http://www.valleyair.org/busind/pto/dpag/dpag_idx.htm

B. Emission Factors

VOC:

Uncontrolled Dairy EF (lb-VOC/hd-yr)				
		Milk Cow	**Dry Cow**	**Support Stock***
C-6817-1: **Milking Parlor**	Enteric Emissions in Milking Parlors	0.41	-	-
	Milking Parlor Floor	0.03	-	-
	Milking Parlor Total	**0.44**	-	-
C-6817-2: **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**
C-6817-3: **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**
C-6817-4: **Solid Manure Handling**	Solid Manure Storage	0.15	0.08	0.06
	Separated Solids Piles	0.06	0.03	0.03
	Solid Manure Land Application	0.33	0.18	0.14
	Solid Manure Handling Total	**0.54**	**0.29**	**0.23**

Silage and TMR (Total Mixed Ration) EF1 (C-6817-5)		
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

PM_{10}:

Uncontrolled Cow Housing PM_{10} EF1 (lbs-PM_{10}/hd-yr) (C-6817-2)			
Type of Cow	**Type of Housing**	**EF**	**Source**
Milk Cow	Freestalls	1.37	SJVAPCD
Dry Cow	Open Corral	5.46	SJVAPCD
Support Stock	Open Corrals/Individual Pens	10.55	CARB/SJVAPCD

NH_3:

Milking Parlor NH_3 EF1 (lbs-NH_3/hd-yr) (C-6817-1)			
Type of Cow	**Type of Housing**	**EF**	**Source**
Milk Cow	Freestalls	1.2	SJVAPCD

Cow Housing NH_3 EF1 (lbs-NH_3/hd-yr) (C-6817-2)			
Type of Cow	**Type of Housing**	**EF**	**Source**
Milk Cow	Freestalls	28	SJVAPCD
Dry Cow	Open Corral	20.6	SJVAPCD
Support Stock	Open Corrals/Individual Pens	14.4	CARB/SJVAPCD

Lagoon/Storage Pond NH_3 EF1 (lbs-NH_3/hd-yr) (C-6817-3)			
Type of Cow	**Type of Housing**	**EF**	**Source**
Milk Cow	Freestalls	15.7	SJVAPCD
Dry Cow	Open Corral	9.5	SJVAPCD
Support Stock	Open Corrals	6.7	CARB/SJVAPCD

Land Application NH_3 EF1 (lbs-NH_3/hd-yr) (C-6817-3)			
Type of Cow	**Type of Housing**	**EF**	**Source**
Milk Cow	Freestalls	29.1	SJVAPCD
Dry Cow	Open Corral	15.3	SJVAPCD
Support Stock	Open Corrals	10.7	CARB/SJVAPCD

Pre and Post-Project Control Efficiency from VOC Mitigations

The applicant has selected the following mitigation measures, providing the VOC controls as shown below:

C-6817-1: 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.	10
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	10

C-6817-1: Cow Housing

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

Corrals/Pens Mitigations		
Apply	**Mitigation**	**CE (%)**
1	Feed according to National Research Council (NRC) guidelines.	10
1	Inspect water pipes and troughs and repair leaks at least once every seven (7) days NOTE: Control efficiency already included in EF2	0
1	Clean manure from corrals at least four (4) times per year with at least sixty (60) days between cleaning, or clean corrals at least once between April and July and at least once between September and December NOTE: Control efficiency already included in EF2	0

1	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	Implement one of the following: 1) slope the surface of the corrals at least 3% where the available space for each animal is 400 sq.ft. or less and slope the surface of the corrals at least 1.5% where the available space for each animal is more than 400 sq. ft.; 2) maintain corrals to ensure proper drainage preventing water from standing more than 48 hrs.; 3) harrow, rake, or scrape pens sufficiently to maintain a dry surface NOTE: Control efficiency already included in EF2	0
	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.	0
1	Install all shade structures uphill of any slope in the corral 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
	Clean manure from under corral shades at least once every fourteen (14) days, when weather permits access into the corral 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.	0
	Install shade structure so that the structure has a North/South orientation 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.	0
1	Manage corrals such that the manure depth in the	0

	corral does not exceed twelve (12) inches at any time or point, except for in-corral mounding. Manure depth may exceed 12 inches when corrals become inaccessible due to rain events. The facility must resume management of the manure depth of 12 inches or lower immediately upon the corral becoming accessible. NOTE: Control efficiency already included in EF2	
	Knockdown fence line manure build-up prior to it exceeding a height of twelve (12) inches at any time or point. Manure depth may exceed 12 inches when corrals become inaccessible due to rain events. The facility must resume management of the manure depth of 12 inches or lower immediately upon the corral becoming accessible.	0
	Use lime or a similar absorbent material in the corral according to the manufacturer's recommendation to minimize moisture in the corrals.	0
	Apply thymol to the corral soil in accordance with the manufacturer's recommendation.	0
	Total CE	23.05

Bedding Mitigations		
Apply	**Mitigation**	**CE (%)**
1	Feed according to National Research Council (NRC) guidelines.	10
	Use non-manure-based bedding and non-separated solids based bedding for at least 90% of the bedding material, by weight, for freestalls (e.g. rubber mats, almond shells, sand, or waterbeds.).	0
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
	For a medium dairy only (500 to 999 milk cows) – Remove manure that is not dry from individual cow freestall beds or rake, harrow, scrape, or grade	0

	freestall bedding at least once every fourteen (14) days.	
	Total CE	19

Lanes Mitigations		
Apply	**Mitigation**	**CE (%)**
1	Feed according to National Research Council (NRC) guidelines.	10
1	Pave feedlanes, where present, for a width of at least 8 feet along the corral side of the feedlane fence for milk and dry cows and at least 6 feet along the corral side of the feedlane for heifers *No control efficiency at this time.	0
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
	Have no animals in exercise pens or corrals at any time.	0
	Total CE	19

C-6817-3: Liquid Manure Handling

Lagoons/Storage Ponds Mitigations		
Apply	**Mitigation**	**CE (%)**
1	Feed according to National Research Council (NRC) guidelines.	10
	Use phototropic lagoon.	0
	Use an anaerobic treatment lagoon designed according to NRCS Guideline No. 359.	0
1	Remove solids from the waste system with a solid separator system, prior to the waste entering the lagoon NOTE: Control efficiency already included in EF2	0

	Maintain lagoon pH between 6.5 and 7.5.	0
	Total CE	10

Liquid Manure Land Application Mitigations		
Apply	**Mitigation**	**CE (%)**
1	Feed according to National Research Council (NRC) guidelines.	10
	Only apply liquid manure that has been treated with an anaerobic or aerobic treatment lagoon, aerobic lagoon, or digester system.	0
1	Allow liquid manure to stand in the fields for no more than twenty-four (24) hours after irrigation NOTE: Control efficiency already included in EF2	0
	Apply liquid/slurry manure via injection with drag hose or similar apparatus.	0
	Total CE	10

C-6817-4: Solid Manure Handling

Solid Manure Storage Mitigations		
Apply	**Mitigation**	**CE (%)**
1	Feed according to National Research Council (NRC) guidelines.	10
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	19

Separated Solids Piles Mitigations		
Apply	**Mitigation**	**CE (%)**
1	Feed according to National Research Council (NRC) guidelines.	10
1	Within 72 hours of removal from the drying process, either a) remove separated solids from the facility, or b) cover separated solids outside the housing with a	10

	weatherproof covering from October through May, except for times when wind events remove the covering, not to exceed 24 hours per event.	
	Total CE	19

Solid Manure Land Application Mitigations		
Apply	**Mitigation**	**CE (%)**
1	Feed according to National Research Council (NRC) guidelines.	10
1	Incorporate all solid manure within 72 hours of land application NOTE: Control efficiency already included in EF2	0
	Only apply solid manure that has been treated with an anaerobic treatment lagoon, aerobic lagoon or digester system.	0
	Apply no solid manure with a moisture content of more than 50%.	0
	Total CE	10

C-6817-5: 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	39

	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 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	Begin feeding total mixed rations within 2 hours of grinding and mixing rations NOTE: Control efficiency already included in EF2	0
	Feed stream-flaked, dry rolled, cracked or ground corn or other ground cereal grains.	0
1	Remove uneaten wet feed from feed bunks within 24 hours after the end of a rain event.	10
	For total mixed rations that contain at least 30% by weight of silage, feed animals total mixed rations that contain at least 45% moisture.	0
	Total CE	19

Controlled VOC:

The above mitigation measures will reduce VOC emissions from the following emission units. The pre and post-control VOC emission factors are calculated as follows:

EF2 = EF1 = EF x [1 – (%Total CE/100)]

Controlled Dairy EF (lb-VOC/hd-yr)				
		Milk Cow	**Dry Cow**	**Support Stock***
C-6817-1: **Milking Parlor**	Enteric Emissions in Milking Parlors	0.37	-	-
	Milking Parlor Floor	0.03	-	-
	Milking Parlor Total	**0.4**	-	-
C-6817-2: **Cow Housing**	Enteric Emissions in Cow Housing	3.32	2.01	1.54
	Corrals/Pens	5.08	2.76	2.12
	Bedding	0.81	0.44	0.34

	Lanes	0.65	0.36	0.27
	Cow Housing Total	**9.86**	**5.57**	**4.27**
C-6817-3: **Liquid Manure Handling**	Lagoons/Storage Ponds	1.17	0.64	0.49
	Liquid Manure Land Application	1.26	0.68	0.52
	Liquid Manure Handling Total	**2.43**	**1.32**	**1.01**
C-6817-4: **Solid Manure Handling**	Solid Manure Storage	0.12	0.06	0.05
	Separated Solids Piles	0.05	0.02	0.02
	Solid Manure Land Application	0.3	0.16	0.13
	Solid Manure Handling Total	**0.47**	**0.24**	**0.2**

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

Controlled Silage and TMR (Total Mixed Ration) EF2 (C-6817-5)		
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

PM_{10}:

Pre-Project Controlled PM_{10} Emission Factors (EF) (C-6817-2-2)				
Type of Cow	Uncontrolled EF (lb-PM_{10}/hd-yr)	Control(s)	Controlled EF Calculation	Controlled EF (lb-PM_{10}/hd-yr)
Milk in Freestalls	1.37	Weekly Scraping using Pull-Type Equipment in morning (15%)	1.37x(1-0.15)=	**1.16**
Dry Cows in Open Corrals	5.46	Weekly Scraping using Pull-Type Equipment in morning (15%) Shade Structures (16.7%)	5.46x(1-0.15)(1-0.167)=	**3.87**

Pre-Project Controlled PM_{10} Emission Factors (EF) (C-6817-2-2)				
Type of Cow	Uncontrolled EF ($lb\text{-}PM_{10}/hd\text{-}yr$)	Control(s)	Controlled EF Calculation	Controlled EF ($lb\text{-}PM_{10}/hd\text{-}yr$)
Support Stock	10.55	Shade Structures (8.3%) Weekly Scraping using Pull-Type Equipment in morning (15%) Feeding Heifers Near Dusk (10%) Sprinklers (24%)	10.55x(1-0.083)(1-0.15)(1-0.10)(1-0.24)=	**5.62**

Post-Project Controlled PM_{10} Emission Factors (EF) (C-6817-2-3)				
Type of Cow	Uncontrolled EF ($lb\text{-}PM_{10}/hd\text{-}yr$)	Control(s)	Controlled EF Calculation	Controlled EF ($lb\text{-}PM_{10}/hd\text{-}yr$)
Milk in Freestalls	1.37	Weekly Scraping using Pull-Type Equipment in morning (15%)	1.37x(1-0.15) =	**1.16**
Dry Cows in Open Corrals	5.46	Downwind Shelterbelts (12.5%) Weekly Scraping using Pull-Type Equipment in morning (15%) Shade Structures (16.7%)	5.46x(1-0.125)(1-0.15)(1-0.167) =	**3.38**
Support Stock	10.55	Downwind Shelterbelts (12.5%) Shade Structures (8.3%) Weekly Scraping using Pull-Type Equipment in morning (15%) Feeding Heifers Near Dusk (10%) Sprinklers (24%)	10.55 x (1-0.125)(1-0.083)(1-0.15)(1-0.10)(1-0.24)=	**4.92**

C. Calculations

1. Pre-Project Potential to Emit (PE1)

Pre-Project Potential to Emit (PE_1) for the dairy will be calculated below based on the maximum design capacity for each type of cow at the dairy and the controls required by the dairy.

C-6817-1-2: Cow Milking

VOC
= [# Milk Cows] x [EF]
= 4,800 x 0.4 lb-VOC/hd-yr
= **1,920 lb-VOC/yr**
= 1,920 lb-VOC/yr ÷ 365 day/yr
= **5.3 lb-VOC/day**

NH_3
= [# Milk Cows] x [EF]
= 4,800 x 1.2 lb-NH_3/hd-yr
= **5,760 lb-NH_3/yr**
= 5,760 lb-NH_3/yr ÷ 365 day/yr
= **15.8 lb-NH_3/yr**

C-6817-2-2: Cow Housing

PM_{10}
= [# Milk Cows] x [EF] + [# Dry Cows] x [EF] + [# Support Stock] x [EF]
= 4,800 x 1.16 lb-PM_{10}/hd-yr + 960 x 3.87 lb-PM_{10}/hd-yr + 5,184 x 5.62 lb-PM_{10}/hd-yr
= **38,417 lb-PM_{10}/yr**
= 38,417 lb-PM_{10}/yr ÷ 365 day/yr
= **105.3 lb-PM_{10}/day**

VOC
= [# Milk Cows] x [EF] + [# Dry Cows] x [EF] + [# Support Stock] x [EF]
= 4,800 x 9.86 lb-VOC/hd-yr + 960 x 5.57 lb-VOC/hd-yr + 5,184 x 4.27 lb-VOC/hd-yr
= **74,811 lb-VOC/yr**
= 74,811 lb-VOC/yr ÷ 365 day/yr
= **205.0 lb-VOC/day**

NH_3
= [# Milk Cows] x [EF] + [# Dry Cows] x [EF] + [# Support Stock] x [EF]
= 4,800 x 28 lb-NH_3/hd-yr + 960 x 20.6 lb-NH_3/hd-yr + 5,184 x 14.4 lb-NH_3/hd-yr
= **228,826 lb-NH_3/yr**
= 228,826 lb-NH_3/yr ÷ 365 day/yr
= **626.9 lb-NH_3/day**

C-6817-3-2: Liquid Manure Handling

Lagoon/Storage Pond

VOC
= [# Milk Cows] x [EF_{lagoon}] + [# Dry Cows] x [EF_{lagoon}] + [# Support Stock] x [EF_{lagoon}]
= 4,800 x 1.17 lb-VOC/hd-yr + 960 x 0.64 lb-VOC/hd-yr + 5,184 x 0.49 lb-VOC/hd-yr
= **8,771 lb-VOC/yr**
= 8,771 lb-VOC/yr ÷ 365 day/yr
= **24.0 lb-VOC/day**

NH_3

= [# Milk Cows] x [EF_{lagoon}] + [# Dry Cows] x [EF_{lagoon}] + [# Support Stock] x [EF_{lagoon}]
= 4,800 x 15.7 lb-NH_3/hd-yr + 960 x 9.5 lb-NH_3/hd-yr + 5,184 x 6.7 lb-NH_3/hd-yr
= **119,213 lb-NH_3/yr**
= 119,213 lb-NH_3/yr ÷ 365 day/yr
= **326.6 lb-NH_3/day**

Land Application

VOC
= [# Milk Cows] x [EF_{land}] + [# Dry Cows] x [EF_{land}] + [# Support Stock] x [EF_{land}]
= 4,800 x 1.26 lb-VOC/hd-yr + 960 x 0.68 lb-VOC/hd-yr + 5,184 x 0.52 lb-VOC/hd-yr
= **9,396 lb-VOC/yr**
= 9,396 lb-VOC/yr ÷ 365 day/yr
= **25.7 lb-VOC/day**

NH_3

= [# Milk Cows] x [EF_{land}] + [# Dry Cows] x [EF_{land}] + [# Support Stock] x [EF_{land}]
= 4,800 x 29.1 lb-NH_3/hd-yr + 960 x 15.3 lb-NH_3/hd-yr + 5,184 x 10.7 lb-NH_3/hd-yr
= **209,837 lb-NH_3/yr**
= 209,837 lb-NH_3/yr ÷ 365 day/yr
= **574.9 lb-NH_3/day**

Liquid Manure Handling Permit

VOC (Lagoon/Storage + Land) = 8,771 lb/yr + 9,396 lb/yr **= 18,167 lb-VOC/yr**
= 18,167 lb-VOC/yr ÷ 365 day/yr **= 49.8 lb-VOC/day**

NH_3 (Lagoon/Storage + Land) = 119,213 lb-NH_3/yr + 209,837 lb-NH_3/yr **= 329,050 lb-NH_3/yr**
= 329,050 lb-NH_3/yr ÷ 365 day/yr **= 901.5 lb-NH3/day**

C-6817-4-1: Solid Manure Handling

VOC
= [# Milk Cows] x [EF] + [# Dry Cows] x [EF] + [# Support Stock] x [EF]
= 4,800 x 0.47 lb-VOC/hd-yr + 960 x 0.24 lb-VOC/hd-yr + 5,184 x 0.2 lb-VOC/hd-yr
= **3,523 lb-VOC/yr**
= 3,523 lb-VOC/yr ÷ 365 day/yr
= **9.7 lb-VOC/day**

C-6817-5-1: Feed Storage and Handling

Silage Open Face Area:

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

Corn Area
= 1 x 30 ft x ((150 ft + (150 ft / (0.1667 x (150 ft / 30 ft) + 1.111 ft))) / 2)
= 3,407 ft^2

Alfalfa Area
= 1 x 12 ft x ((12 ft + (12 ft / (0.1667 x 12 ft / 12 ft) + 1.111 ft)) / 2)
= 128 ft^2

Wheat Area
= 1 x 30 ft x ((150 ft + (150 ft / (0.1667 x 150 ft / 30 ft) + 1.111 ft)) / 2)
= 3407 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 3,407x 0.0929 x 8760 x 60 x 2.20E-9 lb/µg
= 7,742 lb-VOC/yr

Alfalfa Emissions
=emission factor x area x 0.0929 m^2/ft^2 x 4,380 hr/yr x 60 min/hr x 2.20E-9 lb/µg
= 10,649 x 128 x 0.0929 x 4,380 x 60 x 2.20E-9 lb/µg
= 73 lb-VOC/yr

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 3407.1098 x 0.0929 x 8760 x 60 x 2.20E-9 lb/µg
= 9,789 lb-VOC/yr

TMR Annual PE:

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.

= [# of cows] x [emission factor] x [area] x [min/yr] x [lb/µg]
= 10,944 x 10,575 µg/m^2-min x 0.658 m^2 x 525,600 min/yr x 2.20E-9 lb/µg
= 88,056 lb-VOC/yr

Feed Storage and Handling:

VOC = Corn + Alfalfa + Wheat + TMR
= 7,742 lb-VOC/yr + 73 lb-VOC/yr + 9,789 lb-VOC/yr + 88,056 lb-VOC/yr
= **105,660 lb-VOC/yr**
= 105,660 lb-VOC/yr ÷ 365 days/yr
= 289.5 lb-VOC/day

2. Post Project Potential to Emit (PE2)

Post-Project Potential to Emit (PE2) for the dairy will be calculated below based on the maximum design capacity for each type of cow at the dairy and the controls required and proposed by the dairy.

C-6817-1-3: Cow Milking

VOC
= [# Milk Cows] x [EF]
= 10,000 x 0.4 lb-VOC/hd-yr
= **4,000 lb-VOC/yr**
= 4,000 lb-VOC/yr ÷ 365 day/yr
= **11.0 lb-VOC/day**

NH_3
= [# Milk Cows] x [EF]
= 10,000 x 1.2 lb-NH_3/hd-yr
= **12,000 lb-NH_3/yr**
= 12,000 lb-NH_3/yr ÷ 365 day/yr
= **32.9 lb-NH_3/yr**

C-6817-2-3: Cow Housing

PM_{10}
= [# Milk Cows] x [EF] + [# Dry Cows] x [EF] + [# Support Stock] x [EF]
= 10,000 x 1.16 lb-PM_{10}/hd-yr + 2,000 x 3.38 lb-PM_{10}/hd-yr + 7,508 x 4.92 lb-PM_{10}/hd-yr
= **55,299 lb-PM_{10}/yr**
= 55,299 lb-PM_{10}/yr ÷ 365 day/yr
= **151.5 lb-PM_{10}/day**

VOC
= [# Milk Cows] x [EF] + [# Dry Cows] x [EF] + [# Support Stock] x [EF]
= 10,000 x 9.86 lb-VOC/hd-yr + 2,000 x 5.57 lb-VOC/hd-yr + 7,508 x 4.27 lb-VOC/hd-yr
= **141,799 lb-VOC/yr**
= 141,799 lb-VOC/yr ÷ 365 day/yr
= **388.5 lb-VOC/day**

NH_3
= [# Milk Cows] x [EF] + [# Dry Cows] x [EF] + [# Support Stock] x [EF]
= 10,000 x 28 lb-NH_3/hd-yr + 2,000 x 20.6 lb-NH_3/hd-yr + 7,508 x 14.4 lb-NH_3/hd-yr
= **429,315 lb-NH_3/yr**
= 429,315 lb-NH_3/yr ÷ 365 day/yr
= **1176.2 lb-NH_3/day**

C-6817-3-3: Liquid Manure Handling

Lagoon/Storage Pond

VOC
= [# Milk Cows] x [EF_{lagoon}] + [# Dry Cows] x [EF_{lagoon}] + [# Support Stock] x [EF_{lagoon}]
= 10,000 x 1.17 lb-VOC/hd-yr + 2,000 x 0.64 lb-VOC/hd-yr + 7,508 x 0.49 lb-VOC/hd-yr
= **16,659 lb-VOC/yr**
= 16,659 lb-VOC/yr ÷ 365 day/yr
= **45.6 lb-VOC/day**

NH_3

= [# Milk Cows] x [EF_{lagoon}] + [# Dry Cows] x [EF_{lagoon}] + [# Support Stock] x [EF_{lagoon}]
= 10,000 x 15.7 lb-NH_3/hd-yr + 2,000 x 9.5 lb-NH_3/hd-yr + 7,508 x 6.7 lb-NH_3/hd-yr
= **226,304 lb-NH_3/yr**
= 226,304 lb-NH_3/yr ÷ 365 day/yr
= **620.0 lb-NH_3/day**

Land Application

VOC
= [# Milk Cows] x [EF_{land}] + [# Dry Cows] x [EF_{land}] + [# Support Stock] x [EF_{land}]
= 10,000 x 1.26 lb-VOC/hd-yr + 2,000 x 0.68 lb-VOC/hd-yr + 7,508 x 0.52 lb-VOC/hd-yr
= **17,864 lb-VOC/yr**
= 17,864 lb-VOC/yr ÷ 365 day/yr
= **48.9 lb-VOC/day**

NH_3

= [# Milk Cows] x [EF_{land}] + [# Dry Cows] x [EF_{land}] + [# Support Stock] x [EF_{land}]
= 10,000 x 29.1 lb-NH_3/hd-yr + 2,000 x 15.3 lb-NH_3/hd-yr + 7,508 x 10.7 lb-NH_3/hd-yr
= **401,936 lb-NH_3/yr**
= 401,936 lb-NH_3/yr ÷ 365 day/yr
= **1,101.2 lb-NH_3/day**

Liquid Manure Handling Permit

VOC (Lagoon/Storage + Land) = 16,659 lb/yr + 17,864 lb/yr **= 34,523 lb-VOC/yr**
= 34,523 lb-VOC/yr ÷ 365 day/yr **= 94.6 lb-VOC/day**

NH_3 (Lagoon/Storage + Land) = 226,304 lb-NH_3/yr + 401,936 lb-NH_3/yr **= 628,240 lb-NH_3/yr**
= 628,240 lb-NH_3/yr ÷ 365 day/yr **= 1,721.2 lb-NH3/day**

C-6817-4-2: Solid Manure Handling

VOC
= [# Milk Cows] x [EF] + [# Dry Cows] x [EF] + [# Support Stock] x [EF]
= 10,000 x 0.47 lb-VOC/hd-yr + 2,000 x 0.24 lb-VOC/hd-yr + 7,508 x 0.2 lb-VOC/hd-yr
= **6,682 lb-VOC/yr**
= 6,682 lb-VOC/yr ÷ 365 day/yr
= **18.3 lb-VOC/day**

C-6817-5-2: Feed Storage and Handling

Silage Open Face Area:

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

Corn Area
= 1 x 30 ft x ((150 ft + (150 ft / (0.1667 x (150 ft / 30 ft) + 1.111 ft))) / 2)
= 3,407 ft^2

Alfalfa Area
= 1 x 12 ft x ((12 ft + (12 ft / (0.1667 x 12 ft / 12 ft) + 1.111 ft)) / 2)
= 128 ft^2

Wheat Area
= 1 x 30 ft x ((150 ft + (150 ft / (0.1667 x 150 ft / 30 ft) + 1.111 ft)) / 2)
= 3407 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 3,407x 0.0929 x 8760 x 60 x 2.20E-9 lb/µg
= 7,742 lb-VOC/yr

Alfalfa Emissions
=emission factor x area x 0.0929 m^2/ft^2 x 4,380 hr/yr x 60 min/hr x 2.20E-9 lb/µg
= 10,649 x 128 x 0.0929 x 4,380 x 60 x 2.20E-9 lb/µg
= 73 lb-VOC/yr

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 3407.1098 x 0.0929 x 8760 x 60 x 2.20E-9 lb/µg
= 9,789 lb-VOC/yr

TMR Annual PE:

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.

= [# of cows] x [emission factor] x [area] x [min/yr] x [lb/µg]
= 19,508 x 10,575 µg/m^2-min x 0.658 m^2 x 525,600 min/yr x 2.20E-9 lb/µg
= 156,963 lb-VOC/yr

Feed Storage and Handling:

VOC = Corn + Alfalfa + Wheat + TMR
= 7,742 lb-VOC/yr + 73 lb-VOC/yr + 9,789 lb-VOC/yr + 156,963 lb-VOC/yr
= **174,567 lb-VOC/yr**
= 174,567 lb-VOC/yr ÷ 365 days/yr
= 478.3 lb-VOC/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 September 19, 1991 for Actual Emissions Reductions that have occurred at the source, and which have not been used on-site.

Pre-Project Stationary Source Potential to Emit [SSPE1] (lb/year)						
	NO_X	SO_X	PM_{10}	CO	VOC	NH_3
C-6817-1-2 (Milk Parlor)	0	0	0	0	1,920	5,760
C-6817-2-2 (Cow Housing)	0	0	38,417	0	74,811	228,826
C-6817-3-2 (Liquid Manure Handling	0	0	0	0	18,167	329,050
C-6817-4-1 (Solid Manure Handling)	0	0	0	0	3,523	0
C-6817-5-1 (Feed Storage and Handling)	0	0	0	0	105,660	0
Pre-Project SSPE (SSPE1)	**0**	**0**	**38,417**	**0**	**204,081**	**563,636**

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

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

Post-Project Stationary Source Potential to Emit [SSPE2] (lb/year)						
	NO_X	SO_X	PM_{10}	CO	VOC	NH_3
C-6817-1-3 (Milk Parlor)	0	0	0	0	4,000	12,000
C-6817-2-3 (Cow Housing)	0	0	55,299	0	141,799	429,315
C-6817-3-3 (Liquid Manure Handling	0	0	0	0	34,523	628,240
C-6817-4-2 (Solid Manure Handling)	0	0	0	0	6,682	0
C-6817-5-2 (Feed Storage and Handling)	0	0	0	0	174,567	0
C-6817-9-0 (Emergency IC Engine)	725	1	20	193	33	0
Post-Project SSPE (SSPE2)	**725**	**1**	**55,319**	**193**	**361,604**	**1,069,555**

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

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

Because agricultural operations do not fall under any of the specific source categories listed above, fugitive emissions are not counted when determining if an agricultural operation is a major source. 40 CFR 71.2 defines fugitive emissions as "those emissions which could not reasonably pass through a stack, chimney, vent, or other functionally-equivalent opening."

Since emissions at the dairy are not actually collected, a determination of whether emissions could be reasonably collected must be made by the permitting authority. The California Air Pollution Control Association (CAPCOA) prepared guidance in 2005 for estimating potential to emit of Volatile Organic Compounds from dairy farms. The guidance states that *"VOC emissions from the milking centers, cow housing areas, corrals, common manure storage areas, and land application of manure are not physically contained and could not reasonably pass through a stack, chimney, vent, or other functionally-equivalent opening. No collection technologies currently exist for VOC emissions from these emissions units. Therefore, the VOC emissions from these sources are considered fugitive."* The guidance also concludes that, because VOC collection technologies do exist for liquid waste systems at dairies, *"... the VOC emissions from waste lagoons and storage ponds are considered non-fugitive."* The District has researched this issue and concurs with the CAPCOA assessment, as discussed in more detail below.

Milking Center

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

Cow Housing

Although there are smaller dairy farms that have enclosed freestall barns, these barns are not fully enclosed and none of the barns have been found to vent the exhaust through a collection device. The airflow requirements through dairy barns are extremely high, primarily for herd health purposes. The airflow requirements will be even higher in the San Joaquin valley, where temperatures reach in excess of 110 degrees in the dry summer. Collection and control of the exhaust including the large amounts of airflow have not yet been achieved by any facility. Due to this difficultly, the District cannot reasonably demonstrate that emissions can pass through a stack, chimney, vent, or other functionally equivalent opening.

Manure storage Areas

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

opening. In addition, emissions from manure piles have been shown to be insignificant from recent studies.

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

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

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

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

C-6817-3-3: Lagoon/Storage Only

VOC
= [# Milk Cows] x [EF_{lagoon}] + [# Dry Cows] x [EF_{lagoon}] + [# Support Stock] x [EF_{lagoon}]
= 10,000 x 1.17 lb-VOC/hd-yr + 2,000 x 0.64 lb-VOC/hd-yr + 7,508 x 0.49 lb-VOC/hd-yr
= **16,659 lb-VOC/yr**

Non-Fugitive Post-Project Stationary Source Potential to Emit [SSPE2] (lb/year)					
	NO_X	SO_X	PM_{10}	CO	VOC
C-6817-3-3 (Lagoon/Storage)	0	0	0	0	16,659
C-6817-9-0 (Emergency IC Engine)	725	1	20	198	33
Non Fugitive SSPE	**725**	**1**	**20**	**198**	**16,692**

Major Source Determination (lb/year)					
	NO_X	SO_X	PM_{10}	CO	VOC
Post Project SSPE (SSPE2)	**725**	**1**	**20**	**198**	**16,692**
Major Source Threshold	50,000	140,000	140,000	200,000	50,000
Major Source?	No	No	No	No	No

As seen in the table above, the facility is not becoming a Major Source as a result of this project.

6. Baseline Emissions (BE)

The BE calculation (in lb/year) is performed on a pollutant-by-pollutant basis to determine the amount of offsets required, where necessary, when the SSPE1 is greater than the offset threshold. This project is exempt from offsets pursuant to Rule 2201, Section 4.6.9. Therefore, BE calculations are not required.

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

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 B.

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. Unless exempted pursuant to Section 4.2, BACT shall be required for the following actions:*:

a. Any new emissions unit with a potential to emit exceeding two pounds per day,
b. The relocation from one Stationary Source to another of an existing emissions unit with a potential to emit exceeding two pounds per day,
c. Modifications to an existing emissions unit with a valid Permit to Operate resulting in an AIPE exceeding two pounds per day, and/or
d. Any new or modified emissions unit, in a stationary source project, which results in an 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

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

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

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

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

AIPE = PE2 – HAPE

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

HAPE = PE1 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))

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

<u>C-6817-1-3: Cow Milking</u>

<u>VOC</u>

VOC	PE_2 (lb/day)	-	PE_1 (lb/day)	x	(EF_2)	/	(EF_1)	=	AIPE (lb/day)
Milk Cow	11	-	5.3	x	0.4	/	0.4	=	5.7
								Milking Parlor AIPE	**5.7**

As demonstrated above, the AIPE is greater than 2.0 lb/day for VOC from the milking parlor; therefore BACT is triggered for VOC from the existing milking parlor.

NH_3

NH_3	PE_2 (lb/day)	-	PE_1 (lb/day)	x	(EF_2)	/	(EF_1)	=	AIPE (lb/day)
Milk Cow	32.9	-	15.8	x	1.2	/	1.2	=	17.1
								Milking Parlor AIPE	**17.1**

As demonstrated above, the AIPE is greater than 2.0 lb/day for NH_3 from the milking parlor; therefore BACT is triggered for NH_3 from the existing milking parlor.

C-6817-2-3: Cow Housing

PM_{10}

PM_{10}	PE_2 (lb/day)	-	PE_1 (lb/day)	x	(EF_2)	/	(EF_1)	=	AIPE (lb/day)
Milk Cow	31.8	-	15.3	x	1.16	/	1.16	=	16.5
Dry Cow	18.5	-	10.2	x	3.38	/	3.87	=	9.6
Support Stock	101.2	-	79.7	x	4.92	/	5.62	=	31.4
								Cow Housing AIPE	**57.5**

As demonstrated above, the AIPE is greater than 2.0 lb/day for PM_{10} from the cow housing; therefore BACT is triggered for PM_{10} from the existing cow housing.

VOC

VOC	PE_2 (lb/day)	-	PE_1 (lb/day)	x	(EF_2)	/	(EF_1)	=	AIPE (lb/day)
Milk Cow	270.1	-	129.7	x	9.86	/	9.86	=	140.4
Dry Cow	30.5	-	14.6	x	5.57	/	5.57	=	15.9
Support Stock	87.8	-	60.6	x	4.27	/	4.27	=	27.2
								Cow Housing AIPE	**183.5**

As demonstrated above, the AIPE is greater than 2.0 lb/day for VOC from the cow housing; therefore BACT is triggered for VOC from the existing cow housing.

NH_3

NH_3	PE_2 (lb/day)	-	PE_1 (lb/day)	x	(EF_2)	/	(EF_1)	=	AIPE (lb/day)
Milk Cow	767.1	-	368.2	x	28	/	28	=	398.9
Dry Cow	112.9	-	54.2	x	20.6	/	20.6	=	58.7
Support Stock	296.2	-	204.5	x	14.4	/	14.4	=	91.7
								Cow Housing AIPE	**433.9**

As demonstrated above, the AIPE is greater than 2.0 lb/day for NH_3 from the cow housing; therefore BACT is triggered for NH_3 from the existing cow housing.

C-6817-3-3: Liquid Manure Handling

Lagoon/Storage Pond

VOC

VOC	PE_2 (lb/day)	-	PE_1 (lb/day)	x	(EF_2)	/	(EF_1)	=	AIPE (lb/day)
Milk Cow	32.1	-	15.4	x	1.17	/	1.17	=	16.7
Dry Cow	3.5	-	1.7	x	0.64	/	0.64	=	1.8
Support Stock	10.1	-	7.0	x	0.49	/	0.49	=	3.1
								Lagoon/Storage Pond AIPE	**21.6**

As demonstrated above, the AIPE is greater than 2.0 lb/day for VOC from the lagoon/storage pond; therefore BACT is triggered for VOC from the lagoon/storage pond.

NH_3

NH_3	PE_2 (lb/day)	-	PE_1 (lb/day)	x	(EF_2)	/	(EF_1)	=	AIPE (lb/day)
Milk Cow	430.1	-	206.5	x	15.7	/	15.7	=	223.6
Dry Cow	52.1	-	25.0	x	9.5	/	9.5	=	27.1
Support Stock	137.8	-	95.2	x	6.7	/	6.7	=	42.6
								Lagoon/Storage Pond AIPE	**293.3**

As demonstrated above, the AIPE is greater than 2.0 lb/day for NH_3 from the lagoon/storage pond; therefore BACT is triggered for NH_3 from the lagoon/storage pond.

Land Application

VOC

VOC	PE_2 (lb/day)	-	PE_1 (lb/day)	x	(EF_2)	/	(EF_1)	=	AIPE (lb/day)
Milk Cow	34.5	-	16.6	x	1.26	/	1.26	=	17.9
Dry Cow	3.7	-	1.8	x	0.68	/	0.68	=	1.9
Support Stock	10.7	-	7.4	x	0.52	/	0.52	=	3.3
								Land Application AIPE	**23.1**

As demonstrated above, the AIPE is greater than 2.0 lb/day for VOC from land application; therefore BACT is triggered for VOC from land application.

NH_3

NH_3	PE_2 (lb/day)	-	PE_1 (lb/day)	x	(EF_2)	/	(EF_1)	=	AIPE (lb/day)
Milk Cow	797.3	-	382.7	x	29.1	/	29.1	=	414.6
Dry Cow	83.8	-	40.2	x	15.3	/	15.3	=	43.6
Support Stock	220.1	-	152.0	x	10.7	/	10.7	=	68.1
								Land Application AIPE	**526.3**

As demonstrated above, the AIPE is greater than 2.0 lb/day for NH_3 from the land application; therefore BACT is triggered for NH_3 from land application.

C-6817-4-2: Solid Manure Handling

VOC

VOC	PE_2 (lb/day)	-	PE_1 (lb/day)	x	(EF_2)	/	(EF_1)	=	AIPE (lb/day)
Milk Cow	12.9	-	6.8	x	0.47	/	0.47	=	6.1
Dry Cow	1.3	-	0.6	x	0.24	/	0.24	=	0.7
Support Stock	4.1	-	2.8	x	0.2	/	0.2	=	1.3
								Solid Manure Handling AIPE	**8.1**

As demonstrated above, the AIPE is greater than 2.0 lb/day for VOC from the solid manure handling; therefore BACT is triggered for VOC from the solid manure handling.

C-6817-5-3: Feed Storage and Handling

VOC

VOC	PE_2 (lb/day)	-	PE_1 (lb/day)	x	(EF_2)	/	(EF_1)	=	AIPE (lb/day)
Cows	430	-	241.2	x	8.0	/	8.0	=	189
Feed Storage and Handling AIPE									**189**

As demonstrated above, the AIPE is greater than 2.0 lb/day for VOC from the feed storage and handling; therefore BACT is triggered for VOC from the feed storage and handling

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; 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 (see Appendix C), BACT has been satisfied with the following:

Milking Parlor (C-6817-1-3)

VOC: Flush/Spray down milking parlors after each group of cows is milked.

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

Cow Housing (C-6817-2-3)

PM_{10}: 1) Weekly scraping of open corrals using a pull-type scraper in the morning hours except when prevented by wet conditions.
2) Concrete feed lanes and walkways for all cows.
3) Shade structures located uphill of the corrals.
4) Feeding heifers near (within 1 hour of) dusk.
5) Downwind shelter belts designed in accordance to the NRCS guideline #380.
6) Individual calf hutches (calves under three months)
7) Application of water (sprinklers) in corrals.

VOC: 1) Concrete feed lanes and walkways for all cows.
2) Freestall feed lanes and walkways flushed four times per day and feed lanes and walkways in the corrals and hutches for the remaining animals flushed at least two 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) Dry lots sloped to facilitate runoff and drying in accordance with Title 3, Food and Agriculture, Division 2, Animal Industry of the California Code of Regulations, Section 646.1.
5) Weekly scraping of freestall exercise pens and open corrals using a pull-type scraper in the morning hours except when prevented by wet conditions.
6) VOC mitigation measures required by District Rule 4570.

NH_3: 1) Pave feedlane at least 8 feet on the corral side of the fence
2) Freestall feed lanes and walkways for milk cows flushed four times per day and feed lanes and walkways in the corrals and hutches for the remaining animals flushed at least two times per day
3) Dry lots sloped to facilitate runoff and drying in accordance with Title 3, Food and Agriculture, Division 2, Animal Industry of the California Code of Regulations, Section 646.1.
4) Weekly scraping of freestall exercise pens and open corrals using pull-type scraper in the morning hours except when prevented by wet conditions.

Liquid Manure Handling System (C-6817-3-3)

Lagoon & Storage Pond

VOC: 1) Two-stage anaerobic treatment lagoon designed according to NRCS guidelines.
2) Installation of an anaerobic digester contingent upon the final dairy BACT guideline.
3) Mechanical separators equipped with dewatering press.
4) Weekly removal of separated solids.

NH_3: 1) Two-stage anaerobic treatment lagoon designed according to NRCS guidelines.
2) Installation of an anaerobic digester contingent upon the final dairy BACT guideline.
3) Mechanical separators equipped with dewatering press.
4) Weekly removal of separated solids.

Land Application

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

NH_3: Irrigation of crops using liquid and slurry manure from a holding/storage pond after an Anaerobic Treatment Lagoon.

Solid Manure Handling (C-6817-4-2)

VOC: 1) Solid manure applied to fields shall be incorporated into the soil immediately (within two hours) after application.

2) Compliance with District Rule 4570 mitigation measures.

Feed Storage and Handling (C-6817-5-2)

VOC: 1) Refused feed re-fed or removed from feed lanes on a daily basis to prevent decomposition.
2) Compliance with District Rule 4570 mitigation measures.

B. Offsets

Per section 4.6.9 of District Rule 2201, non-major source agricultural operations are exempt from offsets, if emissions reductions from that source would not meet the criteria for real, permanent, quantifiable, and enforceable emission reductions are exempt from offset requirements.

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 non-major source agricultural operations until the District has an approved process that finds that reductions from agriculture operations are real, permanent, quantifiable, and enforceable.

As demonstrated in section VII.C.5, this facility is not a major source of any criteria pollutants, therefore this permitting action is exempt from offsets requirements.

C. Public Notification

1. Applicability

Public noticing is required for:
a. New Major Sources, Federal Major Modifications, and SB288 Major Modifications,
b. Any new emissions unit with a Potential to Emit greater than 100 pounds during any one day for any one pollutant,
c. Any project which results in the offset thresholds being surpassed, and/or
d. Any project with an SSIPE of greater than 20,000 lb/year for any pollutant.

a. New Major Sources, Federal Major Modifications, and SB288 Major Modifications

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

b. PE > 100 lb/day

Applications which include a new emissions unit with a Potential to Emit greater than 100 pounds during any one day for any pollutant will trigger public noticing requirements. There are no new emissions units associated with this project; therefore public noticing is not required for this project for Potential to Emit Purposes.

c. Offset Threshold

The following table compares the SSPE1 with the SSPE2 in order to determine if any offset thresholds have been surpassed with this project.

Offset Threshold				
Pollutant	SSPE1 (lb/year)	SSPE2 (lb/year)	Offset Threshold	Public Notice Required?
NO_X	0	725	20,000 lb/year	No
SO_X	0	1	54,750 lb/year	No
PM_{10}	38,417	55,319	29,200 lb/year	No
CO	0	193	200,000 lb/year	No
VOC	204,081	361,604	20,000 lb/year	No

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

d. SSIPE > 20,000 lb/year

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

Stationary Source Increase in Permitted Emissions [SSIPE] – Public Notice					
Pollutant	SSPE2 (lb/year)	SSPE1 (lb/year)	SSIPE (lb/year)	SSIPE Public Notice Threshold	Public Notice Required?
NO_x	725	0	725	20,000 lb/year	No
SO_x	1	0	1	20,000 lb/year	No
PM_{10}	55,319	38,417	16,902	20,000 lb/year	No
CO	193	0	193	20,000 lb/year	No
VOC	361,604	204,081	157,523	20,000 lb/year	Yes

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

2. Public Notice Action

As discussed above, public noticing is required for this project for SSIPE for VOC exceeding 20,000 lb/yr. Therefore, public notice documents will be submitted to the California Air Resources Board (CARB) and a public notice will be published in a local newspaper of general circulation prior to the issuance of the ATC for this equipment.

D. Daily Emission Limits (DELs)

Daily Emissions Limitations (DELs) and other enforceable conditions are required by Section 3.16 to restrict a unit's maximum daily emissions, to a level at or below the emissions associated with the maximum design capacity. Per Sections 3.16.1 and 3.16.2, the DEL must be contained in the latest ATC and contained in or enforced by the latest PTO and enforceable, in a practicable manner, on a daily basis. DELs are also required to enforce the applicability of BACT.

For dairies, the DEL is satisfied based on the number and types of cows at the dairy and the required controls and mitigation measures. The number and types of cows are listed in the permit equipment description for the Cow Housing (Permit C-6817-2-3).

Milking Parlor (C-6817-1-3)

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

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

Cow Housing (C-6817-2-3)

The following conditions will be placed on the ATC to ensure that the DEL requirements for PM_{10} are met:

- Open corrals shall be scraped weekly using a pull-type scraper in the morning hours, except when this is prevented by wet conditions. [District Rule 2201]

- The applicant shall establish windbreaks adjacent to and along the entire east side (2,500 ft) of the heifer corrals and 875 ft of windbreaks adjacent to and along the south side of the heifer corrals of the dairy. East windbreaks shall consist of the following rows with the first row closest to the heifer corrals: first row shall consist of Arizona Cypress trees, planted 10 feet apart; and the second row shall consist of Chinese Pistache trees, planted 14 feet apart. South windbreaks shall consist of the following rows with the first row closest to the heifer corrals: first row shall consist of Arizona Cypress trees, planted 10 feet apart; and the second row shall consist of Interior Live Oak trees, planted 20 feet apart. Each row should be offset from the adjacent row. Spacing between rows shall be sufficient to accommodate cultivation equipment, not to exceed 24 feet. [District Rule 2201]

- The open corrals shall be equipped with shade structures. [District Rule 2201]

- At least one of the feedings of the heifers at this dairy shall be near (within one hour of) dusk. [District Rule 2201]

- Permittee shall sprinkle water over 56% of area of the heifer corrals. Sprinkling rate shall match with the local evaporation rate to keep sufficient moisture content in the surface of the corrals. [District Rule 2201]

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

- The concrete feed lanes and walkways for milk cows and dry cows shall be flushed at least four times per day. [District Rules 2201]

- The concrete feed lanes and walkways for all heifers and calves shall be flushed at least two times per day. [District Rules 2201]

Liquid Manure Handling (C-6817-3-3)

Since emissions from the liquid manure handling depend on operation of the anaerobic treatment lagoon, the following condition will be placed on the permit:

- Permittee shall operate the lagoon as an anaerobic treatment lagoon designed according to NCRCS Guideline No. 359. [District Rule 2201]

Solid Manure Handling (C-6817-4-2)

Since emissions from the solid manure handling depend on rapid incorporation of the manure into the soil after land application, the following condition will be placed on the permit:

- Solid manure applied to fields shall be incorporated into the soil immediately (within two hours) after application. [District Rule 2201]

Feed Handling and Storage (C-6817-5-2)

The following condition will be placed on the permit to limit the daily emissions from the feed handling and storage:

- Refused feed shall be re-fed or removed from feed lanes on a daily basis. [District Rule 2201]

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

- 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 2201]

- All runoff and leachate from silage and commodity pads shall be directed to the lagoon or other wastewater treatment system. [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 (C-6817-2-3)

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

- Inspection for potholes or other sources of emissions shall be performed on a monthly basis. [District Rule 2201]
- Firm, stable, and not easily eroded soils shall be used for the exercise pens. [District Rule 2201]
- 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]
- 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]
- Permittee shall determine the moisture content of at least one of the corrals on a monthly basis from April to October and once every two months from November to March. Two samples should be taken from the corral, one at the midpoint of the sprinkler spray arc or if multiple sprinklers then at the driest midpoint of any of the arcs, and the second farthest from the sprinklers. Successive moisture sampling shall be performed on alternate corrals (e.g., first month - sample corral 1, second month - sample corral 2, etc.). Samples shall be performed by an independent party. [District Rule 2201]

3. Recordkeeping

Recordkeeping is required to demonstrate compliance with the public notification and daily emission limit requirements of Rule 2201. In general, recordkeeping for the Milking Parlors (C-6817-1), the Liquid Manure Handling System (C-6817-3), and the Solid Manure Handling System (C-6817-4) is satisfied with the records that must be kept to demonstrate compliance with the numbers and types of cows listed in the permit equipment description for the Cow Housing (C-6817-2).

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

Additional recordkeeping conditions to comply with the daily emission limit requirements stated above will appear on the following ATCs.

Milking Parlor (C-6817-1)

The following condition will appear on the ATC for the Milking Parlor:

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

Cow Housing (C-6817-2)

The following conditions will appear on the ATC for the Cow Housing Permit:

- Permittee shall maintain a record of the number of animals of each species and production group at the facility and shall maintain quarterly records of any changes to this information. [District Rules 2201 and 4570]

- Permittee shall maintain records sufficient to demonstrate that freestall lanes and walkways are flushed four times per day and feed lanes and walkways in the open corrals and hutches are flushed at least two times per day. [District Rules 2201 and 4570]

- Permittee shall maintain records of pothole inspections. [District Rule 2201]

- Permittee shall maintain sufficient records to demonstrate that corrals are maintained to ensure drainage and prevent water from standing for more than forty-eight (48) hours after a storm. [District Rules 2201 and 4570]

- Permittee shall maintain records of the date that water pipes and troughs are inspected and leaks are repaired. [District Rules 2201 and 4570]

- Permittee shall maintain records of: (1) the date that animal waste that is not dry is removed from individual cow freestall beds; (2) the date that water pipes and troughs are inspected and leaks are repaired. [District Rules 2201 and 4570]

- Permittee shall maintain records of 1) daily local evaporation rate/soil evaporation rate, 2) the amount of water (inches or cm) applied to the corral surface, and 3) records of the required moisture content samples including the date the samples were taken. Records of sprinkler run time and flow rate may be used to satisfy item 2.

- All records shall be kept and maintained for a minimum of five (5) years and shall be made available to the APCO, ARB and EPA upon request. [District Rules 1070 and 4570]

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

Liquid Manure Handling System (C-6817-3)

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

- Permittee shall maintain records of design specifications and calculations for the Anaerobic Treatment Lagoon system in order to demonstrate that the system has been designed and is operating in accordance with the applicable National Resource Conservation Service (NRCS) technical guide. [District Rule 2201]

- Permittee shall maintain records that only liquid animal waste treated with an anaerobic treatment lagoon is applied to fields. [District Rules 2201 and 4570]

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

Solid Manure Handling System (C-6817-4)

To ensure that the solid manure is handled properly, the following condition will be placed on the ATC for the Solid Manure Handling System:

- Permittee shall maintain records to demonstrate that dry animal waste piles outside the pens are covered with a weatherproof covering from October through May. [District Rules 2201 and 4570]

- Permittee shall maintain records, such as manufacturer warranties or other documentation, demonstrating that the weatherproof covering over solid animal waste and/or weatherproof covering over separated solids, are installed, used, and maintained in accordance with manufacturer recommendations and applicable standards listed in NRCS Field Office Technical Guide Code 313 or 367, or any other applicable standard approved by the APCO, ARB, and EPA. [District Rules 2201 and 4570]

- 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 Rules 2201 and 4570]

- Permittee shall maintain records to demonstrate that all solid manure has been incorporated within 2 hours of land application. [District Rule 2201]

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

Feed Storage and Handling (C-6817-5)

To ensure that the BACT requirements are satisfied, the following conditions will be placed on the ATC for the Feed Storage and Handling Permit:

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

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

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

- Permittee shall maintain records demonstrating grain is/was stored in a weatherproof storage structure or under a weatherproof covering from October through May. [District Rules 2201 and 4570]

- Permittee shall maintain records of the thickness and type of cover used to cover each silage pile. Permittee shall also maintain records of the date of the last delivery of material to each silage pile and the date each pile is covered. [District Rules 2201 and 4570]

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

Additionally, the permit units being modified are subject to the recordkeeping requirements of Section 7.2 of District Rule 4570, *Confined Animal Facilities.* Recordkeeping for compliance with District Rule 4570 will be discussed under the Rule 4570 section below. [District Rules 2201 and 4570]

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 D of this document for the AAQA summary sheet.

The expansion will add 5,200 milk cows, 1,040 dry cows, and 2,324 support stock. The project will result in increases in PM10, VOC, and NH3. Only the increases from the

proposed expansion will be analyzed as part of this RMR and AAQA. Since no lagoons, ponds, or basins are being added or modified as part of this expansion, no analysis or review of H2S will be required.

The proposed location is in a non-attainment area for PM_{10}. The increase in the ambient PM_{10} and $PM_{2.5}$ concentrations due to the proposed dairy expansion are shown on the table titled Calculated Contribution. The District level of significance is shown on the table titled Significance Levels.

Significance Levels				
Pollutant	District Significance Level ($\mu g/m^3$)			
	24 hr Avg.	8 hr Avg.	3 hr Avg.	1 hr Avg.
PM_{10}	10.4	N/A	N/A	N/A
$PM_{2.5}$	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}	9.61	N/A	N/A	N/A
$PM_{2.5}$	1.44	N/A	N/A	N/A

As shown above, the ambient air quality impacts from PM_{10} and $PM_{2.5}$ emissions at the dairy do not exceed the District's 24-hour interim threshold for fugitive dust sources. Therefore, this project is not expected to cause or make worse a violation of an air quality standard.

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 Rule 2550, newly constructed facilities or reconstructed units or sources[5] 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 Maximum Achievable Control Technology.

[5] Reconstruction" is defined as a change that costs 50 percent of the cost of constructing a new unit or source like the one being rebuilt.

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. Please note that a conclusion that MACT requirements are triggered would necessarily involve consideration of controlled emissions levels. The following is a list of HAPs generated at dairies including the associated emission factor.

Hazardous Air Pollutant Emissions		
HAP	lbs-milk cow-yr	Source
Methanol	1.35	UC Davis - *VOC Emission from Dairy Cows and their Excreta,* 2005
Carbon disulfide	0.027	Dr. Schmidt - *Dairy Emissions using Flux Chambers (Phase I & II)*, 2005
Eythylbenzene	0.003	
o-Xylene	0.005	
1,2-Dibromo-3chloropropane	0.011	
1,2,4-Trichlorobenzene	0.025	
Napthalene	0.012	
Hexachlorobutadiene	0.012	
Formaldehyde	0.005	
Acetaldehyde	0.029	
Chloroform	0.017	California State University Fresno (CSUF) - *Monitoring and Modeling of ROG at California Dairies*, 2005
Styrene	0.01	
Vinyl acetate[6]	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[7]	0.162	
Cadmium	0.009	Air Resources Board's Profile No. 423, Livestock Operations Dust
Hexavalent Chromium	0.004	
Nickel	0.026	
Arsenic	0.005	
Cobalt	0.003	
Lead	0.033	
Total	**1.828**	

Although some of the pollutants listed above may have been misidentified as HAPs due to similarities of many compounds consisting of very similar spikes (as measured through the gas Chromatograph Mass Spectroscopy - GCMS), all of these pollutants will be used in calculating the worst-case HAP emissions. Since this dairy is complying with all of the Best Available Control Technology (BACT) requirements and Rule 4570 mitigation measures, many of the pollutants listed above are expected to be mitigated, however, no control is being applied to

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

these factors at this time in order to calculate the worst-case emissions. The emission calculations are shown below:

HAP Emissions						
Type of Cow	**Number of cows**		**Emission Factor lbs/hd-yr[8]**		**lbs/yr**	**tons/yr**
Milking Cow	10,000	x	1.828	=	18,280	9.1
Dry Cow	2,000	x	1.123	=	2,246	1.1
Heifer (15-24 mo)	2,923	x	0.786	=	2,297	1.1
Heifer (7-14 mo)	1,780	x	0.686	=	1,221	0.6
Heifer (3-6 mo)	814	x	0.621	=	505	0.3
Calf (under 3 mo)	1971	x	0.584	=	1,151	0.6
Bulls	20	X	1.123	=	22	0.0
Total				=	**25,722**	**12.8**

As shown above, each individual HAP is expected to be below 10 tons per year and total HAP emissions are expected to be below 25 tons per year. The largest individual HAP would be methanol, at 9.5 tons per year (12.8 tons x (1.35 lbs-methanol/1.828 lbs-HAPs)). Therefore, this facility will not be a major air toxics source and the provisions of Rule 2550 do not apply.

There are several recently completed and ongoing research studies that that will be considered in future revisions of the current emission factors for dairies, including the recent study conducted by Dr. Mitloehner in a study entitled "*Dairy Cow Measurements of Volatile Fatty Acids, Amine, Phenol, and Alcohol Emissions Using an Environmental Chamber*" completed in 2006. These studies have not been fully vetted or reviewed in the context of establishing standardized emission factors. For instance, although Dr. Mitloehner indicates a high methanol emissions rate from fresh manure in the cited study, in the same report he also indicates 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 until that scientific review process is complete and the District has had opportunity to consider public comment on any proposed changes, the premature, and therefore potentially flawed, use of such emissions data would be inconsistent with good governance and good science.

Rule 4101 Visible Emissions

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

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

[8] The emission factor has been adjusted for each type of cow based on the ratio of amount of manure generated for each cow.

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 and Safety Code 41700 (Health Risk Assessment)

District Policy APR 1905 – Risk Management Policy for Permitting New and Modified Sources specifies that for an increase in emissions associated with a proposed new source or modification, the District perform an analysis to determine the possible impact to the nearest resident or worksite.

An HRA is not required for a project with a total facility prioritization score of less than one. According to the Technical Services Memo for this project (**Appendix D**), the total facility prioritization score including this project was greater than one. Therefore, a health risk assessment was required to determine the short-term acute and long-term chronic exposure from this project.

The cancer risk for this project is shown below:

RMR Summary					
Categories	**Milking Parlor (Unit 1-3)**	**Cow Housing (Unit 2-3)**	**Liquid Manure Handing (Unit 3-3)**	**Project Totals**	**Facility Totals**
Prioritization Score	0.01	0.54	0.51	>1	>1
Acute Hazard Index	0.02	0.67	0.01	1.00	1.00[1]
Chronic Hazard Index	0.00	0.06	0.01	0.07	0.07
Maximum Individual Cancer Risk	0.01E-6	0.85E-6	0.77E-6	1.63E-6	61.63E-6
T-BACT Required?	No	No	No		
Special Permit Conditions?	No	No	Yes		

1 The Acute Hazard Index for this facility has reached the permissible threshold. Before any future projects for this facility may be approved, this must be taken into consideration.

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

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

C-6817-1-3 and C-6817-2-3:

No special conditions are required.

C-6817-3-3:

1. The pH value cannot be any lower than 7.5.
2. The quarterly H_2S concentration for the first quarter (January-March) cannot exceed 0.08 mg/l.
3. The quarterly H_2S concentration for the second quarter (April-June) cannot exceed 0.11 mg/l.
4. The quarterly H_2S concentration for the third quarter (July-September) cannot exceed 0.12 mg/l.
5. The quarterly H_2S concentration for the fourth quarter (October-December) cannot exceed 0.09 mg/l.

Rule 4550 Conservation Management Practices (CMP)

This rule applies to agricultural operation sites located within the San Joaquin Valley Air Basin. The purpose of this rule is to limit fugitive dust emissions from agricultural operation sites.

Pursuant to Section 5.1, effective on and after July 1, 2004, an owner/operator shall implement the applicable CMPs selected pursuant to Section 6.2 for each agricultural operation site.

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

The facility received District approval for its CMP plan on June 20, 2006. Continued compliance with the requirements of District Rule 4550 is expected. The applicant has proposed to comply with the same PM_{10} mitigation measures for the expansion as proposed for the existing facility.

Rule 4570 Confined Animal Facilities (CAF)

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

Section 5.0 Requirements

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

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

This facility has already gone through public notice for compliance with the previous version of District Rule 4570; therefore, public notice for this project will not be required.

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

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

plan designating a mitigation measure to be implemented in lieu of the mitigation measure that was suspended, and
- The APCO, ARB, and EPA approve the temporary suspension of the mitigation measure for the time period requested by the owner/operator and a signed written copy of this determination shall be retained on site.

The following condition will be placed on each permit.

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

Section 7.0 Administrative Requirements

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

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

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

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

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

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

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

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

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

General Conditions

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

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

Feed Mitigation Measures Required

Required

Feed according to National Research Council (NRC) guidelines.

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

- {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]

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]

- {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]

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]

- {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]

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

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

- {4461} Permittee shall maintain records demonstrating grain is/was stored in a weatherproof storage structure or under a weatherproof covering from October through May. [District Rule 4570]

Optional

Remove uneaten wet feed from feed bunks within twenty-four (24) hours after the end of a rain event.

- {4464} Permittee shall remove uneaten wet feed from feed bunks within twenty-four (24) hours after the end of a rain event. [District Rule 4570]

- {4465} Permittee shall maintain records demonstrating that uneaten wet feed was removed from feed bunks within twenty-four (24) hours after the end of a rain event. [District Rule 4570]

Silage

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

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

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

- {4469} Permittee shall cover all silage piles, except for the area where feed is being removed from the pile, with a plastic tarp that is at least five (5) mils (0.005 inches) thick, multiple plastic tarps with a cumulative thickness of at least 5 mils (0.005 inches), or an oxygen barrier film covered with a UV resistant material. Silage piles shall be covered within seventy-two (72) hours of last delivery of material to the pile. Sheets of material used to cover silage shall overlap so that silage is not exposed where the sheets meet. [District Rule 4570]

- {4470} Permittee shall maintain records of the thickness and type of cover used to cover each silage pile. Permittee shall also maintain records of the date of the last delivery of material to each silage pile and the date each pile is covered. [District Rule 4570]

Build silage piles such that the average bulk density of silage piles is at least 44 lb/cu ft for corn silage and 40 lb/cu ft for other silage types, as measured in accordance with Section 7.10 of Rule 4570, or when creating a silage pile, adjust filling parameters to assure a calculated average bulk density of at least 44 lb/cu ft for corn silage and at least 40 lb/cu ft for other silage types, using a spreadsheet approved by the District, or incorporate the following practices when creating silage piles:

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

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

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

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

- {4471} Permittee shall select and implement one of the following mitigation measures for building each silage pile at the facility: Option 1) build the silage pile such that the average bulk density is at least 44 lb/cu ft for corn silage and 40 lb/cu ft for other silage types, as measured in accordance with Section 7.11 of District Rule 4570; Option 2) Adjust filling parameters when creating the silage pile to achieve an average bulk density of at least 44 lb/cu ft for corn silage and at least 40 lb/cu ft for other silage types as determined using a District-approved spreadsheet; or Option 3) build silage piles using crops harvested with the applicable minimum moisture content, maximum Theoretical Length of Chop (TLC), and roller opening identified in District Rule 4570, Table 4.1, 1.d and manage silage material delivery such that the thickness of the layer of un-compacted material delivered on top of the pile is no more than six (6) inches. Records of the option chosen as a mitigation measure for building each silage pile shall be maintained. [District Rule 4570]

- {4472} For each silage pile that Option 1 (Measured Bulk Density) is chosen as a mitigation measure for building the pile, records of the measured bulk density shall be maintained. [District Rule 4570]

- {4473} For each silage pile that Option 2 (Bulk Density Determined by Spreadsheet) is chosen as a mitigation measure for building the pile, records of the filling parameters entered

into the District-approved spreadsheet to determine the bulk density shall be maintained. [District Rule 4570]

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

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

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

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

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

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

Manage silage piles such that only one silage pile has an uncovered face and the uncovered face has a total exposed surface area of less than 2,150 square feet.

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

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

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

Silage Additives: Inoculate silage with homolactic acid bacteria in accordance with manufacturer recommendations to achieve a concentration of at least 100,000 colony forming units per gram of wet forage.

Silage Additives: Apply propionic acid, benzoic acid, sorbic acid, sodium benzoate, or potassium sorbate at a rate specified by the manufacturer to reduce yeast counts when forming silage pile.

Apply other additives at specified rates that have been demonstrated to reduce alcohol concentrations in silage and/or VOC emissions from silage and have been approved by the District and EPA.

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

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

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

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

Milking Parlor

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

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

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

Freestall 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]

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]

- {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]

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

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

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

Corral

Required

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

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

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

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

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

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

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

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

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

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

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

Optional

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

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

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

Install all shade structures uphill of any slope in the corral.

- {4513} Permittee shall install all shade structures uphill of any slope in the corral. [District Rule 4570]

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

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

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

Solid Manure

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

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

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

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

- {4528} Permittee shall maintain records, such as manufacturer warranties or other documentation, demonstrating that the weatherproof covering over dry manure are installed, used, and maintained in accordance with manufacturer recommendations and applicable standards listed in NRCS Field Office Technical Guide Code 313 or 367, or any other applicable standard approved by the APCO, ARB, and EPA. [District Rule 4570]

- Remove separated solids from the facility within seventy-two (72) hours of removal from the drying process. Within seventy two (72) hours of removal from the drying process, cover separated solids outside the housing with a weatherproof covering from October through

May, except for times when wind events remove the covering, not to exceed 24 hours per event.

- {4529} Within seventy two (72) hours of removal of separated solids from the drying process, permittee shall either 1) remove separated solids from the dairy, or 2) cover separated solids outside the housing with a weatherproof covering from October through May, except for times when wind events remove the covering, not to exceed twenty-four (24) hours per event. [District Rule 4570]

- {4530} Permittee shall keep records of dates when separated solids are removed from the dairy or permittee shall maintain records to demonstrate that separated solids piles outside the pens are covered with a weatherproof covering from October through May. [District Rule 4570]

- {4531} Permittee shall maintain records, such as manufacturer warranties or other documentation, demonstrating that the weatherproof covering over separated solids are installed, used, and maintained in accordance with manufacturer recommendations and applicable standards listed in NRCS Field Office Technical Guide Code 313 or 367, or any other applicable standard approved by the APCO, ARB, and EPA. [District Rule 4570]

Liquid Manure

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

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

Land Application

Solid

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

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

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

Liquid

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

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

- {4551} Permittee shall maintain records to demonstrate liquid manure did not stand in the fields for more than twenty-four (24) hours after irrigation. [District Rule 4570]

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)

Philip Verwey Farms #2 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.

The emissions from the proposed dairy will exceed the 5 ton-VOC/year threshold and the dairy is classified as a large CAF by the California Air Resources Board (ARB). The facility is therefore subject to District Permit requirements and is complying by obtaining ATC permits. Continued compliance with the requirements of SB 700 is expected.

California Environmental Quality Act (CEQA)

The California Environmental Quality Act (CEQA) requires each public agency to adopt objectives, criteria, and specific procedures consistent with CEQA Statutes and CEQA Guidelines for administering its responsibilities under CEQA, including the orderly evaluation of projects and preparation of environmental documents. The San Joaquin Valley Unified Air Pollution Control District (District) adopted its *Environmental Review Guidelines* (ERG) in 2001. The basic purposes of CEQA are to:

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

The proposed project is located in Kings County and is thus, subject to the Kings County Planning Agency Site Plan Review Process. In 2002, Kings County amended their General Plan to include a Dairy Element. The Dairy Element was developed by the Kings County Planning Agency as a comprehensive set of goals, objectives, policies, and standards to guide development, expansion, and operation of milk cow (bovine) dairies and dairy replacement stock facilities within Kings County. The Dairy element establishes a written process (Site Plan Review) by which subsequent dairy projects involving site-specific operations can be evaluated to determine whether the environmental effects of the operation were covered in the Program Environmental

Impact Report (EIR). The Program EIR for the Dairy Element (State Clearinghouse Number 2000111133) was certified by the Kings County Board of Supervisors on July 20, 2002.

Kings County is the Agency which has the principal responsibility for approving this project. Consistent with procedures established within the Program EIR, the Kings County Planning Agency has approved the project through its Site Plan Review process. The District is a Responsible Agency for the project because of its discretionary approval power over the project via its Permits Rule (Rule 2010) and New Source Review Rule (Rule 2201), (CCR §15381). 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 reduce 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 (CCR §15096). The District has reviewed the environmental review document prepared by the Lead Agency for the project and finds it to be adequate. To reduce project related impacts on air quality, the District has imposed air pollutant emission controls on the project as required by BACT and District Rule 2201. Offsets were considered, but determined not to be a feasible mitigation measure due to legal constraints (Health and Safety Code §42301.18(c)). Thus, the District has adopted all feasible mitigation measures to reduce air impacts associated with the project.

Pursuant to CCR §15096, prior to project approval and issuance of ATCs the District will prepare findings. Upon project approval the District will file a Notice of Determination with the County of Kings.

IX. Recommendation

Compliance with all applicable rules and regulations is expected. Pending a successful NSR Public Noticing period, issue Authorities to Construct C-6817-1-3, -2-3, -3-3, -4-2, and -5-2 subject to the permit conditions on the attached draft Authorities to Construct in Appendix E.

X. Billing Information

Annual Permit Fees			
Permit Number	Fee Schedule	Fee Description	Annual Fee
C-6817-1-3	3020-06	Milk Parlor	$105.00
C-6817-2-3	3020-06	Cow Housing	$105.00
C-6817-3-3	3020-06	Liquid Manure Handling	$105.00
C-6817-4-2	3020-06	Solid Manure Handling	$105.00
C-6817-5-2	3020-06	Feed Storage and Handling	$105.00

Appendixes

A: Current Authority to Construct Permits (C-6817-1-2, -2-2, -3-2, -4-1, -5-1)
B: Quarterly Net Emissions Change
C: BACT Analysis
D: Summary of Health Risk Assessment (HRA) and Ambient Air Quality Analysis (AAQA)
E: Draft ATCs (C-6817-1-3, -2-3, -3-3, -4-2, and -5-2)

APPENDIX A

Current Authority to Construct Permits (C-6817-1-2, -2-2, -3-2, -4-1, -5-1)

San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT

HEALTHY AIR LIVING™

AUTHORITY TO CONSTRUCT

PERMIT NO: C-6817-1-2 **ISSUANCE DATE:** 11/28/2011

LEGAL OWNER OR OPERATOR: PHILIP VERWEY FARMS #2
MAILING ADDRESS: 19765 13TH AVE
HANFORD, CA 93230

LOCATION: 19765 13TH AVE
HANFORD, CA 93230

EQUIPMENT DESCRIPTION:
MODIFICATION OF 4,800 COW MILKING OPERATION WITH TWO DOUBLE 40 PARALLEL (80 STALLS EACH) MILKING PARLORS AND ONE HOSPITAL BARN MILKING PARLOR: ADD MITIGATION MEASURES TO COMPLY WITH RULE 4570

CONDITIONS

1. Authority to Construct (ATC) C-6817-1-0 shall be implemented prior to or concurrently with this ATC. [District Rule 2201]
2. Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to enter the permittee's premises where a permitted source is located or emissions related activity is conducted, or where records must be kept under condition of the permit. [District Rule 1070]
3. Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to have access to and copy, at reasonable times, any records that must be kept under the conditions of the permit. [District Rule 1070]
4. Permittee shall implement and maintain all the Mitigation Measures contained in this permit no later than December 5, 2012. [District Rule 4570]
5. Mitigation measures that are currently being implemented as required by Phase I of Rule 4570 should continue to be implemented until the mitigation measures required under this permit are implemented. [District Rule 4570]

CONDITIONS CONTINUE ON NEXT PAGE

YOU MUST NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (559) 230-5950 WHEN CONSTRUCTION IS COMPLETED AND PRIOR TO OPERATING THE EQUIPMENT OR MODIFICATIONS AUTHORIZED BY THIS AUTHORITY TO CONSTRUCT. This is NOT a PERMIT TO OPERATE. Approval or denial of a PERMIT TO OPERATE will be made after an inspection to verify that the equipment has been constructed in accordance with the approved plans, specifications and conditions of this Authority to Construct, and to determine if the equipment can be operated in compliance with all Rules and Regulations of the San Joaquin Valley Unified Air Pollution Control District. Unless construction has commenced pursuant to Rule 2050, this Authority to Construct shall expire and application shall be cancelled two years from the date of issuance. The applicant is responsible for complying with all laws, ordinances and regulations of all other governmental agencies which may pertain to the above equipment.

Seyed Sadredin, Executive Director / APCO

DAVID WARNER, Director of Permit Services
C-6817-1-2 Nov 28 2011 4:56PM – SANDHUG : Joint Inspection NOT Required

6. 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]
7. No more than 4,800 milk cows shall be milked in the milking parlors. [District Rule 2201]
8. Permittee shall flush or hose milk parlor immediately prior to, immediately after, or during each milking. [District Rules 2201 and 4570]
9. Permittee shall provide verification that milk parlors are flushed or hosed prior to, immediately after, or during each milking. [District Rules 2201 and 4570]
10. Permittee shall keep and maintain all records for a minimum of five (5) years and shall make records available to the APCO and EPA upon request. [District Rule 4570]
11. This permit does not authorize the violation of any conditions established for this facility in the Conditional Use Permit (CUP), Special Use Permit (SUP), Site Approval, Site Plan Review (SPR), or other approval documents issued by a local, state, or federal agency. [District Rules 2070 and 2080, and Public Resources Code 21000-21177: California Environmental Quality Act]

San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT

HEALTHY AIR LIVING™

AUTHORITY TO CONSTRUCT

PERMIT NO: C-6817-2-2 **ISSUANCE DATE:** 11/28/2011

LEGAL OWNER OR OPERATOR: PHILIP VERWEY FARMS #2
MAILING ADDRESS: 19765 13TH AVE
HANFORD, CA 93230

LOCATION: 19765 13TH AVE
HANFORD, CA 93230

EQUIPMENT DESCRIPTION:
MODIFICATION OF COW HOUSING - 4,800 MILK COWS NOT TO EXCEED A COMBINED TOTAL OF 5,760 MATURE COWS (MILK AND DRY); 5,184 TOTAL SUPPORT STOCK (HEIFERS AND CALVES); AND 10 FREESTALLS WITH FLUSH/SCRAPE SYSTEM: ADD MITIGATION MEASURES TO COMPLY WITH RULE 4570

CONDITIONS

1. Authority to Construct (ATC) C-6817-2-0 shall be implemented prior to or concurrently with this ATC. [District Rule 2201]
2. Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to enter the permittee's premises where a permitted source is located or emissions related activity is conducted, or where records must be kept under condition of the permit. [District Rule 1070]
3. Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to have access to and copy, at reasonable times, any records that must be kept under the conditions of the permit. [District Rule 1070]
4. Permittee shall implement and maintain all the Mitigation Measures contained in this permit no later than December 5, 2012. [District Rule 4570]
5. Mitigation measures that are currently being implemented as required by Phase I of Rule 4570 should continue to be implemented until the mitigation measures required under this permit are implemented. [District Rule 4570]

CONDITIONS CONTINUE ON NEXT PAGE

YOU MUST NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (559) 230-5950 WHEN CONSTRUCTION IS COMPLETED AND PRIOR TO OPERATING THE EQUIPMENT OR MODIFICATIONS AUTHORIZED BY THIS AUTHORITY TO CONSTRUCT. This is NOT a PERMIT TO OPERATE. Approval or denial of a PERMIT TO OPERATE will be made after an inspection to verify that the equipment has been constructed in accordance with the approved plans, specifications and conditions of this Authority to Construct, and to determine if the equipment can be operated in compliance with all Rules and Regulations of the San Joaquin Valley Unified Air Pollution Control District. Unless construction has commenced pursuant to Rule 2050, this Authority to Construct shall expire and application shall be cancelled two years from the date of issuance. The applicant is responsible for complying with all laws, ordinances and regulations of all other governmental agencies which may pertain to the above equipment.

Seyed Sadredin, Executive Director / APCO

DAVID WARNER, Director of Permit Services
C-6817-2-2 : Nov 28 2011 4:57PM – RANDHUG : Joint Inspection NOT Required

6. 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]
7. The total number of cattle housed at this dairy at any one time shall not exceed any of the following: 4,800 Holstein milk cows; 960 dry cows; 2,160 heifers (15-24 months); 1,728 heifers (7-14 months); 864 heifers (3-6 months); and 432 calves (under 3 months). [District Rule 2201]
8. Milk cows and dry cows shall be housed in freestall barns. [District Rule 2201]
9. The freestall and corral feed lanes and walkways at this dairy shall be constructed of concrete. [District Rule 2201]
10. All animals at this dairy shall be fed in accordance with the National Research Council (NRC) guidelines utilizing routine dairy nutritionist analyses of rations. [District Rule 2201]
11. 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 1070]
12. At least one of the feedings of the heifers at this dairy shall be near (within one hour of) dusk. [District Rule 2201]
13. Open corrals at this dairy shall be equipped with shade structures. [District Rule 2201]
14. 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]
15. Permittee shall flush, scrape or vacuum freestall lanes immediately prior to, immediately after or during each milking. [District Rule 4570]
16. 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]
17. 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]
18. 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]
19. Permittee shall inspect water pipes and troughs and repair leaks at least once every seven (7) days. [District Rule 4570]
20. Permittee shall maintain records demonstrating that water pipes and troughs are inspected and leaks are repaired at least once every seven (7) days. [District Rule 4570]
21. Permittee shall clean manure from corrals at least four (4) times per year with at least sixty (60) days between each cleaning, or permittee shall clean corrals at least once between April and July and at least once between September and December. [District Rule 4570]
22. Permittee shall record the date that animal waste is cleaned from corrals or demonstrate that manure from corrals are cleaned at least four (4) times per year with at least sixty (60) days between each cleaning. [District Rule 4570]
23. Permittee shall implement at least one of the following corral mitigation measures: 1) slope the surface of the corrals at least 3% where the available space for each animal is 400 square feet or less and shall slope the surface of the corrals at least 1.5% where the available space for each animal is more than 400 square feet per animal; 2) maintain corrals to ensure proper drainage preventing water from standing more than forty-eight hours; or 3) harrow, rake, or scrape pens sufficiently to maintain a dry surface except during periods of rainy weather. [District Rule 4570]
24. Permittee shall either 1) maintain sufficient records to demonstrate that corrals are maintained to ensure proper drainage preventing water from standing for more than forty-eight hours or 2) maintain records of dates pens are groomed (i.e., harrowed, raked, or scraped, etc.). [District Rule 4570]
25. Permittee shall scrape, vacuum or flush concrete lanes in corrals at least once every day for mature cows and every seven (7) days for support stock. [District Rule 4570]

CONDITIONS CONTINUE ON NEXT PAGE

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

27. Permittee shall sprinkle water over at least 48% of area of the unpaved area of the heifer corrals. Sprinkling rate shall match with the local wet soil evaporation rate (70-80% of the local wet pan evaporation rate) to keep sufficient moisture content in the surface of the corrals. Sprinkling of corrals is not required during wet conditions. [District Rule 2201]

28. Sprinklers or water trucks shall be designed to spray the corrals uniformly to prevent inconsistent distribution of water. [District Rule 2201]

29. Permittee shall maintain records of the daily local evaporation rate/soil evaporation rate and the amount of water (inches or cm) applied to the corral surface. Records of sprinkler run time and flow rate may be used to satisfy this requirement. [District Rule 2201]

30. Permittee shall install all shade structures uphill of any slope in the corral. [District Rules 2201 and 4570]

31. Inspection for potholes or other sources of emissions shall be performed on a monthly basis. [District Rule 2201]

32. Firm, stable, and not easily eroded soils shall be used for the exercise pens. [District Rule 2201]

33. 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]

34. 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]

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

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

37. Permittee shall maintain daily records of the number of milk cows and dry cows at this dairy and shall maintain weekly records of the number of cows at the dairy in each of the following categories: large heifers (15 to 24 months of age); medium heifers (7 to 14 months of age); small heifers (3 to 6 months); baby calves (under 3 months); and mature bulls. [District Rule 2201]

38. 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]

39. 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]

40. 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

HEALTHY AIR LIVING™

AUTHORITY TO CONSTRUCT

PERMIT NO: C-6817-3-2 **ISSUANCE DATE:** 11/28/2011

LEGAL OWNER OR OPERATOR: PHILIP VERWEY FARMS #2
MAILING ADDRESS: 19765 13TH AVE
HANFORD, CA 93230

LOCATION: 19765 13TH AVE
HANFORD, CA 93230

EQUIPMENT DESCRIPTION:
MODIFICATION OF LIQUID MANURE HANDLING SYSTEM CONSISTING OF FOUR MECHANICAL SEPARATORS; TWO LIFT STATION FLUSH WATER RECYCLING SUMPS; ONE ANAEROBIC TREATMENT LAGOON (2,280' X 255' X 15') AND ONE STORAGE POND; MANURE IS LAND APPLIED THROUGH FLOOD IRRIGATION AND FURROW IRRIGATION; ADD MITIGATION MEASURES TO COMPLY WITH RULE 4570

CONDITIONS

1. Authority to Construct (ATC) C-6817-3-0 shall be implemented prior to or concurrently with this ATC. [District Rule 2201]
2. Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to enter the permittee's premises where a permitted source is located or emissions related activity is conducted, or where records must be kept under condition of the permit. [District Rule 1070]
3. Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to have access to and copy, at reasonable times, any records that must be kept under the conditions of the permit. [District Rule 1070]
4. Permittee shall implement and maintain all the Mitigation Measures contained in this permit no later than December 5, 2012. [District Rule 4570]
5. Mitigation measures that are currently being implemented as required by Phase I of Rule 4570 should continue to be implemented until the mitigation measures required under this permit are implemented. [District Rule 4570]
6. The lagoon system shall handle flush manure from no more than 4,800 Holstein milk cows; 960 dry cows; 2,160 heifers (15-24 months); 1,728 heifers (7-14 months); 864 heifers (3-6 months); and 432 calves (under 3 months). [District Rule 2201]

CONDITIONS CONTINUE ON NEXT PAGE

YOU MUST NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (559) 230-5950 WHEN CONSTRUCTION IS COMPLETED AND PRIOR TO OPERATING THE EQUIPMENT OR MODIFICATIONS AUTHORIZED BY THIS AUTHORITY TO CONSTRUCT. This is NOT a PERMIT TO OPERATE. Approval or denial of a PERMIT TO OPERATE will be made after an inspection to verify that the equipment has been constructed in accordance with the approved plans, specifications and conditions of this Authority to Construct, and to determine if the equipment can be operated in compliance with all Rules and Regulations of the San Joaquin Valley Unified Air Pollution Control District. Unless construction has commenced pursuant to Rule 2050, this Authority to Construct shall expire and application shall be cancelled two years from the date of issuance. The applicant is responsible for complying with all laws, ordinances and regulations of all other governmental agencies which may pertain to the above equipment.

Seyed Sadredin, Executive Director / APCO

DAVID WARNER, Director of Permit Services
C-6817-3-2 : Nov 28 2011 4:57PM – SANDHUG : Joint Inspection NOT Required

7. If a licensed veterinarian or a certified nutritionist determines that any VOC mitigation measure will be required to be suspended as a detriment to animal health 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]

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

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

10. Permittee shall maintain records of design specifications and calculations for the Anaerobic Treatment Lagoon system in order to demonstrate that the system has been designed and is operating in accordance with the applicable National Resource Conservation Service (NRCS) technical guide. [District Rules 1070 and 2201]

11. Liquid manure used for irrigation of cropland shall only be taken from the storage pond/secondary lagoon after treatment in the primary anaerobic treatment lagoon. [District Rule 2201]

12. Permittee shall maintain records that only liquid animal waste treated with an anaerobic treatment lagoon is applied to fields. [District Rules 1070 and 2201]

13. Liquid manure from the storage pond shall be mixed with irrigation water at a ratio in compliance with the facility nutrient management plan and applied to cropland at agronomic rates in accordance with the requirements of Regional Water Quality Control Board. [District Rule 2201]

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

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

16. Installation of an anaerobic digester may be required for this operation contingent upon the final Dairy BACT Guideline. If the final Dairy BACT Guideline requires the installation of an an anaerobic digester for this operation, the permittee shall install the system in accordance with the timeframes and procedures established by the APCO. [District Rule 2201]

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

18. 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

HEALTHY AIR LIVING™

AUTHORITY TO CONSTRUCT

PERMIT NO: C-6817-4-1 **ISSUANCE DATE:** 11/28/2011

LEGAL OWNER OR OPERATOR: PHILIP VERWEY FARMS #2
MAILING ADDRESS: 19765 13TH AVE
HANFORD, CA 93230

LOCATION: 19765 13TH AVE
HANFORD, CA 93230

EQUIPMENT DESCRIPTION:
MODIFICATION OF SOLID MANURE HANDLING CONSISTING OF MANURE STOCK PILES; SOLID MANURE APPLICATION TO LAND WITH IMMEDIATE INCORPORATION AND MANURE HAULED OFFSITE: ADD MITIGATION MEASURES TO COMPLY WITH RULE 4570

CONDITIONS

1. Authority to Construct (ATC) C-6817-4-0 shall be implemented prior to or concurrently with this ATC. [District Rule 2201]
2. Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to enter the permittee's premises where a permitted source is located or emissions related activity is conducted, or where records must be kept under condition of the permit. [District Rule 1070]
3. Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to have access to and copy, at reasonable times, any records that must be kept under the conditions of the permit. [District Rule 1070]
4. Permittee shall implement and maintain all the Mitigation Measures contained in this permit no later than December 5, 2012. [District Rule 4570]
5. Mitigation measures that are currently being implemented as required by Phase I of Rule 4570 should continue to be implemented until the mitigation measures required under this permit are implemented. [District Rule 4570]

CONDITIONS CONTINUE ON NEXT PAGE

YOU MUST NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (559) 230-5950 WHEN CONSTRUCTION IS COMPLETED AND PRIOR TO OPERATING THE EQUIPMENT OR MODIFICATIONS AUTHORIZED BY THIS AUTHORITY TO CONSTRUCT. This is NOT a PERMIT TO OPERATE. Approval or denial of a PERMIT TO OPERATE will be made after an inspection to verify that the equipment has been constructed in accordance with the approved plans, specifications and conditions of this Authority to Construct, and to determine if the equipment can be operated in compliance with all Rules and Regulations of the San Joaquin Valley Unified Air Pollution Control District. Unless construction has commenced pursuant to Rule 2050, this Authority to Construct shall expire and application shall be cancelled two years from the date of issuance. The applicant is responsible for complying with all laws, ordinances and regulations of all other governmental agencies which may pertain to the above equipment.

Seyed Sadredin, Executive Director / APCO

DAVID WARNER, Director of Permit Services
C-6817-4-1 : Nov 28 2011 4:57PM -- SANDHUG : Joint Inspection NOT Required

6. 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]

7. 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]

8. 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]

9. 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]

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

11. Permittee shall keep records of dates when separated solids are removed from the dairy or permittee shall maintain records to demonstrate that separated solids piles outside the pens are covered with a weatherproof covering from October through May. [District Rule 4570]

12. Permittee shall maintain records, such as manufacturer warranties or other documentation, demonstrating that the weatherproof covering over separated solids are installed, used, and maintained in accordance with manufacturer recommendations and applicable standards listed in NRCS Field Office Technical Guide Code 313 or 367, or any other applicable standard approved by the APCO, ARB, and EPA. [District Rule 4570]

13. All runoff and leachate from solid manure storage areas shall be directed to the lagoon or other wastewater treatment system. [District Rule 2201]

14. Solid manure applied to fields shall be incorporated into the soil immediately (within two hours) after application. [District Rule 2201]

15. Permittee shall maintain records to demonstrate that all solid manure has been incorporated within 2 hours of land application. [District Rule 1070]

16. 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]

17. 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

HEALTHY AIR LIVING™

AUTHORITY TO CONSTRUCT

PERMIT NO: C-6817-5-1 **ISSUANCE DATE:** 11/28/2011

LEGAL OWNER OR OPERATOR: PHILIP VERWEY FARMS #2
MAILING ADDRESS: 19765 13TH AVE
HANFORD, CA 93230

LOCATION: 19765 13TH AVE
HANFORD, CA 93230

EQUIPMENT DESCRIPTION:
MODIFICATION OF FEED STORAGE AND HANDLING CONSISTING OF COMMODITY BARNS, AG BAGS, DRY GRAIN TANKS, SILOS, AND SILAGE PILES: ADD MITIGATION MEASURES TO COMPLY WITH RULE 4570

CONDITIONS

1. Authority to Construct (ATC) C-6817-5-0 shall be implemented prior to or concurrently with this ATC. [District Rule 2201]
2. Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to enter the permittee's premises where a permitted source is located or emissions related activity is conducted, or where records must be kept under condition of the permit. [District Rule 1070]
3. Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to have access to and copy, at reasonable times, any records that must be kept under the conditions of the permit. [District Rule 1070]
4. Permittee shall implement and maintain all the Mitigation Measures contained in this permit no later than December 5, 2012. [District Rule 4570]
5. Mitigation measures that are currently being implemented as required by Phase I of Rule 4570 should continue to be implemented until the mitigation measures required under this permit are implemented. [District Rule 4570]

CONDITIONS CONTINUE ON NEXT PAGE

YOU MUST NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (559) 230-5950 WHEN CONSTRUCTION IS COMPLETED AND PRIOR TO OPERATING THE EQUIPMENT OR MODIFICATIONS AUTHORIZED BY THIS AUTHORITY TO CONSTRUCT. This is NOT a PERMIT TO OPERATE. Approval or denial of a PERMIT TO OPERATE will be made after an inspection to verify that the equipment has been constructed in accordance with the approved plans, specifications and conditions of this Authority to Construct, and to determine if the equipment can be operated in compliance with all Rules and Regulations of the San Joaquin Valley Unified Air Pollution Control District. Unless construction has commenced pursuant to Rule 2050, this Authority to Construct shall expire and application shall be cancelled two years from the date of issuance. The applicant is responsible for complying with all laws, ordinances and regulations of all other governmental agencies which may pertain to the above equipment.

Seyed Sadredin, Executive Director / APCO

DAVID WARNER, Director of Permit Services
C-6817-5-1: Nov 28 2011 4:57PM – SANDHUG : Joint Inspection NOT Required

6. 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]

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

8. 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]

9. 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]

10. 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]

11. Permittee shall begin feeding total mixed rations within two hours of grinding and mixing rations. [District Rule 4570]

12. 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]

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

14. 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]

15. Permittee shall remove uneaten wet feed from feed bunks within twenty-four (24) hours after the end of a rain event. [District Rule 4570]

16. Permittee shall maintain records demonstrating that uneaten wet feed was removed from feed bunks within twenty-four (24) hours after the end of a rain event. [District Rule 4570]

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

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

19. 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]

20. 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]

CONDITIONS CONTINUE ON NEXT PAGE

21. 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]

22. 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]

23. 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]

24. For each silage pile that Option 3 (Moisture, TLC, Roller Opening, & Material Delivery) is chosen as a mitigation measure for building the pile, the permittee shall 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]

25. 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]

26. For each silage pile that Option 3 (Moisture, TLC, Roller Opening, & Material Delivery) is chosen as a mitigation measure for building the pile, the permittee shall 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]

27. 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]

28. 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]

29. 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]

30. 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]

CONDITIONS CONTINUE ON NEXT PAGE

31. 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]

32. 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]

33. 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]

34. 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]

35. 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]

APPENDIX B

Quarterly Net Emissions Change

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.2 and VII.C.6 in the evaluation above, quarterly PE2 and quarterly BE can be calculated as follows:

Milking Parlor (C-6817-1)

BE (lb/qtr) C-6817-1-2					
	BE (lb/year)	÷	4 qtr/year	=	BE (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	1,920	÷	4 qtr/year	=	480.0
NH_3	5,760	÷	4 qtr/year	=	1,440.0

PE2 (lb/qtr) C-6817-1-3					
	PE2 (lb/year)	÷	4 qtr/year	=	BE (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	4,000	÷	4 qtr/year	=	1,000.0
NH_3	12,000	÷	4 qtr/year	=	3,000.0

Quarterly NEC [QNEC] C-6817-1-3					
	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	1,000.0	-	480.0	=	520.0
NH_3	3,000.0	-	1,440.0	=	1,560.0

Cow Housing (C-6817-2)

BE (lb/qtr) C-6817-2-2					
	BE (lb/year)	÷	4 qtr/year	=	BE (lb/qtr)
NO_X	0	÷	4 qtr/year	=	0.0
SO_X	0	÷	4 qtr/year	=	0.0
PM_{10}	38,417	÷	4 qtr/year	=	9,604.3
CO	0	÷	4 qtr/year	=	0.0
VOC	74,811	÷	4 qtr/year	=	18,702.8
NH_3	228,826	÷	4 qtr/year	=	57,206.5

PE2 (lb/qtr) C-6817-2-3					
	PE2 (lb/year)	÷	4 qtr/year	=	BE (lb/qtr)
NO_X	0	÷	4 qtr/year	=	0.0
SO_X	0	÷	4 qtr/year	=	0.0
PM_{10}	55,299	÷	4 qtr/year	=	13,824.8
CO	0	÷	4 qtr/year	=	0.0
VOC	141,799	÷	4 qtr/year	=	35,449.8
NH_3	429,315	÷	4 qtr/year	=	107,328.8

Quarterly NEC [QNEC] C-6817-2-3					
	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}	13,824.8	-	9,604.3	=	4,220.5
CO	0.0	-	0.0	=	0.0
VOC	35,449.8	-	18,702.8	=	16,747.0
NH_3	107,328.8	-	57,206.5	=	50,122.3

Liquid Manure Handling (C-6817-3)

BE (lb/qtr) C-6817-3-2					
	BE (lb/year)	÷	4 qtr/year	=	BE (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	18,167	÷	4 qtr/year	=	4,541.8
NH_3	329,050	÷	4 qtr/year	=	82,262.5
PE2 (lb/qtr) C-6817-3-3					
	PE2 (lb/year)	÷	4 qtr/year	=	BE (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	34,523	÷	4 qtr/year	=	8,630.8
NH_3	628,240	÷	4 qtr/year	=	157,060.0
Quarterly NEC [QNEC] C-6817-3-3					
	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	8,630.8	-	4,541.8	=	4,089.0
NH_3	157,060.0	-	82,262.5	=	74,797.5

Solid Manure Handling System (C-6817-4)

BE (lb/qtr) C-6817-4-1					
	BE (lb/year)	÷	4 qtr/year	=	BE (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	3,523	÷	4 qtr/year	=	880.8
NH_3	0	÷	4 qtr/year	=	0.0

PE2 (lb/qtr) C-6817-4-2					
	PE2 (lb/year)	÷	4 qtr/year	=	BE (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	6,682	÷	4 qtr/year	=	1,670.5
NH_3	0	÷	4 qtr/year	=	0.0

Quarterly NEC [QNEC] C-6817-4-2					
	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	1,670.5	-	880.8	=	789.7
NH_3	0.0	-	0.0	=	0.0

Feed Storage and Handling (C-6817-5)

BE (lb/qtr) C-6817-5-1					
	BE (lb/year)	÷	4 qtr/year	=	BE (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	105,660	÷	4 qtr/year	=	26,415.0
NH_3	0	÷	4 qtr/year	=	0.0

PE2 (lb/qtr) C-6817-5-2					
	PE2 (lb/year)	÷	4 qtr/year	=	BE (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	174,567	÷	4 qtr/year	=	43,641.8
NH_3	0	÷	4 qtr/year	=	0.0

Quarterly NEC [QNEC] C-6817-5-2					
	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	43,641.8	-	26,415.0	=	17,226.8
NH_3	0.0	-	0.0	=	0.0

APPENDIX C
BACT Analysis

Philip Verwey Farms #2 (C-6817, Project # C-1120348)

TOP-DOWN BACT ANALYSIS

Pursuant to Section 5.2 of the Settlement Agreement between the District and the Western United Dairyman and the Alliance of Western Milk Producers Inc, signed September 20, 2004, "*... the District will not make any Achieved in Practice BACT determinations for individual dairy permits or for the dairy BACT guidance until the final BACT guidance has been adopted by the APCO....*".[9] Therefore, a cost effectiveness analysis will be performed for all the technologies, which have not been proposed by the applicant.

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

I. Pollutants Emitted from Dairies

1. PM_{10} Emissions from Dairies

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

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

The mass of particulate matter emitted from totally or partially enclosed confinement facilities, as well as the particle size distribution, depend on type of ventilation and ventilation rate. Particulate matter emissions from naturally ventilated buildings will be lower than those from mechanically ventilated buildings.

2. VOC Formation and Emissions from Manure:

Volatile Organic Compounds (VOCs) result from ruminant digestive processes and are formed as intermediate metabolites when organic matter manure decomposes. Under

[9] 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

aerobic conditions, any VOCs formed in the manure are rapidly oxidized to carbon dioxide and water. Under anaerobic conditions, complex organic compounds are microbially decomposed to volatile organic acids and other volatile organic compounds, which in turn are mostly converted to methane and carbon dioxide by methanogenic bacteria. When the activity of the methanogenic bacteria is not inhibited, virtually all of the VOCs are metabolized to simpler compounds, and the potential for VOC emissions is minimized. However, the inhibition of methane formation results in a buildup of VOCs in the manure and ultimately to volatilization to the air. Inhibition of methane formation typically is caused by low temperatures or excessive loading rates, which both create an imbalance between the populations of microorganisms responsible for the formation of VOC and methane. VOC emissions will vary with temperature because the rate of VOC formation, reduction to methane, and volatilization and the solubility of individual compounds vary with temperature.[10] VOC emissions from manure and the associated field application site can be minimized by a properly designed and operated stabilization process (such as an anaerobic treatment lagoon). In contrast, VOC emissions will be higher from storage tanks, ponds, overloaded anaerobic lagoons, and the land application sites associated with these systems.

3. Ammonia Emissions from Dairies

When sulfur dioxide and nitrogen oxides are present, ammonia is a precursor for the secondary formation of $PM_{2.5}$ in the atmosphere. Ammonia reacts with sulfuric and nitric acids, which are produced from sulfur dioxide and nitrogen oxides in the ambient air, to form ammonium sulfate, ammonium nitrate, and other fine particulates.[11] Exposure to high levels of ammonia can cause irritation to the skin, throat, lungs, and eyes.

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

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

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

ammonia emissions between solid and liquid manure handling systems if liquid manure is stored over extended periods of time prior to land application.[12]

4. Hydrogen Sulfide Emissions from Dairies

Hydrogen Sulfide (H_2S) 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 (H_2S) and the bisulfide (HS-) and sulfide (S_2-) ions. In aqueous solutions molecular H_2S exists in equilibrium with the bisulfide (HS-) and sulfide (S_2-) ions but only molecular H_2S, not the ionized forms, can be transferred across the gas-liquid interface and emitted to the atmosphere. The fractional amount of the form of sulfide present in solution is largely influenced by pH; with the molecular H_2S form being favored in acidic conditions (pH <7) and ionic forms being favored in basic conditions (pH >7).

In a dairy, the conditions for the production of Hydrogen Sulfide exist in 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 (Permit C-6817-1)

1. BACT Analysis for VOC Emissions from the Milking Parlors:

a. Step 1 - Identify all control technologies

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

1) Enclose, capture, and incineration (≈ 93%; 95% Capture, 98% Control)
2) Enclose, capture, and biofiltration (≈ 76%; 95% Capture, 80% Control)
3) Flush/spray down milking parlors after each group of cows is milked (≈ 16.5% of the total VOC emissions from the milking parlors; 75% of manure emissions)

<u>Description of Control Technologies</u>

1) Milking Parlor vented to an incinerator capable of achieving 98% control

Milking parlors can be either naturally or mechanically ventilated. According to some dairy designers, mechanical ventilation is more reliable than natural ventilation. Mechanical ventilation can be easily applied to all areas of the milking parlors, except the holding area. The mechanical ventilation system for the milking parlors can be utilized to capture the gases emitted from the milking parlors, however in order to

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

capture all of the gases, and to keep an appropriate negative pressure throughout the system, the holding area would also need to be entirely enclosed. No facility currently encloses the holding area since cows are continuously going in and out of the barn throughout the day. The capital cost required to enclose this large area would also be significant. Although the feasibility of such a technology is in question, it will be considered in this analysis. The captured VOC emissions could then be sent to an incinerator. Thermal incineration is a well-established VOC control technique. During combustion, gaseous hydrocarbons are oxidized to form CO_2 and water. It is assumed that 95% of the gasses emitted from the milking parlor will be captured by the mechanical ventilation system and that 98% of the captured VOCs will be eliminated by thermal incineration[13]; therefore the total control for VOCs from the milking parlor = 0.95 x 0.98 = 93.1%.

2) Milking Parlor vented to a biofilter capable of achieving 80% control

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 milking parlors will be captured by the mechanical ventilation system and that a properly functioning biofilter will eliminate 80% of the captured VOCs[14]; therefore, the total control for VOCs from the milking parlor = 0.95 x 0.80 = 76%.

3) 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 VOC emissions, is removed from the milking parlors many times a day by flushing after each milking. 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 milking parlor. The flush water can then carry the

[13] OAQPS Control Cost Manual, 4th Edition, EPA 450/3-90-006, January 1990, page 3-8.
[14] According to the SCAQMD Rule 1133.2 final staff report (page 18) "Technology Assessment Report states a well designed, well operated, and well-maintained biofilter is capable of achieving 80% destruction efficiency for VOC and NH_3."

manure and the dissolved volatile compounds to an anaerobic treatment lagoon or other manure stabilization process for treatment.

It must be noted that flushing or spraying out the milking parlor after each group of cows is milked 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. It will be assumed that the control efficiency for VOCs emitted from manure is 75%. Enteric emissions compose approximately 78% of the VOC emissions from the milking parlor and VOC emissions from the manure make up the remaining 22%; therefore the total control for VOCs from the milking parlor = 0.75 x 0.22 =16.5%.

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) Enclose, capture, and incineration (≈ 93% of VOC emissions from the milking parlor)
2) Enclose, capture, and biofiltration (≈ 76% of VOC emissions from the milking parlor)
3) Flush/spray after each group of cows is milked (≈ 16.5% of VOC emissions from the milking parlor)

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.

Air Flow Rate of Milking Parlors

In order to effectively calculate the costs of this control option, the airflow rate of the milking parlors must be determined. According to Cornell University's publication "Environmental Controls for Today's Milking Center," the minimum ventilation rate required for milking parlors is 15 room exchanges per hour in the winter and 60 to 90 room exchanges per hour in the summer.[15] For calculation purposes, an average airflow rate of 35 room exchanges will assumed for the new milking parlors.

[15] Environmental Control for Today's Milking Center, C.A. Gooch, http://www.ansci.cornell.edu/tmplobs/doc217.pdf

As discussed in section I of this evaluation, after completion of the project, the dairy will have 10,000 milk cows with one double 52 parallel milking parlor and one double 60 parallel milking parlor. The dairy will also include a hospital milking parlor. Since the hospital barn is only used for cows in need of special attention, it will be assumed that all the emissions from the milk cows will be from the two main milking parlors. This will also result in more conservative calculations because the required flow rate will be less if the hospital milking parlor is excluded. The two main milking parlors are identical and both are needed to milk the total number of cows at the facility; therefore, although they are separate buildings, the total emissions and airflow requirements for the milking parlors will be evaluated together during this BACT analysis.

According to the applicant, each milking parlor will be identical with dimensions of is 406 ft long by 77 ft wide. The milking parlors are conservatively assumed to have a height of 20 feet for this analysis. The total airflow rate for the milking parlors is calculated as follows:

$$2 \times 406 \text{ ft} \times 77 \text{ ft} \times 20 \text{ ft} \times 35/\text{hr} = 43,766,800 \text{ ft}^3/\text{hr}$$

Fuel Requirement for Thermal Incineration:

The gas leaving the milking parlors is 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 exhaust
Cp_{Air} = specific heat of air: 0.0194 Btu/scf
ΔT = increase in the temperature of the contaminated air stream required for catalytic oxidation to occur (It will be assumed that the air stream would increase in temperature from 100 °F to 600 °F.)
HEF = heat exchanger factor: 0.7

Natural Gas Requirement = (43, 766,800 scf/hr)(0.0194 Btu/scf - °F)(600 °F - 100 °F)(1-0.7)
= **127,361,388 Btu/hr**

Fuel Cost for Thermal Incineration:

The cost for natural gas will be based upon the average industrial price for natural gas in California for the period August 2011 – January 2012 as taken from the Department of Energy's Energy Information Administration (EIA) website (http://tonto.eia.doe.gov/dnav/ng/ng_sum_lsum_dcu_SCA_m.htm).

Average Cost for natural gas = \$6.80/1,000 ft^3 = \$6.80/MMBtu (based on a natural gas HHV of 1,000 Btu/scf)

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:

127,361,388 Btu/hr x 1 MMBtu/10^6 Btu x 12 hr/day x 365 day/year x $6.80/MMBtu
= **$3,793,332/year**

VOC Emission Reductions for Thermal Incineration

The annual VOC Emission Reductions for the milking parlor is calculated as follows:

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

= (5,200 milk cows) x (0.9 lb-VOC/milk cow-year) x (0.95) x (0.98)
= **4,357 lb-VOC/year**

Cost of VOC Emission Reductions

Cost of reductions = ($3,793,332/year)/[(4,357 lb-VOC/year)(1 ton/2000 lb)]
= **$1,741,259/ton of VOC reduced**

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

Biofiltration:

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

The following cost analysis demonstrates that the cost of biofiltration exceeds the District cost effective threshold. Biofiltration can control both VOC and ammonia emissions. Although, this technology can control both pollutants, a cost effective 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".[16] 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

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

the 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 stated above, the minimum ventilation rate required for milking parlor is 15 room exchanges per hour in the winter and 60 to 90 room exchanges per hour in the summer.[15] For more conservative calculations, a warm weather airflow rate of 60 room exchanges will be assumed for the milking parlor. As discussed above, the milk cows at this dairy will be milked in two identical milking parlors. According to the applicant, each milking parlor is 406 ft long by 77 ft wide. The milking parlors are conservatively assumed to have a height of 20 feet for this analysis. The maximum airflow rate entering the biofilter for the milking parlors is calculated as follows:

2 x 406 ft x 77 ft x 20 ft x 60/hr x 1 hr/60 min = 1,250,480 cfm

Capital Cost

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

The capital cost of the biofilter is calculated as follows:

$2.35 cfm x 1,250,480 cfm = $2,938,628

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)

$$A = [\$2{,}938{,}628 \times 0.1(1.1)^{10}]/[(1.1)^{10}-1]$$
$$= \mathbf{\$478{,}248/year}$$

VOC Emission Reductions for Biofiltration

The annual VOC Emission Reductions for the milking parlors is calculated as follows:

[Number of milk cows] x [Uncontrolled Milking Parlor VOC EF (lb/milk cow-year)] x [Capture Efficiency] x [Biofilter Control Efficiency]

= (5,200 milk cows) x (0.9 lb-VOC/milk cow-year) x (0.95) x (0.80)
= **3,557 lb-VOC/year**

Cost of VOC Emission Reductions

Cost of reductions = ($478,248/year)/[(3,557 lb-VOC/year)(1 ton/2000 lb)]
= **$268,905/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. Therefore, this option is not cost effective and is being removed from consideration at this time.

Flushing/Spraying down Milking Parlor after each Group of Cows is Milked:

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

e. Step 5 - Select BACT

The facility is proposing to flush or spray down the milking parlors 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 basic mitigation measures required by District Rule 4570 are cost effective and technologically feasible for confined animal facilities and the applicant has proposed these options. Therefore, in addition to the BACT requirements determined in the Top-Down BACT Analysis above, implementation of the mitigation measures that the applicant has selected to comply with Rule 4570 will also be required as part of BACT for VOC emissions from the milking parlors.

2. 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 parlors 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 basic mitigation measures required by District Rule 4570 are technologically feasible for confined animal facilities and the applicant has proposed these options. Although District Rule 4570 is only intended to reduce VOC emissions, many of these measures also reduce ammonia emissions. Therefore, in addition to the BACT requirements

determined in the Top-Down BACT Analysis above, implementation of the mitigation measures that the applicant has selected to comply with Rule 4570 will also be required as part of BACT for NH_3 emissions from the milk parlors.

III. Top Down BACT Analysis for the Cow Housing Permit Unit (C-6817-2)

1. BACT Analysis for PM_{10} Emissions from the Cow Housing Permit Unit:

a. Step 1 - Identify all control technologies

The following control options were identified for PM_{10} emissions from the freestall barns and corrals.

1) Design and Management Practices
   - Weekly scraping of open corrals using a pull-type scraper in the morning hours except when prevented by wet conditions.
   - Concrete all feed lanes and walkways for all cows
   - Shade structures in open corrals
   - Feeding heifers near (within 1 hour of) dusk
   - Windbreaks/Shelterbelts
   - Individual calf hutches (calves under three months)
   - Application of water (sprinklers) in heifer corrals (7-14 months)

Description of Control Technologies

Weekly scraping of corrals
Dairy animals are typically housed in freestall barns or open corrals. In a freestall barn, the milk cows are grouped in large pens with free access to feed bunks, water, and stalls for resting, and exercise corral areas. An open corral is a large open area where cows are confined with unlimited access to feed and water. The corral surface is composed of earth and deposited manure, both of which have the potential for particulate matter emissions either as a result of wind or animal movement. Frequent scraping of corral surfaces will reduce the amount of dry manure on the corral surfaces that may be pulverized by the cows' hooves and emitted as PM_{10}.

Concrete all feedlanes
Constructing the feed lanes and walkways of concrete causes the dairy animals to spend an increased amount of time on a paved surface rather than dry dirt, thus reducing PM_{10} emissions. Additionally, the manure that is deposited in the lanes and walkways will be flushed, which will prevent PM_{10} emissions from drying manure.

Shade Structures in corrals
Installing shade structures in corral areas helps to decrease PM_{10} emissions. Dairy animals are easily susceptible to heat stress and will tend to seek out shade to reduce the effects of heat, particularly in the warmer months when higher PM_{10} emissions are expected because of drier conditions. PM_{10} emissions are reduced because the cows will spend less time walking on the dry corral surface.

Feeding heifers near (within 1 hour of) dusk

Feeding the heifers near dusk will reduce their activity during this time, which is the time when the corral surface is the driest and there is greater chance for particulate matter from the corral to be entrained into the atmosphere.

Shelterbelts/Windbreaks

A windbreak or shelterbelt is composed of one or more rows of trees or shrubs, which are planted in a manner that breaks up wind and reduces the force of wind on downwind of the windbreak. Windbreaks can be used to prevent soil erosion, improve air quality by intercepting dust, chemicals, and odors, to protect crops, and to provide habitat for wildlife. The NRCS requires that a 3-row shelterbelt be installed, the first row consisting of shrubs, second row consisting of a medium size tree and the last row consisting of an evergreen (larger tree). NRCS also requires that an irrigation system be maintained so that there is greater survivability and rapid growth of the trees and shrubs. A windbreak/shelterbelt will reduce the amount of particulate matter entrained into the atmosphere.

Above-ground Calf Hutches

Above-ground calf hutches will reduce PM_{10} emissions because the calves will be confined within the hutches, significantly limiting their movement. In addition, the calves will have no contact with the ground, resulting in additional emission reductions.

Water Application

A sprinkler system can be installed to reduce PM_{10} emissions. The sprinkler system reduces dust by maintaining adequate moisture in the layer of manure and earth on the corral surface. Studies have shown that increasing the moisture of the corral surface greatly reduces the entrainment of PM_{10} into the atmosphere as a result of animal movement. Installation of a sprinkler system for dust control is an effective mitigation measure that reduces PM_{10} emissions. However, because of concerns for animal health and welfare, water application is not commonly used. Excess moisture from sprinkling systems can potentially accumulate in shaded areas where the cows lie down, which will lead to a breeding ground for pathogens and vermin, which will increase nuisance conditions and instances of disease. For this reason, sprinkler systems are not used.

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) Design and Management Practices
   - Weekly scraping of open corrals using a pull-type scraper in the morning hours except when prevented by wet conditions.
   - Concrete all feed lanes and walkways for all cows
   - Shade structures in open corrals
   - Feeding heifers near (within 1 hour of) dusk

- Windbreaks/Shelterbelts
- Above-ground calf hutches for baby calves under three months
- Application of water (sprinklers) in corrals

d. Step 4 - Cost Effectiveness Analysis

Design and Management Practices:

- Weekly scraping of open corrals using a pull-type scraper in the morning hours except when prevented by wet conditions.
- Concrete all feed lanes and walkways for all cows
- Shade structures in open corrals
- Feeding heifers near (within 1 hour of) dusk
- Windbreaks/Shelterbelts
- Above-ground calf hutches for baby calves under three months
- Application of water (sprinklers) in heifer corrals (7-14 months)

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

e. Step 5 - Select BACT

The facility is proposing to scrape open corrals in the morning hours except when prevented by wet conditions; concrete all feed lanes and walkways; install shade structures in open corrals; feed heifers near dusk; install windbreaks; and install sprinklers in the open corrals, that satisfy the BACT requirements. The dairy does not house baby calves.

2. 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 - Entire herd (≈ 93%; 95% Capture, 98% Control of 100% of cow housing emissions)

2) Enclosed freestalls vented to an incinerator - Mature cows only (≈ 67% overall control of entire housing; 95% capture, 98% Control of 72% of cow housing emissions[17])
3) Enclosed freestalls vented to a biofilter - Entire herd (≈ 76%; 95% Capture, 80% Control of 100% of cow housing emissions)
4) Enclosed freestalls vented to a biofilter - Mature cows only (≈ 55% overall control of entire housing; 95% Capture, 80% Control of 72% of cow housing emissions[18])
5) 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) and feed lanes and walkways in the corrals for the remaining animals flushed at least two times per day
   - All animals fed in accordance with National Research Council (NRC) or other District-approved guidelines utilizing routine nutritional analysis for rations. (5% of total emissions from dairy cows)
   - All open corrals adequately sloped to promote drainage (minimum of 3% slope where the available space for each animal is 400 square feet or less and minimum of 1.5% where the available space for each animal is more than 400 square feet per animal.
   - Weekly scraping of freestall exercise pens and open corrals using pull-type scraper in the morning hours except when prevented by wet conditions.

Description of Control Technologies

1) 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,

[17] Emissions from cow housing (S-6817-2-3) are equal to 141,799 lbs/yr for all cows, while emissions from mature cows are equal to 109,740 lbs/yr. Therefore, mature cows represent 77% of the emissions from the cow housing (109,740 lbs/yr/141,799 lbs/hd-yr). The overall control efficiency can then be calculated as follows: 95% Capture x 98% Control x 77% of emissions = 72% overall control efficiency from entire cow housing.

[18] The overall control efficiency can be calculated as follows: 95% Capture x 80% Control x 77% of emissions = 59% overall control efficiency.

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[19]; 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[20]; therefore, the total control for VOCs from the cow housing permit unit = 0.95 x 0.80 = 76%.

3) Feed and Manure Management Practices

<u>Concrete Feed Lanes and Walkways</u>

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

[19] OAQPS Control Cost Manual, 4th Edition, EPA 450/3-90-006, January 1990, page 3-8.

[20] According to the SCAQMD Rule 1133.2 final staff report (page 18) "Technology Assessment Report states a well designed, well operated, and well-maintained biofilter is capable of achieving 80% destruction efficiency for VOC and NH_3."

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[21], 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

[21] "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).

undigested protein in animal waste.[22] 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.

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

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

b. Step 2 - Eliminate technologically infeasible options

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

c. Step 3 - Rank remaining options by control effectiveness

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

1) Enclosed freestalls vented to an incinerator (≈ 93%; 95% Capture, 98% Control)
2) Enclosed freestalls vented to a biofilter (≈ 76%; 95% Capture, 80% Control)
3) Enclosed freestalls vented to an incinerator - Mature cows only (≈ 67% overall control of entire housing; 95% capture, 98% Control of 72% of cow housing emissions)
4) Enclosed freestalls vented to a biofilter - Mature cows only (≈ 55% overall control of entire housing; 95% Capture, 80% Control of 72% of cow housing emissions)

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

5) 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) and feed lanes and walkways in the corrals for the remaining animals flushed at least two times per day
- All animals fed in accordance with National Research Council (NRC) or other District-approved guidelines utilizing routine nutritional analysis for rations. (5% of total emissions from dairy cows)
- All open corrals adequately sloped to promote drainage (minimum of 3% slope where the available space for each animal is 400 square feet or less and minimum of 1.5% where the available space for each animal is more than 400 square feet per animal.
- Weekly scraping of freestall exercise pens and open corrals using pull-type scraper in the morning hours except when prevented by wet conditions.

d. Step 4 - Cost Effectiveness Analysis

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)			
Age	Winter	Mild Weather	Summer
Baby Calf	15	50	100
Heifer (2-12 months)	20	60	130
Heifer (12-24 months)	30	80	180
Mature Cow	50	170	500 – 1,000

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.[23]

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, the following average year round airflow requirement will be assumed: mature cows – 335 cfm/cow (average of 170 and 500 cfm per cow); large heifers – 130 cfm/cow (average of 80 and 180 cfm per cow); small and medium heifers – 95 cfm/cow (average of 60 and 130 cfm per cow); baby calves – 75 cfm (average of 50 and 100 cfm per cow).

The analysis below is for the expansion herd:

As discussed in the evaluation, the expansion consists of the following: 5,200 milk cows; 1,040 dry cows; 763 heifers (15-24 months); 52 heifers (7-14 months); and 1,539 calves (under 3 months). 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:

Type of cow	# of cows	cfm/cow	min/hr	ft^3/hr
Milk cow	5,200	335	60	104,520,000
Dry cow	1040	335	60	20,904,000
Heifer (15-24 mo)	763	130	60	5,951,400
Heifer (7-14 mo)	52	95	60	296,400
Heifer (3-6 mo)	0	95	60	-
Calves	1539	75	60	6,925,500
Total				**138,597,300**

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 = $(flow)(Cp_{Air})(\Delta T)(1-HEF)$

Where:

[23] 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)

Flow (Q) = exhaust flow rate of VOC the freestall barns
Cp_{Air} = specific heat of air: 0.0194 Btu/scf - °F
ΔT = increase in the temperature of the contaminated air stream required for catalytic oxidation to occur (It will be assumed that the air stream would increase in temperature from 100 °F to 600 °F.)
HEF = heat exchanger factor: 0.7

Natural Gas Requirement for Thermal Incineration

= (138,597,300 scf/hr)(0.0194 Btu/scf-°F)(600 °F - 100 °F)(1 - 0.7)
= **403,318,143 Btu/hr**

Fuel Cost for Thermal Incineration:

The cost for natural gas will be based upon the average industrial price for natural gas in California for the period August 2011 – January 2012 as taken from the Department of Energy's Energy Information Administration (EIA) website (http://tonto.eia.doe.gov/dnav/ng/ng_sum_lsum_dcu_SCA_m.htm).

Average Cost for natural gas = \$6.80/1,000 ft^3 = \$6.80/MMBtu (based on a natural gas HHV of 1,000 Btu/scf)

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:

403,318,143 Btu/hr x 1 MMBtu/10^6 Btu x 12 hr/day x 365 day/year x \$6.80/MMBtu
= **\$12,012,428/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]

Type of cow	# of cows	EF- lbs/hd-yr	CE	lbs-VOC/yr
Milk cow	5,200	12.4	93%	59,966
Dry cow	1040	8.2	93%	7,931
Heifer (15-24 mo)	763	5.7	93%	4,045
Heifer (7-14 mo)	52	5	93%	242
Heifer (3-6 mo)	0	4.5	93%	-
Calves	1539	4.3	93%	6,154
Total				**78,338**

Cost of VOC Emission Reductions

Cost of reductions = ($12,012,428/year)/((78,338 lb-VOC/year)(1 ton/2000 lb))
= **$306,682/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.

The analysis below is for Mature Cows only:

As discussed in the evaluation, the expansion will consist of the following number of mature cows: 6,240 mature cows (5,200 milk cows and 1,040 dry cows). The milk cows are proposed to be housed in freestalls and dry cows housed in corrals. Enclosed freestalls will be evaluated as a housing alternative for the mature cows.

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

Type of cow	# of cows	cfm/cow	min/hr	ft^3/hr
Milk cow	5,200	335	60	104,520,000
Dry cow	1040	335	60	20,904,000
Total				**125,424,000**

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

Natural Gas Requirement for Thermal Incineration

= (125,424,000 scf/hr)(0.0194 Btu/scf-°F)(600°F - 100°F)(1 - 0.7)
= **364,983,840 Btu/hr**

Fuel Cost for Thermal Incineration:

The cost for natural gas will be based upon the average industrial price for natural gas in California for the period August 2011 – January 2012 as taken from the Department of Energy's Energy Information Administration (EIA) website (http://tonto.eia.doe.gov/dnav/ng/ng_sum_lsum_dcu_SCA_m.htm).

Average Cost for natural gas = \$6.80/1,000 ft^3 = \$6.80/MMBtu (based on a natural gas HHV of 1,000 Btu/scf)

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:

364,983,840 Btu/hr x 1 MMBtu/10^6 Btu x 12 hr/day x 365 day/year x \$6.80/MMBtu
= **\$10,870,679/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]

Type of cow	# of cows	EF- lbs/hd-yr	CE	lbs-VOC/yr
Milk cow	5,200	12.4	93%	59,966
Dry cow	1040	8.2	93%	7,931
Total				**67,897**

Cost of VOC Emission Reductions

Cost of reductions = (\$10,870,679/year)/((67,897 lb-VOC/year)(1 ton/2000 lb))
= **\$320,211/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 mature cows, 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 effective 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"[24]. 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."[24] See discussion on page 18 of this BACT analysis): mature cows – 335 cfm/cow (average of 170 and 500 cfm per cow); large heifers – 130 cfm/cow (average of 80 and 180 cfm per cow); small and medium heifers - 95 cfm/cow (average of 60 and 130 cfm per cow); baby calves – 75 cfm (average of 50 and 100 cfm per cow).

The analysis below is for the expansion herd:

As discussed in the evaluation, the expansion consists of the following: 5,200 milk cows; 1,040 dry cows; 763 heifers (15-24 months); 52 heifers (7-14 months); and 1,539 calves. 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:

Type of cow	# of cows	cfm/cow	cfm
Milk cow	5,200	335	1,742,000
Dry cow	1041	335	348,735
Heifer (15-24 mo)	763	130	99,190
Heifer (7-14 mo)	52	95	4,940
Heifer (3-6 mo)	0	95	-
Calves	1539	75	115,425
Total			**2,310,290**

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

[24] "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

stated above, the United States EPA Report gives a capital cost range of between $2.35 per cfm and $37.06 per cfm. In general, the lower cost per cfm is associated with a higher flow rate. To be conservative, the lowest cost in the report of $2.35 per cfm will be assumed in this cost analysis.

The capital cost of the biofilter is calculated as follows:

$2.35 cfm x 2,310,290 cfm = $5,429,182

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)

$$A = [\$5{,}429{,}182 \times 0.1(1.1)^{10}]/[(1.1)^{10}-1]$$
$$= \mathbf{\$886{,}574/year}$$

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 [Overall Control Efficiency]

Type of cow	# of cows	EF- lbs/hd-yr	CE	lbs-VOC/yr
Milk cow	5,200	12.4	76%	49,005
Dry cow	1040	8.2	76%	6,481
Heifer (15-24 mo)	763	5.7	76%	3,305
Heifer (7-14 mo)	52	5	76%	198
Heifer (3-6 mo)	0	4.5	76%	-
Calves	1539	4.3	76%	5,029
Total				**64,018**

Cost of VOC Emission Reductions

Cost of reductions = ($886,574/year)/((64,018 lb-VOC/year)(1 ton/2000 lb))
= **$27,698/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.

The analysis below is for Mature Cows only:

As discussed in the evaluation, the expansion will consist of the following number of mature cows: 6,240 mature cows (5,200 milk cows and 1,040 dry cows). Enclosed freestalls will be evaluated as a housing alternative for the mature cows.

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

Type of cow	# of cows	cfm/cow	cfm
Milk cow	5,200	350	1,820,000
Dry cow	1040	350	364,000
Total			**2,184,000**

Capital Cost

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

The capital cost of the biofilter is calculated as follows:

$2.35/cfm x 2,184,000 cfm = **$5,132,400**

Pursuant to District Policy APR 1305, section X (11/09/99), the cost for the purchase of the biofilter will be spread over the expected life of the system using the capital recovery equation. Although, the biofilter media (e.g., soil, compost, wood chips) must be replaced after 3-5 years, this does not constitute a significant cost of the system. Therefore, the expected life of the system (fans, media, ductwork, plenum, etc.) is estimated at 10 years. A 10% interest rate is assumed in the equation and the assumption will be made that the equipment has no salvage value at the end of the ten-year cycle.

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

Where: A = Annual Cost
P = Present Value

I = Interest Rate (10%)
N = Equipment Life (10 years)

A = [$5,132,400 x $0.1(1.1)^{10}$]/[$(1.1)^{10}$-1]
= **$835,275/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 [Capture Efficiency] x [Biofilter Control Efficiency]

Type of cow	# of cows	EF- lbs/hd-yr	CE	lbs-VOC/yr
Milk cow	5,200	12.4	76%	49,005
Dry cow	1040	8.2	76%	6,481
Total				**55,486**

Cost of VOC Emission Reductions

Cost of reductions = ($835,275/year)/((55,486 lb-VOC/year)(1 ton/2000 lb))
= **$30,108/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 mature cows, 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 and feed lanes and walkways in the corrals for the remaining animals flushed at least two times per day
- All animals fed in accordance with National Research Council (NRC) or other District-approved guidelines utilizing routine nutritional analysis for rations.
- All open corrals adequately sloped to promote drainage (minimum of 3% slope where the available space for each animal is 400 square feet or less and minimum of 1.5% where the available space for each animal is more than 400 square feet per animal.
- Weekly scraping of freestall exercise pens and open corrals using pull-type scraper in the morning hours except when prevented by wet conditions

The applicant has proposed this option; therefore a cost-effective 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 flush the corral feed lanes and walkways for the remaining animals two times per day; open corrals adequately sloped to promote drainage; to feed all animals in accordance with National Research Council (NRC) or other District-approved guidelines utilizing routine nutritional analysis for rations; and to scrape open corrals and freestall exercise pens weekly with a pull-type scraper except during wet conditions, 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 day and feed lanes and walkways in the corrals for the remaining animals flushed at least two times per day
   - All animals fed in accordance with National Research Council (NRC) or other District-approved guidelines utilizing routine nutritional analysis for rations.
   - All open corrals adequately sloped to promote drainage (minimum of 3% slope where the available space for each animal is 400 square feet or less and minimum of 1.5% where the available space for each animal is more than 400 square feet per animal.

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

Description of Control Technologies

1) Feed and Manure Management Practices

Concrete Feed Lanes and Walkways
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.

Weekly Scraping of Exercise Pens and Open Corrals with a Pull-Type Scraper
Frequent scraping the freestall exercise pens and corrals will reduce the amount of manure on the corral surfaces, which will reduce VOC and ammonia emissions resulting from decomposition of this manure. This practice will also provide a uniform surface that promotes aerobic conditions on the corral surface, which will reduce gaseous pollutants from this area.

b. Step 2 - Eliminate technologically infeasible options

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

c. Step 3 - Rank remaining options by control effectiveness

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

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

d. Step 4 - Cost Effectiveness Analysis

The applicant has proposed the only option listed; therefore a cost 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 flush the corral feed lanes and walkways for the remaining animals two times per day; open corrals adequately sloped to promote drainage; to feed all animals in accordance with National Research Council (NRC) or other District-approved guidelines utilizing routine nutritional analysis for rations; and to scrape open corrals and freestall exercise pens weekly with a pull-type scraper except during wet conditions, 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 (C-6817-3)

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

a. Step 1 - Identify all control technologies

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

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

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

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

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

<u>Description of Control Technologies</u>

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

An aerobic treatment lagoon is a waste treatment lagoon that is designed to facilitate the decomposition of wastewater by microbes in the presence of oxygen (O_2). The process of aerobic decomposition results in the conversion of organic compounds in the wastewater into carbon dioxide (CO_2), and (H_2O), nitrates, sulfates, and inert biomass

(sludge). The process of aerobic digestion is sometimes referred to as nitrification (especially when discussing NH_3 transformation). Complete aerobic digestion (100% aeration) removes nearly all malodors and also virtually eliminates VOCs, H_2S, and NH_3 emissions from liquid waste.

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

2) Covered Lagoon Anaerobic Digester

Pursuant to Section 5.3 of the Settlement Agreement (9/20/2004) between the District and the Western United Dairyman and the Alliance of Western Milk Producers Inc., installation of an anaerobic digester will only be required if this technology is proven effective in reducing emissions and is required by the final Dairy BACT Guideline[9].

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

As stated above, the gas generated in the covered lagoon can be captured and then sent to a suitable combustion device. Combustion (thermal incineration) is a generally accepted, well-established VOC control technique. During combustion, gaseous hydrocarbons are oxidized to form CO_2 and water. The VOCs emitted from the liquid manure in the covered lagoon can be reduced by 95% with the use of an appropriate combustion device. Therefore, installation of the digester will lower the total VOCs emitted from the liquid manure from the liquid manure handling system. Although the

control efficiency of the gas captured from the primary lagoon is expected to be 95% or more, the overall control efficiency is expected to be less since VOCs will also be emitted from the storage pond and as fugitive emissions. The overall control efficiency is assumed to be 75% of the emissions that would have been emitted from the lagoon and storage pond.

3) Anaerobic Treatment Lagoon

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

b. Step 2 - Eliminate technologically infeasible options

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

c. Step 3 - Rank remaining options by control effectiveness

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

1) Aerobic Treatment Lagoon – mechanical aeration to achieve a dissolved oxygen concentration of 2.0 mg/L (≈ 95%)
2) Covered Lagoon Anaerobic Digester with biogas collected and vented to a destruction device such as an internal combustion engine or flare, and treated waste discharged into a secondary lagoon or storage pond. (≈ 75%)
3) Anaerobic Treatment Lagoon designed to meet Natural Resources Conservation Service (NRCS) standards (≈ 40%)

d. Step 4 - Cost Effectiveness Analysis

<u>Aerobic Treatment Lagoon:</u>

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

Energy Requirement for Complete Aeration

In order to effectively calculate the costs of this control option, the energy requirement for complete aeration must be determined. 1.5 to 2.5 pounds of oxygen is required to digest 1 pound of Biological Oxygen Demand (BOD_5) with additional oxygen required for conversion of ammonia to nitrate (nitrification).[25] It is generally accepted that at least twice the BOD should be provided for complete aeration[26]. According to Dr. Ruihong Zhang of the University of California, Davis, 2.4 lbs (1.1 kg) of oxygen (O_2) per cow must be provided each day for removal of BOD and an additional 3 lbs (1.4 kg) for oxidation of 70% of the nitrogen.[27] Based on the data gathered in a UC Davis study on aerator performance for wastewater lagoons, aeration efficiencies for mechanical aerators range from 0.10 to 0.68 kg of oxygen provided per kW-hr of energy utilized.[28] For this analysis it will be assumed that twice the BOD is required for complete aeration and that mechanical aerators will provide 1.0 kg of oxygen per kW-hr. This efficiency is very conservative since it is greater than the efficiency of the most efficient aerator tested in the UC Davis study (0.68 kg-O_2/kW-hr) and more than twice the efficiency of the most efficient aerator tested that had been installed in dairy lagoons (0.49 kg-O_2/kW-hr). Additionally, the efficiency tests were performed in clean water and lower aeration efficiencies are expected in liquid dairy manure that contains a significant amount of solids. The yearly energy requirement per cow is calculated as follows:

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

The total yearly energy requirement is calculated below. Based on animal units (AU), it is assumed that the BOD loading (and the energy requirement) for the dry cows will be 80% of that of the milk cows, the BOD loading from the large heifers will be 73% of milk cows, the BOD loading from the small and medium heifers will be 35% of milk cows, and the BOD loading from the baby calves will be 21% of milk cows.[29]

As discussed in the evaluation, the dairy expansion consist of 5,200 milk cows; 1,040 dry cows; 763 heifers (15-24 months); 52 heifers (7-14 months), and 1,539 calves (0-3 months). The amount of electricity required for complete aeration of the lagoon system is calculated as follows:

(5200 milk cows x 803 kW/cow-year) + (1040 dry cows x 0.8 x 803 kW/cow-year) + (763 large heifers (15-24 mo.) x 0.73 x 803 kW/cow-year) + (52 medium heifers (7-14 mo) x 0.35 x 803 kW/cow-year) + (1539 calves x 0.21 x 803 kW/cow-year)

= 5,565,095 kW-hr/year

[25] An Assessment of Technologies for Management and Treatment of Dairy Manure in California's San Joaquin Valley, December 2005, page 34 (http://www.arb.ca.gov/ag/caf/dairypnl/dmtfaprprt.pdf)
[26] See http://www.extension.org/faq/27574 and http://www.omafra.gov.on.ca/english/engineer/facts/04-033.htm
[27] An Assessment of Technologies for Management and Treatment of Dairy Manure in California's San Joaquin Valley, December 2005, page 35 (http://www.arb.ca.gov/ag/caf/dairypnl/dmtfaprprt.pdf)
[28] Aerator Performance for Wastewater Lagoon Application, September 2007, UC Davis, R.H. Zhang (http://asae.frymulti.com/abstract.asp?aid=23832&t=2)
[29] Animal Unit (AU) factors are taken from the California Regional Water Quality Control Board Central Valley Region Annual Report for Dairies Subject to Monitoring and Reporting (http://www.waterboards.ca.gov/centralvalley/available_documents/dairies/genorderwdrform.pdf)

Cost of Electricity for Complete Aeration:

The cost for electricity is based upon on an average retail price of industrial electricity in California for the year 2011 taken from the Energy Information Administration (EIA) Website: http://www.eia.doe.gov/cneaf/electricity/epm/table5_6_b.html.

Average Cost for electricity = $0.1111/kW-hr

The electricity costs for complete aeration are calculated as follows:
5,565,095 kW-hr/year x $0.1111/kW-hr
= $618,282/year

VOC Emission Reductions for Complete Aeration

In addition to controlling 95% of the emissions from the lagoon and storage pond, complete aeration will also control 95% of the emissions from liquid manure land application as well. Therefore, these emissions reductions will also be included in the analysis.

The annual VOC Emission Reductions for the lagoons, storage ponds, and liquid manure land application unit are calculated as follows:

{[Number of cows] x [Uncontrolled Lagoon/Storage Pond VOC EF (lb/cow-year)] x [Complete Aeration Control Efficiency for Lagoon/Storage Pond]} + {[Number of cows] x [Uncontrolled Land application VOC EF (lb/cow-year)] x [Complete Aeration Control Efficiency for Land Application]}

[(5,200 milk cows x 0.74 lb-VOC/cow-year) + (1,040 dry cows x 0.40 lb-VOC/cow-year) + (2,324 support stock x 0.31 lb-VOC/cow-year)] x 0.95 + [(5,200 milk cows x 1.33 lb-VOC/cow-year) + (1,040 dry cows x 0.72 lb-VOC/cow-year) + (2,324 support stock x 0.55 lb-VOC/cow-year)] x 0.95

=[4,984 lb-VOC/year x 0.95] + [8,943 lb-VOC/year x 0.95]

= **13,231 lb-VOC/year**

Cost of VOC Emission Reductions

Cost of reductions = ($618,282/year)/((13,231 lb-VOC/year)(1 ton/2000 lb))
= **$93,460/ton of VOC reduced**

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

Covered Lagoon Anaerobic Digester:

Pursuant to Section 5.3 of the Settlement Agreement (9/20/2004) between the District and the Western United Dairyman and the Alliance of Western Milk Producers Inc, installation of an anaerobic digester will only be required if this technology is proven effective in reducing emissions and is required by the final Dairy BACT Guideline[9].

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

Anaerobic Treatment Lagoon:

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

e. Step 5 - Select BACT

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

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

2. BACT Analysis for NH_3 Emissions from the Lagoon & Storage 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,[30] 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.

[30] 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/dpaq/settlement.pdf)

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.

V. Top Down BACT Analysis for the Liquid Manure Handling System – Liquid Manure Land Application (C-6817-3)

1. BACT Analysis for VOC Emissions from Liquid Manure Land Application:
a. Step 1 - Identify all control technologies

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

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

1) Aerobic Treatment Lagoon – mechanical aeration to achieve a dissolved oxygen concentration of 2.0 mg/L (≈ 95%)
2) Anaerobic Treatment Lagoon designed to meet Natural Resources Conservation Service (NRCS) standards (≈ 40%)
3) Injection of Liquid and Slurry Manure (≈ 50%)

Description of Control Technologies

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

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

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

2) Anaerobic Treatment Lagoon

An anaerobic treatment lagoon is a waste treatment lagoon that is designed to facilitate the decomposition of manure by microbes in the absence of oxygen. The process of anaerobic decomposition results in the preferential conversion of organic compounds in the wastewater into methane (CH_4), carbon dioxide (CO_2), and water rather than intermediate metabolites (VOCs). The National Resource Conservation Service (NRCS) California Field Office Technical Guide Code 359 - Waste Treatment Lagoon specifies criteria for the design of anaerobic treatment lagoons. A properly designed anaerobic treatment lagoon will reduce the Volatile Solids (VS) by at least 50% and will reduce the biological oxygen demand (BOD), which will result in greater efficiency in degrading compounds that contain carbon into methane and carbon dioxide rather than VOCs. Since 50% of the Volatile Solids in the liquid manure will have been removed or digested in the lagoon, there will be less Volatile Solids remaining in the effluent to decompose into VOCs. Although, the Volatile Solids reduction will be at least 50%, to be conservative a 40% control will be applied to irrigation from a storage pond after an anaerobic treatment lagoon.

3) Injection of Liquid and Slurry Manure

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

The manure can only be injected during the time when the crop is not fully mature. This is because a tractor must be used to pull a cultivator with the liquid and slurry manure shanks. Once the crop is planted and grown to a certain height, it is no longer feasible for the tractor to get into the field due to the potential of damaging the crop. Ron Prong of Till-Tech Systems [(519) 775-2575] states that his company's liquid and slurry manure injection system can be used up to four weeks after planting of the crops without causing damage. Therefore, injection of slurry manure can only be required until the crops become so tall that damage will occur.

b. Step 2 - Eliminate technologically infeasible options

Option 4 - Injection of Liquid and Slurry Manure

The Dairy Permitting Advisory Group (DPAG) found that injection of flushed manure was not be a feasible BACT option in their report of BACT options for dairies in the San Joaquin Valley.[31]

Injection is typically restricted to slurry manure that has been vacuumed from the cow housing or that has been removed from settling basins and/or weeping walls. Injection of flushed liquid manure from the lagoons is not considered feasible because the additional water from flushing increases the amount of liquid that must be transported by the trucks or honeywagons, which will generate more emissions. Because of the added time and expense, injection is not used for flushed liquid manure; therefore, this option will be removed from consideration at this time.

c. Step 3 - Rank remaining options by control effectiveness

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

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

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

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

d. Step 4 - Cost Effectiveness Analysis

Aerobic Treatment Lagoon:

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

Anaerobic Treatment Lagoon:

The applicant has proposed a control method that is at least equivalent to this option; therefore a cost-effectiveness analysis is not required.

e. Step 5 - Select BACT

The facility is proposing an anaerobic treatment lagoon that is at least equivalent to an anaerobic treatment lagoon designed according to National Resource Conservation Service (NRCS) Guidelines. Additionally, the facility is proposing to install an anaerobic digester if determined to be an effective emissions control in the final Dairy BACT guideline. Therefore, the BACT requirements are satisfied.

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

2. BACT Analysis for NH_3 Emissions from the Liquid Manure Land Application

a. Step 1 - Identify all control technologies

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

considered 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[30], 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 (C-6817-4)

1. BACT Analysis for VOC Emissions from Solid Manure:

a. Step 1 - Identify all control technologies

Since specific control efficiencies have not been identified in the literature for VOC emissions from solid manure handling, 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 Solid Manure Handling and Land Application:

1) Open Windrow Composting
2) Open Aerated Static Pile (ASP) (≈ 23.2%)
3) Open Negatively Aerated Static Pile vented to biofilter ≥ 80% destruction efficiency for both active and curing phases (or a combination of controls) (≈ 84.6%)
4) Enclosed Negatively Aerated Static Pile (≈ 33.2%)
5) In-Vessel/Enclosed Negative Aerated Static Piles vented to biofilter ≥ 80% destruction efficiency for both active and curing phases (or a combination of controls) (≈ 86.6%)
6) Daily Land Application with Immediate Incorporation (≈ 43.5%)

Description of Control Technologies

1) Open Windrow Composting

Composting is the aerobic decomposition of manure or other organic materials in the thermophilic temperature range (104 –149 degrees F). It is the same process that decays leaves and other organic debris in nature. Composting controls the conditions so that the natural decomposition process occurs at a faster rate. Composting can be performed using windrows. A windrow process involves forming long piles (windrows as shown in the picture below) turned by specially designed machines. Typically the rows are 1 to 2 meters high and 2 to 5 meters at the base. The piles are turned periodically to mix and introduce and rebuild bed porosity. This helps to ensure that all the material is uniformly composted. However, studies have shown that VOC and ammonia emissions from open windrow composting are significant.

Composting is a three-stage process that begins as soon as appropriate materials are combined and piled together. The initial stage of the process is referred to as active composting followed by curing or finishing, and storage and/or processing of composted products.

The composted material is usually odorless, fine-textured, has low moisture, and can be bagged and sold for use in gardens, nurseries or used as fertilizer on cropland. Composting improves the handling characteristics of any organic residue by reducing its volume and weight. Composting also kills pathogens and weed seeds. Composting reduces material volume through natural biological action and produces a product that enhances soil structure and benefits new growth.

Active composting phase (Thermophilic stage):

Based on SCAQMD Rule 1133.2, titled "Emission Reductions from Co-Composting Operations" the active composting phase is the phase of the composting process that begins when organic materials are mixed together for composting purposes and lasts approximately 22 days. According to SCAQMD, 80% of VOC emissions and 50% of NH_3 emissions occur during the first 22 days of composting.[32] The active phase of composting is where the population of thermophilic microorganisms is usually the highest. This stage is characterized by high temperatures, high level of oxygen demand, and high evaporation rates due to temperature.

[32] Page 8 of SCAQMD Rule 1133 final staff report

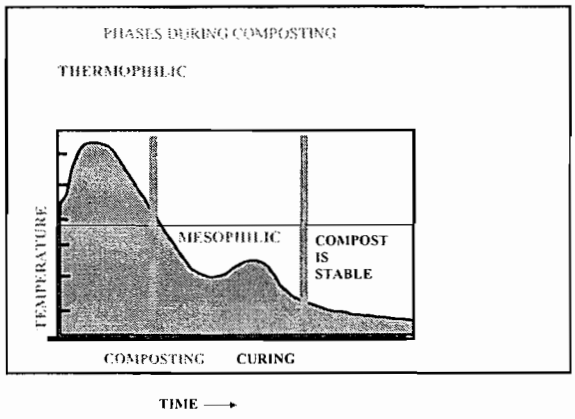
Curing phase (Mesophilic stage):

Conversely, the curing stage of the process is where the mesophilic microorganism population is the highest and the need for oxygen and evaporation rates decreases. The curing phase is defined in SCAQMD Rule 1133.2 as "a period that begins immediately after the active phase and lasts 40 days or until the compost exhibits a Solvita Maturity Index of 7, or the product respiration rate is below 10 milligrams of oxygen per gram of volatile solids per day as measured by direct respirometry." 20% of VOC emissions and 50% of NH_3 emissions are expected to occur during this phase.[33]

VOC emissions from composting:

VOC emissions primarily occur during the active and curing phases of the composting. To ensure consistent temperatures within the piles, a layer of finished compost can be placed on top of the active and curing phase piles. This helps minimize volatility of VOCs at the surface of the compost piles.

There is a linkage between the microbial activity and the VOC emissions profile from composting operations. Emissions are generally higher during thermophilic temperatures and lower during mesophilic temperatures. The figure below illustrates the oxygen demand and microbial profile of the various composting stages. This figure also illustrates the corresponding VOC emissions primarily occurring during active and curing phases of composting.[34]



The graphic was provided by Eliot Epstein, Ph.D. Chief Environmental Scientist, Earth Tech, Inc. "VOC emissions are expected to follow the similar profile as oxygen demand

During the composting process the volume of waste will be reduced anywhere from 40-50 percent. The rate at which manure will compost depends on the following[35]: moisture content; pH; temperature; amount of oxygen available; size of particles in the material; the carbon-to-nitrogen ratio - the weight of decomposable carbon to the weight of total nitrogen in an organic material

The bacterial breakdown of substrates in the material being composted produces various organic and inorganic gases that can contribute to several different air pollution

[33] SCAQMD Rule 1133 Technology Assessment
[34] Page 9-10, SCAQMD Final Staff Report for Proposed Rules 1133, 1133.1, and 1133.2.
[35] Proposed SCAQMD Rule 1133 (Pages 1-6)

problems. Source testing conducted by the SCAQMD District in 1994 and early 1995 indicated that outdoor windrow composting of dewatered sewage sludge releases significant levels of ammonia, methane and VOCs (SCAQMD, 1995).

Disadvantages of composting organic residues include loss of nitrogen and other nutrients, time for processing, cost for handling equipment, available land for composting, odors, marketing, and slow release of available nutrients. During a three year Nebraska study as much as 40 percent of total beef feedlot manure nitrogen and 60 percent of total carbon was lost to the atmosphere during composting.[36] Increasing the carbon-to-nitrogen ratio by incorporating high carbon materials (leaves, plant residue, paper, sawdust, etc.) can reduce nitrogen loss.

2) Negatively Aerated Static Pile (ASP)

Aerated static piles are piles that are aerated directly with forced or drawn air systems to speed up the compost process. The aerated static pile is constructed to allow forced airflow (low pressure-high volume blowers and a piping system) so that the oxygen supply can be more accurately controlled. The material is piled over perforated pipes connected to a blower to withdraw air from the pile. The result is improved control of aerobic degradation or decomposition of organic waste and biomass bulking agents. This is considered a more efficient composting method than the industry standard of windrow composting (non-aerated piles turned mechanically with front-end loaders or scarabs as discussed above).

VOC emissions primarily occur during the active and curing phases of the composting. To ensure consistent temperatures and prevent escape of odors and VOCs, the piles should be covered with a thick layer (12 to 18 inches) of finished compost or bulking agent.

With positive pressure aeration, contaminated air is pushed through the pile to the outer surface; therefore, making it difficult to be collected for odor treatment. However, positive pressure aeration is more effective at cooling the pile because it provides better airflow.

With negative aeration, air is pulled through the pile from the outer surface. Contaminated air is collected in the aeration pipes and can be directed to an odor treatment system. To avoid clogging, condensed moist air drawn from the pile must be removed before reaching the blower. Negative aeration might create uneven drying of the pile due to its airflow patterns.

A study conducted by City of Columbus, Ohio, demonstrated that the weighted-average odor emissions from an outdoor negative aeration pile is approximately 67% lower than those from an outdoor positive aeration pile. Negative aeration is usually used during the beginning of the composting process to greatly reduce odors. In enclosed active composting area, negative pressure aeration also reduces moisture released into the building, and thus, reduces fogging. Positive aeration is used mostly near the end of the

[36] University of Nebraska-Lincoln

composting cycle for more efficient drying of the compost.[37]

An odor and emissions study done at the City of Philadelphia biosolids co-composting facility by the Department of Water[38] also concluded that controlling the temperature by controlling the oxygen availability using negative aeration composting is expected to result in lower emissions than those from open windrow composting.

3) Open negatively aerated static pile with exhaust vented to a biofilter > 80% control efficiency

This technology is the same as that described above for negatively aerated static piles except that the exhaust gases are vented to a biofilter. As discussed above negative aeration appears to be more efficient in reducing odors and emissions than positive aeration.

Biofiltration is an air pollution control technology that uses a solid media to absorb and adsorb compounds in the air stream and retains them for subsequent biological oxidation. A biofilter consists of a series of perforated pipes laid in a bed of gravel and covered with an organic media. As the air stream flows up through the media, the odorous compounds are removed by a combination of physical, chemical and biological processes. However, depending upon the airflow from the composting material and the design and material selection for the biofilter, the organic matter could quickly deteriorate.

In the biofiltration process, live bacteria biodegrade organic contaminants from air into carbon dioxide 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 harmless to humans unless ingested. Chemically, the biodegradation reaction for aerobic cultures is written as:

Organic(s) + Oxygen + Nutrients + Microorganisms => CO_2 + H_2O + Microorganisms

The organic(s) are air contaminants, the oxygen is in air, the nutrients are nitrogen and phosphorus mineral salts needed for microbial growth and the microorganisms are live bacteria on the biofilter media.

Biofiltration is a well-established emission and control technology in Europe where over two hundred biofilters were in use as of 1984 and even more are expected today. In the United States, biofilters have been mainly utilized for the treatment of odors as well as VOCs in wastewater treatment plants. Based on the information collected by SCAQMD, existing biofilter composting applications have achieved control efficiencies of about 80% to 90% for VOC and 70% to over 90% for ammonia (one of this composting

[37] Technology Assessment for SCAQMD proposed Rule 1133 Page 3-2

[38] Conclusion # 2, "Measurement and Control of Odor and VOC emissions from the largest municipal aerated-static pile biosolids composting facility in the United States". William Toffey, Philadelphia Water Department; Lawrence Hentz, Post, Buckley, Shuh and Jerigan.

applications reported an initial control efficiency of 65 percent for VOC but was later improved to achieve an 80 percent control efficiency). This specific field example along with other available data presented in SCAQMD's Technology Assessment Report demonstrates that a well-designed, well-operated, and well-maintained biofilter is capable of achieving 80% control efficiency for VOC and ammonia.[39]

4) Enclosed Aerated Static Pile

An enclosed aerated static pile uses the same forced aeration principle of an open ASP, except that the entire pile is fully enclosed. There are a few companies that are promoting this type of system. In this evaluation, the following two companies will be discussed: AgBag International Ltd and the Gore Cover. Both technologies are briefly described below:

AgBag International Ltd.

The AgBag system was developed by Compost Technology International and is based in Oregon. The system has controlled aeration capabilities and has minimal space requirements. It is suited for small to mid-size composting. The system is comprised of the following components:

- Large sealed bags (pods) of adjustable length up to 200 ft, either 5 ft or 10 ft diameter
- 9 mm recyclable plastic (not re-usable)
- Adjustable aeration system with inserted valved vents
- Hopper, mixer & compost compactor

The Ag-Bag Environmental system provides a cycle time of as little as 8 weeks. Curing adds another 30 to 60 days. AgBag states that three annual composting cycles could be obtained. The area needed to compost is determined by the volume of waste material.

Mixing – A composite mix of materials needs to be balanced for proper carbon to nitrogen (C:N) ratio. This means a mix of greens (nitrogen sources) to browns (carbon sources). The best ratio that AgBag recommends is between 20 to 40:1, with 30:1 being ideal.

The oxygen supply is replenished by forced aeration. This eliminates the labor-intensive need to turn piles. Temperature monitors indicate when the airflow needs adjusting to maintain proper temperatures. Moisture is adjusted at time of filling or added to the total mixture upon blending. The compost matrix is sufficient in size to maintain heat, even in cold climates. The system contains vents throughout to allow air to escape. These vents are controlled by the operator. Ag-Bag is considered an in-vessel system.

After 8-12 weeks of composting, the compost cycle is completed. The "Pod," as AgBag likes to call it, is opened and the material is static piled for 30-60 days to cure or mature.

[39] SCAQMD Final Staff Report for Rule 1133, page 18

A representative of AgBag has claimed very high control efficiencies for both VOCs and ammonia and has claimed that the system acts as its own biofilter, thus reducing emissions. However, VOC and ammonia control efficiencies are not readily available at this time. Furthermore, AgBag has not provided any technical information to support their claimed level of control.

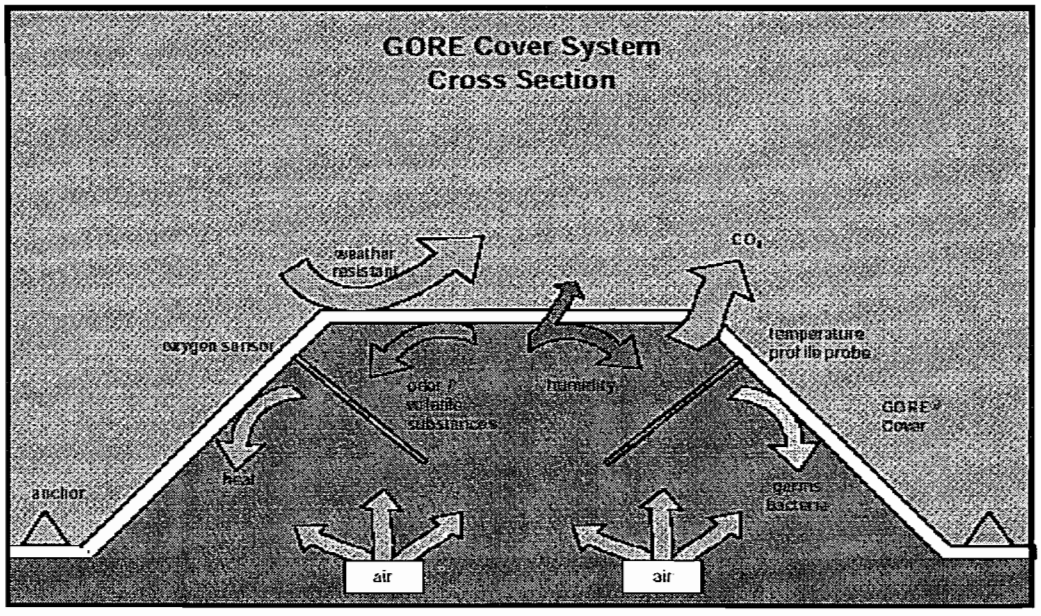
AgBag is working closely with SCAQMD and the Milk Producers Council to perform a pilot study to evaluate the efficiency of this technology. Until the study is completed, this technology will be conservatively assumed to control emissions by at least 10% more than open aerated static piles, with a minimum control efficiency of 33.2%. Once the study is completed, the District will be able to more accurately determine the control efficiency for this technology.

Gore Cover

The Gore Cover, manufactured by Gore Creative Technologies Worldwide, utilizes positive aeration and a specially designed cover to create an enclosed system that controls odors, microorganisms and creates a consistent product unaffected by outside environmental conditions. Medium pressure aerators connect to aeration pipes on the floor or aeration ducts in the floor. Stainless steel probes inserted into the pile monitor oxygen and temperature parameters. The data is relayed to and stored in a computer. This data controls the aerators to keep pile conditions consistent. The Gore Cover system can significantly reduce odors by the controlled use of a semi permeable membrane that is permeable to oxygen but impermeable to large molecules. The cover protects the pile from weather conditions, but allows release of CO_2. These controlled conditions allow consistent product to be produced without risk of damp pockets that may create anaerobic conditions and increased odors.

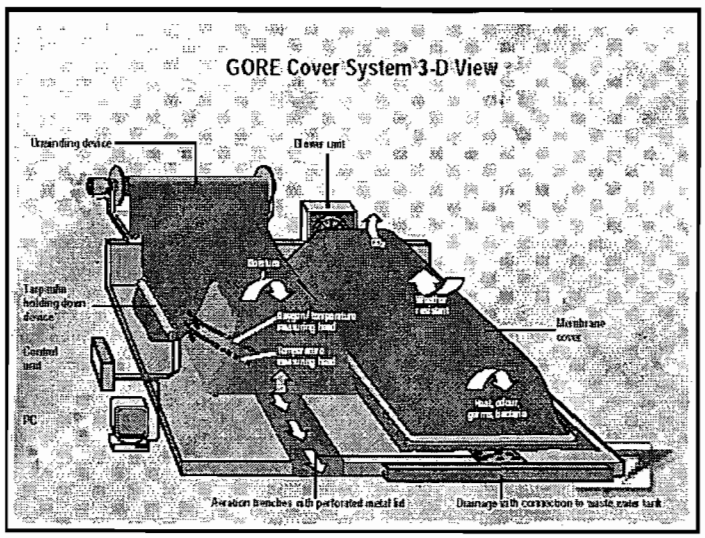
In addition to the membrane, which covers the organic material during composting, the system includes a concrete floor and wall, blowers for aeration, and a winder for efficient movement of the cover. The system also requires consistent management including preparation of materials to achieve a homogenous mixture with moisture content of 55-60% and monitoring of temperature and oxygen levels. With this system, the composting process takes eight weeks. The "heap" of organic material is covered by the membrane, which is secured to the ground, allowed to compost for four weeks, then moved and re-covered for two weeks for stabilization. During the final two weeks of curing, the heap is uncovered.

A fine film of condensation develops during the composting process that collects on the inside cover. According to the manufacturer, the moisture helps to dissolve the gases. The condensation then drips back onto the pile, where they can continue to be broken down by the composting process.



The system, according to Gore Cover, shortens the time required to produce finished, premium compost, as follows:

- First zone – Four weeks – Material stays on the initial placement zone in-vessel
- Second zone – Two weeks – Material moved to another in-vessel zone with minimizing addition of water. Water addition is nominal because the in-vessel system retains the initial moisture within the system and only releases minimal amounts.
- Third zone – Two weeks – the final move is to a third uncovered zone.
- Screening – Material will be screened then ready to sell within 15 days.



The Gore Cover technology is being implemented in over 140 facilities, mainly in Europe and the Mid East. This technology is capable of reducing anywhere from 90-97% of the odor created. However, not much is known regarding the control efficiencies for VOC and ammonia emissions. Oley Shermeta from Oley Shermeta Environmental

has stated that this technology is superior to other in-vessel systems and has control efficiencies greater than 80% for both VOC and ammonia. However, at this point in time, there is no data to validate this. Mr. Shermeta has stated that he will gather all the information necessary to validate his claims and will provide this information to the District as soon as possible.

Until the data is presented, this technology will also be conservatively assumed to control emissions by at least 10% more than open aerated static piles, with a minimum control efficiency of 33.2% (similar to AgBag). Once the data is available, the District will be able to more accurately determine the control efficiency for this technology.

5) In-Vessel/Enclosed Negatively Aerated Static Piles with exhaust vented to biofilter > 80% control efficiency

An in-vessel system confines the composting material within a building or container and uses forced air and mechanical turning to speed up the composting process. The enclosed ASP systems discussed above (AgBag and the Gore Cover) are also considered in-vessel systems. In these types of systems, close to 100% capture efficiency can be achieved. The captured gases can be sent to a control device such as a biofilter.

The enclosed systems typically allow treatment to be completed in less time than the windrow or aerated pile by providing better control of composting conditions. Rapid treatment time is offset by the high initial cost of the composting reactor.

There are a few co-composting facilities that compost in a fully enclosed building. One of these facilities is located in Rockland County, New York. This facility began operations in February of 1999. However, this facility processes biosolids from five publicly owned treatment works (POTWs) and does not process any dairy manure. A brief explanation of system at this the facility is discussed below in order to show some of the intricacies and costs of this type of system.

The facility was designed to handle 110 wet tons/day. The facility had to go through a 12-week odor control acceptance test, which included performance testing of ammonia, reduced sulfur compounds, VOCs and hydrogen sulfide. The facility is located approximately 1,000 feet away from a residential development. New York state regulations required that the facility not cause any objectionable odor impacts, however the required removal rates could not be guaranteed with conventional open biofilter systems. Consequently, proposals for proprietary biofilter systems were evaluated where the required performance could be guaranteed. A system supplied by Envirogen with a guaranteed odor removal rate of 94% was selected. The Envirogen package cost $1,670,000 and included supply and construction/installation of the exhaust fans, dual pretreatment scrubbers with chemical feed system, enclosed biofilter, and discharge stack. In addition to odor concentration, removal rate guarantees were provided for ammonia, hydrogen sulfide, and methyl mercaptan. Ammonia removal of 99% was achieved. VOC concentrations in the inlet averaged in the 20-ppmv range with peaks exceeding 200 ppmv as propane. Based on the data collected, VOCs were reduced from an average 15 ppmv in the inlet to less than 0.5 ppmv in the outlet, or a removal rate greater than 95 percent.

There are also two in-vessel composting systems that are currently being operated in the South Coast AQMD. Both use control equipment for ammonia, VOCs, and odors as well. However, these operations are currently composting materials other than manure.

No dairy or heifer facilities could be identified that are currently utilizing these types of in-vessel composting systems at their facility. The in-vessel systems, although very efficient in controlling emissions, can be extremely costly and are not considered to be cost effective for confined animal facilities at this time.

6) Daily Incorporation of Solid Manure into cropland

Incorporation of solid manure into the soil immediately after removal from animal housing will reduce emissions by minimizing the amount of time that the solid waste is exposed to the atmosphere. Limiting the exposure of the solid manure to the atmosphere will reduce the rate of volatilization of gaseous pollutants, such as VOCs and ammonia, thereby reducing overall emissions. Once the solid manure has been incorporated into the soil, VOCs will be absorbed onto particles of soil providing the opportunity for the VOCs to be oxidized into carbon dioxide and water[40].

Based on estimates in the Final DPAG Report - "Recommendations to the San Joaquin Valley Air Pollution Control Officer Regarding Best Available Control Technology for Dairies in the San Joaquin Valley", daily incorporation of solid manure removed from the cow housing will be assumed to have a 43% control efficiency for VOC emissions from solid manure handling and land application until data becomes available.

b. Step 2 - Eliminate technologically infeasible options

All technologies listed in step 1 are currently considered to be technologically feasible.

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) In-Vessel/Enclosed Negative Aerated Static Piles vented to biofilter $\geq$ 80% destruction efficiency for both active and curing phases (or a combination of controls) ($\approx$ 86.6%)[41]

2) Open Negatively Aerated Static Pile vented to biofilter $\geq$ 80% destruction efficiency for both active and curing phases (or a combination of controls) ($\approx$ 84.6%)[42]

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[40] 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)

[41] According to the SCAQMD Rule 1133.2 final staff report (page 18) "Technology Assessment Report states a well designed, well operated, and well-maintained biofilter is capable of achieving 80% destruction efficiency for VOC and NH3." The overall control efficiency of this technology is equal to the combined control efficiencies of the enclosed aerated system (33.2%) and the biofilter. (80%), calculated as follows: (0.332) + (1-0.332)*0.8 =86.6%

[42] The overall control efficiency of this technology is equal to the combined control efficiencies of the open aerated system (23.2%) and the biofilter. (80%), calculated as follows: (0.232) + (1-0.232)*0.8 =84.6%

3) Daily Land Application with Immediate Incorporation (≈ 43.5%)

4) Enclosed Negatively Aerated Static Pile (≈ 33.2%)[43]

5) Open Negatively Aerated Static Pile (ASP) (≈ 23.2%)[44]

6) Open Windrow Composting (0%)

d. Step 4 - Cost Effectiveness Analysis

Option 1) In-Vessel/Enclosed Composting vented to a biofilter; Option 2) Open Aerated Static Pile (ASP) vented to a biofilter; Option 4) Enclosed ASP; and Option 5) Open ASP

A cost effectiveness was evaluated by SCAQMD for a variety of controls for new and existing co-composting facilities based on implementation of several possible scenarios. The cost effectiveness for new co-composting facilities was estimated to be about $24,000 to $27,000 per ton of VOC reduced or $11,000 to $12,000 per ton of VOC and ammonia reduced based on fabric or concrete type of enclosure for the active phase of composting and forced aeration system for the active and curing phases vented to a bio-filter.[45]

For existing co-composting operations, SCAQMD analyzed a few different scenarios. Under one of the scenarios, assuming enclosure without an aeration system for active phase of composting and a forced aeration system for curing phase (both vented to a biofilter) and depending on the type of enclosure, the cost-effectiveness ranged from $11,400 to $15,400 per ton of VOC and ammonia reduced, or $30,000 to $40,000 per ton of VOC reduced. Under another scenario, using enclosure and aeration system for active phase, and aeration system for curing phase, both vented to biofilter, the cost effectiveness ranged from $8,700 to $10,000 per ton of VOC and ammonia reduced or $23,000 to $26,500 per ton of VOC reduced (depending on the type of enclosure). Under another scenario, assuming that forced aeration system (in combination with process controls, optimized feedstock mix ratios, and best management practices) for both active and curing phases (combined with a biofiltration system) could achieve the required reductions (i.e., 70% for VOC and ammonia), the cost-effectiveness could be as low as $6,500 per ton of VOC and ammonia reduced or $17,000 per ton of VOC reduced. However, SCAQMD stated that additional test data would be necessary to

[43] There is no control efficiency available at this time for enclosed aerated static piles, however vendors for this technology are claiming a high degree of control. A study is under way by SQAQMD and the Milk Producers Council to determine the control efficiencies for VOC and ammonia emissions from enclosed aerated composting systems. Until the study is conducted, this technology will be conservatively assumed to control emissions by at least 10% more than open aerated static piles, with a minimum control efficiency of 33.2%.

[44] Control Efficiency is based on emissions capture efficiency of 25 to 33% from an open ASP multiplied by a conservative 80% control equipment efficiency from the Technology Assessment for Proposed Rule 1133 Table 3-2. The average control efficiency for open aerated static piles based on the Technology Assessment is 23.2%. Additional emission reduction potential from ASP cannot be quantified at this time.

[45] Final Staff report for proposed Rule 1133, 1133.1, and 1133.2)

validate the efficiency of such control methods.[46]

The VOC and ammonia baseline emission factors, used in determining the cost effective analysis (also included in Rule 1133.2), were developed based on the AQMD source tests conducted in 1995 and 1996 for three windrow co-composting facilities (1.78 pounds of VOC and 2.93 pounds of ammonia per ton of throughput). These emission factors do not accurately represent the baseline emissions of manure storage piles from dairy/calf facilities. The emission factor for manure piles may in fact be lower.

Enclosed ASP or in-vessel systems with control equipment, while feasible and effective at significantly reducing emissions, are costly. There may be additional emission reductions associated with ASP systems that have not been quantified in this evaluation. Additional testing of ASP systems, such as the ones discussed in this evaluation would allow the emission reduction potential of all control scenarios to be refined.

Therefore, all aerated static composting systems will be eliminated at this time.

Daily Land Application with Immediate Incorporation:

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

e. Step 5 - Select BACT

The facility is proposing to land apply and immediately incorporate the solid manure.

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 Solid Manure Handling and land Application.

2. BACT Analysis for NH_3 Emissions from Solid Manure Handling & Land Application:

a. Step 1 - Identify all control technologies

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

[46] The cost assumptions used in this analysis (capital and operating cost) are included in the Technology Assessment Report for SCAQMD PR1133 (Attachment A to the Final Staff Report)

District will not deem any control options Achieved-in-Practice until after the final Dairy BACT Guideline has been established.

The following practice has been identified as a possible control option for the increase of NH_3 emissions from solid manure handling and land application.

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

Description of Control Technologies

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

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

b. Step 2 - Eliminate technologically infeasible options

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

c. Step 3 - Rank remaining options by control effectiveness

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

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

d. Step 4 - Cost Effectiveness Analysis

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

e. Step 5 - Select BACT

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

Additionally, District Rule 2201 defines BACT as including the most stringent emission limitation or control technique, including process and equipment changes, that has been found by the APCO to be cost effective and technologically feasible for such class or category of sources or for a specific source. The District has found that the mitigation measures required by District Rule 4570 are technologically feasible for confined animal facilities and the applicant has proposed these options. Although District Rule 4570 is only intended to reduce VOC emissions, many of these measures also reduce ammonia

emissions. Therefore, in addition to the BACT requirements determined in the Top-Down BACT Analysis above, implementation of the mitigation measures that the applicant has selected to comply with Rule 4570 will also be required as part of BACT for NH_3 emissions from solid manure handling and land application.

VII. Top Down BACT Analysis for the Silage (C-6817-5)

1. BACT Analysis for VOC Emissions from Silage:

a. Step 1 - Identify all control technologies

The following options were identified as possible controls for VOC emissions from silage:

1) Fully Enclosed Silage Vented to a Control Device
2) Management Practices

Description of Control Technologies

1) Fully Enclosed Silage Vented to a Control Device

This control would entail total containment of the silage in a sealed space such as a silo, plastic bag, or building. The containment would then be ducted and vented appropriately to ensure that any emissions coming off the silage is captured and directed to a VOC control device such as a thermal oxidizer or biofilter, as already described in full in the preceding parts of this evaluation.

2) Management Practices

Various management measures can be used to minimize the release of VOC emissions from silage. These measures include building silage piles with higher bulk densities, using silage additives and inoculants, limiting the number of silage piles faces exposed for access purposes, using a silage shaver/facer to maintain a clean silage pile face, and covering the surfaces of the silage piles or using sealed silage bags. These management practices, which are included in full detail in the District Rule 4570 discussion section, either reduce the quantities of VOCs produced by the silage, or reduce the rate at which the VOCs already produced escape into the atmosphere.

b. Step 2 - Eliminate technologically infeasible options

Fully Enclosed Silage Vented to a Control Device cannot reasonably be considered to be technologically feasible at this point, as explained below:

Production of silage is an anaerobic process whose purpose is to move the ensiled plant material from an aerobic phase to an anaerobic phase as quickly as possible and achieve a rapid drop in pH that will hinder further microbial decomposition in order to preserve the nutritive value of the forage. The rapid drop in pH is primarily caused by conversion of soluble carbohydrates to nonvolatile lactic acid.

Infiltration of air into the ensiled material is highly undesirable as this encourages the growth of aerobic microbes which cause decomposition (spoilage) of the feed. Aerobic deterioration and heating of silage in bunkers or piles are well-known problems. Many steps are taken to prevent this loss of nutritive value. Active venting of silage would therefore be completely counter-intuitive to the silage making process as it would introduce oxygen into the silage and result in spoilage and the losses of nutritive value that producers are attempting to avoid.

Passive venting of silage to a control device may be considered to be more feasible but this option is not currently reasonable. Because of the need to maintain anaerobic conditions to preserve the nutritive value of the silage, silage piles are usually tightly compacted and covered with plastic to prevent air penetration. Because most of the surface area of silage piles will usually have a compacted surface covered by plastic, the vast majority of emissions will be from the part of the pile that is uncovered to allow removal of feed. Machinery must access this open portion of the silage pile at various times throughout the day to obtain feed for the animals; therefore, enclosing this portion of the pile to allow passive ventilation is not reasonable.

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) Management Practices

d. Step 4 - Cost Effectiveness Analysis

Since the remaining control option has been achieved in practice and/or proposed by the applicant, a cost effectiveness analysis is not required.

Therefore, all aerated static composting systems will be eliminated at this time.

e. Step 5 - Select BACT

The facility is proposing to comply with the silage management practices included in District Rule 4570.

APPENDIX D

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

San Joaquin Valley Air Pollution Control District
Risk Management Review

To:	Joe Siongco – Permit Services
From:	Yu Vu – Technical Services
Date:	March 21, 2012
Facility Name:	Philip Verwey Farms #2
Location:	19765 13th Ave. Hanford, CA 93230
Application #(s):	C-6817-1-3, -2-3, -3-3, -4-2, -5-2, and -9-0
Project #:	C-1120348

A. RMR SUMMARY

RMR Summary						
Categories	**Milking Parlor (Unit 1-3)**	**Cow Housing (Unit 2-3)**	**Liquid Manure Handling (Unit 3-3)**	**Diesel ICE (Unit 9-0)**	**Project Totals**	**Facility Totals**
Prioritization Score	0.01	0.54	0.51	N/A[1]	>1	>1
Acute Hazard Index	0.02	0.67	0.31	N/A[2]	1.00	1.00[3]
Chronic Hazard Index	0.00	0.06	0.01	N/A[2]	0.07	0.07
Maximum Individual Cancer Risk (10^{-6})	0.01	0.85	0.77	0.02	1.65	1.65
T-BACT Required?	**No**	**No**	**No**	**No**		
Special Permit Conditions?	**No**	**No**	**Yes**	**Yes**		

[1]Prioritization for this unit was not conducted since it has been determined that all diesel-fired IC engines will result in a prioritization score greater than 1.0.
[2]Acute and Chronic Hazard Indices were not calculated since there is no risk factor or the risk factor is so low that it has been determined to be insignificant for this type of unit.
[3]The Acute Hazard Index for this facility has reached the permissible threshold. Before any future projects for this facility may be approved, this must be taken into consideration.

Proposed Permit Conditions

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

Unit #s 1-3 and 2-3

No special conditions are required.

Unit # 3-3

1. The pH value cannot be any lower than 7.5.
2. The quarterly H_2S concentration for the first quarter (January-March) cannot exceed 0.08 mg/l.
3. The quarterly H_2S concentration for the second quarter (April-June) cannot exceed 0.11 mg/l.
4. The quarterly H_2S concentration for the third quarter (July-September) cannot exceed 0.12 mg/l.
5. The quarterly H_2S concentration for the fourth quarter (October-December) cannot exceed 0.09 mg/l.

Unit # 9-0

1. The PM10 emissions rate shall not exceed **0.12** g/bhp-hr based on US EPA certification using ISO 8178 test procedure. [District Rules 2201]
2. The exhaust stack shall vent vertically upward. The vertical exhaust flow shall not be impeded by a rain cap (flapper ok), roof overhang, or any other obstruction. [District Rule 4102]
3. This engine shall be operated only for testing and maintenance of the engine, required regulatory purposes, and during emergency situations. Operation of the engine for maintenance, testing, and required regulatory purposes shall not exceed **50** hours per calendar year. [District Rule 4702 and 17 CCR 93115]

B. RMR REPORT

I. Project Description

Technical Services received a request on March 13, 2012, to perform a Risk Management Review for a proposed modification to a dairy operation. The applicant is proposing to increase the number of cows by 8,564 (5,200 milk cows, 1,040 dry cows, and 2,324 support stock) and install a 1,495 bhp emergency diesel IC engine in the existing milk barn.

II. Analysis

Technical Services performed a prioritization using the District's HEARTs database. Since the total facility prioritization score was greater than one, a refined health risk assessment was required. Emissions calculated using the District's DICE database and District-developed spreadsheets for dairies were input into the HEARTs database. AERMOD was used, with the parameters outlined below and meteorological data for 2005-2009 from Hanford to determine the dispersion factors (i.e., the predicted concentration or X divided by the normalized source strength or Q) for a receptor grid. These dispersion factors were input into the risk assessment module of the Hot Spots Analysis and Reporting Program (HARP) to calculate the chronic and acute hazard indices and the carcinogenic risk for the project.

The following parameters were used for the review:

Analysis Parameters C6817 Project 1120348			
Increase in Cows		8,564	
Total NH3 Increase lb/yr	505,919	**Total NH3 Increase lb/hr**	57.8
Total PM10 Increase lb/yr	9,701	**Total PM10 Increase lb/hr**	1.11

Analysis Parameters Unit 1-3 Milk Parlor (each)			
Source Type	Area	**Location Type**	Rural
Approx. Area (m^2)	3,172.9	**Release Height (m)**	1

Analysis Parameters Unit 2-3 Cow Housing			
Source Type	Area	**Location Type**	Rural
Approx. Area (m^2)	478,683.6	**Release Height (m)**	1

Analysis Parameters Unit 3-3 Liquid Manure Handling			
Source Type	Area	**Location Type**	Rural
Approx. Area (m^2)	108,718.4	**Release Height (m)**	0

Analysis Parameters Unit 9-0 Diesel IC Engine[1]			
Source Type	Point	**Location Type**	Rural
Stack Height (m)	7.26	**Closest Receptor (m)**	1,200
Stack Diameter. (m)	0.31	**Type of Receptor**	Business
Stack Exit Velocity (m/s)	10.51	**Max Hours per Year**	50
Stack Exit Temp. (°K)	758	**Fuel Type**	Diesel

[1] Per the engineer, generic stack parameters pulled from the District's DICE database were used.

Technical Services performed modeling for criteria pollutants NOx, SOx and PM_{10} and $PM_{2.5}$. The emission rates used for criteria pollutant modeling were, 725 lb/yr NOx, and 1 lb/yr SOx. For the PM_{10} and $PM_{2.5}$ emissions: 20 lb/yr PM_{10} and 20 lb/yr $PM_{2.5}$ were emitted from unit 9-0 (emergency diesel IC engine) and 9,701 lb/year PM_{10} and 1,455 lb/year $PM_{2.5}$ were emitted from the unit 3-3 (cow housing).

The results from the Criteria Pollutant Modeling are as follows:

Criteria Pollutant Modeling Results*

Diesel ICE	1 Hour	3 Hours	8 Hours.	24 Hours	Annual
CO	NA[1]	X	NA[1]	X	X
NO_x	NA[1]	X	X	X	Pass
SO_x	NA[1]	NA[1]	X	NA[1]	Pass
PM_{10}	X	X	X	Pass[1,2]	Pass[3]
$PM_{2.5}$	X	X	X	Pass[1,2]	Pass[3]

*Results were taken from the attached PSD spreadsheet.
[1]Unit 9-0 (emergency diesel IC engine) is an intermittent source as defined in APR-1920. In accordance with APR-1920, compliance with short-term (i.e., 1-hour, 3-hour,8-hour and 24-hour) standards is not required.
[2]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.
[3]The District has decided on an interim basis to use a threshold for fugitive dust sources of 2.05 $\mu g/m^3$ for the annual average concentration. There are two sources of PM_{10} and $PM_{2.5}$ for this project; unit 3-3 (cow housing) which emits fugitive PM emissions and unit 9-0 (emergency diesel IC engine) which emits non-fugitive PM emissions. Per District policy, the choice of SIL to use is based on which source has the highest impact on the surrounding area. As seen on the accompanying PSD spreadsheet, the primary contributor is unit 3-3 (cow housing), therefore this project was evaluated against the fugitive SIL, which at the time of this writing was 2.05 $\mu g/m^3$.

III. Conclusion

The acute and chronic indices are below 1.0 and the cancer risk associated with the project is greater than 1.0 in a million, but less than 10 in a million. **Since T-BACT is applied on a unit by unit basis, and all individual units in this project are below the T-BACT threshold (1.0), this project approved <u>without</u> 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 proposed 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.

IV. Attachments

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

APPENDIX E

Draft ATCs (C-6817-1-3, -2-3, -3-3, -4-2, and -5-2)

San Joaquin Valley
Air Pollution Control District

AUTHORITY TO CONSTRUCT

PERMIT NO: C-6817-1-3

ISSUANCE DATE: DRAFT

LEGAL OWNER OR OPERATOR: PHILIP VERWEY FARMS #2
MAILING ADDRESS: 19765 13TH AVE
HANFORD, CA 93230

LOCATION: 19765 13TH AVE
HANFORD, CA 93230

EQUIPMENT DESCRIPTION:
MODIFICATION OF 4,800 COW MILKING OPERATION WITH ONE DOUBLE 52 (104 STALLS) PARALLEL MILKING PARLOR AND ONE HOSPITAL BARN MILKING PARLOR: ADD 5,200 MILK COWS FOR A TOTAL OF 10,000 MILK COWS AND CONSTRUCT AN ADDITIONAL DOUBLE 60 (120 STALLS) PARALLEL MILKING PARLOR

CONDITIONS

1. Authority to Construct (ATC) C-6817-1-2 shall be implemented prior to or concurrently with this ATC. [District Rule 2201]
2. {3215} Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to enter the permittee's premises where a permitted source is located or emissions related activity is conducted, or where records must be kept under condition of the permit. [District Rule 1070]
3. {3216} Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to have access to and copy, at reasonable times, any records that must be kept under the conditions of the permit. [District Rule 1070]
4. {4452} If a licensed veterinarian or a certified nutritionist determines that any VOC mitigation measure will be required to be suspended as a detriment to animal health or necessary for the animal to molt, the owners/operators must notify the District in writing within forty-eight (48) hours of the determination including the duration and the specific health condition requiring the mitigation measure to be suspended. If the situation is expected to exist longer than a thirty-day (30) period, the owner/operator shall submit a new emission mitigation plan designating a mitigation measure to be implemented in lieu of the suspended mitigation measure. [District Rule 4570]
5. Permittee shall flush or hose milk parlor immediately prior to, immediately after, or during each milking. [District Rules 2201 and 4570]

CONDITIONS CONTINUE ON NEXT PAGE

YOU MUST NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (559) 230-5950 WHEN CONSTRUCTION IS COMPLETED AND PRIOR TO OPERATING THE EQUIPMENT OR MODIFICATIONS AUTHORIZED BY THIS AUTHORITY TO CONSTRUCT. This is NOT a PERMIT TO OPERATE. Approval or denial of a PERMIT TO OPERATE will be made after an inspection to verify that the equipment has been constructed in accordance with the approved plans, specifications and conditions of this Authority to Construct, and to determine if the equipment can be operated in compliance with all Rules and Regulations of the San Joaquin Valley Unified Air Pollution Control District. Unless construction has commenced pursuant to Rule 2050, this Authority to Construct shall expire and application shall be cancelled two years from the date of issuance. The applicant is responsible for complying with all laws, ordinances and regulations of all other governmental agencies which may pertain to the above equipment.

Seyed Sadredin, Executive Director / APCO

DRAFT

DAVID WARNER, Director of Permit Services

6. Permittee shall provide verification that milk parlors are flushed or hosed prior to, immediately after, or during each milking. [District Rules 2201 and 4570]

7. {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]

8. {3658} This permit does not authorize the violation of any conditions established for this facility in the Conditional Use Permit (CUP), Special Use Permit (SUP), Site Approval, Site Plan Review (SPR), or other approval documents issued by a local, state, or federal agency. [Public Resources Code 21000-21177: California Environmental Quality Act]

San Joaquin Valley
Air Pollution Control District

AUTHORITY TO CONSTRUCT

DRAFT

PERMIT NO: C-6817-2-3

ISSUANCE DATE: DRAFT

LEGAL OWNER OR OPERATOR: PHILIP VERWEY FARMS #2
MAILING ADDRESS: 19765 13TH AVE
HANFORD, CA 93230

LOCATION: 19765 13TH AVE
HANFORD, CA 93230

EQUIPMENT DESCRIPTION:
MODIFICATION OF MODIFICATION OF COW HOUSING - 4,800 MILK COWS NOT TO EXCEED A COMBINED TOTAL OF 5,760 MATURE COWS (MILK AND DRY); 5,184 TOTAL SUPPORT STOCK (HEIFERS AND CALVES); AND 10 FREESTALLS WITH FLUSH/SCRAPE SYSTEM: INCREASE HERD TO 10,000 MILK COWS NOT TO EXCEED A COMBINED TOTAL OF 12,000 MATURE COWS (MILK AND DRY); 7,508 TOTAL SUPPORT STOCK (HEIFERS, CALVES, AND BULLS)

CONDITIONS

1. Authority to Construct (ATC) C-6817-2-2 shall be implemented prior to or concurrently with this ATC. [District Rule 2201]
2. {3215} Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to enter the permittee's premises where a permitted source is located or emissions related activity is conducted, or where records must be kept under condition of the permit. [District Rule 1070]
3. {3216} Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to have access to and copy, at reasonable times, any records that must be kept under the conditions of the permit. [District Rule 1070]
4. {4452} If a licensed veterinarian or a certified nutritionist determines that any VOC mitigation measure will be required to be suspended as a detriment to animal health or necessary for the animal to molt, the owners/operators must notify the District in writing within forty-eight (48) hours of the determination including the duration and the specific health condition requiring the mitigation measure to be suspended. If the situation is expected to exist longer than a thirty-day (30) period, the owner/operator shall submit a new emission mitigation plan designating a mitigation measure to be implemented in lieu of the suspended mitigation measure. [District Rule 4570]
5. Milk cows shall be housed in freestall barns. [District Rule 2201]

CONDITIONS CONTINUE ON NEXT PAGE

YOU MUST NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (559) 230-5950 WHEN CONSTRUCTION IS COMPLETED AND PRIOR TO OPERATING THE EQUIPMENT OR MODIFICATIONS AUTHORIZED BY THIS AUTHORITY TO CONSTRUCT. This is NOT a PERMIT TO OPERATE. Approval or denial of a PERMIT TO OPERATE will be made after an inspection to verify that the equipment has been constructed in accordance with the approved plans, specifications and conditions of this Authority to Construct, and to determine if the equipment can be operated in compliance with all Rules and Regulations of the San Joaquin Valley Unified Air Pollution Control District. Unless construction has commenced pursuant to Rule 2050, this Authority to Construct shall expire and application shall be cancelled two years from the date of issuance. The applicant is responsible for complying with all laws, ordinances and regulations of all other governmental agencies which may pertain to the above equipment.

Seyed Sadredin, Executive Director / APCO

DRAFT

DAVID WARNER, Director of Permit Services
C-6817-2-3 : May 1 2012 8:25AM – SIONGCOJ : Joint Inspection NOT Required

6. The freestall and corral feed lanes and walkways at this dairy shall be constructed of concrete. [District Rule 2201]
7. All animals at this dairy shall be fed in accordance with the National Research Council (NRC) guidelines utilizing routine dairy nutritionist analyses of rations. [District Rule 2201]
8. 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 1070]
9. At least one of the feedings of the heifers at this dairy shall be near (within one hour of) dusk. [District Rule 2201]
10. Open corrals at this dairy shall be equipped with shade structures. [District Rule 2201]
11. Open corrals and freestall exercise pens shall be scraped weekly using a pull-type scraper in the morning hours, except when this is prevented by wet conditions. [District Rule 2201]
12. Permittee shall maintain records of the frequency of scraping and manure removal from open corrals and freestall exercise pens. [District Rule 2201]
13. The applicant shall establish windbreaks adjacent to and along the entire east side (2,500 ft) of the heifer corrals and 875 ft of windbreaks adjacent to and along the south side of the heifer corrals of the dairy. East windbreaks shall consist of the following rows with the first row closest to the heifer corrals: first row shall consist of Arizona Cypress trees, planted 10 feet apart; and the second row shall consist of Chinese Pistache trees, planted 14 feet apart. South windbreaks shall consist of the following rows with the first row closest to the heifer corrals: first row shall consist of Arizona Cypress trees, planted 10 feet apart; and the second row shall consist of Interior Live Oak trees, planted 20 feet apart. Each row should be offset from the adjacent row. Spacing between rows shall be sufficient to accommodate cultivation equipment, not to exceed 24 feet. [District Rule 2201]
14. Trees/shrubs that are initially planted as part of the windbreak shall have a minimum container size of five gallons. [District Rule 2201]
15. Windbreaks shall be irrigated and maintained for survivability and rapid growth. Dead trees and shrubs shall be replaced as necessary to maintain a windbreak density of 65%. [District Rule 2201]
16. Density is the percentage of the background view that is obscured or hidden when viewing through the windbreak from 60 ft to 100 ft upwind of the rows. [District Rule 2201]
17. Calves (under 3 months) shall be housed in individual calf hutches. [District Rule 2201]
18. 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 2201 and 4570]
19. Freestall feed lanes and walkways shall be flushed four times per day and feed lanes and walkways in the corrals and hutches shall be flushed at least two times per day. [District Rule 2201 and 4570]
20. Permittee shall maintain records sufficient to demonstrate that freestall lanes and walkways are flushed four times per day and feed lanes and walkways in the open corrals and hutches are flushed at least two times per day. [District Rule 2201 and 4570]
21. {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]
22. {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]
23. {4499} Permittee shall inspect water pipes and troughs and repair leaks at least once every seven (7) days. [District Rule 4570]
24. {4500} Permittee shall maintain records demonstrating that water pipes and troughs are inspected and leaks are repaired at least once every seven (7) days. [District Rule 4570]
25. {4501} Permittee shall clean manure from corrals at least four (4) times per year with at least sixty (60) days between each cleaning, or permittee shall clean corrals at least once between April and July and at least once between September and December. [District Rule 4570]

CONDITIONS CONTINUE ON NEXT PAGE

26. {4502} Permittee shall record the date that animal waste is cleaned from corrals or demonstrate that manure from corrals are cleaned at least four (4) times per year with at least sixty (60) days between each cleaning. [District Rule 4570]

27. Permittee shall implement at least one of the following corral mitigation measures: 1) slope the surface of the corrals at least 3% where the available space for each animal is 400 square feet or less and shall slope the surface of the corrals at least 1.5% where the available space for each animal is more than 400 square feet per animal; 2) maintain corrals to ensure proper drainage preventing water from standing more than forty-eight hours; or 3) harrow, rake, or scrape pens sufficiently to maintain a dry surface except during periods of rainy weather. [District Rule 2201 and 4570]

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

29. Permittee shall sprinkle water over at least 48% of area of the unpaved area of the heifer corrals. Sprinkling rate shall match with the local wet soil evaporation rate (70-80% of the local wet pan evaporation rate) to keep sufficient moisture content in the surface of the corrals. Sprinkling of corrals is not required during wet conditions. [District Rule 2201]

30. Sprinklers or water trucks shall be designed to spray the corrals uniformly to prevent inconsistent distribution of water. [District Rule 2201]

31. Permittee shall maintain records of the daily local evaporation rate/soil evaporation rate and the amount of water (inches or cm) applied to the corral surface. Records of sprinkler run time and flow rate may be used to satisfy this requirement. [District Rule 2201]

32. Permittee shall determine the moisture content of at least one of the corrals on a monthly basis from April to October and once every two months from November to March. Two samples should be taken from the corral, one at the midpoint of the sprinkler spray arc or if multiple sprinklers then at the driest midpoint of any of the arcs, and the second farthest from the sprinklers. Successive moisture sampling shall be performed on alternate corrals (e.g., first month - sample corral 1, second month - sample corral 2, etc.). Samples shall be performed by an independent party. [District Rule 2201]

33. Permittee shall install all shade structures uphill of any slope in the corral. [District Rules 2201 and 4570]

34. Inspection for potholes or other sources of emissions shall be performed on a monthly basis. [District Rule 2201]

35. Permittee shall maintain records of pothole inspections. [District Rule 2201]

36. Firm, stable, and not easily eroded soils shall be used for the exercise pens. [District Rule 2201]

37. 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]

38. 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]

39. {4518} Permittee shall manage corrals such that the manure depth in the corral does not exceed twelve (12) inches at any time or point, except for in-corral mounding. Manure depth may exceed 12 inches when corrals become inaccessible due to rain events. However, permittee must resume management of the manure depth of 12 inches or lower immediately upon the corral becoming accessible. [District Rule 4570]

40. {4519} Permittee shall measure and document the depth of manure in the corrals at least once every ninety (90) days. [District Rule 4570]

41. Permittee shall maintain daily records of the number of milk cows and dry cows at this dairy and shall maintain weekly records of the number of cows at the dairy in each of the following categories: large heifers (15 to 24 months of age); medium heifers (7 to 14 months of age); small heifers (3 to 6 months); baby calves (under 3 months); and mature bulls. [District Rule 2201]

42. 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 2201 and 4570]

CONDITIONS CONTINUE ON NEXT PAGE

43. {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]

44. {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: C-6817-3-3

ISSUANCE DATE: DRAFT

LEGAL OWNER OR OPERATOR: PHILIP VERWEY FARMS #2
MAILING ADDRESS: 19765 13TH AVE
HANFORD, CA 93230

LOCATION: 19765 13TH AVE
HANFORD, CA 93230

EQUIPMENT DESCRIPTION:
MODIFICATION OF LIQUID MANURE HANDLING SYSTEM CONSISTING OF FOUR MECHANICAL SEPARATORS; TWO LIFT STATION FLUSH WATER RECYCLING SUMPS; ONE ANAEROBIC TREATMENT LAGOON (2,280' X 255' X 15') AND ONE STORAGE POND; MANURE IS LAND APPLIED THROUGH FLOOD IRRIGATION AND FURROW IRRIGATION: INCREASE HERD TO 10,000 MILK COWS NOT TO EXCEED A COMBINED TOTAL OF 12,000 MATURE COWS (MILK AND DRY); 7,508 TOTAL SUPPORT STOCK (HEIFERS, CALVES, AND BULLS)

CONDITIONS

1. Authority to Construct (ATC) C-6817-3-2 shall be implemented prior to or concurrently with this ATC. [District Rule 2201]
2. {3215} Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to enter the permittee's premises where a permitted source is located or emissions related activity is conducted, or where records must be kept under condition of the permit. [District Rule 1070]
3. {3216} Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to have access to and copy, at reasonable times, any records that must be kept under the conditions of the permit. [District Rule 1070]
4. {4452} If a licensed veterinarian or a certified nutritionist determines that any VOC mitigation measure will be required to be suspended as a detriment to animal health or necessary for the animal to molt, the owners/operators must notify the District in writing within forty-eight (48) hours of the determination including the duration and the specific health condition requiring the mitigation measure to be suspended. If the situation is expected to exist longer than a thirty-day (30) period, the owner/operator shall submit a new emission mitigation plan designating a mitigation measure to be implemented in lieu of the suspended mitigation measure. [District Rule 4570]
5. The pH value cannot be any lower than 7.5. [District Rule District Rule 2201 and 4102]

CONDITIONS CONTINUE ON NEXT PAGE

YOU MUST NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (559) 230-5950 WHEN CONSTRUCTION IS COMPLETED AND PRIOR TO OPERATING THE EQUIPMENT OR MODIFICATIONS AUTHORIZED BY THIS AUTHORITY TO CONSTRUCT. This is NOT a PERMIT TO OPERATE. Approval or denial of a PERMIT TO OPERATE will be made after an inspection to verify that the equipment has been constructed in accordance with the approved plans, specifications and conditions of this Authority to Construct, and to determine if the equipment can be operated in compliance with all Rules and Regulations of the San Joaquin Valley Unified Air Pollution Control District. Unless construction has commenced pursuant to Rule 2050, this Authority to Construct shall expire and application shall be cancelled two years from the date of issuance. The applicant is responsible for complying with all laws, ordinances and regulations of all other governmental agencies which may pertain to the above equipment.

Seyed Sadredin, Executive Director / APCO

DRAFT

DAVID WARNER, Director of Permit Services
C-6817-3-3 : May 1 2012 8:25AM – SIONGCOJ : Joint Inspection NOT Required

6. The average concentration of undissociated hydrogen sulfide (H2S) at the surface of the lagoon(s) and storage pond(s) for the first quarter (January-March) cannot exceed 0.08 mg/l. [District Rule 2201 and 4102]

7. The average concentration of undissociated hydrogen sulfide (H2S) at the surface of the lagoon(s) and storage pond(s) for the second quarter (April-June) cannot exceed 0.11 mg/l. [District Rule 2201 and 4102]

8. The average concentration of undissociated hydrogen sulfide (H2S) at the surface of the lagoon(s) and storage pond(s) for the third quarter (July-September) cannot exceed 0.12 mg/l. [District Rule 2201 and 4102]

9. The average concentration of undissociated hydrogen sulfide (H2S) at the surface of the lagoon(s) and storage pond(s) for the fourth quarter (October-December) cannot exceed 0.09 mg/l. [District Rule 2201 and 4102]

10. The concentration of undissociated H2S at the surface of each lagoon and storage pond shall be calculated using the monitored values for the total sulfide concentration, pH, and temperature. The fraction of total sulfide that is undissociated H2S shall calculated using the formula (10^-pH)/(10^-pH + Ka1), where Ka1 is the temperature-adjusted dissociation constant for H2S; or the procedures outlined in Standard Methods 4500-S2-H; or using other procedures approved by the District. [District Rules 2201 and 4102]

11. The total sulfide concentration, pH, and temperature at the surface of each lagoon and storage pond shall be monitored and recorded at least once every calendar quarter and at other times requested by the District. If the average calculated undissociated H2S concentration from monitoring the lagoon(s) and pond(s) exceeds the maximum allowed concentration, the permittee shall monitor and record the total sulfide concentration, pH, and temperature at the surface of at least two other locations in each lagoon and pond as soon as possible, but no longer than 24 hours after results were available from the initial monitoring indicating a potential exceedance. The undissociated H2S concentration calculated from the initial monitoring locations and the secondary monitoring locations for the lagoons and ponds shall be averaged. If the calculated average concentration of undissociated H2S continues exceed the maximum allowed limit, then the total sulfide concentration, pH, and temperature at the surface of each lagoon and storage pond shall be monitored and recorded monthly until three consecutive months of monitoring show compliance, after which the monitoring frequency may return to quarterly. For each secondary storage pond that has a liquid depth of no greater than 5 feet during the monitoring period, the concentration of undissociated H2S may be considered negligible and monitoring shall not be required. Records of the results of monitoring of the sulfide concentration, pH, and temperature at the surface of each lagoon and storage pond, and the maximum depth of storage ponds during periods the storage ponds are not monitored shall be maintained. The District may also approve alternative monitoring frequencies and/or parameters. [District Rules 2201 and 4102]

12. Monitoring of the total sulfide concentration of lagoons and ponds shall be performed using a sulfide test kit, a sulfide meter, procedures of an accredited lab, Standard Methods 4500-S2; ASTM D4658; USGS Method I-3840; EPA Method 376.2; Marine Pollution Studies Laboratory (MPSL) Standard Operating Procedure for measurement of sulfide; or an alternative method approved by the District. [District Rules 2201 and 4102]

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

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

15. Permittee shall maintain records of design specifications and calculations for the Anaerobic Treatment Lagoon system in order to demonstrate that the system has been designed and is operating in accordance with the applicable National Resource Conservation Service (NRCS) technical guide. [District Rules 1070 and 2201]

16. Liquid manure used for irrigation of cropland shall only be taken from the storage pond/secondary lagoon after treatment in the primary anaerobic treatment lagoon. [District Rule 2201]

17. Permittee shall maintain records that only liquid animal waste treated with an anaerobic treatment lagoon is applied to fields. [District Rules 1070 and 2201]

18. Liquid manure from the storage pond shall be mixed with irrigation water at a ratio in compliance with the facility nutrient management plan and applied to cropland at agronomic rates in accordance with the requirements of Regional Water Quality Control Board. [District Rule 2201]

CONDITIONS CONTINUE ON NEXT PAGE

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

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

21. Installation of an anaerobic digester may be required for this operation contingent upon the final Dairy BACT Guideline. If the final Dairy BACT Guideline requires the installation of an an anaerobic digester for this operation, the permittee shall install the system in accordance with the timeframes and procedures established by the APCO. [District Rule 2201]

22. {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]

23. {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: C-6817-4-2

ISSUANCE DATE: DRAFT

LEGAL OWNER OR OPERATOR: PHILIP VERWEY FARMS #2
MAILING ADDRESS: 19765 13TH AVE
HANFORD, CA 93230

LOCATION: 19765 13TH AVE
HANFORD, CA 93230

EQUIPMENT DESCRIPTION:
MODIFICATION OF SOLID MANURE HANDLING CONSISTING OF MANURE STOCK PILES; SOLID MANURE APPLICATION TO LAND WITH IMMEDIATE INCORPORATION AND MANURE HAULED OFFSITE: INCREASE HERD TO 10,000 MILK COWS NOT TO EXCEED A COMBINED TOTAL OF 12,000 MATURE COWS (MILK AND DRY); 7,508 TOTAL SUPPORT STOCK (HEIFERS, CALVES, AND BULLS)

CONDITIONS

1. Authority to Construct (ATC) C-6817-4-1 shall be implemented prior to or concurrently with this ATC. [District Rule 2201]
2. {3215} Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to enter the permittee's premises where a permitted source is located or emissions related activity is conducted, or where records must be kept under condition of the permit. [District Rule 1070]
3. {3216} Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to have access to and copy, at reasonable times, any records that must be kept under the conditions of the permit. [District Rule 1070]
4. {4452} If a licensed veterinarian or a certified nutritionist determines that any VOC mitigation measure will be required to be suspended as a detriment to animal health or necessary for the animal to molt, the owners/operators must notify the District in writing within forty-eight (48) hours of the determination including the duration and the specific health condition requiring the mitigation measure to be suspended. If the situation is expected to exist longer than a thirty-day (30) period, the owner/operator shall submit a new emission mitigation plan designating a mitigation measure to be implemented in lieu of the suspended mitigation measure. [District Rule 4570]

CONDITIONS CONTINUE ON NEXT PAGE

YOU MUST NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (559) 230-5950 WHEN CONSTRUCTION IS COMPLETED AND PRIOR TO OPERATING THE EQUIPMENT OR MODIFICATIONS AUTHORIZED BY THIS AUTHORITY TO CONSTRUCT. This is NOT a PERMIT TO OPERATE. Approval or denial of a PERMIT TO OPERATE will be made after an inspection to verify that the equipment has been constructed in accordance with the approved plans, specifications and conditions of this Authority to Construct, and to determine if the equipment can be operated in compliance with all Rules and Regulations of the San Joaquin Valley Unified Air Pollution Control District. Unless construction has commenced pursuant to Rule 2050, this Authority to Construct shall expire and application shall be cancelled two years from the date of issuance. The applicant is responsible for complying with all laws, ordinances and regulations of all other governmental agencies which may pertain to the above equipment.

Seyed Sadredin, Executive Director / APCO

DRAFT

DAVID WARNER, Director of Permit Services
C-6817-4-2 : May 1 2012 8:25AM -- SIONGCOJ : Joint Inspection NOT Required

5. {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]

6. Permittee shall keep records of dates when manure is removed from the facility or permittee shall maintain records to demonstrate that dry manure piles outside the pens are covered with a weatherproof covering from October through May. [District Rule 2201 and 4570]

7. {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]

8. Within seventy two (72) hours of removal of separated solids from the drying process, permittee shall either 1) remove separated solids from the facility, or 2) cover separated solids outside the housing with a weatherproof covering from October through May, except for times when wind events remove the covering, not to exceed twenty-four (24) hours per event. [District Rule 2201 and 4570]

9. Permittee shall keep records of dates when separated solids are removed from the facility or permittee shall maintain records to demonstrate that separated solids piles outside the pens are covered with a weatherproof covering from October through May. [District Rule 2201 and 4570]

10. Permittee shall maintain records, such as manufacturer warranties or other documentation, demonstrating that the weatherproof covering over separated solids are installed, used, and maintained in accordance with manufacturer recommendations and applicable standards listed in NRCS Field Office Technical Guide Code 313 or 367, or any other applicable standard approved by the APCO, ARB, and EPA. [District Rule 2201 and 4570]

11. All runoff and leachate from solid manure storage areas shall be directed to the lagoon or other wastewater treatment system. [District Rule 2201]

12. Solid manure applied to fields shall be incorporated into the soil immediately (within two hours) after application. [District Rule 2201]

13. Permittee shall maintain records to demonstrate that all solid manure has been incorporated within 2 hours of land application. [District Rule 2201]

14. {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]

15. {3658} This permit does not authorize the violation of any conditions established for this facility in the Conditional Use Permit (CUP), Special Use Permit (SUP), Site Approval, Site Plan Review (SPR), or other approval documents issued by a local, state, or federal agency. [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: C-6817-5-2

ISSUANCE DATE: DRAFT

LEGAL OWNER OR OPERATOR: PHILIP VERWEY FARMS #2
MAILING ADDRESS: 19765 13TH AVE
HANFORD, CA 93230

LOCATION: 19765 13TH AVE
HANFORD, CA 93230

EQUIPMENT DESCRIPTION:
MODIFICATION OF FEED STORAGE AND HANDLING CONSISTING OF COMMODITY BARNS, AG BAGS, DRY GRAIN TANKS, SILOS, AND SILAGE PILES: INCREASE HERD TO 10,000 MILK COWS NOT TO EXCEED A COMBINED TOTAL OF 12,000 MATURE COWS (MILK AND DRY); 7,508 TOTAL SUPPORT STOCK (HEIFERS, CALVES, AND BULLS)

CONDITIONS

1. Authority to Construct (ATC) C-6817-5-1 shall be implemented prior to or concurrently with this ATC. [District Rule 2201]
2. {3215} Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to enter the permittee's premises where a permitted source is located or emissions related activity is conducted, or where records must be kept under condition of the permit. [District Rule 1070]
3. {3216} Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to have access to and copy, at reasonable times, any records that must be kept under the conditions of the permit. [District Rule 1070]
4. {4616} Mitigation measures that are currently being implemented as required by Phase I of Rule 4570 should continue to be implemented until the mitigation measures required under this permit are implemented. [District Rule 4570]
5. {4452} If a licensed veterinarian or a certified nutritionist determines that any VOC mitigation measure will be required to be suspended as a detriment to animal health or necessary for the animal to molt, the owners/operators must notify the District in writing within forty-eight (48) hours of the determination including the duration and the specific health condition requiring the mitigation measure to be suspended. If the situation is expected to exist longer than a thirty-day (30) period, the owner/operator shall submit a new emission mitigation plan designating a mitigation measure to be implemented in lieu of the suspended mitigation measure. [District Rule 4570]

CONDITIONS CONTINUE ON NEXT PAGE

YOU MUST NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (559) 230-5950 WHEN CONSTRUCTION IS COMPLETED AND PRIOR TO OPERATING THE EQUIPMENT OR MODIFICATIONS AUTHORIZED BY THIS AUTHORITY TO CONSTRUCT. This is NOT a PERMIT TO OPERATE. Approval or denial of a PERMIT TO OPERATE will be made after an inspection to verify that the equipment has been constructed in accordance with the approved plans, specifications and conditions of this Authority to Construct, and to determine if the equipment can be operated in compliance with all Rules and Regulations of the San Joaquin Valley Unified Air Pollution Control District. Unless construction has commenced pursuant to Rule 2050, this Authority to Construct shall expire and application shall be cancelled two years from the date of issuance. The applicant is responsible for complying with all laws, ordinances and regulations of all other governmental agencies which may pertain to the above equipment.

Seyed Sadredin, Executive Director / APCO

DRAFT

DAVID WARNER, Director of Permit Services

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

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

7. 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]

8. Refused feed shall be re-fed or removed from feed lanes on a daily basis. [District Rule 2201]

9. Permittee shall maintain records demonstrating that refused feed is re-fed or removed from feed lanes on a daily basis. [District Rule 2201]

10. {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]

11. {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]

12. {4458} Permittee shall begin feeding total mixed rations within two hours of grinding and mixing rations. [District Rule 4570]

13. {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]

14. Permittee shall store grain in a weatherproof storage structure or under a weatherproof covering from October through May. [District Rule 2201 and 4570]

15. 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 2201 and 4570]

16. {4464} Permittee shall remove uneaten wet feed from feed bunks within twenty-four (24) hours after the end of a rain event. [District Rule 4570]

17. {4465} Permittee shall maintain records demonstrating that uneaten wet feed was removed from feed bunks within twenty-four (24) hours after the end of a rain event. [District Rule 4570]

18. {4468} For bagged silage/feedstuff, permittee shall utilize a sealed feed storage system (e.g., ag bag). [District Rule 4570]

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

20. 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 2201 and 4570]

21. 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 2201 and 4570]

CONDITIONS CONTINUE ON NEXT PAGE

22. {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]

23. {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]

24. {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]

25. {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]

26. {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]

27. {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]

28. {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]

29. {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]

30. {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]

31. {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]

CONDITIONS CONTINUE ON NEXT PAGE

32. {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]

33. {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]

34. {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]

35. {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]

36. {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]

APPENDIX F

Emissions Profile

Application Emissions

Permit #: C-6817-1-3	**Last Updated**	
Facility: PHILIP VERWEY FARMS #2	06/13/2012	SIONGCOJ

Equipment Pre-Baselined: NO

	NOX	SOX	PM10	CO	VOC
Potential to Emit (lb/Yr):	0.0	0.0	0.0	0.0	4000.0
Daily Emis. Limit (lb/Day)	0.0	0.0	0.0	0.0	11.0
Quarterly Net Emissions Change (lb/Qtr)					
Q1:	0.0	0.0	0.0	0.0	520.0
Q2:	0.0	0.0	0.0	0.0	520.0
Q3:	0.0	0.0	0.0	0.0	520.0
Q4:	0.0	0.0	0.0	0.0	520.0
Check if offsets are triggered but exemption applies	N	N	N	N	Y
Offset Ratio					
Quarterly Offset Amounts (lb/Qtr)					
Q1:					
Q2:					
Q3:					
Q4:					

Application Emissions

Permit #: C-6817-2-3	**Last Updated**
Facility: PHILIP VERWEY FARMS #2	06/13/2012 SIONGCOJ

Equipment Pre-Baselined: NO

	NOX	SOX	PM10	CO	VOC
Potential to Emit (lb/Yr):	0.0	0.0	55299.0	0.0	141799.0
Daily Emis. Limit (lb/Day)	0.0	0.0	151.5	0.0	388.5
Quarterly Net Emissions Change (lb/Qtr)					
Q1:	0.0	0.0	4220.0	0.0	16747.0
Q2:	0.0	0.0	4220.0	0.0	16747.0
Q3:	0.0	0.0	4221.0	0.0	16747.0
Q4:	0.0	0.0	4221.0	0.0	16747.0
Check if offsets are triggered but exemption applies	N	N	N	N	Y
Offset Ratio					
Quarterly Offset Amounts (lb/Qtr)					
Q1:					
Q2:					
Q3:					
Q4:					

Application Emissions

Permit #: C-6817-3-3 **Last Updated**
Facility: PHILIP VERWEY FARMS #2 06/13/2012 SIONGCOJ

Equipment Pre-Baselined: NO

	NOX	SOX	PM10	CO	VOC
Potential to Emit (lb/Yr):	0.0	0.0	0.0	0.0	34523.0
Daily Emis. Limit (lb/Day)	0.0	0.0	0.0	0.0	94.6
Quarterly Net Emissions Change (lb/Qtr)					
Q1:	0.0	0.0	0.0	0.0	4089.0
Q2:	0.0	0.0	0.0	0.0	4089.0
Q3:	0.0	0.0	0.0	0.0	4089.0
Q4:	0.0	0.0	0.0	0.0	4089.0
Check if offsets are triggered but exemption applies	N	N	N	N	Y
Offset Ratio					
Quarterly Offset Amounts (lb/Qtr)					
Q1:					
Q2:					
Q3:					
Q4:					

Application Emissions

Permit #: C-6817-4-2	**Last Updated**	
Facility: PHILIP VERWEY FARMS #2	06/13/2012	SIONGCOJ

Equipment Pre-Baselined: NO

	NOX	SOX	PM10	CO	VOC
Potential to Emit (lb/Yr):	0.0	0.0	0.0	0.0	6682.0
Daily Emis. Limit (lb/Day)	0.0	0.0	0.0	0.0	18.3
Quarterly Net Emissions Change (lb/Qtr)					
Q1:	0.0	0.0	0.0	0.0	789.0
Q2:	0.0	0.0	0.0	0.0	790.0
Q3:	0.0	0.0	0.0	0.0	790.0
Q4:	0.0	0.0	0.0	0.0	790.0
Check if offsets are triggered but exemption applies	N	N	N	N	Y
Offset Ratio					
Quarterly Offset Amounts (lb/Qtr)					
Q1:					
Q2:					
Q3:					
Q4:					

Application Emissions

Permit #: C-6817-5-2	**Last Updated**
Facility: PHILIP VERWEY FARMS #2	06/13/2012 SIONGCOJ

Equipment Pre-Baselined: NO

	NOX	SOX	PM10	CO	VOC
Potential to Emit (lb/Yr):	0.0	0.0	0.0	0.0	174567.0
Daily Emis. Limit (lb/Day)	0.0	0.0	0.0	0.0	478.3
Quarterly Net Emissions Change (lb/Qtr)					
Q1:	0.0	0.0	0.0	0.0	17226.0
Q2:	0.0	0.0	0.0	0.0	17227.0
Q3:	0.0	0.0	0.0	0.0	17227.0
Q4:	0.0	0.0	0.0	0.0	17227.0
Check if offsets are triggered but exemption applies	N	N	N	N	Y
Offset Ratio					
Quarterly Offset Amounts (lb/Qtr)					
Q1:					
Q2:					
Q3:					
Q4:					

San Joaquin Valley Air Pollution Control District
Authority to Construct
Application Review
Diesel-Fired Emergency Standby IC Engine

Facility Name:	Paul Verwey Farms #2	Date:	April 19, 2012
Mailing Address:	19765 13th Avenue Hanford, CA 93230	Engineer	Juscelino Siongco
		Lead Engineer:	Martin Keast
Contact Person:	Jason Pausma		
Telephone:	(559) 587-2800		
Application #:	C-6817-9-0		
Project #:	C-1120348		
Complete:	March 27, 2012		

I. Proposal

Philip Verwey Farms #2 is proposing to install a 1,495 bhp (intermittent) diesel-fired emergency standby internal combustion (IC) engine powering an electrical generator.

II. Applicable Rules

Rule 2201 New and Modified Stationary Source Review Rule (4/21/11)
Rule 2520 Federally Mandated Operating Permits (6/21/01)
Rule 4001 New Source Performance Standards (4/14/99)
Rule 4002 National Emission Standards for Hazardous Air Pollutants (5/20/04)
Rule 4101 Visible Emissions (2/17/05)
Rule 4102 Nuisance (12/17/92)
Rule 4201 Particulate Matter Concentration (12/17/92)
Rule 4701 Stationary Internal Combustion Engines – Phase 1 (8/21/03)
Rule 4702 Stationary Internal Combustion Engines (8/18/11)
Rule 4801 Sulfur Compounds (12/17/92)
CH&SC 41700 Health Risk Assessment
CH&SC 42301.6 School Notice
Title 17 CCR, Section 93115 - Airborne Toxic Control Measure (ATCM) for Stationary Compression-Ignition (CI) Engines
California Environmental Quality Act (CEQA)
Public Resources Code 21000-21177: California Environmental Quality Act (CEQA)
California Code of Regulations, Title 14, Division 6, Chapter 3, Sections 15000-15387: CEQA Guidelines

III. Project Location

The project is located at 19765 13th Avenue in Hanford, CA.

IV. Process Description

The emergency standby engine powers an electrical generator. Other than emergency standby operation, the engine may be operated up to 50 hours per year for maintenance and testing purposes.

V. Equipment Listing

C-6817-9-0: 1,495 BHP MTU DETROIT DIESEL MODEL 2000 TIER 2 CERTIFIED DIESEL-FIRED EMERGENCY STANDBY IC ENGINE POWERING AN ELECTRICAL GENERATOR

VI. Emission Control Technology Evaluation

The applicant has proposed to install a Tier 2 certified diesel-fired IC engine that is fired on very low-sulfur diesel fuel (0.0015% by weight sulfur maximum).

The proposed engine(s) meet the latest Tier Certification requirements; therefore, the engine(s) meets the latest ARB/EPA emissions standards for diesel particulate matter, hydrocarbons, nitrogen oxides, and carbon monoxide (see Appendix C for a copy of the emissions data sheet and/or the ARB/EPA executive order).

The use of very low-sulfur diesel fuel (0.0015% by weight sulfur maximum) reduces SO_X emissions by over 99% from standard diesel fuel.

VII. General Calculations

A. Assumptions

Emergency operating schedule:	24 hours/day
Non-emergency operating schedule:	50 hours/year
Density of diesel fuel:	7.1 lb/gal
EPA F-factor (adjusted to 60 °F):	9,051 dscf/MMBtu
Fuel heating value:	137,000 Btu/gal
BHP to Btu/hr conversion:	2,542.5 Btu/bhp-hr
Thermal efficiency of engine:	commonly ≈ 35%
PM_{10} fraction of diesel exhaust:	0.96 (CARB, 1988)

The engine has certified NO_X + VOC emissions of 6.1 g/bhp-hr. It will be assumed the NOx + VOC emission factor is split 95% NOx and 5% VOC (per the District's Carl Moyer program).

B. Emission Factors

Emission Factors		
Pollutant	Emission Factor (g/bhp-hr)	Source
NO_X	4.4	ARB/EPA Certification
SO_X	0.0051	Mass Balance Equation Below
PM_{10}	0.12	ARB/EPA Certification
CO	1.2	ARB/EPA Certification
VOC	0.2	ARB/EPA Certification

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

C. Calculations

1. Pre-Project Emissions (PE1)

Since this is a new emissions unit, PE1 = 0.

2. Post-Project PE (PE2)

The daily and annual PE are calculated as follows:

Pollutant	Emissions Factor (g/bhp-hr)	Rating (bhp)	Daily Hours of Operation (hrs/day)	Annual Hours of Operation (hrs/yr)	Daily PE2 (lb/day)	Annual PE2 (lb/yr)
NO_X	4.40	1495	24	50	**348.0**	**725**
SO_X	0.0051	1495	24	50	**0.4**	**1**
PM_{10}	0.12	1495	24	50	**9.5**	**20**
CO	1.20	1495	24	50	**94.9**	**198**
VOC	0.20	1495	24	50	**15.8**	**33**

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 ATCs or PTOs at the Stationary Source and the quantity of Emission Reduction Credits (ERCs) 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.

SSPE1 is summarized in the following table.

Post-Project Stationary Source Potential to Emit [SSPE1] (lb/year)					
	NO_X	SO_X	PM_{10}	CO	VOC
C-6817-1-3 (Milk Parlor)	0	0	0	0	4,000
C-6817-2-3 (Cow Housing)	0	0	55,299	0	141,799
C-6817-3-3 (Liquid Manure Handling	0	0	0	0	34,523
C-6817-4-2 (Solid Manure Handling)	0	0	0	0	6,682
C-6817-5-2 (Feed Storage and Handling)	0	0	0	0	174,567
Post-Project SSPE (SSPE1)	0	0	55,299	0	361,571

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 ATCs or PTOs, except for emissions units proposed to be shut down as part of the Stationary Project, at the Stationary Source and the quantity of Emission Reduction Credits (ERCs) 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.

For this project the change in emissions for the facility is due to the installation of the new emergency standby IC engine, permit unit -9-0. Thus:

Post-Project Stationary Source Potential to Emit [SSPE2] (lb/year)					
	NO_X	SO_X	PM_{10}	CO	VOC
C-6817-1-3 (Milk Parlor)	0	0	0	0	4,000
C-6817-2-3 (Cow Housing)	0	0	55,299	0	141,799
C-6817-3-3 (Liquid Manure Handling	0	0	0	0	34,523
C-6817-4-2 (Solid Manure Handling)	0	0	0	0	6,682
C-6817-5-2 (Feed Storage and Handling)	0	0	0	0	174,567
C-6817-9-0	725	1	20	198	33

SSPE2 Total	**725**	**1**	**55,319**	**198**	**361,604**
Offset Threshold	**20,000**	**54,750**	**29,200**	**200,000**	**20,000**
Offset Threshold Surpassed?	**No**	**No**	**Yes**	**No**	**Yes**

5. Major Source Determination

Pursuant to Section 3.24 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 3.24.2 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."

This facility does not contain ERCs which have been banked at the source; therefore, no adjustment to SSPE2 is necessary.

Major Source Determination					
Pollutant	SSPE1 (lb/yr)	SSPE2 (lb/yr)	Major Source Threshold (lb/yr)	Existing Major Source?	Becoming a Major Source?
NO_X	0	725	20,000	No	No
SO_X	0	1	140,000	No	No
PM_{10}	0	20	140,000	No	No
CO	0	198	200,000	No	No
VOC	16,659	16,692	20,000	No	No

As seen in the table above, the facility is not an existing Major Source and also is not becoming a Major Source as a result of this project.

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

Since this is a new emissions unit, BE = PE1 = 0 for all criteria pollutants.

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."

As discussed in Section VII.C.5 above, this facility is not a major source for any of the pollutants addressed in this project; therefore, the project does not constitute a SB 288 Major Modification.

8. Federal Major Modification

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

Since this facility is not a Major Source for any 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 E.

VIII. Compliance

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.

As discussed in Section I, the facility is proposing to install a new emergency standby IC engine. Additionally, as determined in Sections VII.C.7 and VII.C.8, this project does not result in an SB288 Major Modification or a Federal Major Modification, respectively. Therefore, BACT can only be triggered if the daily emissions exceed 2.0 lb/day for any pollutant.

The daily emissions from the new engine are compared to the BACT threshold levels in the following table:

New Emissions Unit BACT Applicability				
Pollutant	Daily Emissions for unit -9-0 (lb/day)	BACT Threshold (lb/day)	SSPE2 (lb/yr)	BACT Triggered?
NO_X	348	> 2.0	n/a	Yes
SO_X	0.4	> 2.0	n/a	No
PM_{10}	9.5	> 2.0	n/a	Yes
CO	94.9	> 2.0 and SSPE2 ≥ 200,000 lb/yr	198	No
VOC	15.8	> 2.0	n/a	Yes

As shown above, BACT will be triggered for NO_X, PM_{10}, and VOC emissions from the engine for this project.

2. BACT Guideline

BACT Guideline 3.1.1, which appears in Appendix B of this report, covers diesel-fired emergency IC engines.

3. Top Down BACT Analysis

Per District Policy APR 1305, Section IX, "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 for source categories or classes covered in the BACT Clearinghouse, relevant information under each of the following steps may be simply cited from the Clearinghouse without further analysis."

Pursuant to the attached Top-Down BACT Analysis, which appears in Appendix B of this report, BACT is satisfied with:

NO_X: Latest EPA Tier Certification level for applicable horsepower range
VOC: Latest EPA Tier Certification level for applicable horsepower range
PM_{10}: 0.15 g/hp-hr or the Latest EPA Tier Certification level for applicable horsepower range, whichever is more stringent. (ATCM)

The following condition(s) will be listed on the ATC to ensure compliance with the PM_{10} BACT emissions limit(s):

- Emissions from this IC engine shall not exceed 0.12 g-PM10/bhp-hr based on USEPA certification using ISO 8178 test procedure. [District Rules 2201 and 4102, 17 CCR 93115, 40 CFR Part 60 Subpart IIII]

B. Offsets

Since emergency IC engines are exempt from the offset requirements of Rule 2201, per Section 4.6.2, offsets are not required for this engine, and no offset calculations are required.

C. Public Notification

1. Applicability

Public noticing is required for:

a. New Major Sources, SB288 Major Modifications, Federal Major Modifications

As shown in Sections VII.C.5, VII.C.7, and VII.C.8, this facility is not a new Major Source, not an SB 288 Major Modification, and not a Federal Major Modification, respectively.

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

As calculated in Section VII.C.2, daily emissions for NO_X is greater than 100 lb/day.

c. Any project which results in the offset thresholds being surpassed

As shown in Section VII.C.4, an offset threshold will be surpassed.

d. Any project with a Stationary Source Project Increase in Permitted Emissions (SSIPE) greater than 20,000 lb/year for any pollutant.

For this project, the proposed engine is the only emissions source that will generate an increase in Potential to Emit. Since the proposed engine

emissions are well below 20,000 lb/year for all pollutants (See Section VII.C.2), the SSIPE for this project will be below the public notice threshold.

2. Public Notice Action

As demonstrated above, this project will require public noticing for being a new emissions unit with a Potential to Emit greater than 100 pounds during any one day and surpassing the offset thresholds. Therefore, public notice documents will be submitted to the California Air Resources Board (CARB) and a public notice will be published in a local newspaper of general circulation prior to the issuance of the ATC(s) for this equipment.

D. Daily Emissions Limits

Daily Emissions Limitations (DELs) and other enforceable conditions are required by Section 3.16 to restrict a unit's maximum daily emissions, to a level at or below the emissions associated with the maximum design capacity. Per Sections 3.16.1 and 3.16.2, 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. Therefore, the following conditions will be listed on the ATC to ensure compliance:

- Emissions from this IC engine shall not exceed any of the following limits: 4.4 g-NOx/bhp-hr, 1.2 g-CO/bhp-hr, or 0.2 g-VOC/bhp-hr. [District Rule 2201, 17 CCR 93115, and 40 CFR Part 60 Subpart IIII]

- Emissions from this IC engine shall not exceed 1.2 g-PM10/bhp-hr based on USEPA certification using ISO 8178 test procedure. [District Rules 2201 and 4102, 17 CCR 93115, and 40 CFR Part 60 Subpart IIII]

- Only CARB certified diesel fuel containing not more than 0.0015% sulfur by weight is to be used. [District Rules 2201 and 4801, 17 CCR 93115, and 40 CFR Part 60 Subpart IIII]

E. Compliance Assurance

1. Source Testing

Pursuant to District Policy APR 1705, source testing is not required for emergency standby IC engines to demonstrate compliance with Rule 2201.

2. Monitoring

No monitoring is required to demonstrate compliance with Rule 2201.

3. Recordkeeping

Recordkeeping requirements, in accordance with District Rule 4702, will be discussed in Section VIII, *District Rule 4702*, of this evaluation.

4. Reporting

No reporting is required to ensure compliance with Rule 2201.

F. Ambient Air Quality Analysis (AAQA)

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.

As shown by the AAQA summary sheet in Appendix D, the proposed equipment will not cause or make worse a violation of an air quality standard for NO_X, CO, PM10, or SO_X.

Rule 2520 Federally Mandated Operating Permits

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

Rule 4001 New Source Performance Standards (NSPS)

40 CFR 60 Subpart IIII – Standards of Performance for Stationary Compression Ignition Internal Combustion Engines

The following table demonstrates how the proposed engine(s) will comply with the requirements of 40 CFR Part 60 Subpart IIII.

40 CFR 60 Subpart IIII Requirements for New Emergency IC Engines Powering Generators (2007 and Later Model Year)	Proposed Method of Compliance with 40 CFR 60 Subpart IIII Requirements
Engine(s) must meet the appropriate Subpart IIII emission standards for new engines, based on the model year, size, and number of liters per cylinder.	The applicant has proposed the use of engine(s) that are certified to the latest EPA Tier Certification level for the applicable horsepower range, guaranteeing compliance with the emission standards of Subpart IIII.
Engine(s) must be fired on 500 ppm sulfur content fuel or less, and fuel with a minimum centane index of 40 or a maximum aromatic content of 35 percent by volume. Starting in October 1, 2010, the maximum allowable sulfur fuel content will be lowered to 15 ppm.	The applicant has proposed the use of CARB certified diesel fuel, which meets all of the fuel requirements listed in Subpart IIII. A permit condition enforcing this requirement was included earlier in this evaluation.
The operator/owner must install a non-resettable hour meter prior to startup of the	The applicant has proposed to install a non-resettable hour meter. The following condition will

engine(s).	be included on the permit: • This engine shall be equipped with an operational non-resettable elapsed time meter or other APCO approved alternative. [District Rule 4702, 17 CCR 93115, and 40 CFR 60 Subpart IIII]
Emergency engine(s) may be operated for the purpose of maintenance and testing up to 100 hours per year. There is no limit on emergency use.	The Air Toxic Control Measure for Stationary Compression Ignition Engines (Stationary ATCM) limits this engine maintenance and testing to 50 hours/year. Thus, compliance is expected.
The owner/operator must operate and maintain the engine(s) and any installed control devices according to the manufacturers written instructions.	The following condition will be included on the permit: • This engine shall be operated and maintained in proper operating condition as recommended by the engine manufacturer or emissions control system supplier. [District Rule 4702 and 40 CFR 60 Subpart IIII]

Rule 4002 National Emission Standards for Hazardous Air Pollutants

40 CFR 63 Subpart ZZZZ – National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Emissions (RICE)

Emergency engines are subject to this subpart if they are operated at a major or area source of Hazardous Air Pollutant (HAP) emissions. A major source of HAP emissions is a facility that has the potential to emit any single HAP at a rate of 10 tons/year or greater or any combinations of HAPs at a rate of 25 tons/year or greater. An area source of HAPs is a facility is not a major source of HAPs. The proposed engine(s) are new stationary RICE located at an area source of HAP emissions; therefore, these engines are subject to this Subpart.

40 CFR 63 Subpart ZZZZ requires the following engines to comply with 40 CFR 60 Subpart IIII:

1. New emergency engines located at area sources of HAPs
2. Emergency engines rated less than or equal to 500 bhp and located at major sources of HAPs

The proposed engine(s) will be in compliance with 40 CFR 60 Subpart IIII.

Additionally, 40 CFR 63 Subpart ZZZZ requires engines rated greater 500 bhp and located at major sources of HAPs to meet the notification requirements of §63.6645(h); however, that section only applies if an initial performance test is

required. Since an initial performance test is not required for emergency engines, the notification requirement is not applicable.

The proposed engines are expected to be in compliance with 40 CFR 63 Subpart ZZZZ.

Rule 4101 Visible Emissions

Rule 4101 states that no air contaminant shall be discharged into the atmosphere for a period or periods aggregating more than three minutes in any one hour which is as dark as, or darker than, Ringelmann 1 or 20% opacity. Therefore, the following condition will be listed on the ATC to ensure compliance:

- {15} No air contaminant shall be discharged into the atmosphere for a period or periods aggregating more than three minutes in any one hour which is as dark as, or darker than, Ringelmann 1 or 20% opacity. [District Rule 4101]

Rule 4102 Nuisance

Rule 4102 states that no air contaminant shall be released into the atmosphere which causes a public nuisance. Public nuisance conditions are not expected as a result of these operations, provided the equipment is well maintained. Therefore, the following condition will be listed on the ATC to ensure compliance:

- {98} No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]

California Health & Safety Code 41700 (Health Risk Assessment)

District Policy APR 1905 - Risk Management Policy for Permitting New and Modified Sources (dated 3/2/01) 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. Therefore, a risk management review (RMR) was performed for this project. The RMR results are summarized in the following table, and can be seen in detail in Appendix D.

RMR Results				
Unit	Acute Hazard Index	Chronic Hazard Index	Cancer Risk	T-BACT Required?
C-6817-9-0	N/A	N/A	0.02 in a million	No

The following conditions will be listed on the ATC to ensure compliance with the RMR:

- {1898} The exhaust stack shall vent vertically upward. The vertical exhaust flow shall not be impeded by a rain cap (flapper ok), roof overhang, or any other obstruction. [District Rule 4102]

- Emissions from this IC engine shall not exceed 0.12 g-PM10/bhp-hr based on USEPA certification using ISO 8178 test procedure. [District Rules 2201 and 4102, 17 CCR 93115, 40 CFR Part 60 Subpart IIII]

Rule 4201 Particulate Matter Concentration

Rule 4201 limits particulate matter emissions from any single source operation to 0.1 g/dscf, which, as calculated below, is equivalent to a PM_{10} emission factor of 0.4 g-PM_{10}/bhp-hr.

$$0.1 \quad \frac{grain-PM}{dscf} \times \frac{g}{15.43 grain} \times \frac{1\,Btu_{in}}{0.35\,Btu_{out}} \times \frac{9{,}051 dscf}{10^6\,Btu} \times \frac{2{,}542.5\,Btu}{1\,bhp-hr} \times \frac{0.96 g-PM_{10}}{1 g-PM} = 0.4 \frac{g-PM_{10}}{bhp-hr}$$

The new engine has a PM_{10} emission factor less than 0.4 g/bhp-hr. Therefore, compliance is expected and the following condition will be listed on the ATC:

- {14} Particulate matter emissions shall not exceed 0.1 grains/dscf in concentration. [District Rule 4201]

Rule 4701 Internal Combustion Engines – Phase 1

The purpose of this rule is to limit the emissions of nitrogen oxides (NOx), carbon monoxide (CO), and volatile organic compounds (VOC) from internal combustion engines. Except as provided in Section 4.0, the provisions of this rule apply to any internal combustion engine, rated greater than 50 bhp, that requires a PTO.

The proposed engine(s) are also subject to District Rule 4702, Internal Combustion Engines. Since emissions limits of District Rule 4702 and all other requirements are equivalent or more stringent than District Rule 4701 requirements, compliance with District Rule 4702 requirements will satisfy requirements of District Rule 4701.

Rule 4702 Internal Combustion Engines

The following table demonstrates how the proposed engine(s) will comply with the requirements of District Rule 4702.

District Rule 4702 Requirements Emergency Standby IC Engines	Proposed Method of Compliance with District Rule 4702 Requirements
Operation of emergency standby engines is limited to 100 hours or less per calendar year for non-emergency purposes, verified through the use of a non-resettable elapsed operating time	The Air Toxic Control Measure for Stationary Compression Ignition Engines (Stationary ATCM) limits this engine maintenance and testing to 50 hours/year. Thus, compliance is expected.

meter.	
Emergency standby engines cannot be used to reduce the demand for electrical power when normal electrical power line service has not failed, or to produce power for the electrical distribution system, or in conjunction with a voluntary utility demand reduction program or interruptible power contract.	The following conditions will be included on the permit: • {3807} An emergency situation is an unscheduled electrical power outage caused by sudden and reasonably unforeseen natural disasters or sudden and reasonably unforeseen events beyond the control of the permittee. [District Rule 4702] • {3808} This engine shall not be used to produce power for the electrical distribution system, as part of a voluntary utility demand reduction program, or for an interruptible power contract. [District Rule 4702]
The owner/operator must operate and maintain the engine(s) and any installed control devices according to the manufacturers written instructions.	A permit condition enforcing this requirement was shown earlier in the evaluation.
The owner/operator must monitor the operational characteristics of each engine as recommended by the engine manufacturer or emission control system supplier.	The following condition will be included on the permit: • {3478} During periods of operation for maintenance, testing, and required regulatory purposes, the permittee shall monitor the operational characteristics of the engine as recommended by the manufacturer or emission control system supplier (for example: check engine fluid levels, battery, cables and connections; change engine oil and filters; replace engine coolant; and/or other operational characteristics as recommended by the manufacturer or supplier). [District Rule 4702]
Records of the total hours of operation of the emergency standby engine, type of fuel used, purpose for operating the engine, all hours of non-emergency and emergency operation, and support documentation must be maintained. All records shall be retained for a period of at least five years, shall be readily available, and be made available to the APCO upon request.	The following conditions will be included on the permit: • {3496} The permittee shall maintain monthly records of emergency and non-emergency operation. Records shall include the number of hours of emergency operation, the date and number of hours of all testing and maintenance operations, the purpose of the operation (for example: load testing, weekly testing, rolling blackout, general area power outage, etc.) and records of operational characteristics monitoring. For units with automated testing systems, the operator may, as an alternative to keeping records of actual operation for testing purposes, maintain a readily accessible written record of the automated testing schedule. [District Rule 4702 and 17 CCR 93115]

	• The permittee shall maintain monthly records of the type of fuel purchased. [District Rule 4702 and 17 CCR 93115] • {3475} All records shall be maintained and retained on-site for a minimum of five (5) years, and shall be made available for District inspection upon request. [District Rule 4702 and 17 CCR 93115]

Rule 4801 Sulfur Compounds

Rule 4801 requires that sulfur compound emissions (as SO_2) shall not exceed 0.2% by volume. Using the ideal gas equation, the sulfur compound emissions are calculated as follows:

Volume SO_2 = (n x R x T) ÷ P
n = moles SO_2
T (standard temperature) = 60 °F or 520 °R
R (universal gas constant) = $\frac{10.73\,\text{psi}\cdot\text{ft}^3}{\text{lb}\cdot\text{mol}\cdot{}^\circ\text{R}}$

$$\frac{0.000015\,lb-S}{lb-fuel}\times\frac{7.1\,\text{lb}}{\text{gal}}\times\frac{64\,\text{lb}-SO_2}{32\,\text{lb}-S}\times\frac{1\,\text{MMBtu}}{9{,}051\,\text{scf}}\times\frac{1\,\text{gal}}{0.137\,\text{MMBtu}}\times\frac{\text{lb}-\text{mol}}{64\,\text{lb}-SO_2}\times\frac{10.73\,\text{psi}-\text{ft}^3}{\text{lb}-\text{mol}-{}^\circ\text{R}}\times\frac{520^\circ\text{R}}{14.7\,\text{psi}}\times 1{,}000{,}000 = 1.0\ \text{ppmv}$$

Since 1.0 ppmv is ≤ 2,000 ppmv, this engine is expected to comply with Rule 4801. Therefore, the following condition will be listed on the ATC to ensure compliance:

- Only CARB certified diesel fuel containing not more than 0.0015% sulfur by weight is to be used. [District Rules 2201 and 4801, 17 CCR 93115, and 40 CFR Part 60 Subpart IIII]

California Health & Safety Code 42301.6 (School Notice)

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

Title 17 California Code of Regulations (CCR), Section 93115 - Airborne Toxic Control Measure (ATCM) for Stationary Compression-Ignition (CI) Engines

The following table demonstrates how the proposed engine(s) will comply with the requirements of Title 17 CCR Section 93115.

Title 17 CCR Section 93115 Requirements for New Emergency IC Engines Powering Electrical Generators	**Proposed Method of Compliance with Title 17 CCR Section 93115 Requirements**
Emergency engine(s) must be fired on CARB diesel fuel, or an approved alternative diesel fuel.	The applicant has proposed the use of CARB certified diesel fuel. The proposed permit condition, requiring the use of CARB certified diesel fuel, was included earlier in this evaluation.
The engine(s) must emit diesel PM at a rate less than or equal to 0.15 g/bhp-hr or must meet the diesel PM standard, as specified in the Off-road compression ignition standards for off-road engines with the same maximum rated power (Title 13 CCR, Section 2423).	The applicant has proposed the use of engine(s) that are certified to the latest EPA Tier Certification level for the applicable horsepower range, guaranteeing compliance with the emission standards of Subpart IIII. Additionally, the proposed diesel PM emissions rate is less than or equal to 0.15 g/bhp-hr.
The engine may not be operated more than 50 hours per year for maintenance and testing purposes.	The following condition will be included on the permit: • This engine shall be operated only for testing and maintenance of the engine, required regulatory purposes, and during emergency situations. Operation of the engine for maintenance, testing, and required regulatory purposes shall not exceed 50 hours per calendar year. [District Rule 4702, 17 CCR 93115 and 40 CFR Part 60 Subpart IIII]
New stationary emergency standby diesel-fueled CI engines (> 50 bhp) must meet the standards for off-road engines of the same model year and maximum rated power as specified in the Off-Road Compression Ignition Engine Standards (title 13, CCR, section 2423).	The applicant has proposed the use of engine(s) that are certified to the latest EPA Tier Certification level for the applicable horsepower range.
Engines, with a PM10 emissions rate greater than 0.01 g/bhp-hr and located at schools, may not be operated for maintenance and testing whenever there is a school sponsored activity on the grounds. Additionally, engines located within 500 feet of school grounds may not be operated for maintenance and testing between 7:30 AM and 3:30 PM	The District has verified that this engine is not located within 500' of a school.
An owner or operator shall maintain monthly records of the following: emergency use hours of operation; maintenance and testing hours of operation; hours of operation for emission testing; initial start-up testing hours; hours of operation for all other uses; and the type of fuel used. All records shall be retained for a minimum of 36 months.	Permit conditions enforcing these requirements were shown earlier in the evaluation.

California Environmental Quality Act (CEQA)

The California Environmental Quality Act (CEQA) requires each public agency to adopt objectives, criteria, and specific procedures consistent with CEQA Statutes and the CEQA Guidelines for administering its responsibilities under CEQA, including the orderly evaluation of projects and preparation of environmental documents. The San Joaquin Valley Unified Air Pollution Control District (District) adopted its *Environmental Review Guidelines* (ERG) in 2001. The basic purposes of CEQA are to:

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

The District performed an Engineering Evaluation (this document) for the proposed project and determined that the project qualifies for ministerial approval under the District's Guideline for Expedited Application Review (GEAR). Section 21080 of the Public Resources Code exempts from the application of CEQA those projects over which a public agency exercises only ministerial approval. Therefore, the District finds that this project is exempt from the provisions of CEQA.

IX. Recommendation

Pending a successful NSR Public Noticing period, issue Authority to Construct C-6817-9-0 subject to the permit conditions on the attached draft Authority to Construct in Appendix A.

X. Billing Information

Billing Schedule			
Permit Number	**Fee Schedule**	**Fee Description**	**Fee Amount**
C-6817-9-0	3020-10-F	1,495 bhp IC engine	$749.00

Appendixes

A. Draft ATC and Emissions Profile
B. BACT Guideline and BACT Analysis
C. Emissions Data Sheet
D. HRA Summary and AAQA
E. QNEC Calculations

Appendix A
Draft ATC and Emissions Profile

San Joaquin Valley
Air Pollution Control District

AUTHORITY TO CONSTRUCT

DRAFT

PERMIT NO: C-6817-9-0

ISSUANCE DATE: DRAFT

LEGAL OWNER OR OPERATOR: PHILIP VERWEY FARMS #2
MAILING ADDRESS: 19765 13TH AVE
HANFORD, CA 93230

LOCATION: 19765 13TH AVE
HANFORD, CA 93230

EQUIPMENT DESCRIPTION:
1495 BHP (INTERMITTENT) MTU DETROIT DIESEL MODEL 2000 S/N 5362004806 TIER 2 CERTIFIED DIESEL-FIRED EMERGENCY STANDBY IC ENGINE POWERING AN ELECTRICAL GENERATOR

CONDITIONS

1. {14} Particulate matter emissions shall not exceed 0.1 grains/dscf in concentration. [District Rule 4201]
2. {15} No air contaminant shall be discharged into the atmosphere for a period or periods aggregating more than three minutes in any one hour which is as dark as, or darker than, Ringelmann 1 or 20% opacity. [District Rule 4101]
3. {98} No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]
4. {1898} The exhaust stack shall vent vertically upward. The vertical exhaust flow shall not be impeded by a rain cap (flapper ok), roof overhang, or any other obstruction. [District Rule 4102]
5. {4257} This engine shall be equipped with an operational non-resettable elapsed time meter or other APCO approved alternative. [District Rule 4702, 17 CCR 93115, and 40 CFR 60 Subpart IIII]
6. {4258} Only CARB certified diesel fuel containing not more than 0.0015% sulfur by weight is to be used. [District Rules 2201 and 4801, 17 CCR 93115, 40 CFR Part 60 Subpart IIII]
7. Emissions from this IC engine shall not exceed any of the following limits: 4.4 g-NOx/bhp-hr, 1.2 g-CO/bhp-hr, or 0.2 g-VOC/bhp-hr. [District Rule 2201, 17 CCR 93115, and 40 CFR Part 60 Subpart IIII]
8. Emissions from this IC engine shall not exceed 0.12 g-PM10/bhp-hr based on USEPA certification using ISO 8178 test procedure. [District Rules 2201 and 4102, 17 CCR 93115, and 40 CFR Part 60 Subpart IIII]
9. {4261} This engine shall be operated and maintained in proper operating condition as recommended by the engine manufacturer or emissions control system supplier. [District Rule 4702 and 40 CFR 60 Subpart IIII]

CONDITIONS CONTINUE ON NEXT PAGE

YOU MUST NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (559) 230-5950 WHEN CONSTRUCTION IS COMPLETED AND PRIOR TO OPERATING THE EQUIPMENT OR MODIFICATIONS AUTHORIZED BY THIS AUTHORITY TO CONSTRUCT. This is NOT a PERMIT TO OPERATE. Approval or denial of a PERMIT TO OPERATE will be made after an inspection to verify that the equipment has been constructed in accordance with the approved plans, specifications and conditions of this Authority to Construct, and to determine if the equipment can be operated in compliance with all Rules and Regulations of the San Joaquin Valley Unified Air Pollution Control District. Unless construction has commenced pursuant to Rule 2050, this Authority to Construct shall expire and application shall be cancelled two years from the date of issuance. The applicant is responsible for complying with all laws, ordinances and regulations of all other governmental agencies which may pertain to the above equipment.

Seyed Sadredin, Executive Director / APCO

DRAFT

DAVID WARNER, Director of Permit Services
C-6817-9-0 : Apr 19 2012 1:17PM – SIONGCOJ : Joint Inspection NOT Required

10. {3478} During periods of operation for maintenance, testing, and required regulatory purposes, the permittee shall monitor the operational characteristics of the engine as recommended by the manufacturer or emission control system supplier (for example: check engine fluid levels, battery, cables and connections; change engine oil and filters; replace engine coolant; and/or other operational characteristics as recommended by the manufacturer or supplier). [District Rule 4702]

11. {3807} An emergency situation is an unscheduled electrical power outage caused by sudden and reasonably unforeseen natural disasters or sudden and reasonably unforeseen events beyond the control of the permittee. [District Rule 4702]

12. {3808} This engine shall not be used to produce power for the electrical distribution system, as part of a voluntary utility demand reduction program, or for an interruptible power contract. [District Rule 4702]

13. {3496} The permittee shall maintain monthly records of emergency and non-emergency operation. Records shall include the number of hours of emergency operation, the date and number of hours of all testing and maintenance operations, the purpose of the operation (for example: load testing, weekly testing, rolling blackout, general area power outage, etc.) and records of operational characteristics monitoring. For units with automated testing systems, the operator may, as an alternative to keeping records of actual operation for testing purposes, maintain a readily accessible written record of the automated testing schedule. [District Rule 4702 and 17 CCR 93115]

14. {4262} This engine shall be operated only for testing and maintenance of the engine, required regulatory purposes, and during emergency situations. Operation of the engine for maintenance, testing, and required regulatory purposes shall not exceed 50 hours per calendar year. [District Rule 4702, 17 CCR 93115 and 40 CFR Part 60 Subpart IIII]

15. {4263} The permittee shall maintain monthly records of the type of fuel purchased. [District Rule 4702 and 17 CCR 93115]

16. {3475} All records shall be maintained and retained on-site for a minimum of five (5) years, and shall be made available for District inspection upon request. [District Rule 4702 and 17 CCR 93115]

Application Emissions

Permit #: C-6817-9-0	**Last Updated**	
Facility: PHILIP VERWEY FARMS #2	06/13/2012	SIONGCOJ

Equipment Pre-Baselined: NO

	NOX	SOX	PM10	CO	VOC
Potential to Emit (lb/Yr):	725.0	1.0	20.0	198.0	33.0
Daily Emis. Limit (lb/Day)	348.0	0.4	9.5	94.9	15.8
Quarterly Net Emissions Change (lb/Qtr)					
Q1:	181.0	0.0	5.0	49.0	8.0
Q2:	181.0	0.0	5.0	49.0	8.0
Q3:	181.0	0.0	5.0	50.0	8.0
Q4:	182.0	1.0	5.0	50.0	9.0
Check if offsets are triggered but exemption applies	N	N	N	N	Y
Offset Ratio					
Quarterly Offset Amounts (lb/Qtr)					
Q1:					
Q2:					
Q3:					
Q4:					

Appendix B
BACT Guideline and BACT Analysis

San Joaquin Valley
Unified Air Pollution Control District

Best Available Control Technology (BACT) Guideline 3.1.1
Last Update: 7/10/2009
Emergency Diesel IC Engine

Pollutant	Achieved in Practice or in the SIP	Technologically Feasible	Alternate Basic Equipment
CO	Latest EPA Tier Certification level for applicable horsepower range		
NOX	Latest EPA Tier Certification level for applicable horsepower range		
PM10	0.15 g/hp-hr or the Latest EPA Tier Certification level for applicable horsepower range, whichever is more stringent. (ATCM)		
SOX	Very low sulfur diesel fuel (15 ppmw sulfur or less)		
VOC	Latest EPA Tier Certification level for applicable horsepower range		

BACT is the most stringent control technique for the emissions unit and class of source. Control techniques that are not achieved in practice or contained in a state implementation plan must be cost effective as well as feasible. Economic analysis to demonstrate cost effectiveness is required for all determinations that are not achieved in practice or contained in an EPA approved State Implementation Plan.

Top Down BACT Analysis for the Emergency IC Engine(s)

BACT Guideline 3.1.1 (July 10, 2009) applies to emergency diesel IC engines. In accordance with the District BACT policy, information from that guideline will be utilized without further analysis.

1. **BACT Analysis for NO_X, and VOC:**
   (delete pollutants for which BACT is not required)

   a. Step 1 - Identify all control technologies

   BACT Guideline 3.1.1 identifies only the following option:

   - *Latest EPA Tier Certification level for applicable horsepower range*

   To determine the latest applicable Tier level, the following EPA and state regulations were consulted:

   - 40 CFR Part 60 Subpart IIII – Standards of Performance for Stationary Compression Ignition Internal Combustion Engines
   - 40 CFR Part 89 – Control of Emissions from New and In-Use Nonroad Compression – Ignition Engines
   - 40 CFR Part 1039 – Control of Emissions from New and In-Use Nonroad Compression-Ignition Engines
   - Title 17 CCR, Section 93115 - Airborne Toxic Control Measure (ATCM) for Stationary Compression-Ignition (CI) Engines

   40 CFR Parts 89 and 1039, which apply only to nonroad engines, do not directly apply because the proposed emergency engine(s) do not meet the definition of a nonroad engine. Therefore, only Title 17 CCR, Section 93115 and 40 CFR Part 60 Subpart IIII apply directly to the proposed emergency engine(s).

   Title 17 CCR, Section 93115.6(a)(3)(A) (CARB stationary diesel engine ATCM) applies to emergency standby diesel-fired engines and requires that such engines be certified to the emission levels in Table 1 (below). Please note that these levels are at least as stringent or more stringent than the emission levels in 40 CFR Subpart IIII.

Table 1: Emission Standards for New Stationary Emergency Standby Diesel-Fueled CI Engines g/bhp-hr (g/kW-hr)					
Maximum Engine Power	**Tier**	**Model Year(s)**	**PM**	**NMHC+NOx**	**CO**
50 ≤ HP < 75 (37 ≤ kW < 56)	2	2007	0.15 (0.20)	5.6 (7.5)	3.7 (5.0)
	4i	2008+		3.5 (4.7)	
75 ≤ HP < 100 (56 ≤ kW < 75)	2	2007	0.15 (0.20)	5.6 (7.5)	3.7 (5.0)
	3	2008+		3.5 (4.7)	
100 ≤ HP < 175 (75 ≤ kW < 130)	3	2007	0.15 (0.20)	3.0 (4.0)	3.7 (5.0)
		2008+			
175 ≤ HP < 300 (130 ≤ kW < 225)	3	2007	0.15 (0.20)	3.0 (4.0)	2.6 (3.5)
		2008+			
300 ≤ HP < 600 (225 ≤ kW < 450)	3	2007	0.15 (0.20)	3.0 (4.0)	2.6 (3.5)
		2008+			
600 ≤ HP ≤ 750 (450 ≤ kW ≤ 560)	3	2007	0.15 (0.20)	3.0 (4.0)	2.6 (3.5)
		2008+			
HP > 750 (kW > 560)	2	2007	0.15 (0.20)	4.8 (6.4)	2.6 (3.5)
		2008+			

Additionally, 40 CFR Subpart IIII establishes emission standards for emergency diesel IC engines. These emission standards are the same as those specified in the CARB ATCM, except for engines rated greater than or equal to 50 and less than 75 hp. For such IC engines, the CARB ATCM is more stringent.

Therefore, the most stringent applicable emission standards are those listed in the CARB ATCM (Table 1).

For IC engines rated greater than or equal to 50 hp and less than 75 hp the the higherst Tier required is Tier 4i. For IC engines rated greater than or equal to 75 hp and less than 750 hp the highest Tier reqired is Tier 3. For engines rated equal to or greater than 750 hp the highest Tier required is Tier 2.

Also, please note that neither the state ATCM nor the Code of Federal Regulations require the installation of IC engines meeting a higher Tier standard than those listed above for emergency applications, due to concerns regarding the effectiveness of the exhaust emissions controls during periods of short-term operation (such as testing operational readiness of an emergency engine).

{For engines rated > 750 bhp use the following, otherwise delete}
The proposed engine(s) is/are rated at 1,495 hp. Therefore, the applicable control technology option is EPA Tier 2 certification.

b. Step 2 - Eliminate technologically infeasible options

The control option listed in Step 1 is not technologically infeasible.

c. Step 3 - Rank remaining options by control effectiveness

No ranking needs to be done because there is only one control option listed in Step 1.

d. Step 4 - Cost Effectiveness Analysis

The applicant has proposed the only control option remaining under consideration. Therefore, a cost effectiveness analysis is not required.

e. Step 5 - Select BACT

BACT for NOx, and VOC will be the use of an EPA Tier 2 certified engine. The applicant is proposing such a unit. Therefore, BACT will be satisfied.

2. BACT Analysis for PM_{10} Emissions:

a. Step 1 - Identify all control technologies

BACT Guideline 3.1.1 identifies only the following option:

- *0.15 g/bhp-hr or the Latest EPA Tier Certification level for applicable horsepower range, whichever is more stringent. (ATCM)*

The latest EPA Tier Certification level for an engine of the proposed model year and horsepower rating is Tier 2/3. Refer to the Top-Down BACT analysis for NOx for a discussion regarding the determination of the EPA Tier level to be considered.

Please note Tier 2 or 3 IC engines do not have a PM emission standard that is more stringent than 0.15 g/hp-hr. Additionally, the ATCM requires a PM emission standard of 0.15 g/hp-hr for all new emergency diesel IC engines.

Therefore, a PM/PM10 emission standard of 0.15 g/hp-hr is required as BACT.

b. Step 2 - Eliminate technologically infeasible options

The control option listed in Step 1 is not technologically infeasible.

c. Step 3 - Rank remaining options by control effectiveness

No ranking needs to be done because there is only one control option listed in Step 1.

d. Step 4 - Cost Effectiveness Analysis

The applicant has proposed the only control option remaining under consideration. Therefore, a cost effectiveness analysis is not required.

e. Step 5 - Select BACT

BACT for PM10 is emissions of 0.15 g/hp-hr or less. The applicant is proposing an engine that meets this requirement. Therefore, BACT will be satisfied.

Appendix C
Emissions Data Sheet

California Environmental Protection Agency AIR RESOURCES BOARD	MTU DETROIT DIESEL, INC.	EXECUTIVE ORDER U-R-052-0008 New Off-Road Compression-Ignition Engines

Pursuant to the authority vested in the Air Resources Board by Sections 43013, 43018, 43101, 43102, 43104 and 43105 of the Health and Safety Code; and

Pursuant to the authority vested in the undersigned by Sections 39515 and 39516 of the Health and Safety Code and Executive Order G-02-003;

IT IS ORDERED AND RESOLVED: That the following compression-ignition engines and emission control systems produced by the manufacturer are certified as described below for use in off-road equipment. Production engines shall be in all material respects the same as those for which certification is granted.

MODEL YEAR	ENGINE FAMILY	DISPLACEMENT (liters)	FUEL TYPE	USEFUL LIFE (hours)
2009	9MDDL31.8XRR	23.9, 31.8	Diesel	8000

SPECIAL FEATURES & EMISSION CONTROL SYSTEMS	TYPICAL EQUIPMENT APPLICATION
Direct Diesel Injection, Engine Control Module, Turbocharger, Charge Air Cooler	Crane, Loader, Tractor, Pump, Compressor, Genset

The engine models and codes are attached.

The following are the exhaust certification standards (STD) and certification levels (CERT) for hydrocarbons (HC), oxides of nitrogen (NOx), or non-methane hydrocarbons plus oxides of nitrogen (NMHC+NOx), carbon monoxide (CO), and particulate matter (PM) in grams per kilowatt-hour (g/kW-hr), and the opacity-of-smoke certification standards and certification levels in percent (%) during acceleration (Accel), lugging (Lug), and the peak value from either mode (Peak) for this engine family (Title 13, California Code of Regulations, (13 CCR) Section 2423):

RATED POWER CLASS	EMISSION STANDARD CATEGORY		EXHAUST (g/kW-hr)					OPACITY (%)		
			HC	NOx	NMHC+NOx	CO	PM	ACCEL	LUG	PEAK
kW > 560	Tier 2	STD	N/A	N/A	6.4	3.5	0.20	20	15	50
		CERT	–	–	6.1	1.6	0.16	8	3	10

BE IT FURTHER RESOLVED: That for the listed engine models, the manufacturer has submitted the information and materials to demonstrate certification compliance with 13 CCR Section 2424 (emission control labels), and 13 CCR Sections 2425 and 2426 (emission control system warranty).

Engines certified under this Executive Order must conform to all applicable California emission regulations.

This Executive Order is only granted to the engine family and model-year listed above. Engines in this family that are produced for any other model-year are not covered by this Executive Order.

Executed at El Monte, California on this 16 day of January 2009.

Annette Hebert, Chief
Mobile Source Operations Division

ATTACHMENT
EO# V-R-052-0008

Engine Family	1.Engine Code	2.Engine Model	3.BHP@RPM (SAE Gross)	4.Fuel Rate: mm/stroke @ peak HP (for diesel only)	5.Fuel Rate: (lbs/hr) @ peak HP (for diesels only)	6.Torque @ RPM (SEA Gross)	7.Fuel Rate: mm/stroke@peak torque	8.Fuel Rate: (lbs/hr)@peak torque	9.Emission Control Device Per SAE J1930
1DDL31.8XRR	5492	16V-2000 S	1500 @ 2100	295	547	4429 @ 1500	331	440	DFI, TC, CAC, ECM
1DDL31.8XRR	5541	16V-2000 S12	1050 @ 2100	219	407	3290 @ 1350	242	289	DFI, TC, CAC,
1DDL31.8XRR	5542	16V-2000 SCCC	1050 @ 1800	237	407	3290 @ 1350	242	289	DFI, TC, CAC,
1DDL31.8XRR	5543	16V-2000 S12R	1205 @ 1800	270	428	3905 @ 1500	288	383	DFI, TC, CAC,
1DDL31.8XRR	5544	16V-2000 S52R	1205 @ 2100	249	461	3905 @ 1500	288	383	DFI, TC, CAC,
1DDL31.8XRR	5545	16V-2000 S52	1340 @ 2100	267	495	3905 @ 1500	288	383	DFI, TC, CAC,
1DDL31.8XRR	5365	12V-2000 S92R	760 @ 2100	207	288	2277 @ 1350	223	201	DFI, TC, CAC,
1DDL31.8XRR	5568	12V-2000 S/C	760 @ 2100	210	293	2452 @ 1350	249	224	DFI, TC, CAC,
1DDL31.8XRR	5569	12V-2000 S12	850 @ 2100	232	324	2762 @ 1500	278	277	DFI, TC, CAC,
1DDL31.8XRR	5570	12V-2000 C22R	905 @ 2100	247	345	2946 @ 1500	296	295	DFI, TC, CAC,
1DDL31.8XRR	5571	12V-2000 C22	1005 @ 2100	273	381	3014 @ 1500	302	301	DFI, TC, CAC,
1DDL31.8XRR	5549	12V-2000 G84 3D	1120@ 1800	330	374	NA	NA	NA	DFI, TC, CAC,
1DDL31.8XRR	5547	12V-2000 G44 3D	986 @ 1800	300	341	NA	NA	NA	DFI, TC, CAC,
1DDL31.8XRR	5548	12V-2000 G84 3B	1021 @ 1800	308	350	NA	NA	NA	DFI, TC, CAC,
1DDL31.8XRR	5546	12V-2000 G44 3B	896 @ 1800	280	314	NA	NA	NA	DFI, TC, CAC,
1DDL31.8XRR	5552	12V-2000 G84 3B	1021 @ 1800	308	350	NA	NA	NA	DFI, TC, CAC,
1DDL31.8XRR	5553	12V-2000 G84 3D	1120 @ 1800	330	374	NA	NA	NA	DFI, TC, CAC,
1DDL31.8XRR	5567	12V-2000 G84L	1234 @ 1800	367	417	NA	NA	NA	DFI, TC, CAC,
1DDL31.8XRR	5550	12V-2000 G44 3B	896 @ 1800	280	313	NA	NA	NA	DFI, TC, CAC,
1DDL31.8XRR	5551	12V-2000 G44 3D	986 @ 1800	300	342	NA	NA	NA	DFI, TC, CAC,
1DDL31.8XRR	5556	16V-2000 G44 3D	1354 @ 1800	306	467	NA	NA	NA	DFI, TC, CAC,
1DDL31.8XRR	5557	16V-2000 G84 3D	1495 @ 1800	333	508	NA	NA	NA	DFI, TC, CAC,
1DDL31.8XRR	5558	16V-2000 G44 3B	1227 @ 1800	285	433	NA	NA	NA	DFI, TC, CAC,
1DDL31.8XRR	5559	16V-2000 G84 3B	1354 @ 1800	306	467	NA	NA	NA	DFI, TC, CAC,
1DDL31.8XRR	7047	12V-2000 P12	805 @ 1800	241	290	3500@1800	262	263	DFI, TC, CAC,
1DDL31.8XRR	7048	12V-2000 P92R	905 @ 1800	267	321	4010@1800	294	295	DFI, TC, CAC,
1DDL31.8XRR	7049	12V-2000 P92	1057 @ 2100	280	393	4010@2100	299	300	DFI, TC, CAC,
1DDL31.8XRR	7050	16V-2000 P12	1073 @ 1800	241	297	4770@1800	261	330	DFI, TC, CAC,

Appendix D
HRA Summary and AAQA

San Joaquin Valley Air Pollution Control District
Risk Management Review

To:	Joe Siongco – Permit Services
From:	Yu Vu – Technical Services
Date:	March 21, 2012
Facility Name:	Philip Verwey Farms #2
Location:	19765 13th Ave. Hanford, CA 93230
Application #(s):	C-6817-1-3, -2-3, -3-3, -4-2, -5-2, and -9-0
Project #:	C-1120348

A. RMR SUMMARY

RMR Summary						
Categories	**Milking Parlor (Unit 1-3)**	**Cow Housing (Unit 2-3)**	**Liquid Manure Handling (Unit 3-3)**	**Diesel ICE (Unit 9-0)**	**Project Totals**	**Facility Totals**
Prioritization Score	0.01	0.54	0.51	N/A[1]	>1	>1
Acute Hazard Index	0.02	0.67	0.31	N/A[2]	1.00	1.00[3]
Chronic Hazard Index	0.00	0.06	0.01	N/A[2]	0.07	0.07
Maximum Individual Cancer Risk (10^{-6})	0.01	0.85	0.77	0.02	1.65	1.65
T-BACT Required?	**No**	**No**	**No**	**No**		
Special Permit Conditions?	**No**	**No**	**Yes**	**Yes**		

[1]Prioritization for this unit was not conducted since it has been determined that all diesel-fired IC engines will result in a prioritization score greater than 1.0.
[2]Acute and Chronic Hazard Indices were not calculated since there is no risk factor or the risk factor is so low that it has been determined to be insignificant for this type of unit.
[3]The Acute Hazard Index for this facility has reached the permissible threshold. Before any future projects for this facility may be approved, this must be taken into consideration.

Proposed Permit Conditions

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

Unit #s 1-3 and 2-3

No special conditions are required.

Unit # 3-3

1. The pH value cannot be any lower than 7.5.
2. The quarterly H_2S concentration for the first quarter (January-March) cannot exceed 0.08 mg/l.
3. The quarterly H_2S concentration for the second quarter (April-June) cannot exceed 0.11 mg/l.
4. The quarterly H_2S concentration for the third quarter (July-September) cannot exceed 0.12 mg/l.
5. The quarterly H_2S concentration for the fourth quarter (October-December) cannot exceed 0.09 mg/l.

Unit # 9-0

1. The PM10 emissions rate shall not exceed **0.12** g/bhp-hr based on US EPA certification using ISO 8178 test procedure. [District Rules 2201]
2. The exhaust stack shall vent vertically upward. The vertical exhaust flow shall not be impeded by a rain cap (flapper ok), roof overhang, or any other obstruction. [District Rule 4102]
3. This engine shall be operated only for testing and maintenance of the engine, required regulatory purposes, and during emergency situations. Operation of the engine for maintenance, testing, and required regulatory purposes shall not exceed **50** hours per calendar year. [District Rule 4702 and 17 CCR 93115]

B. RMR REPORT

I. Project Description

Technical Services received a request on March 13, 2012, to perform a Risk Management Review for a proposed modification to a dairy operation. The applicant is proposing to increase the number of cows by 8,564 (5,200 milk cows, 1,040 dry cows, and 2,324 support stock) and install a 1,495 bhp emergency diesel IC engine in the existing milk barn.

II. Analysis

Technical Services performed a prioritization using the District's HEARTs database. Since the total facility prioritization score was greater than one, a refined health risk assessment was required. Emissions calculated using the District's DICE database and District-developed spreadsheets for dairies were input into the HEARTs database. AERMOD was used, with the parameters outlined below and meteorological data for 2005-2009 from Hanford to determine the dispersion factors (i.e., the predicted concentration or X divided by the normalized source strength or Q) for a receptor grid. These dispersion factors were input into the risk assessment module of the Hot Spots Analysis and Reporting Program (HARP) to calculate the chronic and acute hazard indices and the carcinogenic risk for the project.

The following parameters were used for the review:

Analysis Parameters C6817 Project 1120348			
Increase in Cows		8,564	
Total NH3 Increase lb/yr	505,919	**Total NH3 Increase lb/hr**	57.8
Total PM10 Increase lb/yr	9,701	**Total PM10 Increase lb/hr**	1.11

Analysis Parameters Unit 1-3 Milk Parlor (each)			
Source Type	Area	**Location Type**	Rural
Approx. Area (m^2)	3,172.9	**Release Height (m)**	1

Analysis Parameters Unit 2-3 Cow Housing			
Source Type	Area	**Location Type**	Rural
Approx. Area (m^2)	478,683.6	**Release Height (m)**	1

Analysis Parameters Unit 3-3 Liquid Manure Handling			
Source Type	Area	**Location Type**	Rural
Approx. Area (m^2)	108,718.4	**Release Height (m)**	0

Analysis Parameters Unit 9-0 Diesel IC Engine[1]			
Source Type	Point	**Location Type**	Rural
Stack Height (m)	7.26	**Closest Receptor (m)**	1,200
Stack Diameter. (m)	0.31	**Type of Receptor**	Business
Stack Exit Velocity (m/s)	10.51	**Max Hours per Year**	50
Stack Exit Temp. (°K)	758	**Fuel Type**	Diesel

[1] Per the engineer, generic stack parameters pulled from the District's DICE database were used.

Technical Services performed modeling for criteria pollutants NOx, SOx and PM_{10} and $PM_{2.5}$. The emission rates used for criteria pollutant modeling were, 725 lb/yr NOx, and 1 lb/yr SOx. For the PM_{10} and $PM_{2.5}$ emissions: 20 lb/yr PM_{10} and 20 lb/yr $PM_{2.5}$ were emitted from unit 9-0 (emergency diesel IC engine) and 9,701 lb/year PM_{10} and 1,455 lb/year $PM_{2.5}$ were emitted from the unit 3-3 (cow housing).

The results from the Criteria Pollutant Modeling are as follows:

Criteria Pollutant Modeling Results*

Diesel ICE	1 Hour	3 Hours	8 Hours.	24 Hours	Annual
CO	NA[1]	X	NA[1]	X	X
NO_x	NA[1]	X	X	X	Pass
SO_x	NA[1]	NA[1]	X	NA[1]	Pass
PM_{10}	X	X	X	Pass[1,2]	Pass[3]
$PM_{2.5}$	X	X	X	Pass[1,2]	Pass[3]

*Results were taken from the attached PSD spreadsheet.
[1]Unit 9-0 (emergency diesel IC engine) is an intermittent source as defined in APR-1920. In accordance with APR-1920, compliance with short-term (i.e., 1-hour, 3-hour,8-hour and 24-hour) standards is not required.
[2]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.
[3]The District has decided on an interim basis to use a threshold for fugitive dust sources of 2.05 $\mu g/m^3$ for the annual average concentration. There are two sources of PM_{10} and $PM_{2.5}$ for this project; unit 3-3 (cow housing) which emits fugitive PM emissions and unit 9-0 (emergency diesel IC engine) which emits non-fugitive PM emissions. Per District policy, the choice of SIL to use is based on which source has the highest impact on the surrounding area. As seen on the accompanying PSD spreadsheet, the primary contributor is unit 3-3 (cow housing), therefore this project was evaluated against the fugitive SIL, which at the time of this writing was 2.05 $\mu g/m^3$.

III. Conclusion

The acute and chronic indices are below 1.0 and the cancer risk associated with the project is greater than 1.0 in a million, but less than 10 in a million. **Since T-BACT is applied on a unit by unit basis, and all individual units in this project are below the T-BACT threshold (1.0), this project approved <u>without</u> 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 proposed 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.

IV. Attachments

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

Appendix E
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 - PE1, where:

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

Since this is a new unit, PE1 = 0 for all pollutants. Thus, QNEC = PE2 (lb/qtr).

Using the PE2 (lb/yr) values calculated in Section VII.C.2, Quarterly PE2 is calculated as follows:

$PE2_{quarterly}$ = PE2 (lb/yr) ÷ 4 quarters/year = QNEC

QNEC		
Pollutant	PE2 Total (lb/yr)	Quarterly PE2 (lb/qtr)
NO_X	725	181.3
SO_X	1	0.3
PM_{10}	20	5.0
CO	198	49.5
VOC	33	8.3