APPENDIX G

Health Risk Assessment and Ambient Air Quality Analysis

This page intentionally
left blank.

Health Risk Assessment and Ambient Air Quality Analysis

Azevedo Dairy #2 Facility Expansion

7618 S. Highway 59
El Nido, CA 95317
Merced County

Prepared By:

Matt Daniel – Senior Consultant

TRINITY CONSULTANTS
4900 California Avenue, Suite 420A
Bakersfield, CA 93309
661-282-2200

April 2024

Project 230505.0290

Trinity Consultants

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1. EXECUTIVE SUMMARY

This document contains the health risk assessment (HRA) and ambient air quality analysis (AAQA) performed on behalf of Environmental Planning Partners, Inc. for the Azevedo Dairy #2 facility operation in Merced County, California. As part of the development requirements for the project, an assessment is required of the potential risk to the population attributable to emissions of hazardous air pollutants from the proposed dairy expansion and an ambient air quality analysis of the criteria pollutants compared to the California and national ambient air quality standards.

Emissions of hazardous air pollutants attributable to proposed construction activities, animal movement, manure management and on-site mobile sources were calculated using generally accepted emission factors and the California Emissions Estimator Model version 2020.4.0 (CalEEMod). Ambient air concentrations were predicted with dispersion modeling to arrive at a conservative estimate of increased individual carcinogenic risk that might occur as a result of continuous exposure over a 70-year lifetime. Similarly, concentrations of compounds with non-cancer adverse health effects were used to calculate hazard indices (HIs), which are the ratio of expected exposure to acceptable exposure.

The San Joaquin Valley Air Pollution Control District (SJVAPCD) has set the level of significance for carcinogenic risk to twenty in one million (20×10^{-6}), which is understood as the possibility of causing twenty additional cancer cases in a population of one million people. The level of significance for acute and chronic non-cancer risk is a hazard index of 1.0. The maximum predicted cancer risk after mitigation among the modeled receptors is 6.49 in one million, which is below the significance level of twenty in one million. The maximum predicted acute and chronic non-cancer hazard indices among the modeled receptors are 0.152 and 0.105, respectively, which is below the significance level for chronic and acute significance level.

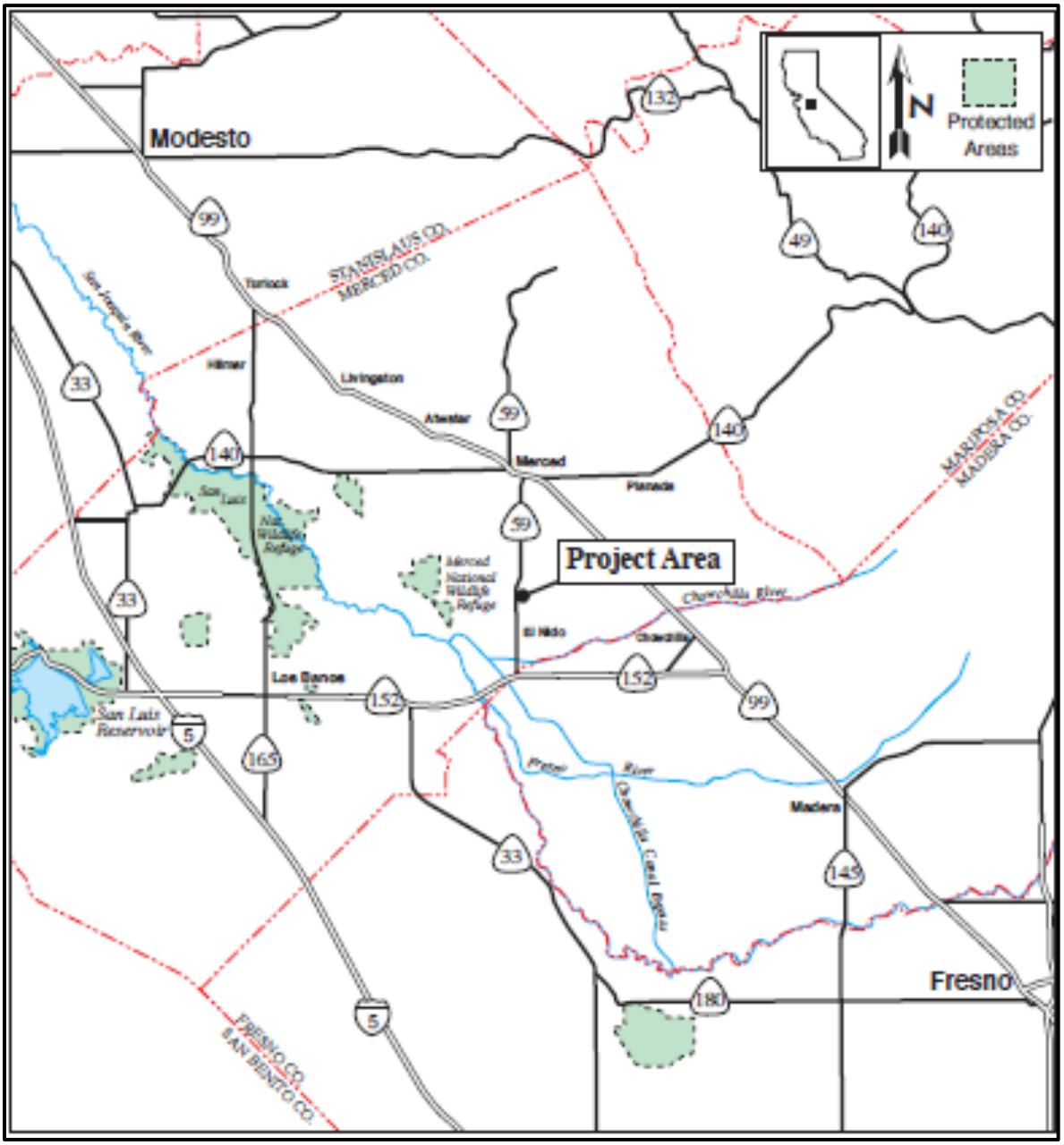
In accordance with the SJVAPCD's *Guide for Assessing and Mitigating Air Quality Impacts* (SJVAPCD 2015a) and polices (SJVAPCD 2015b; SJVAPCD 2015c) the potential health risk attributable to the proposed project is determined to be less than significant.

Emissions of criteria pollutants attributable to proposed construction activities, animal movement, manure management and on-site mobile sources were calculated using generally accepted emission factors. The SJVAPCD has developed screening levels for requiring an AAQA. The SJVAPCD recommends that an AAQA be performed for all criteria pollutants when emissions of any criteria pollutant or ammonia resulting from project construction or operational activities exceed the 100 pounds per day screening level, after compliance with Rule 9510 requirements and implementation of all enforceable mitigation measures. The proposed project's construction and operational activities will not exceed 100 pounds per day of any criteria pollutant or ammonia. Therefore, an AAQA is not required, and the proposed Project is considered less than significant for ambient air quality impacts.

2. INTRODUCTION

This Health Risk Assessment (HRA) is provided as a service of Trinity Consultants, performed on behalf of Environmental Planning Partners, Inc. for the Azevedo Dairy #2 facility operation in Merced County, California (**Figure 2-1**). As part of the development requirements for the property, an HRA and AAQA are required.

Figure 2-1. Location Map



2.1. PROJECT DESCRIPTION

The existing dairy is located at 7618 S. Highway 59 in El Nido, California, which is in the County of Merced. The facility will not be located within 1,000 feet of a K-12 school.

The only construction activities associated with the project would include the construction of a new 68,000 square foot concrete manure storage area and the installation of a new mechanical separator. No new buildings are proposed for this project. Construction activities are anticipated to not exceed two weeks. Therefore, emissions and health risk associated with construction activities are considered de-minimis and are not analyzed any further in this analysis.

After modification, the dairy will house approximately 4,000 head of cattle. The existing and proposed herd configuration is provided in Table 2-1. The dairy will continue to operate 24 hours per day and 365 days per year.

Table 2-1. Herd Configuration – Existing and Proposed

Cow Type	Current	Proposed	Increment
Milk Cows	1,135	3,000	1,865
Dry Cows	0	500	500
Bred Heifers 15-24 mos.	450	500	50
Heifers 7-14 mos.	575	0	-575
Heifers 4-6 mos.	575	0	-575
Calves 0-3 mos.	0	0	0
Bulls	0	0	0
TOTAL	**2,735**	**4,000**	**1,265**

3. AMBIENT AIR QUALITY ANALYSIS

As stated in the GAMAQI (2015, p 96-97), SJVAPCD has developed screening levels for requiring an Ambient Air Quality Analysis (AAQA). The SJVAPCD recommends that an AAQA be performed for all criteria pollutants when emissions of any criteria pollutant or ammonia resulting from project construction or operational activities exceed the 100 pounds per day screening level, after compliance with Rule 9510 requirements and implementation of all enforceable mitigation measures.

As shown below in **Table 3-1**, average daily emissions for operational activities associated with this Project would not exceed 100 pounds per day for any criteria pollutant or ammonia. *Therefore, an AAQA is not required for this Project.*

Table 3-1. Average Daily Criteria Pollutant Emissions

Emissions Source	Pollutant (lbs/day)						
	NOX	CO	SOX	PM_{10}	$PM_{2.5}$	VOC	NH3
Operational Emissions							
Milk Parlor	-	-	-	-	-	2.10	0.70
Cow Housing	-	-	-	1.60	0.18	43.40	52.30
Liquid Manure	-	-	-	-	-	11.10	17.90
Solid Manure	-	-	-	-	-	2.30	14.20
Feed Handling*	-	-	-	-	-	27.90	0.00
Mobile Sources	0.85	7.97	0.01	0.01	0.01	0.43	0.00
Total Average Daily Operational Emissions	**0.85**	**7.97**	**0.01**	**1.61**	**0.19**	**87.23**	**85.10**
SJVAPCD AAQA Screening Threshold	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Is Threshold Exceeded?	No	No	No	No	No	No	No
*No change is the size of the silage piles of corn, wheat or alfalfa. Emissions from TMR only.							

4. RISK ASSESSMENT METHODOLOGY

This section describes the methodology used to predict the potential health risk to the population attributable to emissions of hazardous air pollutants from the proposed expansion of the dairy operation.

4.1. HAZARD IDENTIFICATION

The basis for evaluating potential health risk is the identification of sources of hazardous air pollutants (HAPs). The proposed dairy will include sources with the potential to emit HAPs.

Operational mobile sources include a diesel-fueled feed loading tractor, a feed delivery tractor, bedding delivery tractor, manure loading tractor, milk tankers, solids manure removal trucks, and commodity delivery trucks. There will also be emissions from the housing barns, milk barn, lagoons, solid manure storage and land application areas associated with increased herd size. HRA emission sources are listed in **Table 4-1**.

Table 4-1. Sources of Potential Emissions

Source ID	Description
MTI	Milk Truck Idling
MTT	Milk Truck Travel
CTI	Commodity Truck Idling
CTT	Commodity Truck Travel
SMTI	Solid Manure Truck Idling
SMTT	Solid Manure Truck Travel
FLT	Feed Loading Tractor
FBDT1-3	Feed and Bedding Delivery Tractors
Milk1	Milk Parlor
LB1-6	Loafing Barns
LA1-2	Land Applications
LAGOON	Lagoon
MLT	Manure Loading Tractor
SMS	Solid Manure Storage
QMTT	Off-Site Quarter Mile Truck Travel

Table 4-2 lists the toxic substances emitted from each of these activities and also presents the classification of these species as to their potential for producing carcinogenic and non-cancer acute or chronic health impacts, if any.

Table 4-2. Chemicals of Potential Concern

CAS	Pollutant	Source	Cancer	Non-Cancer	
				Acute	Chronic
9901	Diesel Exhaust, Particulate Matter	Tractors, Diesel Trucks	X		X
9960	Sulfates	Animal Movement		X	X
50000	Formaldehyde	Animal Movement	X	X	X
56235	Carbon tetrachloride	Animal Movement, Lagoons	X	X	X
67630	Isopropyl Alcohol	Animal Movement		X	X
67663	Chloroform	Animal Movement, Lagoons	X	X	X
71432	Benzene	Animal Movement, Lagoons	X	X	X
71556	1,1,1-trichloroethane	Lagoons		X	X
74873	Methyl Chloride	Animal Movement	X	X	X
75003	Ethyl Chloride	Animal Movement			X
75070	Acetaldehyde	Animal Movement	X		X
75150	Carbon disulfide	Animal Movement		X	X
75252	Tribromomethane *	Lagoons			
75694	Trichloromonofluoromethane *	Lagoons			
76131	1,1,2-Trichloro-1,2,2-trifluoroethane	Lagoons			X
78933	Methyl Ethyl Ketone (MEK)	Animal Movement, Lagoons		X	X
79005	1,1,2-Trichloroethane	Animal Movement	X		
79016	Trichloroethylene	Animal Movement, Lagoons	X		X
79345	1,1,2,2-Tetrachloroethane	Animal Movement	X		
91203	Naphthalene	Animal Movement	X		X
95501	1,2-Dichlorobenzene *	Animal Movement, Lagoons			
95636	1,2,4-Trichlorobenzene *	Lagoons			
96128	1,2-Dibromo-3-chloropropane	Animal Movement	X		X
96184	1,2,3-Trichloropropane *	Animal Movement			
98828	Cumene *	Animal Movement			
100414	Ethylbenzene	Animal Movement			X
100425	Styrene	Animal Movement, Lagoons		X	X
100447	Benzyl chloride	Animal Movement	X	X	X
106467	1,4-Dichlorobenzene	Animal Movement, Lagoons	X		X
106934	1,2-Dibromoethane (EDB)	Animal Movement	X		X
106990	1,3-Butadiene	Lagoons	X		X
107062	1,2-Dichloroethane (EDC)	Animal Movement	X		X
107131	Acrylonitrile	Animal Movement	X		X
108054	Vinyl acetate	Animal Movement, Lagoons			X
108101	Methyl Isobutyl Ketone *	Animal Movement, Lagoons			
108883	Toluene	Animal Movement, Lagoons		X	X
108907	Chlorobenzene	Animal Movement			X
110543	Hexane	Animal Movement			X
110827	Cyclohexane *	Animal Movement, Lagoons			
115071	Propylene	Lagoons			X

CAS	Pollutant	Source	Cancer	Non-Cancer	
				Acute	Chronic
120821	1,2,4-Trichlorobenzene *	Animal Movement			
123728	Butyraldehyde *	Animal Movement			
123911	1,4 Dioxane	Animal Movement	X	X	X
127184	Tetrachloroethene	Animal Movement	X	X	X
541731	1,3-Dichlorobenzene *	Animal Movement, Lagoons			
764410	t-1,4-Dichloro-2-butene *	Animal Movement			
1330207	Xylene Isomers	Animal Movement, Lagoons		X	X
4170303	Crotonaldehyde *	Animal Movement			
7429905	Aluminum *	Animal Movement			
7439921	Lead	Animal Movement	X		
7439965	Manganese	Animal Movement			X
7439976	Mercury	Animal Movement		X	X
7440020	Nickel	Animal Movement	X	X	X
7440360	Antimony *	Animal Movement			
7440382	Arsenic	Animal Movement	X	X	X
7440393	Barium *	Animal Movement			
7440439	Cadmium	Animal Movement	X		X
7440473	Chromium *	Animal Movement			
7440508	Copper	Animal Movement		X	X
7440622	Vanadium	Animal Movement	X		
7440666	Zinc	Animal Movement			X
7664417	Ammonia	Animal Movement, Lagoons Wastewater Application		X	X
7723140	Phosphorus *	Animal Movement			
7726956	Bromine	Animal Movement			X
7782492	Selenium	Animal Movement			X
7782505	Chlorine	Animal Movement		X	X
18540299	Hexavalent Chromium	Animal Movement	X	X	X

*Health risk assessment values have not yet been assigned for this chemical.

4.2. EXPOSURE ASSESSMENT

4.2.1. Source Emissions and Characterization

Peak one-hour emission rates and annual-averaged emission rates were calculated for all pollutants for each modeled source. Emissions attribute to animal movement and manure management were estimated by the SJVAPCD using PM_{10} emission factors and HAPs speciation spreadsheets. The project applicant provided cattle numbers. Control efficiencies were applied to PM_{10} emission factors for having shaded corrals. Emissions for tractors were calculated using the EPA's *Nonroad Compression-Ignition Engines - Exhaust Emission Standards* for the appropriate engine horsepower (HP) and year and load factors for the appropriate engine horsepower from California Emissions Estimator Model (CalEEMod) Appendix D, Tables 3.3 and 3.4. Diesel truck running and idling emissions are based on EMFAC2021 emission factors specific to Merced County for vehicle category "T7 Single Other Class 8." Diesel trucks were assumed to have 15 minutes of idling per visit. The lagoon's H_2S

emissions calculations are based on the surface area of the lagoon. As there will be no increase in the surface area of the existing lagoons, there will be no increase in H_2S emission associated with the proposed expansion.

The calculation worksheets for the emissions are provided in **Appendix A**. Hourly and annual emissions for each source are also provided in the HARP output files, electronic copies of which are provided in **Appendix B**.

4.2.2. Dispersion Modeling

A version of EPA's AMS/EPA Regulatory Model - AERMOD (recompiled for the Lakes ISC-AERMOD View interface) was used to predict the dispersion of emissions from the proposed dairy. The animal housing areas, milk barn, lagoons, solid manure storage, and land application areas were modeled as area sources. Unit emission rates for the area sources of 1 g/sec divided by the area of the source were input into AERMOD. The travel route for the feed and bedding delivery tractors, solids removal trucks, milk tankers, and commodity trucks were modeled as line sources, which represents a series of volume sources, with a unit emission rate of 1 g/sec. The feed loading tractor, manure loading tractor, solids removal truck idling, milk tanker idling, and commodity truck idling were modeled as point sources, with a unit emission rate of 1 g/sec. Modeled sources are identified in **Table 4-1**.

All of the AERMOD regulatory default parameters were employed. Rural dispersion parameters were used because the facility and surrounding land are considered "rural" under the Auer land use classification method. The AERMOD files are provided in electronic format on a CD in **Appendix B.**

4.2.2.1. Meteorological Data

The SJVAPCD provided meteorological data for Merced County, California to be used for projects within Merced County. SJVAPCD-approved, AERMET processed meteorological datasets for calendar years 2018 through 2022[1] was input into AERMOD. This was the most recent available dataset available at the time the modeling runs were conducted.

4.2.2.2. Receptors

Existing land uses in the area where the proposed dairy will be located are predominantly agriculture. There are scattered rural residences in the general area of the project; most of which are associated with local agricultural operations. A total of 98 off-site receptors of residences and workers were assessed during the preparation of this HRA. There are currently four on-site residence which includes children under the age of 18 reside and is not occupied by the owner. Modeling results predicted that the on-site residences will exceed the significant threshold for cancer risk of 20 in one million. Therefore, these families will be relocated off-site and the on-site receptor risks for this analysis have been removed. Coordinates for the point of maximum impact (PMI) receptors are provided in **Table 4-3**.

4.2.3. HARP Post-Processing

The files generated in AERMOD were uploaded to the Air Dispersion Modeling and Risk Assessment Tool (ADMRT) program in the Hotspots Analysis and Reporting Program Version 2 (HARP 2) (CARB 2015). ADMRT post-processing was used to assess the potential for excess cancer risk and chronic non-cancer effects using the most recent health effects data from the California EPA Office of Environmental Health Hazard Assessment (OEHHA). ADMRT site parameters were set for mandatory minimum exposure pathways for carcinogenic risk.

[1] Provided via website, San Joaquin Valley Air Pollution Control District (SJVAPCD), https://ww2.valleyair.org/permitting/air-dispersion-modeling/meteorological-data-zip-files/

The deposition rate was set to 0.02 m/s. Risk reports were generated for carcinogenic risk, non-carcinogenic chronic risk and non-carcinogenic acute risk. Site parameters are included in the HARP output files.

4.3. RISK CHARACTERIZATION

For permitting and CEQA purposes, SJVAPCD has set the level of significance for carcinogenic risk at 20 in one million, which is understood as the possibility of causing twenty additional cancer cases in a population of one million people (SJVAPCD 2015b). The level of significance for chronic and acute non-cancer risk is a hazard index of one (SJVAPCD 2015c).

HARP 2 post-processing was used to assess the potential for the following: excess cancer risk, acute non-cancer effects, and chronic non-cancer effects. Total cancer risk was predicted for inhalation and non-inhalation pathways at each receptor. The hazard index is computed by endpoint as the sum of the hazard indices for all relevant pollutants, the highest of which is designated as the total hazard index.

The carcinogenic risk predicted at the potentially impacted receptors does not exceed the significance level of twenty in one million (20×10^{-6}). The health hazard index (HI) for chronic and acute non-cancer risk is below the significance level of 1.0 at all modeled receptors. The excess cancer risk, acute non-cancer HI, and chronic non-cancer HI for the maximum modeled receptor are provided in **Table 4-3**. The HARP2 output files for cancer, acute, and chronic risks are provided in electronic format on **Appendix B.**

As shown below in **Table 4-3,** the maximum predicted cancer risk is 6.49E-06. Cancer risks are primarily attributable to emissions of naphthalene through the inhalation pathway. Carcinogenic risks are tabulated by pollutant in **Table 4-4**.

The maximum predicted acute non-cancer hazard index is 0.152. Acute risks are primarily attributable to emissions of ammonia, which affects the respiratory system. Acute risks are tabulated by pollutant in **Table 4-5**.

The maximum predicted chronic non-cancer hazard index is 0.105. Chronic risks, tabulated by pollutant in **Table 4-6**, are primarily attributable to emissions of ammonia, which affects the respiratory system.

Table 4-3. Risk Predicted By HARP

	Maximum Lifetime Excess Cancer Risk	Maximum Non-Cancer Chronic Hazard Index	Maximum Non-Cancer Acute Hazard Index
Operational	6.49E-06	1.05E-01	1.52E-01
Receptor #, Name	48, Off-Site Worker	48, Off-Site Worker	47, Off-Site Worker
UTM Easting (m)	723514.48	723514.48	723151.56
UTM Northing (m)	4117070.63	4117070.63	4117070.63

Table 4-4. Risk by Pollutant – Maximum Cancer Risk at Receptor #48

CHEM	INHAL	SOIL	DERM	MOTHER	WATER	FISH	CROP	BEEF	DAIRY	PIG	CHICK	EGG	TOTAL
Naphthalene	2.49E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.49E-06
Acrylonitrile	9.20E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.20E-07
TetraClEthane	7.37E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.37E-07
Benzyl Chloride	5.96E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.96E-07
EDB	4.28E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.28E-07
Perc	4.01E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.01E-07
p-DiClBenzene	2.34E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.34E-07
DBCP	1.96E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.96E-07
1,4-Dioxane	9.38E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.38E-08
Arsenic	2.44E-08	5.22E-08	1.09E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.75E-08
1,1,2TriClEthan	5.57E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.57E-08
Benzene	4.88E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.88E-08
DieselExhPM	4.87E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.87E-08
Cr(VI)	4.54E-08	7.62E-10	5.28E-11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.62E-08
EDC	3.37E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.37E-08
Acetaldehyde	3.04E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.04E-08
Formaldehyde	2.30E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.30E-08
Ethyl Benzene	1.10E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.10E-08
TCE	8.38E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.38E-09
CCl4	4.98E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.98E-09
Chloroform	1.41E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.41E-09
Lead	1.87E-10	6.47E-10	6.73E-11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.02E-10
Nickel	8.09E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.09E-10
SUM	6.43E-06	5.36E-08	1.10E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.49E-06

Table 4-5. Risk by Pollutant – Maximum Acute Noncancer Risk at Receptor #47

CHEM	CV	CNS	IMMUN	KIDNEY	GILV	REPRO /DEVEL	RESP	SKIN	EYE	BONE /TEETH	ENDO	BLOOD	ODOR	GENERAL	MAX
NH3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.39E-01	0.00E+00	1.39E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.39E-01
Benzene	0.00E+00	0.00E+00	5.67E-03	0.00E+00	0.00E+00	5.67E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.67E-03	0.00E+00	0.00E+00	5.67E-03
Formaldehyde	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.66E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.66E-03
Arsenic	5.26E-03	5.26E-03	0.00E+00	0.00E+00	0.00E+00	5.26E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.26E-03
SULFATES	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.99E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.99E-03
Benzyl Chloride	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.75E-03	0.00E+00	3.75E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.75E-03
Nickel	0.00E+00	0.00E+00	2.30E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.30E-03
Acetaldehyde	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.12E-03	0.00E+00	2.12E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.12E-03
Mercury	0.00E+00	4.39E-04	0.00E+00	0.00E+00	0.00E+00	4.39E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.39E-04
1,4-Dioxane	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.34E-04	0.00E+00	3.34E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.34E-04
MEK	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.99E-04	0.00E+00	2.99E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.99E-04
CS2	0.00E+00	2.65E-04	0.00E+00	0.00E+00	0.00E+00	2.65E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.65E-04
Perc	0.00E+00	2.40E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.40E-04	0.00E+00	2.40E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.40E-04
Chloroform	0.00E+00	2.11E-04	0.00E+00	0.00E+00	0.00E+00	2.11E-04	2.11E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.11E-04
Isopropyl Alcoh	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.84E-04	0.00E+00	1.84E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.84E-04
Toluene	0.00E+00	1.18E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.18E-04	0.00E+00	1.18E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.18E-04
Copper	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.68E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.68E-05
Vanadium	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.58E-05	0.00E+00	6.58E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.58E-05
Xylenes	0.00E+00	4.23E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.23E-05	0.00E+00	4.23E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.23E-05
Styrene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.47E-05	2.47E-05	0.00E+00	2.47E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.47E-05
CCl4	0.00E+00	7.45E-06	0.00E+00	0.00E+00	7.45E-06	7.45E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.45E-06
SUM	5.26E-03	6.59E-03	7.97E-03	0.00E+00	7.45E-06	1.19E-02	1.50E-01	0.00E+00	1.52E-01	0.00E+00	0.00E+00	5.67E-03	0.00E+00	0.00E+00	1.52E-01

Table 4-6. Risk by Pollutant – Maximum Chronic Noncancer Risk at Receptor #48

CHEM	CV	CNS	IMMUN	KIDNEY	GILV	REPRO/ DEVEL	RESP	SKIN	EYE	BONE/ TEETH	ENDO	BLOOD	ODOR	GENERAL	MAX
NH3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.75E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.75E-02
Arsenic	3.39E-02	3.39E-02	0.00E+00	0.00E+00	0.00E+00	3.39E-02	3.39E-02	3.39E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.39E-02
Naphthalene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.03E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.03E-02
EDB	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.88E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.88E-02
Manganese	0.00E+00	9.44E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.44E-03
Perc	0.00E+00	0.00E+00	0.00E+00	4.81E-03	4.81E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.81E-03
Acrylonitrile	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.62E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.62E-03
Benzene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.43E-03	0.00E+00	0.00E+00	1.43E-03
Formaldehyde	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.07E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.07E-03
Nickel	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.88E-06	5.60E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.60E-04	0.00E+00	0.00E+00	5.60E-04
Mercury	0.00E+00	3.15E-04	0.00E+00	3.15E-04	0.00E+00	3.15E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.15E-04
Acetaldehyde	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.91E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.91E-04
DieselExhPM	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.80E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.80E-05
p-DiClBenzene	0.00E+00	6.44E-05	0.00E+00	6.44E-05	6.44E-05	0.00E+00	6.44E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.44E-05
CS2	0.00E+00	6.19E-05	0.00E+00	0.00E+00	0.00E+00	6.19E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.19E-05
Vinyl Acetate	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.91E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.91E-05
Toluene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.08E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.08E-05
Xylenes	0.00E+00	3.81E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.81E-05	0.00E+00	3.81E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.81E-05
Styrene	0.00E+00	1.90E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.90E-05
TCE	0.00E+00	1.76E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.76E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.76E-05
Chlorobenzn	0.00E+00	0.00E+00	0.00E+00	1.37E-05	1.37E-05	1.37E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.37E-05
EDC	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.03E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.03E-05
1,4-Dioxane	1.02E-05	0.00E+00	0.00E+00	1.02E-05	1.02E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.02E-05
CCl4	0.00E+00	7.32E-06	0.00E+00	0.00E+00	7.32E-06	7.32E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.32E-06
Ethyl Benzene	0.00E+00	0.00E+00	0.00E+00	5.58E-06	5.58E-06	5.58E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.58E-06	0.00E+00	0.00E+00	0.00E+00	5.58E-06
Cr(VI)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.92E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.13E-07	0.00E+00	0.00E+00	3.92E-06
Chloroform	0.00E+00	0.00E+00	0.00E+00	2.18E-06	2.18E-06	2.18E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.18E-06
Isopropyl Alcoh	0.00E+00	0.00E+00	0.00E+00	2.16E-06	0.00E+00	2.16E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.16E-06
Selenium	1.33E-06	1.33E-06	0.00E+00	0.00E+00	1.33E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.33E-06
Hexane	0.00E+00	1.16E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.16E-06
Ethyl Chloride	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.85E-07	1.85E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.85E-07
SUM	3.39E-02	4.38E-02	0.00E+00	5.22E-03	4.92E-03	5.31E-02	1.05E-01	3.39E-02	9.64E-05	0.00E+00	5.58E-06	1.99E-03	0.00E+00	0.00E+00	1.05E-01

5. CONCLUSIONS

In accordance with the *Guide for Assessing and Mitigating Air Quality Impacts* (SJVAPCD 2015a) and San Joaquin Valley Air Pollution Control District policies (SJVAPCD 2015b; SJVAPCD 2016c), the unmitigated potential health risk attributable to the Azevedo Dairy #2 facility for chronic and acute carcinogenic and non- carcinogenic risk is determined to be less than significant after removal of on-site receptors based on the following conclusion:

- Potential chronic carcinogenic risk from the proposed facility is *below* the significance level of twenty in one million at each of the modeled receptors.
- The hazard index for the potential chronic non-cancer risk from the proposed facility is *below* the significance level of 1.0 at each of the modeled receptors.
- The hazard index for the potential acute non-cancer risk from the proposed facility is *below* the significance level of 1.0 at each of the modeled receptors.

Additionally, the ambient air quality impact is determined to be less than significant based on the following conclusions:

- The average daily emissions for construction and operational activities associated with this Project would not exceed 100 pounds per day for any criteria pollutant or ammonia.

6. REFERENCES

Auer, Jr., A.H., 1978. Correlation of Land Use and Cover with Meteorological Anomalies. Journal of Applied Meteorology, 17(5): 636-643, 1978.

California Air Pollution Control Officers Association (CAPCOA). 2017. California Emissions Estimator Model tm (CalEEMod), version 2016.3.2, released October 2017. Available online at: http://caleemod.com/

California Environmental Protection Agency Air Resources Board (CARB). 2003. *HARP User Guide*. Released December 2003.

----------. 2015. *Air Dispersion Modeling and Risk Tool*. Version 15197. July 16, 2015. Downloaded from http://www.arb.ca.gov/toxics/harp/harp.htm

California Environmental Quality Act, *Appendix G – Environmental Checklist Form, Final Text.* October 26, 1998.

OEHHA. 2015. Air Toxics Hot Spots Program Risk Assessment Guidelines, Appendix H, Accessed January 7, 2016. <http://www.oehha.ca.gov/air/hot_spots/2015/2015GMAppendicesG_J.pdf>

San Joaquin Valley Air Pollution Control District (SJVAPCD). 2000. *Environmental Review Guidelines Procedures for Implementing the California Environmental Quality Act*. August 2000.

----------. 2007. *Guidance for Air Dispersion Modeling (Working Draft).* January 2007.

----------. 2012. *Dairy H_2S AERMOD Hourly Emission File Generator, Version 1.0.* September 2012.

----------. 2015a. Guide for Assessing and Mitigating Air Quality Impacts. March 19, 2015.

----------. 2015b. APR -1906 Framework for Performing Health Risk Assessments. June 30, 2015.

----------. 2015c. APR -1905 Risk Management Policy for Permitting New and Modified Sources. May 28, 2015.

SCAQMD. 2006. Final Methodology to Calculate Particulate Matter (PM) 2.5 and PM2.5 Significance Thresholds. October 2006. <http://www.aqmd.gov/docs/default-source/ceqa/handbook/localized-significance-thresholds/particulate-matter-(pm)-2.5-significance-thresholds-and-calculation-methodology/final_pm2_5methodology.pdf?sfvrsn=2

Villalvazo, Leland. 2015. Supervising Atmospheric Modeler, SJVAPCD. Email to Kathy Parker at Insight Environmental Consultants, August 3, 2015.

APPENDIX A: EMISSION ESTIMATION WORKSHEETS

Rev. January 6, 2020

Pre-Project Facility Information

1. Does this facility house Holstein or Jersey cows? Holstein
   Most facilities house Holstein cows unless explicitly stated on the PTO or application.
2. Does the facility have an anaerobic treatment lagoon? no
3. Does the facility land apply liquid manure? yes
   Answering "yes" assumes worst case.
4. Does the facility land apply solid manure? yes
   Answering "yes" assumes worst case.
5. Is any scraped manure sent to a lagoon/storage pond? yes
   Answering "yes" assumes worst case.

Pre-Project Herd Size

Herd	Flushed Freestalls	Scraped Freestalls	Flushed Corrals	Scraped Corrals	Total # of Animals
Milk Cows			1,135		1,135
Dry Cows			0		0
Support Stock (Heifers, Calves, and Bulls)			1,600		1,600
Large Heifers			0		0
Medium Heifers			0		0
Small Heifers			0		0
Bulls			0		0

	Calf Hutches				Calf Corrals		
	Aboveground Flushed	Aboveground Scraped	On-Ground Flushed	On-Ground Scraped	Flushed	Scraped	Total # of Calves
Calves							0

Total Herd Summary	
Total Milk Cows	1,135
Total Mature Cows	1,135
Support Stock (Heifers, Calves, and Bulls)	1,600
Total Calves	0
Total Dairy Head	2,735

Pre-Project Silage Information

Feed Type	Max # Open Piles	Max Height (ft)	Max Width (ft)
Corn	1	20	85
Alfalfa			
Wheat	1	20	85

Post-Project Facility Information

1. Does this facility house Holstein or Jersey cows? Holstein
   Most facilities house Holstein cows unless explicitly stated on the PTO or application.
2. Does the facility have an anaerobic treatment lagoon? no
3. Does the facility land apply liquid manure? yes
   Answering "yes" assumes worst case.
4. Does the facility land apply solid manure? yes
   Answering "yes" assumes worst case.
5. Is any scraped manure sent to a lagoon/storage pond? yes
   Answering "yes" assumes worst case.
6. Does this project result in an increase or relocation of uncovered surface area for any lagoon/storage pond? no

Post-Project Herd Size

Herd	Flushed Freestalls	Scraped Freestalls	Flushed Corrals	Scraped Corrals	Total # of Animals
Milk Cows			3,000		3,000
Dry Cows			500		500
Support Stock (Heifers, Calves, and Bulls)			500		500
Large Heifers					0
Medium Heifers					0
Small Heifers					0
Bulls					0

	Calf Hutches				Calf Corrals		
	Aboveground Flushed	Aboveground Scraped	On-Ground Flushed	On-Ground Scraped	Flushed	Scraped	Total # of Calves
Calves							0

Total Herd Summary	
Total Milk Cows	3,000
Total Mature Cows	3,500
Support Stock (Heifers, Calves, and Bulls)	500
Total Calves	0
Total Dairy Head	4,000

Post-Project Silage Information

Feed Type	Max # Open Piles	Max Height (ft)	Max Width (ft)
Corn	1	20	85
Alfalfa			
Wheat	1	20	85

This spreadsheet serves only as a resource to calculate potential emissions from dairies, and may not reflect the final emissions used by the District due to parameters not addressed in this spreadsheet and/or omissions from the spreadsheet. Any other permittable equipment (e.g. IC engines, gasoline tanks, etc.) at a facility will need to be calculated separately. All final calculations used in permitting projects will be conducted by District staff.

VOC Mitigation Measures and Control Efficiencies

Milking Parlor				
Measure Proposed?		Mitigation Measure(s) per Emissions Point	VOC Control Efficiency (%)	
Pre-Project	Post-Project		Pre-Project	Post-Project
		Enteric Emissions Mitigations		
☑	☑	(D) Feed according to NRC guidelines	10%	10%
		Total Control Efficiency	10%	10%
		Milking Parlor Floor Mitigations		
☑	☑	(D) Feed according to NRC guidelines	10%	10%
☑	☑	(D) Flush or hose milk parlor immediately prior to, immediately after, or during each milking. Note: If selected for dairies > 999 milk cows, control efficiency is already included in EF.	0%	0%
		Total Control Efficiency	10%	10%

Cow Housing				
Measure Proposed?		Mitigation Measure(s) per Emissions Point	VOC Control Efficiency (%)	
Pre-Project	Post-Project		Pre-Project	Post-Project
		Enteric Emissions Mitigations		
☑	☑	Feed according to NRC guidelines	10%	10%
		Total Control Efficiency	10%	10%
		Corrals/Pens Mitigations		
☑	☑	Feed according to NRC guidelines	10%	10%
☑	☑	Inspect water pipes and troughs and repair leaks at least once every seven days. Note: If selected for dairies > 999 milk cows, CE is already included in EF.	0%	0%
☐	☐	**Dairies:** Clean manure from corrals at least four times per year with at least 60 days between cleaning, or clean corrals at least once between April and July and at least once between September and December. Note: If selected for dairies > 999 milk cows, CE is already included in EF. Note: No additional control given for increased cleaning frequency (e.g. BACT requirement). **Heifer/Calf Ranches:** Scrape corrals twice a year with at least 90 days between cleanings, excluding in-corral mounds. Note: No additional control given for increased cleaning frequency (e.g. BACT requirement).	0%	0%
☑	☑	Scrape, vacuum, or flush concrete lanes in corrals at least once every day for mature cows and every seven days for support stock, or clean concrete lanes such that the depth of manure does not exceed 12 inches at any point or time. Note: No additional control given for increased cleaning frequency (e.g. BACT requirement).	10%	10%
☐	☐	Implement one of the following: 1) slope the surface of the corrals at least 3% where the available space for each animal is 400 sq ft or less and slope the surface of the corrals at least 1.5% where the available space for each animal is more than 400 sq ft; 2) maintain corrals to ensure proper drainage preventing water from standing more than 48 hrs; 3) harrow, rake, or scrape pens sufficiently to maintain a dry surface. Note: If selected for dairies > 999 milk cows, CE already included in EF.	0%	0%
☐	☐	Install shade structures such that they are constructed with a light permeable roofing material. Note: If selected for dairies > 999 milk cows, the control efficiency will be 5% since the EF used includes a partial control for this measure.	5%	5%
☐	☐	Install all shade structures uphill of any slope in the corral. Note: If selected for dairies > 999 milk cows, the control efficiency will be 5% since the EF used includes a partial control for this measure.		
☑	☑	Clean manure from under corral shades at least once every 14 days, when weather permits access into corral. Note: If selected for dairies > 999 milk cows, the control efficiency will be 5% since the EF used includes a partial control for this measure.		
☐	☐	Install shade structure so that the structure has a North/South orientation. Note: If selected for dairies > 999 milk cows, the control efficiency will be 5% since the EF used includes a partial control for this measure.		
☐	☐	Manage corrals such that the manure depth in the corral does not exceed 12 inches at any time or point, except for in-corral mounding. Manure depth may exceed 12 inches when corrals become inaccessible due to rain events. The manure facility must resume management of the manure depth of 12 inches or lower immediately upon the corral becoming accessible. Note: If selected for dairies > 999 milk cows, control efficiency is already included in EF.	0%	0%
☑	☑	Knockdown fence line manure build-up prior to it exceeding a height of 12 inches at any time or point. Manure depth may exceed 12 inches when corrals become inaccessible due to rain events. The facility must resume management of the manure depth of 12 inches or lower immediately upon the corral becoming accessible.	10%	10%
☐	☐	Use lime or a similar absorbent material in the corral according to the manufacturer's recommendation to minimize moisture in the corrals.	0%	0%
☐	☐	Apply thymol to the corral soil in accordance with the manufacturer's recommendation.	0%	0%
		Total Control Efficiency	30.75%	30.75%
		Bedding Mitigations		
☑	☑	Feed according to NRC guidelines	10%	10%
☐	☐	Use non-manure-based bedding and non-separated solids based bedding for at least 90% of the bedding material, by weight, for freestalls (e.g. rubber mats, almond shells, sand, or waterbeds).	0%	0%

☐	☐	For a large dairy (1,000 milk cows or larger) or a heifer/calf ranch - Remove manure that is not dry from individual cow freestall beds or rake, harrow, scrape, or grade freestall bedding at least once every 7 days.	0%	0%
☐	☐	(D) For a medium dairy only (500 to 999 milk cows) - Remove manure that is not dry from individual cow freestall beds or rake, harrow, scrape, or grade freestall bedding at least once every 14 days.	0%	0%
		Total Control Efficiency	10.00%	10.00%
		Lanes Mitigations		
☑	☑	Feed according to NRC guidelines	10%	10%
☑	☑	Pave feedlanes, where present, for a width of at least 8 feet along the corral side of the feedlane fence for milk and dry cows and at least 6 feet along the corral side of the feedlane for heifers. Note: No control efficiency at this time.	0%	0%
☑	☑	**Dairies**: Flush, scrape, or vacuum freestall flush lanes immediately prior to or after, or during each milking; or flush or scrape freestall flush lanes at least 3 times per day. **Heifer/Calf Ranches:** Vacuum, scrape, or flush freestalls at least once every seven days.	10%	10%
☐	☐	(D) Have no animals in exercise pens or corrals at any time.	0%	0%
		Total Control Efficiency	19.00%	19.00%

Liquid Manure Handling				
Measure Proposed?		**Mitigation Measure(s) per Emissions Point**	**VOC Control Efficiency (%)**	
Pre-Project	Post-Project		Pre-Project	Post-Project
		Lagoons/Storage Ponds Mitigations		
☑	☑	Feed according to NRC guidelines	10%	10%
☐	☐	Use phototropic lagoon	0%	0%
☐	☐	Use an anaerobic treatment lagoon designed according to NRCS Guideline No. 359, or aerobic treatment lagoon, or mechanically aerated lagoon, or covered lagoon digester vented to a control device with minimum 95% control	0%	0%
☐	☑	Remove solids from the waste system with a solid separator system, prior to the waste entering the lagoon. Note: If selected for dairies > 999 milk cows, control efficiency is already included in EF.	0%	0%
☐	☐	Maintain lagoon pH between 6.5 and 7.5	0%	0%
		Total Control Efficiency	10.00%	10.00%
		Liquid Manure Land Application Mitigations		
☑	☑	Feed according to NRC guidelines	10%	10%
☐	☐	Only apply liquid manure that has been treated with an anaerobic or aerobic treatment lagoon, aerobic lagoon, or digester system	0%	0%
☐	☐	Allow liquid manure to stand in the fields for no more than 24 hours after irrigation. Note: If selected for dairies > 999 milk cows, control efficiency is already included in EF.	0%	0%
☐	☐	Apply liquid/slurry manure via injection with drag hose or similar apparatus	0%	0%
		Total Control Efficiency	10.00%	10.00%

Solid Manure Handling				
Measure Proposed?		**Mitigation Measure(s) per Emissions Point**	**VOC Control Efficiency (%)**	
Pre-Project	Post-Project		Pre-Project	Post-Project
		Solid Manure Storage Mitigations		
☑	☑	Feed according to NRC guidelines	10%	10%
☐	☐	**LARGE CAFO ONLY**: Within 72 hours of removal from housing, either a) remove dry manure from the facility, or b) cover dry manure outside the housing with a weatherproof covering from October through May, except for times when wind events remove the covering, not to exceed 24 hours per event.	0%	0%
		Total Control Efficiency	10.00%	10.00%
		Separated Solids Piles Mitigations		
☑	☑	Feed according to NRC guidelines	10%	10%
☐	☐	**LARGE CAFO ONLY**: Within 72 hours of removal from the drying process, either a) remove separated solids from the facility, or b) cover separated solids outside the housing with a weatherproof covering from October through May, except for times when wind events remove the covering, not to exceed 24 hours per event.	0%	0%
		Total Control Efficiency	10.00%	10.00%
		Solid Manure Land Application Mitigations		
☑	☑	Feed according to NRC guidelines	10%	10%
☑	☑	Incorporate all solid manure within 72 hours of land application. Note: If selected for dairies > 999 milk cows, control efficiency is already included in EF. Note: No additional control given for rapid manure incorporation (e.g. BACT requirement).	0%	0%
☐	☐	Only apply solid manure that has been treated with an anaerobic treatment lagoon, aerobic lagoon or digester system.	0%	0%
☐	☐	Apply no solid manure with a moisture content of more than 50%	0%	0%
		Total Control Efficiency	10.00%	10.00%

Silage and TMR				
Measure Proposed?		**Mitigation Measure(s) per Emissions Point**	**VOC Control Efficiency (%)**	
Pre-Project	Post-Project		Pre-Project	Post-Project
		Corn/Alfalfa/Wheat Silage Mitigations		
		1. Utilize a sealed feed storage system (e.g. Ag-Bag) for bagged silage, or 2. Cover the surface of silage piles, except for the area where feed is being removed from the pile, with a plastic tarp that is at least 5 mils thick (0.005 inches), multiple plastic tarps with a cumulative thickness of at least 5 mils (0.005 inches), or an oxygen barrier film covered with a UV resistant material within 72 hours of last delivery of material to the pile, and implement one of the following:		

☑	☑	a) build silage piles such that the average bulk density is at least 44 lb/cu-ft for corn silage and 40 lb/cu-ft for other silage types, as measured in accordance with Section 7.10 of Rule 4570, b) when creating a silage pile, adjust filling parameters to assure a calculated average bulk density of at least 44 lb/cu-ft for corn silage and at least 40 lb/cu-ft for other silage types, using a spreadsheet approved by the District, c) harvest silage crop at > or = 65% moisture for corn; and >= 60% moisture for alfalfa/grass and other silage crops; manage silage material delivery such that no more than 6 inches of materials are uncompacted on top of the pile; and incorporate the applicable Theoretical Length of Chop (TLC) and roller opening for the crop being harvested. For dairies - implement two of the following: For heifer/calf ranches - implement one of the following: Manage Exposed Silage. 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. Maintain Silage Working Face. 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 Silage Additive: 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.	39.0%	39.0%
		Total Control Efficiency*	39.00%	39.00%

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

		TMR Mitigations		
☑	☑	(D) Push feed so that it is within 3 feet of feedlane fence within 2 hrs of putting out the feed or use a feed trough or other feeding structure designed to maintain feed within reach of the cows.	10%	10%
☑	☑	(D) Begin feeding total mixed rations within 2 hrs of grinding and mixing rations. Note: If selected for dairies > 999 milk cows, control efficiency already included in EF.	0%	0%
☑	☑	Feed steam-flaked, dry rolled, cracked or ground corn or other ground cereal grains.	10%	10%
☐	☐	Remove uneaten wet feed from feed bunks within 24 hrs after then end of a rain event.	0%	0%
☐	☐	(D) For total mixed rations that contain at least 30% by weight of silage, feed animals total mixed rations that contain at least 45% moisture.	0%	0%
☑	☑	Feed according to NRC guidelines. Note: If selected for dairies, control efficiency already included in EF.	0%	0%
		Total Control Efficiency	19.00%	19.00%

Ammonia Mitigation Measures and Control Efficiencies

Milking Parlor				
Measure Proposed?		Mitigation Measure(s) per Emissions Point	NH3 Control Efficiency (%)	
Pre-Project	Post-Project		Pre-Project	Post-Project
		Milking Parlor Floor Mitigations		
☑	☑	Feed according to NRC guidelines	28%	28%
		Total Control Efficiency	28%	28%

Cow Housing				
Measure Proposed?		Mitigation Measure(s) per Emissions Point	NH3 Control Efficiency (%)	
Pre-Project	Post-Project		Pre-Project	Post-Project
		Corrals/Pens Mitigations		
☑	☑	Feed according to NRC guidelines	28%	28%
☐	☑	Clean manure from corrals at least four times per year with at least 60 days between cleaning, or clean corrals at least once between April and July and at least once between September and December. **OR** Use lime or a similar absorbent material in the corral according to the manufacturer's recommendation to minimize moisture in the corrals. **OR** Apply thymol to the corral soil in accordance with the manufacturer's recommendation.	0%	50%
		Total Control Efficiency	28%	64%
		Bedding Mitigations		
☑	☑	Feed according to NRC guidelines	28%	28%
☐	☐	Use non-manure-based bedding and non-separated solids based bedding for at least 90% of the bedding material, by weight, for freestalls (e.g. rubber mats, almond shells, sand, or waterbeds). **OR** For a large dairy only (1,000 milk cows or larger) - Remove manure that is not dry from individual cow freestall beds or rake, harrow, scrape, or grade freestall bedding at least once every 7 days. **OR** For a medium dairy only (500 to 999 milk cows) - Remove manure that is not dry from individual cow freestall beds or rake, harrow, scrape, or grade freestall bedding at least once every 14 days.	0.0%	0.0%
		Total Control Efficiency	28.00%	28.00%
		Lanes Mitigations		
☑	☑	Feed according to NRC guidelines	28%	28%
		Total Control Efficiency	28%	28%

Liquid Manure Handling				
Measure Proposed?		Mitigation Measure(s) per Emissions Point	NH3 Control Efficiency (%)	
Pre-Project	Post-Project		Pre-Project	Post-Project
		Lagoons/Storage Ponds Mitigations		
☑	☑	Feed according to NRC guidelines	28%	28%
☐	☑	Use phototropic lagoon **OR** Remove solids from the waste system with a solid separator system, prior to the waste entering the lagoon.	0%	80%
		Total Control Efficiency	28.0%	85.6%
		Liquid Manure Land Application Mitigations		
☑	☑	Feed according to NRC guidelines	28%	28%
☐	☐	Only apply liquid manure that has been treated with an anaerobic treatment lagoon	0%	0%
		Total Control Efficiency	28.00%	28.00%

Solid Manure Handling				
Measure Proposed?		Mitigation Measure(s) per Emissions Point	NH3 Control Efficiency (%)	
Pre-Project	Post-Project		Pre-Project	Post-Project
		Solid Manure Land Application Mitigations		
☑	☑	Feed according to NRC guidelines	28%	28%
☐	☐	Incorporate all solid manure within 72 hours of land application. **AND** Only apply solid manure that has been treated with an anaerobic treatment lagoon, aerobic lagoon or digester system. **AND** Apply no solid manure with a moisture content of more than 50%	0%	0%
		Total Control Efficiency	28.00%	28.00%

Control Measure	PM10 Control Efficiency
Shaded corrals (milk and dry cows)	16.7%
Shaded corrals (heifers and bulls)	8.3%
Downwind shelterbelts	12.5%
Upwind shelterbelts	10%
Freestall with no exercise pens and non-manure based bedding	90%
Freestall with no exercise pens and manure based bedding	80%
Fibrous layer in dusty areas (i.e. hay, etc.)	10%
Bi-weekly corral/exercise pen scraping and/or manure removal using a pull type manure harvesting equipment in morning hours when moisture in air except during periods of rainy weather	15%
Sprinkling of open corrals/exercise pens	12.5%
Feeding young stock (heifers and calves) near dusk	10%

Pre-Project PM10 Mitigation Measures

Pre-Project PM10 Mitigation Measures

	Housing Name(s) or #(s)	Type of Housing	Type of cow	Total # of cows in Each Housing Structure(s)	Maximum Design Capacity of Each Structure	# of Combined Housing Structures in row	Shaded Corrals	Downwind Shelterbelts	Upwind Shelterbelts	No exercise pens, non-manure bedding	No exercise pens, manure bedding	Fibrous layer	Bi-weekly scraping Corrals/Pens	Sprinkling Corrals/Pens	Feed Young Stock Near Dusk
1	Shade Barn 1	loafing barn	milk cows	700	700	1	☑	☐	☐	☐	☐	☐	☐	☐	☐
2	Shade Barn 2	loafing barn	dry cows			1	☑	☐	☐	☐	☐	☐	☐	☐	☐
3	Shade Barn 3	loafing barn	milk cows	435	435	1	☑	☐	☐	☐	☐	☐	☐	☐	☐
4	Shade Barn 3	loafing barn	support stock	450	450	1	☑	☐	☐	☐	☐	☐	☐	☐	☐
5	Shade Barn 4	loafing barn	support stock	1,150	1,150	1	☑	☐	☐	☐	☐	☐	☐	☐	☐
6	Shade Barn 5	loafing barn	support stock			1	☑	☐	☐	☐	☐	☐	☐	☐	☐
7	Shade Barn 6	loafing barn	support stock			1	☑	☐	☐	☐	☐	☐	☐	☐	☐
8							☐	☐	☐	☐	☐	☐	☐	☐	☐
9							☐	☐	☐	☐	☐	☐	☐	☐	☐
10							☐	☐	☐	☐	☐	☐	☐	☐	☐
11							☐	☐	☐	☐	☐	☐	☐	☐	☐
12							☐	☐	☐	☐	☐	☐	☐	☐	☐
13							☐	☐	☐	☐	☐	☐	☐	☐	☐
14							☐	☐	☐	☐	☐	☐	☐	☐	☐
15							☐	☐	☐	☐	☐	☐	☐	☐	☐
16							☐	☐	☐	☐	☐	☐	☐	☐	☐
			Pre-Project Total # of Cows	2,735											

Pre-Project PM10 Control Efficiencies and Emission Factors

	Housing Name(s) or #(s)	Type of Housing	Type of cow	Total # of cows in Each Housing Structure(s)	Maximum Design Capacity of Each Structure	Uncontrolled EF (lb/hd-yr)	Shaded Corrals	Downwind Shelterbelts	Upwind Shelterbelts	No exercise pens, non-manure bedding	No exercise pens, manure bedding	Fibrous layer	Bi-weekly scraping Corrals/Pens	Sprinkling Corrals/Pens	Feed Young Stock Near Dusk	Controlled EF (lb/hd-yr)
1	Shade Barn 1	loafing barn	milk cows	700	700	2.730										2.73
2	Shade Barn 2	loafing barn	dry cows													
3	Shade Barn 3	loafing barn	milk cows	435	435	2.730										2.73
4	Shade Barn 3	loafing barn	support stock	450	450	5.280										5.28
5	Shade Barn 4	loafing barn	support stock	1,150	1,150	5.280										5.28
6	Shade Barn 5	loafing barn	support stock													
7	Shade Barn 6	loafing barn	support stock													
8																
9																
10																
11																
12																
13																
14																
15																
16																
			Pre-Project Total # of Cows	2,735												

Post-Project PM10 Mitigation Measures

Post-Project PM10 Mitigation Measures

	Housing Name(s) or #(s)	Type of Housing	Type of cow	Total # of cows in Each Housing Structure(s)	Maximum Design Capacity of Each Structure	# of Combined Housing Structures in row	Shaded Corrals	Downwind Shelterbelts	Upwind Shelterbelts	No exercise pens, non-manure bedding	No exercise pens, manure bedding	Fibrous layer	Bi-weekly scraping Corrals/Pens	Sprinkling Corrals/Pens	Feed Young Stock Near Dusk
1	Shade Barn 1	loafing barn	milk cows	1,500	1,500	1	☑	☐	☐	☐	☐	☐	☐	☐	☐
2	Shade Barn 2	loafing barn	dry cows	300	300	1	☑	☐	☐	☐	☐	☐	☐	☐	☐
3	Shade Barn 3	loafing barn	milk cows	1,500	1,500	1	☑	☐	☐	☐	☐	☐	☐	☐	☐
4	Shade Barn 3	loafing barn	dry cows	100	100	1	☑	☐	☐	☐	☐	☐	☐	☐	☐
5	Shade Barn 4	loafing barn	dry cows	100	100	1	☑	☐	☐	☐	☐	☐	☐	☐	☐
6	Shade Barn 4	loafing barn	support stock	400	400	1	☑	☐	☐	☐	☐	☐	☐	☐	☐
7	Shade Barn 5	loafing barn	support stock	50	50	1	☑	☐	☐	☐	☐	☐	☐	☐	☐
8	Shade Barn 6	loafing barn	support stock	50	50	1	☑	☐	☐	☐	☐	☐	☐	☐	☐
9							☐	☐	☐	☐	☐	☐	☐	☐	☐
10							☐	☐	☐	☐	☐	☐	☐	☐	☐
11							☐	☐	☐	☐	☐	☐	☐	☐	☐
12							☐	☐	☐	☐	☐	☐	☐	☐	☐
13							☐	☐	☐	☐	☐	☐	☐	☐	☐
14							☐	☐	☐	☐	☐	☐	☐	☐	☐
15							☐	☐	☐	☐	☐	☐	☐	☐	☐
16							☐	☐	☐	☐	☐	☐	☐	☐	☐
17							☐	☐	☐	☐	☐	☐	☐	☐	☐
18							☐	☐	☐	☐	☐	☐	☐	☐	☐
19							☐	☐	☐	☐	☐	☐	☐	☐	☐
20							☐	☐	☐	☐	☐	☐	☐	☐	☐
21							☐	☐	☐	☐	☐	☐	☐	☐	☐
22							☐	☐	☐	☐	☐	☐	☐	☐	☐
23							☐	☐	☐	☐	☐	☐	☐	☐	☐
24							☐	☐	☐	☐	☐	☐	☐	☐	☐
25							☐	☐	☐	☐	☐	☐	☐	☐	☐
26							☐	☐	☐	☐	☐	☐	☐	☐	☐
27							☐	☐	☐	☐	☐	☐	☐	☐	☐
28							☐	☐	☐	☐	☐	☐	☐	☐	☐
29							☐	☐	☐	☐	☐	☐	☐	☐	☐
30							☐	☐	☐	☐	☐	☐	☐	☐	☐
31							☐	☐	☐	☐	☐	☐	☐	☐	☐
32							☐	☐	☐	☐	☐	☐	☐	☐	☐
33							☐	☐	☐	☐	☐	☐	☐	☐	☐
34							☐	☐	☐	☐	☐	☐	☐	☐	☐
35							☐	☐	☐	☐	☐	☐	☐	☐	☐
36							☐	☐	☐	☐	☐	☐	☐	☐	☐
37							☐	☐	☐	☐	☐	☐	☐	☐	☐
38							☐	☐	☐	☐	☐	☐	☐	☐	☐
39							☐	☐	☐	☐	☐	☐	☐	☐	☐
40							☐	☐	☐	☐	☐	☐	☐	☐	☐

Post-Project PM10 Mitigation Measures for New Housing Units at an Expanding Dairy

	Housing Name(s) or #(s)	Type of Housing	Type of cow	Total # of cows in Each Housing Structure(s)	Maximum Design Capacity of Each Structure	# of Combined Housing Structures in row	Shaded Corrals	Downwind Shelterbelts	Upwind Shelterbelts	No exercise pens, non-manure bedding	No exercise pens, manure bedding	Fibrous layer	Bi-weekly scraping Corrals/Pens	Sprinkling Corrals/Pens	Feed Young Stock Near Dusk
1							☐	☐	☐	☐	☐	☐	☐	☐	☐
2							☐	☐	☐	☐	☐	☐	☐	☐	☐
3							☐	☐	☐	☐	☐	☐	☐	☐	☐
4							☐	☐	☐	☐	☐	☐	☐	☐	☐
5							☐	☐	☐	☐	☐	☐	☐	☐	☐
6							☐	☐	☐	☐	☐	☐	☐	☐	☐
7							☐	☐	☐	☐	☐	☐	☐	☐	☐
8							☐	☐	☐	☐	☐	☐	☐	☐	☐
9							☐	☐	☐	☐	☐	☐	☐	☐	☐
10							☐	☐	☐	☐	☐	☐	☐	☐	☐
11							☐	☐	☐	☐	☐	☐	☐	☐	☐
12							☐	☐	☐	☐	☐	☐	☐	☐	☐
13							☐	☐	☐	☐	☐	☐	☐	☐	☐
14							☐	☐	☐	☐	☐	☐	☐	☐	☐
			Post-Project Total # of Cows	4,000											

Post-Project PM10 Control Efficiencies and Emission Factors

	Housing Name(s) or #(s)	Type of Housing	Type of cow	Total # of cows in Each Housing Structure(s)	Maximum Design Capacity of Each Structure	Uncontrolled EF (lb/hd-yr)	Shaded Corrals	Downwind Shelterbelts	Upwind Shelterbelts	No exercise pens, non-manure bedding	No exercise pens, manure bedding	Fibrous layer	Bi-weekly scraping Corrals/Pens	Sprinkling Corrals/Pens	Feed Young Stock Near Dusk	Controlled EF (lb/hd-yr)
1	Shade Barn 1	loafing barn	milk cows	1,500	1,500	2.730										2.73
2	Shade Barn 2	loafing barn	dry cows	300	300	2.730										2.73
3	Shade Barn 3	loafing barn	milk cows	1,500	1,500	2.730										2.73
4	Shade Barn 3	loafing barn	dry cows	100	100	2.730										2.73
5	Shade Barn 4	loafing barn	dry cows	100	100	2.730										2.73
6	Shade Barn 4	loafing barn	support stock	400	400	5.280										5.28
7	Shade Barn 5	loafing barn	support stock	50	50	5.280										5.28
8	Shade Barn 6	loafing barn	support stock	50	50	5.280										5.28
9																
10																
11																
12																
13																
14																
15																
16																
17																
18																
19																
20																
21																
22																
23																
24																
25																
26																
27																
28																
29																
30																
31																
32																
33																
34																
35																
36																
37																
38																
39																
40																

Post-Project PM10 Control Efficiencies and Emission Factors for New Housing Emissions Units

	Housing Name(s) or #(s)	Type of Housing	Type of cow	Total # of cows in Each Housing Structure(s)	Maximum Design Capacity of Each Structure	Uncontrolled EF (lb/hd-yr)	Shaded Corrals	Downwind Shelterbelts	Upwind Shelterbelts	No exercise pens, non-manure bedding	No exercise pens, manure bedding	Fibrous layer	Bi-weekly scraping Corrals/Pens	Sprinkling Corrals/Pens	Feed Young Stock Near Dusk	Controlled EF (lb/hd-yr)
1																
2																
3																
4																
5																
6																
7																
8																
9																
10																
11																
12																
13																
14																

Increase in Emissions

SSIPE (lb/yr)							
	NOx	SOx	PM10	CO	VOC	NH3	H2S
Milking Parlor	0	0	0	0	746	255	0
Cow Housing	0	0	648	0	15,766	19,155	0
Liquid Manure	0	0	0	0	4,075	6,519	0
Solid Manure	0	0	0	0	824	5,168	0
Feed Handling	0	0	0	0	10,179	0	0
Total	**0**	**0**	**648**	**0**	**31,589**	**31,097**	**0**

Total Daily Change in Emissions (lb/day)							
	NOx	SOx	PM10	CO	VOC	NH3	H2S
Milking Parlor	0.0	0.0	0.0	0.0	2.10	0.70	0.0
Cow Housing	0.0	0.0	1.60	0.0	43.40	52.30	0.0
Liquid Manure	0.0	0.0	0.0	0.0	11.10	17.90	0.0
Solid Manure	0.0	0.0	0.0	0.0	2.30	14.20	0.0
Feed Handling	0.0	0.0	0.0	0.0	27.90	0.00	0.0
Total	**0.0**	**0.0**	**1.6**	**0.0**	**86.80**	**85.10**	**0.0**

Total Annual Change in Non-Fugitive Emissions (Major Source Emissions) (lb/yr)							
	NOx	SOx	PM10	CO	VOC	NH3	H2S
Milking Parlor	0	0	0	0	0	0	0
Cow Housing	0	0	0	0	0	0	0
Liquid Manure	0	0	0	0	1,963	0	0
Solid Manure	0	0	0	0	0	0	0
Feed Handling	0	0	0	0	0	0	0
Total	**0**	**0**	**0**	**0**	**1,963**	**0**	**0**

Name	Cow Housing Summary				
Applicability	Use this spreadsheet to enter data from the Engineer's Dairy Calculator. Entries here will be linked to other worksheets. After completion, proceed to RMR worksheet for further entries.				
Author or updater	Matthew Cegielski	*Last Update*	September 24, 2018		
Facility:	Azevedo Dairy #2		0	Not Set	
ID#:					
Project #:					

*Notes:

Potential to Emit - Cow Housing

Housing Name(s) or #(s)	Type of Cow	# of Cows	VOC (lb/hr)	VOC (lb/yr)	NH_3 (lb/hr)	NH_3 (lb/yr)	PM_{10} (lb/hr)	PM_{10} (lb/yr)
Loafing Barn 1	Milk	1500	0.86	7552.00	0.92	8075.00	0.25	2184.00
Loafing Barn 2	Dry	300	0.18	1602.00	0.40	3542.00	0.09	819.00
Loafing Barn 3	Milk/Dry	1600	1.00	8743.00	1.70	14889.00	0.09	804.00
Loafing Barn 4	Dry/Support Stock	500	-0.29	-2541.00	-0.91	-7963.00	-0.42	-3687.00
Loafing Barn 5	Support Stock	50	0.03	205.00	0.03	306.00	0.03	264.00
Loafing Barn 6	Support Stock	50	0.03	205.00	0.03	306.00	0.03	264.00

Copy and paste values from the corresponding table in the Engineer Dairy Calculator's RMR Summary worksheet. Paste values only with matched destination formatting. Ensure the same names are lined up by row number. Zero and null entries will be highlighted in red after entry.

SSIPE RMR Summary							
	PM10 lb/hr	PM10 lb/yr	VOC lb/hr	VOC lb/yr	NH3 lb/hr	NH3 lb/yr	H2S lb/yr
Milking Parlor	-	-	0.09	746	0.03	255	-
Cow Housing	0.1	648	1.80	15,766	2.19	19,155	-
Liquid Manure	-	-	0.47	4,075	0.74	6,519	-
Solid Manure	-	-	0.09	824	0.59	5,168	-
Feed Handling	-	-	1.16	10,179	-	-	-
Lagoon/Storage Pond	-	-	0.23	2,008	-0.60	-5,256	0
Land Application (Liquid)	-	-	0.24	2,117	1.34	11,753	-
Land Application (Solid)	-	-	0.06	511	0.31	2,738	-
Solid Manure Storage	-	-	0.04	329	0.28	2,446	-

SSIPE Total Herd Summary	
Change in Milk Cows	1,865
Change in Dairy Head	1,265
Change in Dairy Head (Flushed)	1,265

PM_{10} based Agricultural Emissions from Operations generating Dust from Livestock Soil

Use this spreadsheet when the emissions are from a Feedlot Soil sources or Cow Housing and the PM_{10} rates are known (e.g. Dairy operations). Ammonia and PM_{10} Emission rates linked to Cow Housing worksheet. No entries required on this worksheet. Zero and null entries will be highlighted in red after entry.

Author or updater	Matthew Cegielski
Last Update	September 24, 2018
Facility:	Azevedo Dairy #2
ID#:	0
Project #:	0

Formula

Emission are calculated by the multiplication of the PM_{10} Rates and the Emission Factors.

			Loafing Barn 1		Loafing Barn 2		Loafing Barn 3		Loafing Barn 4		Loafing Barn 5		Loafing Barn 6	
			lb/hr	lb/yr	lb/hr	lb/yr	lb/hr	lb/yr	lb/hr	lb/yr	lb/hr	lb/yr	lb/hr	lb/yr
PM_{10} Emissions Rates			2.50E-01	2.18E+03	9.17E-02	8.19E+02	8.75E-02	8.04E+02	0.00E+00	0.00E+00	2.92E-02	2.64E+02	2.92E-02	2.64E+02
Substances	**CAS#**	**Dust* lb/lb PM_{10}**	**LB/HR**	**LB/YR**	**LB/HR**	**LB/YR**	**LB/HR**	**LB/YR**	**LB/HR**	**LB/YR**	**LB/HR**	**LB/YR**	**LB/HR**	**LB/YR**
Aluminum	**7429905**	4.66E-02	1.17E-02	1.02E+02	4.27E-03	3.82E+01	4.08E-03	3.75E+01	0.00E+00	0.00E+00	1.36E-03	1.23E+01	1.36E-03	1.23E+01
Antimony	**7440360**	1.90E-05	4.75E-06	4.15E-02	1.74E-06	1.56E-02	1.66E-06	1.53E-02	0.00E+00	0.00E+00	5.54E-07	5.02E-03	5.54E-07	5.02E-03
Arsenic	**7440382**	1.60E-05	4.00E-06	3.49E-02	1.47E-06	1.31E-02	1.40E-06	1.29E-02	0.00E+00	0.00E+00	4.67E-07	4.22E-03	4.67E-07	4.22E-03
Barium	**7440393**	4.69E-04	1.17E-04	1.02E+00	4.30E-05	3.84E-01	4.10E-05	3.77E-01	0.00E+00	0.00E+00	1.37E-05	1.24E-01	1.37E-05	1.24E-01
Bromine	**7726956**	4.40E-05	1.10E-05	9.61E-02	4.03E-06	3.60E-02	3.85E-06	3.54E-02	0.00E+00	0.00E+00	1.28E-06	1.16E-02	1.28E-06	1.16E-02
Chromium	**7440473**	1.40E-05	3.50E-06	3.06E-02	1.28E-06	1.15E-02	1.23E-06	1.13E-02	0.00E+00	0.00E+00	4.08E-07	3.70E-03	4.08E-07	3.70E-03
Copper	**7440508**	1.32E-04	3.30E-05	2.88E-01	1.21E-05	1.08E-01	1.16E-05	1.06E-01	0.00E+00	0.00E+00	3.85E-06	3.48E-02	3.85E-06	3.48E-02
Hexavalent Chromium**	**18540299**	7.00E-07	1.75E-07	1.53E-03	6.42E-08	5.73E-04	6.12E-08	5.63E-04	0.00E+00	0.00E+00	2.04E-08	1.85E-04	2.04E-08	1.85E-04
Lead	**7439921**	3.50E-05	8.75E-06	7.64E-02	3.21E-06	2.87E-02	3.06E-06	2.81E-02	0.00E+00	0.00E+00	1.02E-06	9.24E-03	1.02E-06	9.24E-03
Manganese	**7439965**	7.59E-04	1.90E-04	1.66E+00	6.96E-05	6.22E-01	6.64E-05	6.10E-01	0.00E+00	0.00E+00	2.21E-05	2.00E-01	2.21E-05	2.00E-01
Mercury	**7439976**	4.00E-06	1.00E-06	8.74E-03	3.67E-07	3.28E-03	3.50E-07	3.22E-03	0.00E+00	0.00E+00	1.17E-07	1.06E-03	1.17E-07	1.06E-03
Nickel	**7440020**	7.00E-06	1.75E-06	1.53E-02	6.42E-07	5.73E-03	6.12E-07	5.63E-03	0.00E+00	0.00E+00	2.04E-07	1.85E-03	2.04E-07	1.85E-03
Phosphorus	**7723140**	4.01E-02	1.00E-02	8.77E+01	3.68E-03	3.29E+01	3.51E-03	3.23E+01	0.00E+00	0.00E+00	1.17E-03	1.06E+01	1.17E-03	1.06E+01
Selenium	**7782492**	1.00E-06	2.50E-07	2.18E-03	9.17E-08	8.19E-04	8.75E-08	8.04E-04	0.00E+00	0.00E+00	2.92E-08	2.64E-04	2.92E-08	2.64E-04
Sulfates	**9960**	7.28E-03	1.82E-03	1.59E+01	6.68E-04	5.96E+00	6.37E-04	5.86E+00	0.00E+00	0.00E+00	2.12E-04	1.92E+00	2.12E-04	1.92E+00
Vanadium	**7440622**	3.00E-05	7.50E-06	6.55E-02	2.75E-06	2.46E-02	2.63E-06	2.41E-02	0.00E+00	0.00E+00	8.75E-07	7.92E-03	8.75E-07	7.92E-03
Zinc	**7440666**	3.42E-04	8.55E-05	7.47E-01	3.14E-05	2.80E-01	2.99E-05	2.75E-01	0.00E+00	0.00E+00	9.98E-06	9.03E-02	9.98E-06	9.03E-02
Ammonia	**7664417**		9.21E-01	8.08E+03	4.04E-01	3.54E+03	1.70E+00	1.49E+04	0.00E+00	0.00E+00	3.33E-02	3.06E+02	3.33E-02	3.06E+02

Agricultural Miscellaneous Emissions from Dairy Operations (Cow Housing)

Use this spreadsheet to characterize the miscellanous emissions from Dairy sources when VOC rates are known. VOC emission rates linked to Cow Housing worksheet. No entries required on this worksheet. Zero and null entries will be highlighted in red after entry.

Author or updater	Matthew Cegielski
Last Update	September 24, 2018
Facility:	Azevedo Dairy #2
ID#:	0
Project #:	0

Formula

Emissions are calculated by the multiplication of the VOC Rates, and Emission Factors.

			Loafing Barn 1		Loafing Barn 2		Loafing Barn 3		Loafing Barn 4		Loafing Barn 5		Loafing Barn 6	
			lb/hr	lb/yr	lb/hr	lb/yr	lb/hr	lb/yr	lb/hr	lb/yr	lb/hr	lb/yr	lb/hr	lb/yr
VOC Emission Rates			**8.63E-01**	**7,552.0**	**1.83E-01**	**1,602.0**	**1.00E+00**	**8,743.0**	**0.00E+00**	**0.0**	**2.50E-02**	**205.0**	**2.50E-02**	**205.0**
Substances	**CAS#**	**Volatiles (lb/lb VOC)***	**LB/HR**	**LB/YR**	**LB/HR**	**LB/YR**	**LB/HR**	**LB/YR**	**LB/HR**	**LB/YR**	**LB/HR**	**LB/YR**	**LB/HR**	**LB/YR**
1,1,2,2-Tetrachloroethane	79345	8.73E-06	7.53E-06	6.59E-02	1.60E-06	1.40E-02	8.73E-06	7.63E-02	0.00E+00	0.00E+00	2.18E-07	1.79E-03	2.18E-07	8.70E-03
1,1,2-Trichloroethane	79005	2.26E-04	1.95E-04	1.71E+00	4.14E-05	3.62E-01	2.26E-04	1.98E+00	0.00E+00	0.00E+00	5.65E-06	4.63E-02	5.65E-06	4.63E-02
1,2,3-Trichloropropane	96184	2.76E-04	2.38E-04	2.08E+00	5.06E-05	4.42E-01	2.76E-04	2.41E+00	0.00E+00	0.00E+00	6.90E-06	5.66E-02	6.90E-06	5.66E-02
1,2,4-Trichlorobenzene	120821	7.79E-04	6.72E-04	5.88E+00	1.43E-04	1.25E+00	7.79E-04	6.81E+00	0.00E+00	0.00E+00	1.95E-05	1.60E-01	1.95E-05	1.60E-01
1,2-Dibromo-3-chloropropane	96128	4.94E-05	4.26E-05	3.73E-01	9.06E-06	7.91E-02	4.94E-05	4.32E-01	0.00E+00	0.00E+00	1.24E-06	1.01E-02	1.24E-06	1.01E-02
1,2-Dichlorobenzene	95501	5.48E-04	4.73E-04	4.14E+00	1.00E-04	8.78E-01	5.48E-04	4.79E+00	0.00E+00	0.00E+00	1.37E-05	1.12E-01	1.37E-05	1.12E-01
1,3-Dichlorobenzene	541731	4.90E-04	4.23E-04	3.70E+00	8.98E-05	7.85E-01	4.90E-04	4.28E+00	0.00E+00	0.00E+00	1.23E-05	1.00E-01	1.23E-05	1.00E-01
1,4 Dioxane	123911	1.41E-03	1.22E-03	1.06E+01	2.59E-04	2.26E+00	1.41E-03	1.23E+01	0.00E+00	0.00E+00	3.53E-05	2.89E-01	3.53E-05	2.89E-01
1,4-Dichlorobenzene	106467	5.19E-04	4.48E-04	3.92E+00	9.52E-05	8.31E-01	5.19E-04	4.54E+00	0.00E+00	0.00E+00	1.30E-05	1.06E-01	1.30E-05	1.06E-01
Acetaldehyde	75070	2.41E-03	2.08E-03	1.82E+01	4.42E-04	3.86E+00	2.41E-03	2.11E+01	0.00E+00	0.00E+00	6.03E-05	4.94E-01	6.03E-05	4.94E-01
Acrylonitrile	107131	2.43E-04	2.10E-04	1.84E+00	4.46E-05	3.89E-01	2.43E-04	2.12E+00	0.00E+00	0.00E+00	6.08E-06	4.98E-02	6.08E-06	4.98E-02
Benzene	71432	3.19E-04	2.75E-04	2.41E+00	5.85E-05	5.11E-01	3.19E-04	2.79E+00	0.00E+00	0.00E+00	7.98E-06	6.54E-02	7.98E-06	6.54E-02
Benzyl chloride	100447	2.89E-04	2.49E-04	2.18E+00	5.30E-05	4.63E-01	2.89E-04	2.53E+00	0.00E+00	0.00E+00	7.23E-06	5.92E-02	7.23E-06	5.92E-02
Butyraldehyde	123728	1.14E-04	9.83E-05	8.61E-01	2.09E-05	1.83E-01	1.14E-04	9.97E-01	0.00E+00	0.00E+00	2.85E-06	2.34E-02	2.85E-06	2.34E-02
Carbon Disulfide	75150	2.49E-03	2.15E-03	1.88E+01	4.57E-04	3.99E+00	2.49E-03	2.18E+01	0.00E+00	0.00E+00	6.23E-05	5.10E-01	6.23E-05	5.10E-01
Carbon tetrachloride	56235	5.87E-05	5.06E-05	4.43E-01	1.08E-05	9.40E-02	5.87E-05	5.13E-01	0.00E+00	0.00E+00	1.47E-06	1.20E-02	1.47E-06	1.20E-02
Chlorobenzene	108907	2.72E-04	2.35E-04	2.05E+00	4.99E-05	4.36E-01	2.72E-04	2.38E+00	0.00E+00	0.00E+00	6.80E-06	5.58E-02	6.80E-06	5.58E-02
Chloroform	67663	1.31E-04	1.13E-04	9.89E-01	2.40E-05	2.10E-01	1.31E-04	1.15E+00	0.00E+00	0.00E+00	3.28E-06	2.69E-02	3.28E-06	2.69E-02
Chloromethane	74873	7.93E-04	6.84E-04	5.99E+00	1.45E-04	1.27E+00	7.93E-04	6.93E+00	0.00E+00	0.00E+00	1.98E-05	1.63E-01	1.98E-05	1.63E-01
Crotonaldehyde	4170303	1.41E-04	1.22E-04	1.06E+00	2.59E-05	2.26E-01	1.41E-04	1.23E+00	0.00E+00	0.00E+00	3.53E-06	2.89E-02	3.53E-06	2.89E-02
Cyclohexane	110827	6.83E-03	5.89E-03	5.16E+01	1.25E-03	1.09E+01	6.83E-03	5.97E+01	0.00E+00	0.00E+00	1.71E-04	1.40E+00	1.71E-04	1.40E+00
Ethyl Chloride	75003	2.39E-04	2.06E-04	1.80E+00	4.38E-05	3.83E-01	2.39E-04	2.09E+00	0.00E+00	0.00E+00	5.98E-06	4.90E-02	5.98E-06	4.90E-02
Ethylbenzene	100414	3.47E-04	2.99E-04	2.62E+00	6.36E-05	5.56E-01	3.47E-04	3.03E+00	0.00E+00	0.00E+00	8.68E-06	7.11E-02	8.68E-06	7.11E-02
Ethylene Dibromide (EDB)	106934	3.06E-04	2.64E-04	2.31E+00	5.61E-05	4.90E-01	3.06E-04	2.68E+00	0.00E+00	0.00E+00	7.65E-06	6.27E-02	7.65E-06	6.27E-02
Ethylene Dichloride (EDC)	107062	5.89E-05	5.08E-05	4.45E-01	1.08E-05	9.44E-02	5.89E-05	5.15E-01	0.00E+00	0.00E+00	1.47E-06	1.21E-02	1.47E-06	1.21E-02
Formaldehyde	50000	3.98E-04	3.43E-04	3.01E+00	7.30E-05	6.38E-01	3.98E-04	3.48E+00	0.00E+00	0.00E+00	9.95E-06	8.16E-02	9.95E-06	8.16E-02
Hexane	110543	8.12E-04	7.00E-04	6.13E+00	1.49E-04	1.30E+00	8.12E-04	7.10E+00	0.00E+00	0.00E+00	2.03E-05	1.66E-01	2.03E-05	1.66E-01
Isopropyl Alchol	67630	1.62E-03	1.40E-03	1.22E+01	2.97E-04	2.60E+00	1.62E-03	1.42E+01	0.00E+00	0.00E+00	4.05E-05	3.32E-01	4.05E-05	3.32E-01
Isopropylbenzene (Cumene)	98828	5.61E-05	4.84E-05	4.24E-01	1.03E-05	8.99E-02	5.61E-05	4.90E-01	0.00E+00	0.00E+00	1.40E-06	1.15E-02	1.40E-06	1.15E-02
Methyl Ethyl Ketone (2-butanone)	78933	1.46E-02	1.26E-02	1.10E+02	2.68E-03	2.34E+01	1.46E-02	1.28E+02	0.00E+00	0.00E+00	3.65E-04	2.99E+00	3.65E-04	2.99E+00
Methyl Isobutyl Ketone	108101	7.09E-04	6.12E-04	5.35E+00	1.30E-04	1.14E+00	7.09E-04	6.20E+00	0.00E+00	0.00E+00	1.77E-05	1.45E-01	1.77E-05	1.45E-01
Napthalene	91203	1.16E-03	1.00E-03	8.76E+00	2.13E-04	1.86E+00	1.16E-03	1.01E+01	0.00E+00	0.00E+00	2.90E-05	2.38E-01	2.90E-05	2.38E-01
Perchloroethylene	127184	6.51E-04	5.61E-04	4.92E+00	1.19E-04	1.04E+00	6.51E-04	5.69E+00	0.00E+00	0.00E+00	1.63E-05	1.33E-01	1.63E-05	1.33E-01
Styrene	100425	3.59E-04	3.10E-04	2.71E+00	6.58E-05	5.75E-01	3.59E-04	3.14E+00	0.00E+00	0.00E+00	8.98E-06	7.36E-02	8.98E-06	7.36E-02
t-1,4-Dichloro-2-butene	764410	8.92E-04	7.69E-04	6.74E+00	1.64E-04	1.43E+00	8.92E-04	7.80E+00	0.00E+00	0.00E+00	2.23E-05	1.83E-01	2.23E-05	1.83E-01
Toluene	108883	1.07E-03	9.23E-04	8.08E+00	1.96E-04	1.71E+00	1.07E-03	9.36E+00	0.00E+00	0.00E+00	2.68E-05	2.19E-01	2.68E-05	2.19E-01
Trichlorofluoromethane*	75694	1.08E-07	9.32E-08	8.16E-04	1.98E-08	1.73E-04	1.08E-07	9.44E-04	0.00E+00	0.00E+00	2.70E-09	2.21E-05	2.70E-09	2.21E-05
Vinyl acetate	108054	1.97E-03	1.70E-03	1.49E+01	3.61E-04	3.16E+00	1.97E-03	1.72E+01	0.00E+00	0.00E+00	4.93E-05	4.04E-01	4.93E-05	4.04E-01
Xylenes	1330207	1.80E-03	1.55E-03	1.36E+01	3.30E-04	2.88E+00	1.80E-03	1.57E+01	0.00E+00	0.00E+00	4.50E-05	3.69E-01	4.50E-05	3.69E-01

Name	Agricultural Miscellaneous Emissions from Dairy Operations (Milk Parlors)					
Applicability	Use this spreadsheet to characterize the miscellanous emissions from Dairy sources when VOC rates are known. VOC emission rates linked to RMR worksheet. Enter VOC and NH_3 rates if there is more than one Milk Parlor.					
Author or updater	Matthew Cegielski		*Last Update*	August 26, 2016		
Facility:	Azevedo Dairy #2					
ID#:	0					
Project #:	0					
More than one Milk Parlor?	N		**Formula**			
Inputs	VOC lb/yr	NH_3 lb/yr	Select N or Y from the dropdown. If there is more than one Milk Parlor, enter VOC and NH_3 rates. Toxic emissions are calculated by the multiplication of the VOC Rates and Emission Factors.			
Milk Parlor 1	746	255				
Milk Parlor 2			lb/hr	lb/yr	lb/hr	lb/yr
VOC Emission Rates			**8.52E-02**	**7.46E+02**	**0.00E+00**	**0.00E+00**

Substances	CAS#	Toxic EF's (lb/lb VOC)*	LB/HR	LB/YR	LB/HR	LB/YR
1,1,2,2-Tetrachloroethane	**79345**	8.73E-06	7.43E-07	6.51E-03	0.00E+00	0.00E+00
1,1,2-Trichloroethane	**79005**	2.26E-04	1.92E-05	1.69E-01	0.00E+00	0.00E+00
1,2,3-Trichloropropane	**96184**	2.76E-04	2.35E-05	2.06E-01	0.00E+00	0.00E+00
1,2,4-Trichlorobenzene	**120821**	7.79E-04	6.63E-05	5.81E-01	0.00E+00	0.00E+00
1,2-Dibromo-3-chloropropane	**96128**	4.94E-05	4.21E-06	3.69E-02	0.00E+00	0.00E+00
1,2-Dichlorobenzene	**95501**	5.48E-04	4.67E-05	4.09E-01	0.00E+00	0.00E+00
1,3-Dichlorobenzene	**541731**	4.90E-04	4.17E-05	3.66E-01	0.00E+00	0.00E+00
1,4 Dioxane	**123911**	1.41E-03	1.20E-04	1.05E+00	0.00E+00	0.00E+00
1,4-Dichlorobenzene	**106467**	5.19E-04	4.42E-05	3.87E-01	0.00E+00	0.00E+00
Acetaldehyde	**75070**	2.41E-03	2.05E-04	1.80E+00	0.00E+00	0.00E+00
Acrylonitrile	**107131**	2.43E-04	2.07E-05	1.81E-01	0.00E+00	0.00E+00
Benzene	**71432**	3.19E-04	2.72E-05	2.38E-01	0.00E+00	0.00E+00
Benzyl chloride	**100447**	2.89E-04	2.46E-05	2.16E-01	0.00E+00	0.00E+00
Butyraldehyde	**123728**	1.14E-04	9.71E-06	8.50E-02	0.00E+00	0.00E+00
Carbon Disulfide	**75150**	2.49E-03	2.12E-04	1.86E+00	0.00E+00	0.00E+00
Carbon tetrachloride	**56235**	5.87E-05	5.00E-06	4.38E-02	0.00E+00	0.00E+00
Chlorobenzene	**108907**	2.72E-04	2.32E-05	2.03E-01	0.00E+00	0.00E+00
Chloroform	**67663**	1.31E-04	1.12E-05	9.77E-02	0.00E+00	0.00E+00
Chloromethane	**74873**	7.93E-04	6.75E-05	5.92E-01	0.00E+00	0.00E+00
Crotonaldehyde	**4170303**	1.41E-04	1.20E-05	1.05E-01	0.00E+00	0.00E+00
Cyclohexane	**110827**	6.83E-03	5.82E-04	5.10E+00	0.00E+00	0.00E+00
Ethyl Chloride	**75003**	2.39E-04	2.04E-05	1.78E-01	0.00E+00	0.00E+00
Ethylbenzene	**100414**	3.47E-04	2.96E-05	2.59E-01	0.00E+00	0.00E+00
Ethylene Dibromide (EDB)	**106934**	3.06E-04	2.61E-05	2.28E-01	0.00E+00	0.00E+00
Ethylene Dichloride (EDC)	**107062**	5.89E-05	5.02E-06	4.39E-02	0.00E+00	0.00E+00
Formaldehyde	**50000**	3.98E-04	3.39E-05	2.97E-01	0.00E+00	0.00E+00
Hexane	**110543**	8.12E-04	6.91E-05	6.06E-01	0.00E+00	0.00E+00
Isopropyl Alchol	**67630**	1.62E-03	1.38E-04	1.21E+00	0.00E+00	0.00E+00
Isopropylbenzene (Cumene)	**98828**	5.61E-05	4.78E-06	4.19E-02	0.00E+00	0.00E+00
Methyl Ethyl Ketone (2-butanone)	**78933**	1.46E-02	1.24E-03	1.09E+01	0.00E+00	0.00E+00
Methyl Isobutyl Ketone	**108101**	7.09E-04	6.04E-05	5.29E-01	0.00E+00	0.00E+00
Napthalene	**91203**	1.16E-03	9.88E-05	8.65E-01	0.00E+00	0.00E+00
Perchloroethylene	**127184**	6.51E-04	5.54E-05	4.86E-01	0.00E+00	0.00E+00
Styrene	**100425**	3.59E-04	3.06E-05	2.68E-01	0.00E+00	0.00E+00
t-1,4-Dichloro-2-butene	**764410**	8.92E-04	7.60E-05	6.65E-01	0.00E+00	0.00E+00
Toluene	**108883**	1.07E-03	9.11E-05	7.98E-01	0.00E+00	0.00E+00
Trichlorofluoromethane*	**75694**	1.08E-07	9.20E-09	8.06E-05	0.00E+00	0.00E+00
Vinyl acetate	**108054**	1.97E-03	1.68E-04	1.47E+00	0.00E+00	0.00E+00
Xylenes	**1330207**	1.80E-03	1.53E-04	1.34E+00	0.00E+00	0.00E+00
Ammonia	**7664417**		2.91E-02	2.55E+02	0.00E+00	0.0

Name	Agricultural Lagoon Emissions from Dairy Operations
Applicability	Use this spreadsheet when the emissions are from a Dairy Lagoon sources and the VOC rates are known. The VOC rates are linked to the RMR worksheet cells VOC rates in 'Lagoon/Storage Pond row'. Enter values into the Lagoon area calculator on the right to determine area fraction(s). Total ammonia value is linked to the RMR worksheet cells, 'Lagoon/Storage Pond'. Individual Lagoon values are calculated by multiplying the total lagoon ammonia by their area fraction. Entries required in yellow areas, output in gray areas.

Author or updater	Matthew Cegielski	*Last Update*	September 12, 2018	
Facility:	Azevedo Dairy #2			
ID#:	0			
Project #:	0			

Inputs	lb/hr	lb/yr	**Formula**
VOC Rate	0.23	2,008	Emissions are calculated by the multiplication of the VOC rates, area fracton, and emission factors.

			Lagoon Area Fraction		**1.00**					
Substances	**CAS#**	**Emissions Factors lb/VOC***	**LB/HR**	**LB/YR**	**Lagoon LB/HR**	**Lagoon LB/YR**	**Lagoon 2 LB/HR**	**Lagoon 2 LB/YR**	**Lagoon 3 LB/HR**	**Lagoon 3 LB/YR**
1,1,2,2-Tetrachloroethane	**79345**	3.44E-02	7.88E-03	6.90E+01	7.88E-03	6.90E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,1,2-Trichloroethane	**79005**	7.94E-03	1.82E-03	1.59E+01	1.82E-03	1.59E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2,4-Trimethylbenzene	**95636**	2.94E-02	6.73E-03	5.90E+01	6.73E-03	5.90E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2-Dichlorobenzene	**95501**	6.25E-02	1.43E-02	1.25E+02	1.43E-02	1.25E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,3-Dichlorobenzene	**541731**	4.94E-02	1.13E-02	9.91E+01	1.13E-02	9.91E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,3-Dichloropropene	**542756**	7.44E-03	1.70E-03	1.49E+01	1.70E-03	1.49E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,4 Dioxane	**123911**	2.50E-02	5.73E-03	5.02E+01	5.73E-03	5.02E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,4-Dichloro-2-butene	**764410**	6.88E-02	1.58E-02	1.38E+02	1.58E-02	1.38E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,4-Dichlorobenzene	**106467**	5.19E-02	1.19E-02	1.04E+02	1.19E-02	1.04E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Acetaldehyde	**75070**	1.56E-02	3.58E-03	3.14E+01	3.58E-03	3.14E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Acrylonitrile	**107131**	7.31E-03	1.68E-03	1.47E+01	1.68E-03	1.47E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzene	**71432**	2.88E-03	6.59E-04	5.77E+00	6.59E-04	5.77E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzyl chloride	**100447**	3.13E-02	7.16E-03	6.27E+01	7.16E-03	6.27E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Carbon disulfide	**75150**	3.94E-02	9.02E-03	7.90E+01	9.02E-03	7.90E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chlorobenzene	**108907**	1.31E-02	3.01E-03	2.63E+01	3.01E-03	2.63E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cumene	**98828**	1.94E-02	4.44E-03	3.89E+01	4.44E-03	3.89E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cyclohexane	**110827**	8.19E-03	1.88E-03	1.64E+01	1.88E-03	1.64E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ethyl Chloride	**75003**	4.63E-03	1.06E-03	9.28E+00	1.06E-03	9.28E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ethylbenzene	**100414**	1.00E-02	2.29E-03	2.01E+01	2.29E-03	2.01E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ethylene Dibromide (EDB)	**106934**	1.44E-02	3.29E-03	2.89E+01	3.29E-03	2.89E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ethylene Dichloride (EDC)	**107062**	4.06E-03	9.31E-04	8.16E+00	9.31E-04	8.16E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Formaldehyde	**50000**	8.13E-03	1.86E-03	1.63E+01	1.86E-03	1.63E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Hexane	**110543**	4.31E-03	9.88E-04	8.66E+00	9.88E-04	8.66E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Isopropyl Alchol	**67630**	7.50E-03	1.72E-03	1.51E+01	1.72E-03	1.51E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Methyl Ethyl Ketone	**78933**	1.38E-02	3.15E-03	2.76E+01	3.15E-03	2.76E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Methyl Isobutyl Ketone	**108101**	1.13E-02	2.59E-03	2.27E+01	2.59E-03	2.27E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Napthalene	**91203**	1.88E-01	4.30E-02	3.76E+02	4.30E-02	3.76E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Perchloroethylene	**127184**	1.75E-01	4.01E-02	3.51E+02	4.01E-02	3.51E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Styrene	**100425**	1.63E-02	3.72E-03	3.26E+01	3.72E-03	3.26E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Toluene	**108883**	1.25E-02	2.86E-03	2.51E+01	2.86E-03	2.51E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Trichloroethylene	**79016**	1.12E-02	2.56E-03	2.25E+01	2.56E-03	2.25E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Xylenes	**1330207**	1.88E-02	4.30E-03	3.76E+01	4.30E-03	3.76E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ammonia	**7664417**				-6.000E-01	-5.256E+03	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Table 1. Truck Travel: Diesel Particulate Matter Increased Emissions

Type of Vehicles	Source	Round Trip Distance (mi)	Emission Factor (g/mi)	Increase in Trucks/Year	Emissions (lb/yr)	Emissions (lb/day)
Milk Tankers	MTT	0.52	0.02	730	1.25E-02	3.43E-05
Commodity Delivery	CTT	0.67	0.02	1825	4.05E-02	1.11E-04
Manure Transport	SMTT	0.77	0.02	800	2.04E-02	5.58E-05
Silage Hauling	STT	0.00	0.02	0	0.00E+00	0.00E+00
Quarter Mile Off Site	QMTT	0.25	0.02	3355	2.78E-02	7.61E-05

Note 1: Running emission factors for vehicle category "T7 Single Other Class 8" were obtained from the EMFAC2021 Web Database for Merced County (2023) with an Aggregate Fleet Mix Traveling 10 MPH.
Note 2: Increases in trucks/yr is from the Initial Study, page 17

Table 2. Truck Idling: Diesel Particulate Matter Increased Emissions

Type of Vehicles	Source	Emission Factor (g/hr-vehicle)	Minutes Idling/Truck	Increase in Trucks/Year	Emissions (lb/yr)	Emissions (lb/day)
Milk Tankers	MTI	0.002	15	730	8.81E-04	2.41E-06
Commodity Delivery	CTI	0.002	15	1825	2.20E-03	6.03E-06
Manure Transport	SMTI	0.002	15	800	9.65E-04	2.65E-06
Silage Hauling	STI	0.002	15	0	0.00E+00	0.00E+00

Note 1: Running emission factors for vehicle category "T7 Single Other Class 8" were obtained from the EMFAC2021 Web Database for Merced County (2023) with an Aggregate Fleet Mix Idling.
Note 2: Increases in trucks/yr is from the Initial Study, page 17

Table 3. Tractors: Diesel Particulate Matter Increased Emissions

	Source (# Volume Sources)	HP	Load Factor	Hours/day	Days/year	Emission Factor (g/hp-hr)	Emissions (lb/yr)	Emissions (lb/day)
Feed Loading	FLT	173	0.37	4.0	365	1.49E-02	3.07E+00	8.42E-03
Bedding Delivery	FBDT1-6	114	0.37	10.0	24	1.49E-02	1.39E-02	5.78E-04
Manure Scraping	MST1-2	114	0.37	0.0	12	1.49E-02	0.00E+00	0.00E+00
Manure Loading	MLT1-2	173	0.37	4.3	7	1.49E-02	9.02E-03	1.29E-03
Feed Delivery	FBDT1-6	405	0.37	4.0	365	1.49E-02	1.97E-02	5.40E-05

Note1 : Emissions based on EPA's *Nonroad Compression-Ignition* Engines - Exhaust Emission Standards for the appropriate year and HP
https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100OA05.pdf

Note 2: Increase in hours/day was provided by the project applicant

Table 4. Truck Travel: NOx Increased Emissions

	Source	Round Trip Distance (mi)	Emission Factor (g/mi)	Increase in Trucks/Year	Emissions (lb/yr)	Emissions (lb/day)
Milk Tankers	MTT	0.52	6.64	730	5.54E+00	1.52E-02
Commodity Delivery	CTT	0.67	6.64	1825	1.79E+01	4.91E-02
Manure Transport	SMTT	0.77	6.64	800	9.00E+00	2.47E-02
Silage Hauling	STT	0.00	6.64	0	0.00E+00	0.00E+00

Note 1: Running emission factors for vehicle category "T7 Single Other Class 8" were obtained from the EMFAC2021 Web Database for Merced County (2023) with an Aggregate Fleet Mix Traveling 10 MPH.
Note 2: Increases in trucks/yr is from the Initial Study, page 23

Table 5. Truck Idling: NOx Increased Emissions

Type of Vehicles	Source	Emission Factor (g/hr-vehicle)	Minutes Idling/Truck	Increase in Trucks/Year	Emissions (lb/yr)	Emissions (lb/day)
Milk Tankers	MTI	0.94	15	730	3.80E-01	1.04E-03
Commodity Delivery	CTI	0.94	15	1825	9.50E-01	2.60E-03
Manure Transport	SMTI	0.94	15	800	4.16E-01	1.14E-03
Silage Hauling	STI	0.94	15	0	0.00E+00	0.00E+00

Note 1: Running emission factors for vehicle category "T7 Single Other Class 8" were obtained from the EMFAC2021 Web Database for Merced County (2023) with an Aggregate Fleet Mix Idling.
Note 2: Increases in trucks/yr is from the Initial Study, page 23

Table 6. Tractors: NOx Increased Emissions

	Source (# Volume Sources)	HP	Load Factor	Hours/day	Days/Year	Emission Factor (g/hp-hr)	Emissions (lb/yr)	Emissions (lb/day)
Feed Loading	FLT	173	0.37	4.0	365.0	2.98E-01	6.146E+01	1.68E-01
Bedding Delivery	FBDT1-6	114	0.37	10.0	24.0	2.98E-01	2.77E-01	1.16E-02
Manure Scraping	MS1-2	114	0.37	0.0	12.0	2.98E-01	0.00E+00	0.00E+00
Manure Loading	MLT1-2	173	0.37	4.3	7.0	2.98E-01	1.26E+00	1.80E-01
Feed Delivery	FBDT1-6	405	0.37	4.0	365.0	2.98E-01	1.44E+02	3.94E-01

Note1 : Emissions based on EPA's *Nonroad Compression-Ignition* Engines - Exhaust Emission Standards for the appropriate year and HP https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100OA05.pdf
Note 2: Increase in hours/day was provided by the project applicant
Note 3: Load factors from CalEEMod's Appendix D Table 3.3 *OFFROAD Default Horsepower and Load Factors*

Table 7. Truck Travel: SOx Increased Emissions

Type of Vehicles	Source	Round Trip Distance (mi)	Emission Factor (g/mi)	Increase in Trucks/Year	Emissions (lb/yr)	Emissions (lb/day)
Milk Tankers	MTT	0.52	0.03	730	2.45E-02	6.71E-05
Commodity Delivery	CTT	0.67	0.03	1825	7.92E-02	2.17E-04
Manure Transport	SMTT	0.77	0.03	800	3.98E-02	1.09E-04
Silage Hauling	STT	0.00	0.03	0	0.00E+00	0.00E+00

Note 1: Running emission factors for vehicle category "T7 Single Other Class 8" were obtained from the EMFAC2021 Web Database for Merced County (2023) with an Aggregate Fleet Mix Traveling 10 MPH.
Note 2: Increases in trucks/yr is from the Initial Study, page 23

Table 8. Truck Idling: SOx Increased Emissions

Type of Vehicles	Source	Emission Factor (g/hr-vehicle)	Minutes Idling/Truck	Increase in Trucks/Year	Emissions (lb/yr)	Emissions (lb/day)
Milk Tankers	MTI	0.002	15	730	7.51E-04	2.06E-06
Commodity Delivery	CTI	0.002	15	1825	1.88E-03	5.14E-06
Manure Transport	SMTI	0.002	15	800	8.23E-04	2.26E-06
Silage Hauling	STI	0.002	15	0	0.00E+00	0.00E+00

Note 1: Running emission factors for vehicle category "T7 Single Other Class 8" were obtained from the EMFAC2021 Web Database for Merced County (2023) with an Aggregate Fleet Mix Idling.
Note 2: Increases in trucks/yr is from the Initial Study, page 23

Table 9. Tractors: SOx Increase Emissions

	Source (# Volume Sources)	HP	Load Factor	Hours/day	Days/Year	Emission Factor (g/hp-hr)	Emissions (lb/yr)	Emissions (lb/day)
Feed Loading	FLT	173	0.37	4.0	365	5.00E-03	1.03E+00	2.82E-03
Bedding Delivery	FBDT1-6	114	0.37	10.0	24	5.00E-03	4.65E-03	1.94E-04
Manure Scraping	MS1-2	114	0.37	0.0	12	5.00E-03	0.00E+00	0.00E+00
Manure Loading	MLT1-2	173	0.37	4.3	7	5.00E-03	2.12E-02	3.02E-03
Feed Delivery	FBDT1-6	405	0.37	4.0	365	5.00E-03	2.41E+00	6.61E-03

Note1 : Emissions based on CalEEmod's Appendix D, dafualts for the appropriate year and HP
Note 2: Increase in hours/day was provided by the project applicant
Note 3: Load factors from CalEEMod's Appendix D Table 3.3 *OFFROAD Default Horsepower and Load Factors*

Table 10. Truck Travel: CO Increased Emissions

Type of Vehicles	Source	Round Trip Distance (mi)	Emission Factor (g/mi)	Increase in Trucks/Year	Emissions (lb/year)	Emissions (lb/day)
Milk Tankers	MTT	0.52	1.03	730	8.60E-01	2.36E-03
Commodity Delivery	CTT	0.67	1.03	1825	2.78E+00	7.62E-03
Manure Transport	SMTT	0.77	1.03	800	1.40E+00	3.83E-03
Silage Hauling	STT	0.00	1.03	0	0.00E+00	0.00E+00

Note 1: Running emission factors for vehicle category "T7 Single Other Class 8" were obtained from the EMFAC2021 Web Database for Merced County (2023) with an Aggregate Fleet Mix Travelir
Note 2: Increases in trucks/yr is from the Initial Study, page 23

Table 11. Truck Idling: CO Increased Emissions

Type of Vehicles	Source	Emission Factor (g/hr-vehicle)	Minutes Idling/Truck	Increase in Trucks/Year	Emissions (lb/yr)	Emissions (lb/day)
Milk Tankers	MTI	1.08	15	730	4.36E-01	1.19E-03
Commodity Delivery	CTI	1.08	15	1825	1.09E+00	2.98E-03
Manure Transport	SMTI	1.08	15	800	4.78E-01	1.31E-03
Silage Hauling	STI	1.08	15	0	0.00E+00	0.00E+00

Note 1: Running emission factors for vehicle category "T7 Single Other Class 8" were obtained from the EMFAC2021 Web Database for Merced County (2023) with an Aggregate Fleet Mix Idling.
Note 2: Increases in trucks/yr is from the Initial Study, page 23

Table 12. Tractors: CO Increase Emissions

	Source (# Volume Sources)	HP	Load Factor	Hours/day	Days/Year	Emission Factor (g/hp-hr)	Emissions (lb/yr)	Emissions (lb/day)
Feed Loading	FLT	173	0.37	4.0	365	3.73E+00	7.68E+02	2.10E+00
Bedding Delivery	FBDT1-6	114	0.37	10.0	24	3.73E+00	3.47E+00	1.44E-01
Manure Scraping	MS1-2	114	0.37	0.0	12	3.73E+00	0.00E+00	0.00E+00
Manure Loading	MLT1-2	173	0.37	4.3	7	3.73E+00	1.58E+01	2.25E+00
Feed Delivery	FBDT1-6	405	0.37	4.0	365	2.61E+00	1.26E+03	3.45E+00

Note1 : Emissions based on EPA's *Nonroad Compression-Ignition* Engines - Exhaust Emission Standards for the appropriate year and HP
https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100OA05.pdf
Note 2: Increase in hours/day was provided by the project applicant
Note 3: Load factors from CalEEMod's Appendix D Table 3.3 *OFFROAD Default Horsepower and Load Factors*

Table 13. Truck Travel: VOC Increased Emissions

Type of Vehicles	Source	Round Trip Distance (mi)	Emission Factor (g/mi)	Increase in Trucks/Year	Emissions (lb/year)	Emissions (lb/day)
Milk Tankers	MTT	0.52	0.13	730	1.09E-01	2.99E-04
Commodity Delivery	CTT	0.67	0.13	1825	3.54E-01	9.69E-04
Manure Transport	SMTT	0.77	0.13	800	1.78E-01	4.87E-04
Silage Hauling	STT	0.00	0.13	0	0.00E+00	0.00E+00

Note 1: Running emission factors for vehicle category "T7 Single Other Class 8" were obtained from the EMFAC2021 Web Database for Merced County (2023) with an Aggregate Fleet Mix Travelir
Note 2: Increases in trucks/yr is from the Initial Study, page 23

Table 14. Truck Idling: VOC Increased Emissions

Type of Vehicles	Source	Emission Factor (g/hr-vehicle)	Minutes Idling/Truck	Increase in Trucks/Year	Emissions (lb/yr)	Emissions (lb/day)
Milk Tankers	MTI	2.00	15	730	8.06E-01	2.21E-03
Commodity Delivery	CTI	2.00	15	1825	2.02E+00	5.52E-03
Manure Transport	SMTI	2.00	15	800	8.84E-01	2.42E-03
Silage Hauling	STI	2.00	15	0	0.00E+00	0.00E+00

Note 1: Running emission factors for vehicle category "T7 Single Other Class 8" were obtained from the EMFAC2021 Web Database for Merced County (2023) with an Aggregate Fleet Mix Idling.
Note 2: Increases in trucks/yr is from the Initial Study, page 23

Table 15. Tractors: VOC Increase Emissions

	Source (# Volume Sources)	HP	Load Factor	Hours/day	Days/Year	Emission Factor (g/hp-hr)	Emissions (lb/yr)	Emissions (lb/day)
Feed Loading	FLT	173	0.37	4.0	365	1.76E-01	3.63E+01	9.93E-02
Bedding Delivery	FBDT1-6	114	0.37	10.0	24	2.27E-01	2.11E-01	8.80E-03
Manure Scraping	MS1-2	114	0.37	0.0	12	2.27E-01	0.00E+00	0.00E+00
Manure Loading	MLT1-2	173	0.37	4.3	7	1.76E-01	7.45E-01	1.06E-01
Feed Delivery	FBDT1-6	405	0.37	4.0	365	1.50E-01	7.23E+01	1.98E-01

Note1 : Emissions based on CalEEmod's Appendix D, dafualts for the appropriate year and HP
Note 2: Increase in hours/day was provided by the project applicant
Note 3: Load factors from CalEEMod's Appendix D Table 3.3 *OFFROAD Default Horsepower and Load Factors*

APPENDIX B: AERMOD AND HARP2 ELECTRONIC FILES