APPENDIX G

Health Risk Assessment and Ambient Air Quality Analysis

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Health Risk Assessment and Ambient Air Quality Analysis

Vierra Dairy Facility Expansion

23160 W. Williams Ave.
Hilmar, CA 95324
Merced County

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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 Vierra Dairy 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 among the modeled receptors is 14.1 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 0.241 and 0.199, respectively, which is below the significance level for chronic and acute significance level.

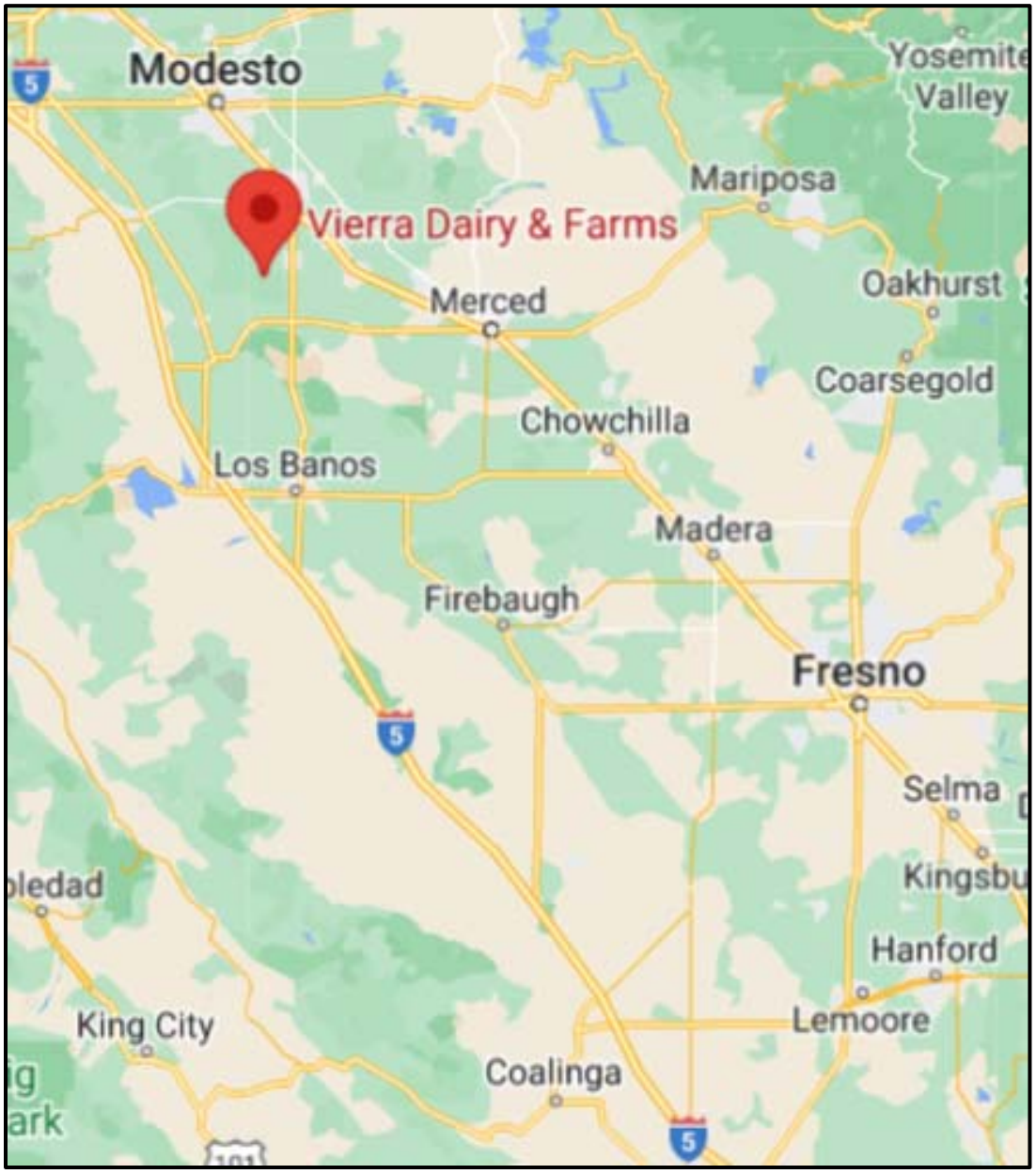
In accordance with the SJVAPCD's *Guide for Assessing and Mitigating Air Quality Impacts* (SJVAPCD 2015a) and polices (SJVAPCD 2015b; SJVAPCD 2015c) the potential health risk attributable to the proposed project is determined to be less than significant.

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 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 that has an ambient air quality standard. 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 Vierra Dairy 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 23160 W. Williams Avenue in Hilmar, California, which is in the County of Merced. The facility will not be located within 1,000 feet of a K-12 school.

The proposed structure construction was modeled as one phase. Construction would include the construction of 481,360 square feet of new structures including two free stall barns, hospital barn, commodity barn additions, shade structure for corrals, and a utility shop. Construction was estimated to take approximately one year.

After modification, the dairy will house approximately 7,117 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	2,650	4,170	1,520
Dry Cows	550	550	0
Bred Heifers 15-24 mos.	797	797	0
Heifers 7-14 mos.	800	800	0
Heifers 4-6 mos.	400	400	0
Calves 0-3 mos.	0	0	0
Bulls	0	0	0
TOTAL	**5,597**	**7,117**	**1,520**

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 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 construction and operational activities associated with this Project would not exceed 100 pounds per day for any criteria pollutant that has an ambient air quality standard. *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}	$PM_{2.5}$
Construction Emissions					
Building Structures	13.02	15.14	0.03	1.95	1.00
Operational Emissions					
Cow Housing	-	-	-	-10.63	-1.21
Mobile Sources	0.24	1.95	0.004	0.01	0.01
Total Average Daily Operational Emissions	**0.24**	**1.95**	**0.004**	**-10.62**	**-1.20**
SJVAPCD AAQA Screening Threshold	**100**	**100**	**100**	**100**	**100**
Is Threshold Exceeded?	No	No	No	No	No

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.

Construction equipment sources include diesel-fueled dozers, loaders, backhoes, excavators, graders, cranes, forklifts, generator sets, concrete/industrial saws, and welders. CalEEMod default equipment listing for general heavy industrial usages were utilized. Default horsepower, daily operating hours, and load factors were also used. Operational mobile sources include a diesel-fueled feed loading tractor, a feed delivery tractor, milk tankers, solids manure removal trucks, and commodity delivery trucks. Other diesel-fueled sources that will not have an increase in usage as a result of the Project are bedding delivery tractor, manure scraping tractor, and manure loading tractor. 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
SMTI	Solid Manure Truck Idling
SMTT	Solid Manure Truck Travel
CTI	Commodity Truck Idling
CTT	Commodity Truck Travel
FLT	Feed Loading Tractor
FDT1-2	Feed Delivery Tractor
Milk1	Milk Parlor
FSB4 and 5	Free Stall Barns (4 and 5)
SLA1	Solid Land Application
LAGOON	Lagoons
SMS	Solid Manure Storage
CONST	Construction Activities

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 at least bi-weekly scraping of corrals or pens, no exercise pens for freestall barns 3, 4, and 5, and 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 actual total construction activities were estimated to be 1 year. Therefore, a one-year exposure HRA was conducted and added to the operational HRA results. Construction emissions will be restricted to occur between the hours of 7am and 5pm.

The calculation worksheets and CalEEMod output files 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 construction activities, 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 delivery tractor, 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, 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 2013 through 2017[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. There is a more densely populated area south of the facility. A total of 153 off-site receptors of residences and workers and 2 on-site receptors were assessed during the preparation of this HRA. There are currently five on-site residences, however, currently only two have children residing in the house. Receptor 1 (on-site residence) currently has children residing in the house, however, since initial modeling results showed a potential to cause a cancer risk to this residence when construction and operational risks are combined the applicant has agreed to either temporarily relocate the employee family to an offsite location or other on-site residence that has a less than significant impact during construction activity or permanently replace the employee family with a family that has no children. Therefore, this receptor would either be exempt from being modeled (no children present) [2] or would only be modeled for operational risk (children present). The results of this analysis assumed children are present at the on-site residence during operational activities

[1] Provided via website, San Joaquin Valley Air Pollution Control District (SJVAPCD), ftp://12.219.204.27/public/Modeling/Meteorological_Data/AERMET_v16216/Modesto_23258/
[2] Personal communication with Leland Villalvazo, SJVAPCD, November 1, 2012.

only which is the worst-case scenario based on the information outlined above. 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. 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 14.3E-06. Cancer risks are primarily attributable to emissions of DBCP through the inhalation pathway. Carcinogenic risks are tabulated by pollutant in **Table 4-4**.

The maximum predicted acute non-cancer hazard index is 0.241. Acute risks are primarily attributable to emissions of ammonia, which affects the respiratory system and eyes. Acute risks are tabulated by pollutant in **Table 4-5**.

The maximum predicted chronic non-cancer hazard index is 0.199. 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
Construction	0.00E-00*	0.00E-00*	0.00E+00
Operational	1.43E-05	1.99E-01	2.41E-01
Total	1.43E-05	1.99E-01	2.441E-01
Receptor #, Name	1, On-Site Residence	1, On-Site Residence	71, Off-Site Worker
UTM Easting (m)	685200.77	685200.77	685132.73
UTM Northing (m)	4140244.33	4140244.33	4140122.61

*Receptor 1 will not be occupied during construction periods (or exempt), however, Receptor 1's operational cancer and chronic risks are still higher than any other receptor's combined construction and operational risk.

Table 4-4. Risk by Pollutant – Maximum Cancer Risk at Receptor #1

CHEM	INHAL	SOIL	DERM	MOTHER	WATER	FISH	CROP	BEEF	DAIRY	PIG	CHICK	EGG	TOTAL
DBCP	4.09E-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	4.09E-06
Acrylonitrile	2.88E-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	2.88E-06
DieselExhPM	1.72E-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	1.72E-06
Naphthalene	1.65E-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	1.65E-06
EDB	9.06E-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	9.06E-07
Benzyl Chloride	5.82E-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	5.82E-07
1,4-Dioxane	4.51E-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	4.51E-07
Benzene	3.78E-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	3.78E-07
Arsenic	5.33E-08	2.88E-07	1.23E-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	3.54E-07
Acetaldehyde	2.85E-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	0.00E+00	0.00E+00	0.00E+00	2.85E-07
p-DiClBenzene	2.46E-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	2.46E-07
Perc	1.62E-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	1.62E-07
1,1,2TriClEthan	1.52E-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	1.52E-07
CCl4	1.04E-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	1.04E-07
Cr(VI)	9.91E-08	4.20E-09	5.97E-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	1.03E-07
Formaldehyde	9.89E-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	9.89E-08
EDC	5.02E-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	5.02E-08
Ethyl Benzene	3.57E-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	3.57E-08
Chloroform	2.95E-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	2.95E-08
TetraClEthane	2.07E-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	2.07E-08
Lead	4.08E-10	3.57E-09	7.61E-11	3.91E-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	4.09E-09
Nickel	1.77E-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	1.77E-09
SUM	1.40E-05	2.96E-07	1.24E-08	3.91E-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	1.43E-05

Table 4-5. Risk by Pollutant – Maximum Acute Noncancer Risk at Receptor #71

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	2.35E-01	0.00E+00	2.35E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.35E-01
Benzene	0.00E+00	0.00E+00	4.15E-03	0.00E+00	0.00E+00	4.15E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.15E-03	0.00E+00	0.00E+00	4.15E-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	2.54E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.54E-03
Acetaldehyde	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.80E-03	0.00E+00	1.80E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.80E-03
Arsenic	6.34E-04	6.34E-04	0.00E+00	0.00E+00	0.00E+00	6.34E-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	6.34E-04
SULFATES	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.83E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.83E-04
Benzyl Chloride	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.23E-04	0.00E+00	4.23E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.23E-04
MEK	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.93E-04	0.00E+00	3.93E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.93E-04
Chloroform	0.00E+00	3.07E-04	0.00E+00	0.00E+00	0.00E+00	3.07E-04	3.07E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.07E-04
Nickel	0.00E+00	0.00E+00	2.78E-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	0.00E+00	0.00E+00	0.00E+00	2.78E-04
Isopropyl Alcoh	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.78E-04	0.00E+00	1.78E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.78E-04
1,4-Dioxane	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.65E-04	0.00E+00	1.65E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.65E-04
CS2	0.00E+00	1.41E-04	0.00E+00	0.00E+00	0.00E+00	1.41E-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	1.41E-04
Toluene	0.00E+00	7.51E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.51E-05	0.00E+00	7.51E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.51E-05
Mercury	0.00E+00	5.29E-05	0.00E+00	0.00E+00	0.00E+00	5.29E-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	5.29E-05
Xylenes	0.00E+00	2.87E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.87E-05	0.00E+00	2.87E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.87E-05
Perc	0.00E+00	1.14E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.14E-05	0.00E+00	1.14E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.14E-05
CCl4	0.00E+00	1.08E-05	0.00E+00	0.00E+00	1.08E-05	1.08E-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	1.08E-05
Copper	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.05E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.05E-05
Vanadium	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.94E-06	0.00E+00	7.94E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.94E-06
Styrene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.00E-06	6.00E-06	0.00E+00	6.00E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.00E-06
SUM	6.34E-04	1.26E-03	4.42E-03	0.00E+00	1.08E-05	5.30E-03	2.39E-01	0.00E+00	2.41E-01	0.00E+00	0.00E+00	4.15E-03	0.00E+00	0.00E+00	2.41E-01

Table 4-6. Risk by Pollutant – Maximum Chronic Noncancer Risk at Receptor #1

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	1.76E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.76E-01
Arsenic	1.79E-02	1.79E-02	0.00E+00	0.00E+00	0.00E+00	1.79E-02	1.79E-02	1.79E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.79E-02
EDB	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.21E-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	6.21E-03
Manganese	0.00E+00	3.21E-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	3.21E-03
Naphthalene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.09E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.09E-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	1.73E-03	0.00E+00	0.00E+00	1.73E-03
Acrylonitrile	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.89E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.89E-04
Formaldehyde	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.17E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.17E-04
DieselExhPM	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.30E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.30E-04
Perc	0.00E+00	0.00E+00	0.00E+00	3.02E-04	3.02E-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	0.00E+00	3.02E-04
Acetaldehyde	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.79E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.79E-04
Nickel	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.27E-06	1.90E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.90E-04	0.00E+00	0.00E+00	1.90E-04
Vinyl Acetate	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.60E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.60E-04
Mercury	0.00E+00	1.43E-04	0.00E+00	1.43E-04	0.00E+00	1.43E-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	1.43E-04
CS2	0.00E+00	5.05E-05	0.00E+00	0.00E+00	0.00E+00	5.05E-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	5.05E-05
Xylenes	0.00E+00	4.17E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.17E-05	0.00E+00	4.17E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.17E-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	4.13E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.13E-05
CCl4	0.00E+00	2.38E-05	0.00E+00	0.00E+00	2.38E-05	2.38E-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	2.38E-05
p-DiClBenzene	0.00E+00	1.05E-05	0.00E+00	1.05E-05	1.05E-05	0.00E+00	1.05E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.05E-05
1,4-Dioxane	7.63E-06	0.00E+00	0.00E+00	7.63E-06	7.63E-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	7.63E-06
Chloroform	0.00E+00	0.00E+00	0.00E+00	7.08E-06	7.08E-06	7.08E-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	7.08E-06
Styrene	0.00E+00	6.47E-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	6.47E-06
Chlorobenzn	0.00E+00	0.00E+00	0.00E+00	4.41E-06	4.41E-06	4.41E-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	4.41E-06
Isopropyl Alcoh	0.00E+00	0.00E+00	0.00E+00	3.75E-06	0.00E+00	3.75E-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	3.75E-06
Ethyl Benzene	0.00E+00	0.00E+00	0.00E+00	2.82E-06	2.82E-06	2.82E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.82E-06	0.00E+00	0.00E+00	0.00E+00	2.82E-06
EDC	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.39E-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	2.39E-06
Hexane	0.00E+00	1.88E-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	1.88E-06
Cr(VI)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.33E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.25E-07	0.00E+00	0.00E+00	1.33E-06
Selenium	7.45E-07	7.45E-07	0.00E+00	0.00E+00	7.45E-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	7.45E-07
Ethyl Chloride	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.29E-07	1.29E-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	1.29E-07
SUM	1.79E-02	2.14E-02	0.00E+00	4.81E-04	3.61E-04	2.43E-02	1.99E-01	1.79E-02	8.31E-05	0.00E+00	2.82E-06	1.92E-03	0.00E+00	0.00E+00	1.99E-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 Vierra Dairy facility for chronic and acute carcinogenic and non- carcinogenic risk is determined to be less than significant 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 that has an ambient air quality standard.

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? no
   Answering "yes" assumes worst case.

Pre-Project Herd Size

Herd	Flushed Freestalls	Scraped Freestalls	Flushed Corrals	Scraped Corrals	Total # of Animals
Milk Cows	2,200		450		2,650
Dry Cows			550		550
Support Stock (Heifers, Calves, and Bulls)			1,997		1,997
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						400	400

Total Herd Summary	
Total Milk Cows	2,650
Total Mature Cows	3,200
Support Stock (Heifers, Calves, and Bulls)	1,997
Total Calves	400
Total Dairy Head	5,597

Pre-Project Silage Information

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

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? no
   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	4,170				4,170
Dry Cows			550		550
Support Stock (Heifers, Calves, and Bulls)			1,997		1,997
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					400		400

Total Herd Summary	
Total Milk Cows	4,170
Total Mature Cows	4,720
Support Stock (Heifers, Calves, and Bulls)	1,997
Total Calves	400
Total Dairy Head	7,117

Post-Project Silage Information

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

PM10 Mitigation Measures and Control Efficiencies

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	Freestall Barn 1	freestall	milk cows	800	800	1	☐	☐	☐	☐	☐	☐	☐	☐	☐
2	Freestall Barn 2	freestall	milk cows	700	700	1	☐	☐	☐	☐	☐	☐	☐	☐	☐
3	Freestall Barn 3	freestall	milk cows	700	700	1	☐	☐	☐	☐	☑	☐	☐	☐	☐
4	Bed Pack Barn 1	saudi style barn	milk cows	450	450	1	☐	☐	☐	☐	☐	☐	☐	☐	☐
5	Bed Pack Barn 1	saudi style barn	dry cows	250	250	1	☐	☐	☐	☐	☐	☐	☐	☐	☐
6	Shade Barn 1	loafing barn	dry cows	300	150	1	☐	☐	☐	☐	☐	☐	☐	☐	☐
7	Shade Barn 1	loafing barn	support stock	850	850	1	☐	☐	☐	☐	☐	☐	☐	☐	☐
8	Pens 1-8	open corral	support stock	1,147	1,147	1	☐	☐	☐	☐	☐	☐	☐	☐	☐
9	Shade Barn 1	loafing barn	calves	400	400	1	☐	☐	☐	☐	☐	☐	☐	☐	☐
		Pre-Project Total # of Cows		5,597											

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	Freestall Barn 1	freestall	milk cows	800	800	1.370										1.37
2	Freestall Barn 2	freestall	milk cows	700	700	1.370										1.37
3	Freestall Barn 3	freestall	milk cows	700	700	1.370					80%					0.27
4	Bed Pack Barn 1	saudi style barn	milk cows	450	450	1.370										1.37
5	Bed Pack Barn 1	saudi style barn	dry cows	250	250	1.370										1.37
6	Shade Barn 1	loafing barn	dry cows	300	150	2.730										2.73
7	Shade Barn 1	loafing barn	support stock	850	850	5.280										5.28
8	Pens 1-8	open corral	support stock	1,147	1,147	10.550										10.55
9	Shade Barn 1	loafing barn	calves	400	400	0.690										0.69
		Pre-Project Total # of Cows		5,597												

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	Freestall Barn 1	freestall	milk cows	800	800	1	☐	☐	☐	☐	☐	☐	☑	☐	☐
2	Freestall Barn 2	freestall	milk cows	700	700	1	☐	☐	☐	☐	☐	☐	☑	☐	☐
3	Freestall Barn 3	freestall	milk cows	700	700	1	☐	☐	☐	☐	☑	☐	☑	☐	☐
4	Bed Pack Barn 1	saudi style barn	milk cows	370	370	1	☐	☐	☐	☐	☐	☐	☑	☐	☐
5	Bed Pack Barn 1	saudi style barn	dry cows	400	400	1	☐	☐	☐	☐	☐	☐	☑	☐	☐
6	Shade Barn 1	loafing barn	dry cows	150	150	1	☐	☐	☐	☐	☐	☐	☑	☐	☐
7	Shade Barn 1	loafing barn	support stock	850	850	1	☐	☐	☐	☐	☐	☐	☑	☐	☐
8	Pens 1-8	open corral	support stock	1,147	1,147	1	☑	☐	☐	☐	☐	☐	☑	☐	☐
9	Shade Barn 1	loafing barn	calves	400	400	1	☐	☐	☐	☐	☐	☐	☑	☐	☐

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	Freestall Barn 4	freestall	milk cows	800	800	1	☐	☐	☐	☐	☑	☐	☑	☐	☐
2	Freestall Barn 5	freestall	milk cows	800	800	1	☐	☐	☐	☐	☑	☐	☑	☐	☐
		Post-Project Total # of Cows		7,117	(The post-project total includes				dairy cows already on-site and			new cows from the expansion.)			

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	Freestall Barn 1	freestall	milk cows	800	800	1.370							15%			1.17
2	Freestall Barn 2	freestall	milk cows	700	700	1.370							15%			1.17
3	Freestall Barn 3	freestall	milk cows	700	700	1.370					80%		15%			0.23
4	Bed Pack Barn 1	saudi style barn	milk cows	370	370	1.370							15%			1.17
5	Bed Pack Barn 1	saudi style barn	dry cows	400	400	1.370							15%			1.17
6	Shade Barn 1	loafing barn	dry cows	150	150	2.730							15%			2.32
7	Shade Barn 1	loafing barn	support stock	850	850	5.280							15%			4.49
8	Pens 1-8	open corral	support stock	1,147	1,147	10.550	8.3%						15%			8.22
9	Shade Barn 1	loafing barn	calves	400	400	0.690							15%			0.59

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	Freestall Barn 4	freestall	milk cows	800	800	1.370					80%		15%			0.23
2	Freestall Barn 5	freestall	milk cows	800	800	1.370					80%		15%			0.23

Pre-Project Potential to Emit - Cow Housing

	Pre-Project Potential to Emit - Cow Housing											
	Housing Name(s) or #(s)	Type of Cow	# of Cows	Controlled VOC EF (lb/hd-yr)	Controlled NH3 EF (lb/hd-yr)	Controlled PM10 EF (lb/hd-yr)	VOC (lb/day)	VOC (lb/yr)	NH3 (lb/day)	NH3 (lb/yr)	PM10 (lb/day)	PM10 (lb/yr)
1	Freestall Barn 1	milk cows	800	10.13	21.13	1.37	22.2	8,104	46.3	16,903	3.0	1,096
2	Freestall Barn 2	milk cows	700	10.13	21.13	1.37	19.4	7,091	40.5	14,790	2.6	959
3	Freestall Barn 3	milk cows	700	10.13	21.13	0.27	19.4	7,091	40.5	14,790	0.5	192
4	Bed Pack Barn 1	milk cows	450	10.13	21.13	1.37	12.5	4,559	26.0	9,508	1.7	617
5	Bed Pack Barn 1	dry cows	250	5.71	10.71	1.37	3.9	1,428	7.3	2,677	0.9	343
6	Shade Barn 1	dry cows	300	5.71	10.71	2.73	4.7	1,713	8.8	3,213	2.2	819
7	Shade Barn 1	support stock	850	4.38	5.54	5.28	10.2	3,723	12.9	4,706	12.3	4,488
8	Pens 1-8	support stock	1,147	4.38	5.54	10.55	13.8	5,024	17.4	6,350	33.2	12,101
9	Shade Barn 1	calves	400	0.8	0.90	0.69	0.9	320	1.0	362	0.8	276
10												
11												
12												
13												
	Pre-Project Total # of Cows		**5,597**				**107.0**	**39,053**	**200.7**	**73,299**	**57.2**	**20,891**

*Multiple emissions units (freestalls, corrals, calf hutch areas, etc.) are combined in these rows.

Pre-Project Totals						
Total # of Cows	VOC (lb/day)	VOC (lb/yr)	NH3 (lb/day)	NH3 (lb/yr)	PM10 (lb/day)	PM10 (lb/yr)
5,597	107.0	39,053	200.7	73,299	57.2	20,891

Calculations:

Annual PE 1 for each pollutant (lb/yr) = Controlled EF (lb/hd-yr) x # of cows (hd)
Daily PE1 for each pollutant (lb/day) = [Controlled EF (lb/hd-yr) x # of cows (hd)] ÷ 365 (day/yr)

Post-Project Potential to Emit - Cow Housing

	Post-Project Potential to Emit - Cow Housing											
	Housing Name(s) or #(s)	Type of Cow	# of Cows	Controlled VOC EF (lb/hd-yr)	Controlled NH3 EF (lb/hd-yr)	Controlled PM10 EF (lb/hd-yr)	VOC (lb/day)	VOC (lb/yr)	NH3 (lb/day)	NH3 (lb/yr)	PM10 (lb/day)	PM10 (lb/yr)
1	Freestall Barn 1	milk cows	800	9.35	21.13	1.17	20.5	7,480	46.3	16,903	2.6	932
2	Freestall Barn 2	milk cows	700	9.35	21.13	1.17	17.9	6,545	40.5	14,790	2.2	816
3	Freestall Barn 3	milk cows	700	9.35	21.13	0.23	17.9	6,545	40.5	14,790	0.4	163
4	Bed Pack Barn 1	milk cows	370	9.35	21.13	1.17	9.5	3,460	21.4	7,817	1.2	431
5	Bed Pack Barn 1	dry cows	400	5.29	10.71	1.17	5.8	2,116	11.7	4,284	1.3	466
6	Shade Barn 1	dry cows	150	5.29	10.71	2.32	2.2	794	4.4	1,606	1.0	348
7	Shade Barn 1	support stock	850	4.06	5.54	4.49	9.5	3,451	12.9	4,706	10.5	3,815
8	Pens 1-8	support stock	1,147	4.06	5.54	8.22	12.8	4,657	17.4	6,350	25.8	9,432
9	Shade Barn 1	calves	400	0.74	0.90	0.59	0.8	296	1.0	362	0.6	235
10												
11												
12												
13												
	Post-Project # of Cows (non-expansion)		**5,517**				**96.9**	**35,344**	**196.1**	**71,608**	**45.6**	**16,638**

*Multiple emissions units (freestalls, corrals, calf hutch areas, etc.) are combined in these rows.

	Post-Project Potential to Emit - Cow Housing: New Housing Units at an Expanding Dairy											
	Housing Name(s) or #(s)	Type of Cow	# of Cows	Controlled VOC EF (lb/hd-yr)	Controlled NH3 EF (lb/hd-yr)	Controlled PM10 EF (lb/hd-yr)	VOC (lb/day)	VOC (lb/yr)	NH3 (lb/day)	NH3 (lb/yr)	PM10 (lb/day)	PM10 (lb/yr)
1	Freestall Barn 4	milk cows	800	9.35	21.13	0.23	20.5	7,480	46.3	16,903	0.5	186
2	Freestall Barn 5	milk cows	800	9.35	21.13	0.23	20.5	7,480	46.3	16,903	0.5	186
	Total # of Cows From Expansion		**1,600**				**41.0**	**14,960**	**92.6**	**33,806**	**1.0**	**372**

*Multiple emissions units (freestalls, corrals, calf hutch areas, etc.) are combined in these rows.

Post-Project Totals						
Total # of Cows	VOC (lb/day)	VOC (lb/yr)	NH3 (lb/day)	NH3 (lb/yr)	PM10 (lb/day)	PM10 (lb/yr)
7,117	137.9	50,304	288.7	105,414	46.6	17,010

Calculations:

Annual PE 2 for each pollutant (lb/yr) = Controlled EF (lb/hd-yr) x # of cows (hd)
Daily PE2 for each pollutant (lb/day) = [Controlled EF (lb/hd-yr) x # of cows (hd)] ÷ 365 (day/yr)

Increase in Emissions

SSIPE (lb/yr)							
	NOx	SOx	PM10	CO	VOC	NH3	H2S
Milking Parlor	0	0	0	0	608	208	0
Cow Housing	0	0	-3,881	0	11,251	32,115	0
Liquid Manure	0	0	0	0	-1,423	-1,726	0
Solid Manure	0	0	0	0	92	4,302	0
Feed Handling	0	0	0	0	6,826	0	0
Total	**0**	**0**	**-3,881**	**0**	**17,354**	**34,898**	**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	1.7	0.6	0.0
Cow Housing	0.0	0.0	-10.6	0.0	30.9	88.0	0.0
Liquid Manure	0.0	0.0	0.0	0.0	-3.9	-4.8	0.0
Solid Manure	0.0	0.0	0.0	0.0	0.2	11.8	0.0
Feed Handling	0.0	0.0	0.0	0.0	18.7	0.0	0.0
Total	**0.0**	**0.0**	**-10.6**	**0.0**	**47.6**	**95.6**	**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	-703	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**	**-703**	**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:	Vierra Dairy			
ID#:		0	Not Set	
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)
Freestall Barn 1	Milk	800	-0.07	-624.00	0.00	0.00	-0.02	-164.00
Freestall Barn 2	Milk	700	-0.06	-546.00	0.00	0.00	-0.02	-143.00
Freestall Barn 3	Milk	700	-0.06	-546.00	0.00	0.00	0.00	-29.00
Bed Pack Barn 1	Milk/Dry	770	-0.05	-411.00	-0.01	-84.00	0.00	-63.00
Shade Barn 1	Dry/Support Stock	1400	-0.14	-1215.00	-0.18	-1607.00	-0.13	-1185.00
Pens 1-8	Support Stock	1147	-0.04	-367.00	0.00	0.00	-0.31	-2669.00
Freestall Barn 4	Milk	800	0.85	7480.00	1.93	16903.00	0.02	186.00
Freestall Barn 5	Milk	800	0.85	7480.00	1.93	16903.00	0.02	186.00

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	-	-	0.07	608	0.02	208	-
Cow Housing	-0.4	-3,881	1.28	11,251	3.67	32,115	-
Liquid Manure	-	-	-0.16	-1,423	-0.20	-1,726	-
Solid Manure	-	-	0.01	92	0.49	4,302	-
Feed Handling	-	-	0.78	6,826	-	-	-
Lagoon/Storage Pond	-	-	-0.08	-694	0.21	1,825	0
Land Application (Liquid)	-	-	-0.08	-730	-0.40	-3,541	-
Land Application (Solid)	-	-	-0.03	-219	0.26	2,300	-
Solid Manure Storage	-	-	0.03	292	0.23	2,008	-

SSIPE Total Herd Summary	
Change in Milk Cows	1,520
Change in Dairy Head	1,520
Change in Dairy Head (Flushed)	1,920

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:	Vierra Dairy
ID#:	0
Project #:	0

Formula

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

Substances	CAS#	Dust* lb/lb PM_{10}	Freestall Barn 1		Freestall Barn 2		Freestall Barn 3		Bed Pack Barn 1		Shade Barn 1		Pens 1-8		Freestall Barn 4		Freestall Barn 5	
			lb/hr	lb/yr	lb/hr	lb/yr	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			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	0.02	186.00	0.02	186.00
			LB/HR	LB/YR	LB/HR	LB/YR	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	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	9.71E-04	8.67E+00	9.71E-04	8.67E+00
Antimony	**7440360**	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	3.96E-07	3.53E-03	3.96E-07	3.53E-03
Arsenic	**7440382**	1.60E-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	3.33E-07	2.98E-03	3.33E-07	2.98E-03
Barium	**7440393**	4.69E-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	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.77E-06	8.72E-02	9.77E-06	8.72E-02
Bromine	**7726956**	4.40E-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	9.17E-07	8.18E-03	9.17E-07	8.18E-03
Chromium	**7440473**	1.40E-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	2.92E-07	2.60E-03	2.92E-07	2.60E-03
Copper	**7440508**	1.32E-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	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.75E-06	2.46E-02	2.75E-06	2.46E-02
Hexavalent Chromium**	**18540299**	7.00E-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	0.00E+00	1.46E-08	1.30E-04	1.46E-08	1.30E-04
Lead	**7439921**	3.50E-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	7.29E-07	6.51E-03	7.29E-07	6.51E-03
Manganese	**7439965**	7.59E-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	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.58E-05	1.41E-01	1.58E-05	1.41E-01
Mercury	**7439976**	4.00E-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	8.33E-08	7.44E-04	8.33E-08	7.44E-04
Nickel	**7440020**	7.00E-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	1.46E-07	1.30E-03	1.46E-07	1.30E-03
Phosphorus	**7723140**	4.01E-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	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.36E-04	7.47E+00	8.36E-04	7.47E+00
Selenium	**7782492**	1.00E-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	2.08E-08	1.86E-04	2.08E-08	1.86E-04
Sulfates	**9960**	7.28E-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	1.52E-04	1.35E+00	1.52E-04	1.35E+00
Vanadium	**7440622**	3.00E-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	6.25E-07	5.58E-03	6.25E-07	5.58E-03
Zinc	**7440666**	3.42E-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	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.13E-06	6.36E-02	7.13E-06	6.36E-02
Ammonia	**7664417**		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	1.93E+00	1.69E+04	1.93E+00	1.69E+04

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:	Vierra Dairy
ID#:	0
Project #:	0

Formula

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

			Freestall Barn 1		Freestall Barn 2		Freestall Barn 3		Bed Pack Barn 1		Shade Barn 1		Pens 1-8		Freestall Barn 4		Freestall Barn 5	
			lb/hr	lb/yr	lb/hr	lb/yr	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			0.00E+00	0.0	0.00E+00	0.0	0.00E+00	0.0	0.00E+00	0.0	0.00E+00	0.0	0.00E+00	0.0	0.85	7480.00	0.85	7480.00
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**	**LB/HR**	**LB/YR**	**LB/HR**	**LB/YR**
1,1,2,2-Tetrachloroethane	79345	8.73E-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	7.46E-06	6.53E-02	7.46E-06	6.53E-02
1,1,2-Trichloroethane	79005	2.26E-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	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.93E-04	1.69E+00	1.93E-04	1.69E+00
1,2,3-Trichloropropane	96184	2.76E-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	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.36E-04	2.06E+00	2.36E-04	2.06E+00
1,2,4-Trichlorobenzene	120821	7.79E-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	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.65E-04	5.83E+00	6.65E-04	5.83E+00
1,2-Dibromo-3-chloropropane	96128	4.94E-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	4.22E-05	3.70E-01	4.22E-05	3.70E-01
1,2-Dichlorobenzene	95501	5.48E-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	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.68E-04	4.10E+00	4.68E-04	4.10E+00
1,3-Dichlorobenzene	541731	4.90E-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	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.19E-04	3.67E+00	4.19E-04	3.67E+00
1,4 Dioxane	123911	1.41E-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	1.20E-03	1.05E+01	1.20E-03	1.05E+01
1,4-Dichlorobenzene	106467	5.19E-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	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.43E-04	3.88E+00	4.43E-04	3.88E+00
Acetaldehyde	75070	2.41E-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	2.06E-03	1.80E+01	2.06E-03	1.80E+01
Acrylonitrile	107131	2.43E-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	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.08E-04	1.82E+00	2.08E-04	1.82E+00
Benzene	71432	3.19E-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	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.72E-04	2.39E+00	2.72E-04	2.39E+00
Benzyl chloride	100447	2.89E-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	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.47E-04	2.16E+00	2.47E-04	2.16E+00
Butyraldehyde	123728	1.14E-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	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.74E-05	8.53E-01	9.74E-05	8.53E-01
Carbon Disulfide	75150	2.49E-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	2.13E-03	1.86E+01	2.13E-03	1.86E+01
Carbon tetrachloride	56235	5.87E-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	5.01E-05	4.39E-01	5.01E-05	4.39E-01
Chlorobenzene	108907	2.72E-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	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.32E-04	2.03E+00	2.32E-04	2.03E+00
Chloroform	67663	1.31E-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	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.12E-04	9.80E-01	1.12E-04	9.80E-01
Chloromethane	74873	7.93E-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	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.77E-04	5.93E+00	6.77E-04	5.93E+00
Crotonaldehyde	4170303	1.41E-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	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.20E-04	1.05E+00	1.20E-04	1.05E+00
Cyclohexane	110827	6.83E-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	5.83E-03	5.11E+01	5.83E-03	5.11E+01
Ethyl Chloride	75003	2.39E-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	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.04E-04	1.79E+00	2.04E-04	1.79E+00
Ethylbenzene	100414	3.47E-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	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.96E-04	2.60E+00	2.96E-04	2.60E+00
Ethylene Dibromide (EDB)	106934	3.06E-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	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.61E-04	2.29E+00	2.61E-04	2.29E+00
Ethylene Dichloride (EDC)	107062	5.89E-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	5.03E-05	4.41E-01	5.03E-05	4.41E-01
Formaldehyde	50000	3.98E-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	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.40E-04	2.98E+00	3.40E-04	2.98E+00
Hexane	110543	8.12E-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	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.94E-04	6.07E+00	6.94E-04	6.07E+00
Isopropyl Alchol	67630	1.62E-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	1.38E-03	1.21E+01	1.38E-03	1.21E+01
Isopropylbenzene (Cumene)	98828	5.61E-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	4.79E-05	4.20E-01	4.79E-05	4.20E-01
Methyl Ethyl Ketone (2-butanone)	78933	1.46E-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	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.25E-02	1.09E+02	1.25E-02	1.09E+02
Methyl Isobutyl Ketone	108101	7.09E-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	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.06E-04	5.30E+00	6.06E-04	5.30E+00
Napthalene	91203	1.16E-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	9.91E-04	8.68E+00	9.91E-04	8.68E+00
Perchloroethylene	127184	6.51E-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	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.56E-04	4.87E+00	5.56E-04	4.87E+00
Styrene	100425	3.59E-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	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.07E-04	2.69E+00	3.07E-04	2.69E+00
t-1,4-Dichloro-2-butene	764410	8.92E-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	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.62E-04	6.67E+00	7.62E-04	6.67E+00
Toluene	108883	1.07E-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	9.14E-04	8.00E+00	9.14E-04	8.00E+00
Trichlorofluoromethane*	75694	1.08E-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	0.00E+00	9.23E-08	8.08E-04	9.23E-08	8.08E-04
Vinyl acetate	108054	1.97E-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	1.68E-03	1.47E+01	1.68E-03	1.47E+01
Xylenes	1330207	1.80E-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	1.54E-03	1.35E+01	1.54E-03	1.35E+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:	Vierra Dairy					
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	608	208				
Milk Parlor 2			lb/hr	lb/yr	lb/hr	lb/yr
VOC Emission Rates			**6.94E-02**	**6.08E+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	6.06E-07	5.31E-03	0.00E+00	0.00E+00
1,1,2-Trichloroethane	**79005**	2.26E-04	1.57E-05	1.37E-01	0.00E+00	0.00E+00
1,2,3-Trichloropropane	**96184**	2.76E-04	1.92E-05	1.68E-01	0.00E+00	0.00E+00
1,2,4-Trichlorobenzene	**120821**	7.79E-04	5.41E-05	4.74E-01	0.00E+00	0.00E+00
1,2-Dibromo-3-chloropropane	**96128**	4.94E-05	3.43E-06	3.00E-02	0.00E+00	0.00E+00
1,2-Dichlorobenzene	**95501**	5.48E-04	3.80E-05	3.33E-01	0.00E+00	0.00E+00
1,3-Dichlorobenzene	**541731**	4.90E-04	3.40E-05	2.98E-01	0.00E+00	0.00E+00
1,4 Dioxane	**123911**	1.41E-03	9.79E-05	8.57E-01	0.00E+00	0.00E+00
1,4-Dichlorobenzene	**106467**	5.19E-04	3.60E-05	3.16E-01	0.00E+00	0.00E+00
Acetaldehyde	**75070**	2.41E-03	1.67E-04	1.47E+00	0.00E+00	0.00E+00
Acrylonitrile	**107131**	2.43E-04	1.69E-05	1.48E-01	0.00E+00	0.00E+00
Benzene	**71432**	3.19E-04	2.21E-05	1.94E-01	0.00E+00	0.00E+00
Benzyl chloride	**100447**	2.89E-04	2.01E-05	1.76E-01	0.00E+00	0.00E+00
Butyraldehyde	**123728**	1.14E-04	7.91E-06	6.93E-02	0.00E+00	0.00E+00
Carbon Disulfide	**75150**	2.49E-03	1.73E-04	1.51E+00	0.00E+00	0.00E+00
Carbon tetrachloride	**56235**	5.87E-05	4.07E-06	3.57E-02	0.00E+00	0.00E+00
Chlorobenzene	**108907**	2.72E-04	1.89E-05	1.65E-01	0.00E+00	0.00E+00
Chloroform	**67663**	1.31E-04	9.09E-06	7.96E-02	0.00E+00	0.00E+00
Chloromethane	**74873**	7.93E-04	5.50E-05	4.82E-01	0.00E+00	0.00E+00
Crotonaldehyde	**4170303**	1.41E-04	9.79E-06	8.57E-02	0.00E+00	0.00E+00
Cyclohexane	**110827**	6.83E-03	4.74E-04	4.15E+00	0.00E+00	0.00E+00
Ethyl Chloride	**75003**	2.39E-04	1.66E-05	1.45E-01	0.00E+00	0.00E+00
Ethylbenzene	**100414**	3.47E-04	2.41E-05	2.11E-01	0.00E+00	0.00E+00
Ethylene Dibromide (EDB)	**106934**	3.06E-04	2.12E-05	1.86E-01	0.00E+00	0.00E+00
Ethylene Dichloride (EDC)	**107062**	5.89E-05	4.09E-06	3.58E-02	0.00E+00	0.00E+00
Formaldehyde	**50000**	3.98E-04	2.76E-05	2.42E-01	0.00E+00	0.00E+00
Hexane	**110543**	8.12E-04	5.64E-05	4.94E-01	0.00E+00	0.00E+00
Isopropyl Alchol	**67630**	1.62E-03	1.12E-04	9.85E-01	0.00E+00	0.00E+00
Isopropylbenzene (Cumene)	**98828**	5.61E-05	3.89E-06	3.41E-02	0.00E+00	0.00E+00
Methyl Ethyl Ketone (2-butanone)	**78933**	1.46E-02	1.01E-03	8.88E+00	0.00E+00	0.00E+00
Methyl Isobutyl Ketone	**108101**	7.09E-04	4.92E-05	4.31E-01	0.00E+00	0.00E+00
Napthalene	**91203**	1.16E-03	8.05E-05	7.05E-01	0.00E+00	0.00E+00
Perchloroethylene	**127184**	6.51E-04	4.52E-05	3.96E-01	0.00E+00	0.00E+00
Styrene	**100425**	3.59E-04	2.49E-05	2.18E-01	0.00E+00	0.00E+00
t-1,4-Dichloro-2-butene	**764410**	8.92E-04	6.19E-05	5.42E-01	0.00E+00	0.00E+00
Toluene	**108883**	1.07E-03	7.43E-05	6.51E-01	0.00E+00	0.00E+00
Trichlorofluoromethane*	**75694**	1.08E-07	7.50E-09	6.57E-05	0.00E+00	0.00E+00
Vinyl acetate	**108054**	1.97E-03	1.37E-04	1.20E+00	0.00E+00	0.00E+00
Xylenes	**1330207**	1.80E-03	1.25E-04	1.09E+00	0.00E+00	0.00E+00
Ammonia	**7664417**		2.37E-02	2.08E+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:	Vierra Dairy		
ID#:	0		
Project #:	0		

Inputs	lb/hr	lb/yr	**Formula**
VOC Rate	-0.08	-694	Emissions are calculated by the multiplication of the VOC rates, area fracton, and emission factors.

			Lagoon Area Fraction		**1.00**		**0.00**		**0.00**	
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	-2.72E-03	-2.38E+01	-2.72E-03	-2.38E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,1,2-Trichloroethane	**79005**	7.94E-03	-6.28E-04	-5.50E+00	-6.28E-04	-5.50E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2,4-Trimethylbenzene	**95636**	2.94E-02	-2.33E-03	-2.04E+01	-2.33E-03	-2.04E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2-Dichlorobenzene	**95501**	6.25E-02	-4.95E-03	-4.33E+01	-4.95E-03	-4.33E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,3-Dichlorobenzene	**541731**	4.94E-02	-3.91E-03	-3.42E+01	-3.91E-03	-3.42E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,3-Dichloropropene	**542756**	7.44E-03	-5.89E-04	-5.16E+00	-5.89E-04	-5.16E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,4 Dioxane	**123911**	2.50E-02	-1.98E-03	-1.73E+01	-1.98E-03	-1.73E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,4-Dichloro-2-butene	**764410**	6.88E-02	-5.44E-03	-4.77E+01	-5.44E-03	-4.77E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,4-Dichlorobenzene	**106467**	5.19E-02	-4.11E-03	-3.60E+01	-4.11E-03	-3.60E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Acetaldehyde	**75070**	1.56E-02	-1.24E-03	-1.08E+01	-1.24E-03	-1.08E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Acrylonitrile	**107131**	7.31E-03	-5.79E-04	-5.07E+00	-5.79E-04	-5.07E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzene	**71432**	2.88E-03	-2.28E-04	-1.99E+00	-2.28E-04	-1.99E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzyl chloride	**100447**	3.13E-02	-2.47E-03	-2.17E+01	-2.47E-03	-2.17E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Carbon disulfide	**75150**	3.94E-02	-3.12E-03	-2.73E+01	-3.12E-03	-2.73E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chlorobenzene	**108907**	1.31E-02	-1.04E-03	-9.10E+00	-1.04E-03	-9.10E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cumene	**98828**	1.94E-02	-1.53E-03	-1.34E+01	-1.53E-03	-1.34E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cyclohexane	**110827**	8.19E-03	-6.48E-04	-5.68E+00	-6.48E-04	-5.68E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ethyl Chloride	**75003**	4.63E-03	-3.66E-04	-3.21E+00	-3.66E-04	-3.21E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ethylbenzene	**100414**	1.00E-02	-7.92E-04	-6.94E+00	-7.92E-04	-6.94E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ethylene Dibromide (EDB)	**106934**	1.44E-02	-1.14E-03	-9.97E+00	-1.14E-03	-9.97E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ethylene Dichloride (EDC)	**107062**	4.06E-03	-3.22E-04	-2.82E+00	-3.22E-04	-2.82E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Formaldehyde	**50000**	8.13E-03	-6.43E-04	-5.63E+00	-6.43E-04	-5.63E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Hexane	**110543**	4.31E-03	-3.41E-04	-2.99E+00	-3.41E-04	-2.99E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Isopropyl Alchol	**67630**	7.50E-03	-5.94E-04	-5.20E+00	-5.94E-04	-5.20E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Methyl Ethyl Ketone	**78933**	1.38E-02	-1.09E-03	-9.54E+00	-1.09E-03	-9.54E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Methyl Isobutyl Ketone	**108101**	1.13E-02	-8.96E-04	-7.85E+00	-8.96E-04	-7.85E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Napthalene	**91203**	1.88E-01	-1.48E-02	-1.30E+02	-1.48E-02	-1.30E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Perchloroethylene	**127184**	1.75E-01	-1.39E-02	-1.21E+02	-1.39E-02	-1.21E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Styrene	**100425**	1.63E-02	-1.29E-03	-1.13E+01	-1.29E-03	-1.13E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Toluene	**108883**	1.25E-02	-9.90E-04	-8.67E+00	-9.90E-04	-8.67E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Trichloroethylene	**79016**	1.12E-02	-8.86E-04	-7.76E+00	-8.86E-04	-7.76E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Xylenes	**1330207**	1.88E-02	-1.48E-03	-1.30E+01	-1.48E-03	-1.30E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ammonia	**7664417**				2.083E-01	1.825E+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	0.21	0.14	1095	7.18E-02	1.97E-04
Commodity Delivery	CTT	0.13	0.14	365	1.43E-02	3.91E-05
Manure Transport	SMTT	0.59	0.14	100	1.81E-02	4.95E-05

Note 1: Running emission factors for vehicle category "T7 Single Other Class 8" were obtained from the EMFAC2021 Web Database for Merced County (2021) 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	0.003	15	1095	1.91E-03	5.22E-06
Commodity Delivery	CTI	0.003	15	365	6.35E-04	1.74E-06
Manure Transport	SMTI	0.003	15	100	1.74E-04	4.77E-07

Note 1: Running emission factors for vehicle category "T7 Single Other Class 8" were obtained from the EMFAC2021 Web Database for Merced County (2021) 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/Year	Emission Factor (g/hp-hr)	Emissions (lb/yr)	Emissions (lb/day)
Feed Loading	FLT	110	0.37	1095	1.49E-02	1.47E+00	4.01E-03
Bedding Delivery		150	0.37	0.00	1.49E-02	0.00E+00	0.00E+00
Manure Scraping		140	0.37	0	1.49E-02	0.00E+00	0.00E+00
Manure Loading		173	0.37	0.00	1.49E-02	0.00E+00	0.00E+00
Feed Delivery	FDT1-2	200	0.37	1095	1.49E-02	2.66E+00	7.30E-03

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/Max hr)
Milk Tankers	MTT	0.21	7.27	1095	3.74E+00	3.41E-03
Commodity Delivery	CTT	0.13	7.27	365	7.42E-01	2.03E-03
Manure Transport	SMTT	0.59	7.27	100	9.40E-01	9.40E-03

Note 1: Running emission factors for vehicle category "T7 Single Other Class 8" were obtained from the EMFAC2021 Web Database for Merced County (2021) with an Aggregate Fleet Mix Traveling 10 MPH.
Note 2: Increases in trucks/yr is from the Initial Study, page 17

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/Max hr)
Milk Tankers	MTI	1.00	15	1095	6.04E-01	5.52E-04
Commodity Delivery	CTI	1.00	15	365	2.01E-01	5.52E-04
Manure Transport	SMTI	1.00	15	100	5.52E-02	5.52E-04

Note 1: Running emission factors for vehicle category "T7 Single Other Class 8" were obtained from the EMFAC2021 Web Database for Merced County (2021) with an Aggregate Fleet Mix Idling.
Note 2: Increases in trucks/yr is from the Initial Study, page 17

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/Max hr)
Feed Loading	FLT	110	0.37	3	365	2.98E-01	2.931E+01	2.68E-02
Bedding Delivery	0	150	0.37	0.00	365	2.98E-01	0.00E+00	0.00E+00
Manure Scraping	0	140	0.37	0.00	52	2.98E-01	0.00E+00	0.00E+00
Manure Loading	0	173	0.37	0.00	52	2.98E-01	0.00E+00	0.00E+00
Feed Delivery	FDT1-2	200	0.37	3	365	2.98E-01	5.33E+01	4.87E-02

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/Max 24-hr)	Emissions (lb/Max 3-hr)	Emissions (lb/Max 1-hr)
Milk Tankers	MTT	0.21	0.03	1095	1.55E-02	2.41E-04	1.42E-05	1.42E-05
Commodity Delivery	CTT	0.13	0.03	365	3.08E-03	8.44E-05	8.44E-06	8.44E-06
Manure Transport	SMTT	0.59	0.03	100	3.90E-03	1.07E-05	3.90E-05	3.90E-05

Note 1: Running emission factors for vehicle category "T7 Single Other Class 8" were obtained from the EMFAC2021 Web Database for Merced County (2021) with an Aggregate Fleet Mix Traveling 10 MPH.
Note 2: Increases in trucks/yr is from the Initial Study, page 17

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/Max 24-hr)	Emissions (lb/Max 3-hr)	Emissions (lb/Max 1-hr)
Milk Tankers	MTI	0.002	15	1095	1.11E-03	3.04E-06	1.01E-06	1.01E-06
Commodity Delivery	CTI	0.002	15	365	3.70E-04	1.01E-06	1.01E-06	1.01E-06
Manure Transport	SMTI	0.002	15	100	1.01E-04	2.78E-07	1.01E-06	1.01E-06

Note 1: Running emission factors for vehicle category "T7 Single Other Class 8" were obtained from the EMFAC2021 Web Database for Merced County (2021) with an Aggregate Fleet Mix Idling.
Note 2: Increases in trucks/yr is from the Initial Study, page 17

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/Max 24-hr)	Emissions (lb/Max 3-hr)	Emissions (lb/Max 1-hr)
Feed Loading	FLT	110	0.37	3	365	5.00E-03	4.91E-01	1.35E-03	1.68E-04	5.61E-05
Bedding Delivery	0	150	0.37	0.00	365	5.00E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Manure Scraping	0	140	0.37	0.00	52	5.00E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Manure Loading	0	173	0.37	0.00	52	5.00E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Feed Delivery	FDT1-2	200	0.37	3	365	5.00E-03	8.93E-01	2.45E-03	3.06E-04	1.02E-04

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/Max 8-hr)	Emissions (lb/Max hr)
Milk Tankers	MTT	0.21	1.30	1095	6.10E-04	6.10E-04
Commodity Delivery	CTT	0.13	1.30	365	3.63E-04	3.63E-04
Manure Transport	SMTT	0.59	1.30	100	1.68E-03	1.68E-03

Note 1: Running emission factors for vehicle category "T7 Single Other Class 8" were obtained from the EMFAC2021 Web Database for Merced County (2021) with an Aggregate Fleet Mix Trave
Note 2: Increases in trucks/yr is from the Initial Study, page 17

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/Max 8-hr)	Emissions (lb/Max hr)
Milk Tankers	MTI	1.01	15	1095	5.55E-04	5.55E-04
Commodity Delivery	CTI	1.01	15	365	5.55E-04	5.55E-04
Manure Transport	SMTI	1.01	15	100	5.55E-04	5.55E-04

Note 1: Running emission factors for vehicle category "T7 Single Other Class 8" were obtained from the EMFAC2021 Web Database for Merced County (2021) with an Aggregate Fleet Mix Idling
Note 2: Increases in trucks/yr is from the Initial Study, page 17

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/Max 8-hr)	Emissions (lb/Max hr)
Feed Loading	FLT	110	0.37	3	365	2.61E+00	2.56E+02	7.03E-01	2.34E-01
Bedding Delivery	0	150	0.37	0.00	365.00	3.73E+00	0.00E+00	0.00E+00	0.00E+00
Manure Scraping	0	140	0.37	0.00	52.00	3.73E+00	0.00E+00	0.00E+00	0.00E+00
Manure Loading	0	173	0.37	0.00	52.00	3.73E+00	0.00E+00	0.00E+00	0.00E+00
Feed Delivery	FDT1-2	200	0.37	3	365	2.61E+00	4.66E+02	1.28E+00	4.26E-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*

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Vierra Dairy

Merced County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Heavy Industry	481.36	1000sqft	5.81	481,360.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	49
Climate Zone	3			**Operational Year**	2023
Utility Company	Pacific Gas and Electric Company				
CO2 Intensity (lb/MWhr)	203.98	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Construction occurs during 12-month period

Trips and VMT -

Grading -

Vehicle Trips - Operational emissions not calculated.

Consumer Products - Operational emissions not calculated.

Area Coating - Operational emissions not calculated.

Landscape Equipment - Operational emissions not calculated.

Energy Use - Operational emissions not calculated.

Water And Wastewater - Operational emissions not calculated.

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Solid Waste - Operational emissions not calculated.

Construction Off-road Equipment Mitigation -

Fleet Mix -

Table Name	Column Name	Default Value	New Value
tblAreaCoating	ReapplicationRatePercent	10	0
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblEnergyUse	LightingElect	2.70	0.00
tblEnergyUse	NT24E	4.16	0.00
tblEnergyUse	NT24NG	3.84	0.00
tblEnergyUse	T24E	1.75	0.00
tblEnergyUse	T24NG	16.86	0.00
tblLandscapeEquipment	NumberSummerDays	180	0
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblSolidWaste	SolidWasteGenerationRate	313.72	0.00
tblVehicleTrips	ST_TR	6.42	0.00
tblVehicleTrips	SU_TR	5.09	0.00
tblVehicleTrips	WD_TR	3.93	0.00
tblWater	IndoorWaterUseRate	58,506,250.00	0.00

2.0 Emissions Summary

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2022	0.1813	1.4933	1.6200	3.4000e-003	0.2680	0.0692	0.3372	0.1114	0.0647	0.1761	0.0000	302.8717	302.8717	0.0505	9.1900e-003	306.8739
2023	0.1138	0.8827	1.1422	2.4800e-003	0.0835	0.0384	0.1219	0.0225	0.0362	0.0586	0.0000	220.7604	220.7604	0.0313	7.5200e-003	223.7843
Maximum	**0.1813**	**1.4933**	**1.6200**	**3.4000e-003**	**0.2680**	**0.0692**	**0.3372**	**0.1114**	**0.0647**	**0.1761**	**0.0000**	**302.8717**	**302.8717**	**0.0505**	**9.1900e-003**	**306.8739**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2022	0.1813	1.4933	1.6200	3.4000e-003	0.1649	0.0692	0.2340	0.0597	0.0647	0.1244	0.0000	302.8715	302.8715	0.0505	9.1900e-003	306.8736
2023	0.1138	0.8827	1.1422	2.4800e-003	0.0835	0.0384	0.1219	0.0225	0.0362	0.0586	0.0000	220.7602	220.7602	0.0313	7.5200e-003	223.7841
Maximum	**0.1813**	**1.4933**	**1.6200**	**3.4000e-003**	**0.1649**	**0.0692**	**0.2340**	**0.0597**	**0.0647**	**0.1244**	**0.0000**	**302.8715**	**302.8715**	**0.0505**	**9.1900e-003**	**306.8736**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**29.35**	**0.00**	**22.47**	**38.61**	**0.00**	**22.02**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**6-1-2022**	**8-31-2022**	0.7775	0.7775
2	**9-1-2022**	**11-30-2022**	0.6696	0.6696
3	**12-1-2022**	**2-28-2023**	0.6235	0.6235
4	**3-1-2023**	**5-31-2023**	0.6058	0.6058
		Highest	0.7775	0.7775

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.9881	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.9881**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.9881	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.9881**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	6/1/2022	6/14/2022	5	10	
2	Grading	Grading	6/15/2022	7/12/2022	5	20	
3	Building Construction	Building Construction	7/13/2022	5/30/2023	5	230	

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Acres of Grading (Site Preparation Phase): 15

Acres of Grading (Grading Phase): 20

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	1	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	7	18.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Grading	6	15.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	106.00	41.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Vierra Dairy - Merced County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Site Preparation - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0983	0.0000	0.0983	0.0505	0.0000	0.0505	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0159	0.1654	0.0985	1.9000e-004		8.0600e-003	8.0600e-003		7.4200e-003	7.4200e-003	0.0000	16.7197	16.7197	5.4100e-003	0.0000	16.8549
Total	**0.0159**	**0.1654**	**0.0985**	**1.9000e-004**	**0.0983**	**8.0600e-003**	**0.1064**	**0.0505**	**7.4200e-003**	**0.0579**	**0.0000**	**16.7197**	**16.7197**	**5.4100e-003**	**0.0000**	**16.8549**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.2 Site Preparation - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.7000e-004	3.9000e-004	4.2700e-003	1.0000e-005	1.1200e-003	1.0000e-005	1.1200e-003	3.0000e-004	1.0000e-005	3.0000e-004	0.0000	0.9459	0.9459	3.0000e-005	3.0000e-005	0.9556
Total	**4.7000e-004**	**3.9000e-004**	**4.2700e-003**	**1.0000e-005**	**1.1200e-003**	**1.0000e-005**	**1.1200e-003**	**3.0000e-004**	**1.0000e-005**	**3.0000e-004**	**0.0000**	**0.9459**	**0.9459**	**3.0000e-005**	**3.0000e-005**	**0.9556**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0383	0.0000	0.0383	0.0197	0.0000	0.0197	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0159	0.1654	0.0985	1.9000e-004		8.0600e-003	8.0600e-003		7.4200e-003	7.4200e-003	0.0000	16.7197	16.7197	5.4100e-003	0.0000	16.8549
Total	**0.0159**	**0.1654**	**0.0985**	**1.9000e-004**	**0.0383**	**8.0600e-003**	**0.0464**	**0.0197**	**7.4200e-003**	**0.0271**	**0.0000**	**16.7197**	**16.7197**	**5.4100e-003**	**0.0000**	**16.8549**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.2 Site Preparation - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.7000e-004	3.9000e-004	4.2700e-003	1.0000e-005	1.1200e-003	1.0000e-005	1.1200e-003	3.0000e-004	1.0000e-005	3.0000e-004	0.0000	0.9459	0.9459	3.0000e-005	3.0000e-005	0.9556
Total	**4.7000e-004**	**3.9000e-004**	**4.2700e-003**	**1.0000e-005**	**1.1200e-003**	**1.0000e-005**	**1.1200e-003**	**3.0000e-004**	**1.0000e-005**	**3.0000e-004**	**0.0000**	**0.9459**	**0.9459**	**3.0000e-005**	**3.0000e-005**	**0.9556**

3.3 Grading - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0708	0.0000	0.0708	0.0343	0.0000	0.0343	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0195	0.2086	0.1527	3.0000e-004		9.4100e-003	9.4100e-003		8.6600e-003	8.6600e-003	0.0000	26.0548	26.0548	8.4300e-003	0.0000	26.2654
Total	**0.0195**	**0.2086**	**0.1527**	**3.0000e-004**	**0.0708**	**9.4100e-003**	**0.0802**	**0.0343**	**8.6600e-003**	**0.0429**	**0.0000**	**26.0548**	**26.0548**	**8.4300e-003**	**0.0000**	**26.2654**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.3 Grading - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.9000e-004	6.5000e-004	7.1200e-003	2.0000e-005	1.8600e-003	1.0000e-005	1.8700e-003	4.9000e-004	1.0000e-005	5.0000e-004	0.0000	1.5766	1.5766	5.0000e-005	5.0000e-005	1.5927
Total	**7.9000e-004**	**6.5000e-004**	**7.1200e-003**	**2.0000e-005**	**1.8600e-003**	**1.0000e-005**	**1.8700e-003**	**4.9000e-004**	**1.0000e-005**	**5.0000e-004**	**0.0000**	**1.5766**	**1.5766**	**5.0000e-005**	**5.0000e-005**	**1.5927**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0276	0.0000	0.0276	0.0134	0.0000	0.0134	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0195	0.2086	0.1527	3.0000e-004		9.4100e-003	9.4100e-003		8.6600e-003	8.6600e-003	0.0000	26.0547	26.0547	8.4300e-003	0.0000	26.2654
Total	**0.0195**	**0.2086**	**0.1527**	**3.0000e-004**	**0.0276**	**9.4100e-003**	**0.0370**	**0.0134**	**8.6600e-003**	**0.0220**	**0.0000**	**26.0547**	**26.0547**	**8.4300e-003**	**0.0000**	**26.2654**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.3 Grading - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.9000e-004	6.5000e-004	7.1200e-003	2.0000e-005	1.8600e-003	1.0000e-005	1.8700e-003	4.9000e-004	1.0000e-005	5.0000e-004	0.0000	1.5766	1.5766	5.0000e-005	5.0000e-005	1.5927
Total	**7.9000e-004**	**6.5000e-004**	**7.1200e-003**	**2.0000e-005**	**1.8600e-003**	**1.0000e-005**	**1.8700e-003**	**4.9000e-004**	**1.0000e-005**	**5.0000e-004**	**0.0000**	**1.5766**	**1.5766**	**5.0000e-005**	**5.0000e-005**	**1.5927**

3.4 Building Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1049	0.9604	1.0064	1.6600e-003		0.0498	0.0498		0.0468	0.0468	0.0000	142.5110	142.5110	0.0341	0.0000	143.3646
Total	**0.1049**	**0.9604**	**1.0064**	**1.6600e-003**		**0.0498**	**0.0498**		**0.0468**	**0.0468**	**0.0000**	**142.5110**	**142.5110**	**0.0341**	**0.0000**	**143.3646**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.4 Building Construction - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	5.3900e-003	0.1299	0.0414	4.9000e-004	0.0151	1.4100e-003	0.0165	4.3600e-003	1.3500e-003	5.7100e-003	0.0000	46.5458	46.5458	2.9000e-004	6.9400e-003	48.6203
Worker	0.0343	0.0281	0.3096	7.5000e-004	0.0808	4.9000e-004	0.0813	0.0215	4.5000e-004	0.0219	0.0000	68.5179	68.5179	2.2000e-003	2.1700e-003	69.2203
Total	**0.0397**	**0.1580**	**0.3510**	**1.2400e-003**	**0.0959**	**1.9000e-003**	**0.0978**	**0.0259**	**1.8000e-003**	**0.0277**	**0.0000**	**115.0637**	**115.0637**	**2.4900e-003**	**9.1100e-003**	**117.8406**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1049	0.9604	1.0064	1.6600e-003		0.0498	0.0498		0.0468	0.0468	0.0000	142.5109	142.5109	0.0341	0.0000	143.3644
Total	**0.1049**	**0.9604**	**1.0064**	**1.6600e-003**		**0.0498**	**0.0498**		**0.0468**	**0.0468**	**0.0000**	**142.5109**	**142.5109**	**0.0341**	**0.0000**	**143.3644**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.4 Building Construction - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	5.3900e-003	0.1299	0.0414	4.9000e-004	0.0151	1.4100e-003	0.0165	4.3600e-003	1.3500e-003	5.7100e-003	0.0000	46.5458	46.5458	2.9000e-004	6.9400e-003	48.6203
Worker	0.0343	0.0281	0.3096	7.5000e-004	0.0808	4.9000e-004	0.0813	0.0215	4.5000e-004	0.0219	0.0000	68.5179	68.5179	2.2000e-003	2.1700e-003	69.2203
Total	**0.0397**	**0.1580**	**0.3510**	**1.2400e-003**	**0.0959**	**1.9000e-003**	**0.0978**	**0.0259**	**1.8000e-003**	**0.0277**	**0.0000**	**115.0637**	**115.0637**	**2.4900e-003**	**9.1100e-003**	**117.8406**

3.4 Building Construction - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0841	0.7696	0.8691	1.4400e-003		0.0374	0.0374		0.0352	0.0352	0.0000	124.0155	124.0155	0.0295	0.0000	124.7531
Total	**0.0841**	**0.7696**	**0.8691**	**1.4400e-003**		**0.0374**	**0.0374**		**0.0352**	**0.0352**	**0.0000**	**124.0155**	**124.0155**	**0.0295**	**0.0000**	**124.7531**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.4 Building Construction - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.4700e-003	0.0920	0.0310	4.1000e-004	0.0131	5.8000e-004	0.0137	3.8000e-003	5.6000e-004	4.3600e-003	0.0000	39.0538	39.0538	1.5000e-004	5.8100e-003	40.7881
Worker	0.0272	0.0211	0.2421	6.3000e-004	0.0703	4.0000e-004	0.0707	0.0187	3.7000e-004	0.0191	0.0000	57.6910	57.6910	1.6900e-003	1.7100e-003	58.2431
Total	**0.0297**	**0.1131**	**0.2731**	**1.0400e-003**	**0.0835**	**9.8000e-004**	**0.0844**	**0.0225**	**9.3000e-004**	**0.0234**	**0.0000**	**96.7448**	**96.7448**	**1.8400e-003**	**7.5200e-003**	**99.0312**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0841	0.7696	0.8691	1.4400e-003		0.0374	0.0374		0.0352	0.0352	0.0000	124.0154	124.0154	0.0295	0.0000	124.7529
Total	**0.0841**	**0.7696**	**0.8691**	**1.4400e-003**		**0.0374**	**0.0374**		**0.0352**	**0.0352**	**0.0000**	**124.0154**	**124.0154**	**0.0295**	**0.0000**	**124.7529**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.4 Building Construction - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.4700e-003	0.0920	0.0310	4.1000e-004	0.0131	5.8000e-004	0.0137	3.8000e-003	5.6000e-004	4.3600e-003	0.0000	39.0538	39.0538	1.5000e-004	5.8100e-003	40.7881
Worker	0.0272	0.0211	0.2421	6.3000e-004	0.0703	4.0000e-004	0.0707	0.0187	3.7000e-004	0.0191	0.0000	57.6910	57.6910	1.6900e-003	1.7100e-003	58.2431
Total	**0.0297**	**0.1131**	**0.2731**	**1.0400e-003**	**0.0835**	**9.8000e-004**	**0.0844**	**0.0225**	**9.3000e-004**	**0.0234**	**0.0000**	**96.7448**	**96.7448**	**1.8400e-003**	**7.5200e-003**	**99.0312**

APPENDIX B: AERMOD AND HARP2 ELECTRONIC FILES