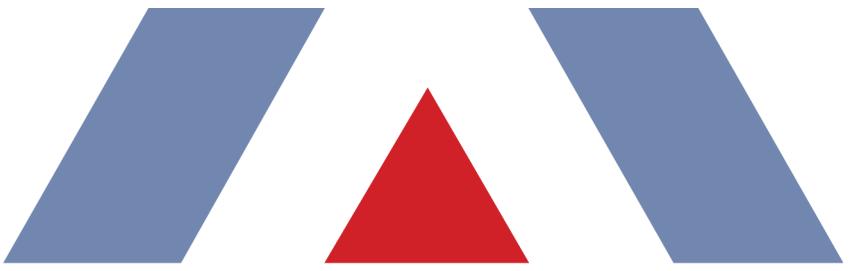

APPENDIX D

Nunes Dairy Health Risk Assessment

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HEALTH RISK ASSESSMENT
Nunes Dairy Expansion

**1730 South Healy Road
Merced, CA 95340
Merced County**

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May2020

Project 200505.0140

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1. EXECUTIVE SUMMARY

This document contains the health risk assessment performed on behalf of Environmental Planning Partners, Inc. for an expansion of the existing Nunes Dairy 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.

Emissions of hazardous air pollutants attributable to proposed increases in 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 2016.3.2 (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.

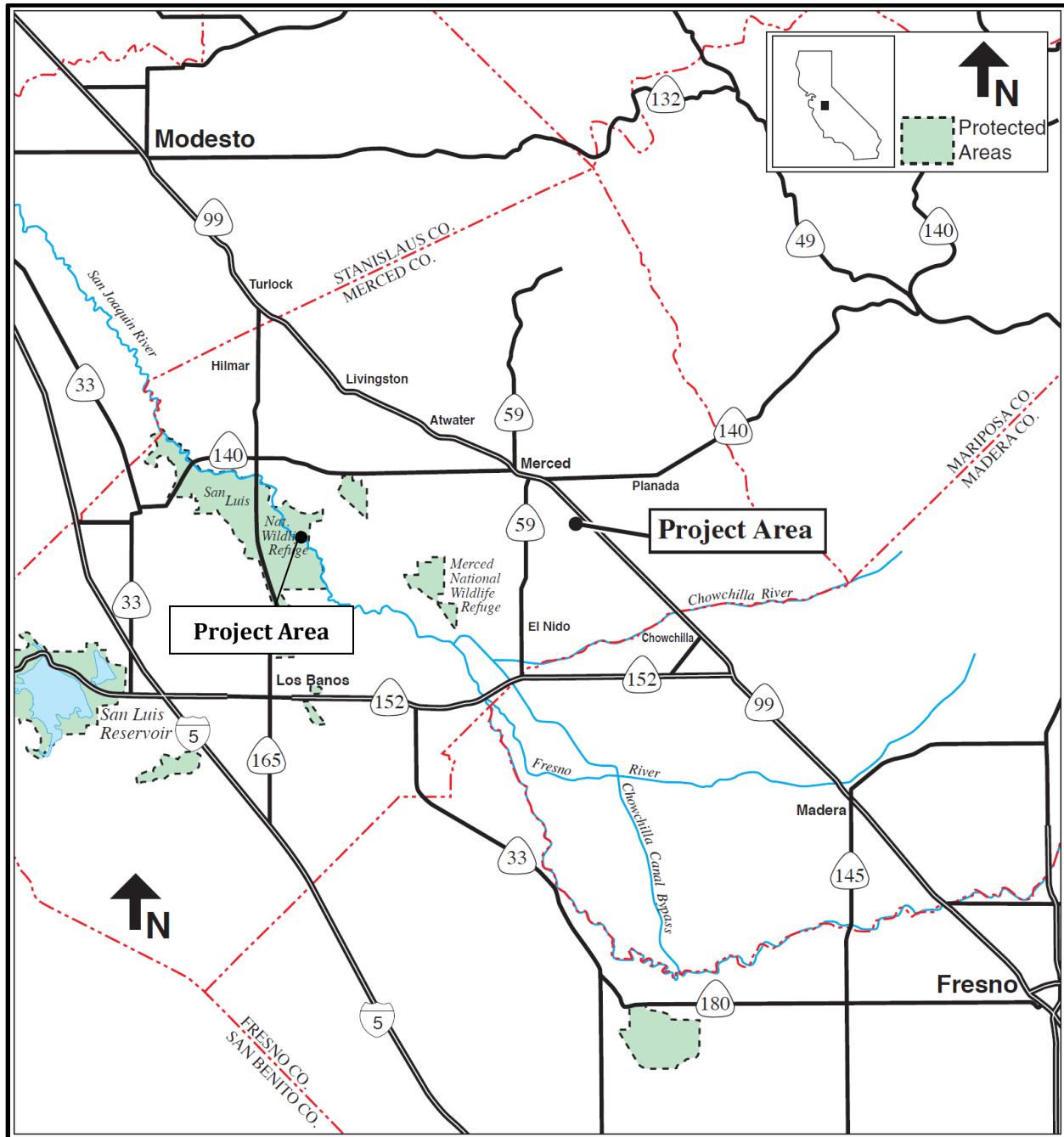
The San Joaquin Valley Air Pollution Control District (SJVAPCD) has set the level of significance for carcinogenic risk to twenty in one million (20×10^{-6}), which is understood as the possibility of causing twenty additional cancer cases in a population of one million people. The level of significance for acute and chronic non-cancer risk is a hazard index of 1.0. The maximum predicted cancer risk among the modeled receptors is 10.9 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 0.306 and 0.095, 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 policies (SJVAPCD 2015b; SJVAPCD 2015c) the potential health risk attributable to the proposed project is determined to be less than significant.

2. INTRODUCTION

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

Figure 2-1. Location Map



2.1. PROJECT DESCRIPTION

The existing dairy is located at 1730 South Healy Road in Merced, 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 would occur within one phase. Construction would include the removal of 41,200 square feet of existing animal shelter structures and construction of a new 85,800 square foot free stall barn which would take approximately six months of construction time within the three to five years after application approval. All proposed construction would occur within the existing facility footprint.

After modification, the dairy will house approximately 2,100 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

	Current	Proposed	Increment
Milk Cows	676	1,500	824
Dry Cows	100	300	200
Bred Heifers 15-24 mos.	238	0	-238
Heifers 7-14 mos.	190	0	-190
Heifers 4-6 mos.	72	150	78
Calves 0-3 mos.	0	150	150
Bulls	0	0	0
TOTAL	1,276	2,100	824

The proposed structure construction would consist of one new freestall barn. The proposed expansion would include construction of 85,800 square feet of new buildings.

3. 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.

3.1. 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. Pursuant to guidance by the San Joaquin Valley Air Pollution Control District¹ (SJVAPCD), emissions based on the current configuration of the dairy are considered to be existing emissions. Based on this fact, the facility's existing emissions are not included in the emissions proposed for the subject project. Therefore, emissions from the dairy modifications will be restricted to incremental emissions attributable to construction activities, animal movement, manure management, and land application of wastewater based on the proposed increase in the number of cattle (**Table 2-1**) and the additional on-site mobile sources required for the expansion.

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 light 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 manure loading tractor, a feed delivery tractor, a bedding delivery tractor, milk tankers, solids manure removal trucks, and commodity delivery trucks. The increased herd size will require additional tractor use for feed loading and delivery, bedding delivery, manure scraping, and solid manure loading. Additional truck trips will be required for milk tankers, solid manure removal trucks, and commodity delivery trucks. There will also be emission increases from the freestalls, shade barns, milk barn, lagoons, solid manure storage and land application areas associated with increased herd size. HRA emission sources HRA are listed in **Table 3-1**.

Table 3-1. Sources of Potential Emissions

Source ID	Description
MTI	Milk Truck Idling
CTI	Commodity Delivery Idling
SRTI	Solids Removal Truck Idling
FLT	Feed Loading
MLT	Solids Removal (Loader)
MTT	Milk Delivery Truck Travel
CTT	Commodity Delivery Truck Travel
SRTT	Solids Removal Truck Travel
MS1	Manure Scraping
FBTD1	Feed and Bedding Delivery
SHADE1, SHADE3	Shade Barns 1 & 2, Shade Barn 3
FSB1, FSB2	Freestall Barn 1, Freestall Barn 2
SMS	Solid Manure Storage
MILK1	Milk Barn
SLA1-2, LLA1-2	Solids and Liquid Land Application
LAGOON1	Lagoons
CONSTP1	Construction Activities

¹ Personal Communication with Leland Villalvazo, San Joaquin Valley Air Pollution Control District, June 15, 2007.

Table 3-2 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 3-2. 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

CAS	Pollutant	Source	Cancer	Non-Cancer	
				Acute	Chronic
108907	Chlorobenzene	Animal Movement			X
110543	Hexane	Animal Movement			X
110827	Cyclohexane *	Animal Movement, Lagoons			
115071	Propylene	Lagoons			X
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.

3.2. EXPOSURE ASSESSMENT

3.2.1. 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 PM₁₀ emission factors and HAPs speciation spreadsheets. The incremental increase in emissions attributable to cattle were calculated by comparing the emissions from each source based on the number and type of cattle pre and post project. The project applicant provided pre and post cattle numbers. 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 EMFAC2017 emission factors specific to Merced County for vehicle category "T7 Ag." Diesel trucks were assumed to have 15 minutes of idling per visit.

The SJVAPCD's *Dairy H₂S AERMOD Hourly Emission File Generator* states that H₂S emissions are only generated at dairies in lagoons used to store or treat collected waste material. The generator calculates emissions 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 H₂S emission associated with the proposed expansion.

The actual total construction activities were estimated to be six months based on other dairy expansion projects. Therefore, a six-month exposure HRA was conducted and added to the operational HRA results. Construction emissions will be restricted to occur between the hours of 6am and 8pm.

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 on a CD in **Appendix B**.

3.2.2. 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 expansion. The construction activities, animal housing areas, milk barn, lagoon, manure scraping, solid manure storage and land application areas were modeled as area sources. Unit emission rates for the area sources of 1 g/sec divided by the area of the source were input into AERMOD. The travel route for the feed and bedding delivery tractors, milk trucks, solids removal trucks, and commodity trucks were modeled as line sources, which represents a series of volume sources, with a unit emission rate of 1 g/sec. The feed loading tractor, manure loading tractor, milk truck idling, solids removal truck 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 3-1**.

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**.

3.2.2.1. 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 2017² was input into AERMOD. This was the most recent available dataset available at the time the modeling runs were conducted.

3.2.2.2. Receptors

Existing land uses in the area where the proposed dairy will be located are predominantly agriculture. There are scattered rural residences in the general area of the project; most of which are associated with local agricultural operations. A total of 107 off-site receptors of residences, 3 on-site receptor, and 100 potential agricultural workers were assessed during the preparation of this HRA. There are currently five other on-site residence, however, these residences are either occupied by the dairy owner or by workers that do not have

² Provided via website, San Joaquin Valley Air Pollution Control District (SJVAPCD), [http://12.219.204.27/public/Modeling/Meteorological Data/AERMET v16216/Modesto 23258/](http://12.219.204.27/public/Modeling/Meteorological%20Data/AERMET%20v16216/Modesto%2023258/)

children present. Therefore, these residences is exempt from being modeled.³ Coordinates for the point of maximum impact (PMI) receptors are provided in **Table 2-3**.

3.2.3. 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.

3.3. 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 3-3**. The HARP2 output files for cancer, acute, and chronic risks are provided in electronic format on a CD in **Appendix B**.

As shown below in **Table 3-3**, the maximum predicted cancer risk is 10.9E-06. Cancer risks are primarily attributable to emissions of diesel particulate matter (DPM) through the inhalation pathway. Carcinogenic risks are tabulated by pollutant in **Table 3-4**.

The maximum predicted acute non-cancer hazard index is 0.306. Acute risks are primarily attributable to emissions of ammonia, which affects the respiratory system and eyes. Acute risks are tabulated by pollutant in **Table 3-5**.

The maximum predicted chronic non-cancer hazard index is 0.095. Chronic risks, tabulated by pollutant in **Table 3-6**, are primarily attributable to emissions of ammonia which affect the respiratory system.

³ Personal communication with Leland Villalvazo, SJVAPCD, November 1, 2012.

Table 3-3. Risk Predicted By HARP

	Maximum Lifetime Excess Cancer Risk	Maximum Non-Cancer Chronic Hazard Index	Maximum Non-Cancer Acute Hazard Index
Construction	1.95E-06	4.80E-03	0.00E+00
Operational	8.98E-06	9.00E-02	3.06E-01
Total	10.9E-06	9.48E-02	3.06E-01
Receptor #, Name	1, On-Site Residence	1, On-Site Residence	2, On-Site Residence
UTM Easting (m)	727536.58	727536.58	727541.75
UTM Northing (m)	4126996.20	4126996.20	4126926.70

Table 3-4. Risk by Pollutant – Maximum Cancer Risk at Receptor #1

CHEM	INHAL	SOIL	DERM	MOTHER	WATER	FISH	CROP	BEEF	DAIRY	PIG	CHICK	EGG	TOTAL
DieselExhPM	5.12E-06	0.00E+0	0.00E+0	0.00E+0	0.00E+00	0.00E+0	5.12E-06						
TetraClEthane	3.51E-07	0.00E+0	0.00E+0	0.00E+0	0.00E+00	0.00E+0	3.51E-07						
1,1,2TriClEthan	6.11E-08	0.00E+0	0.00E+0	0.00E+0	0.00E+00	0.00E+0	6.11E-08						
DBCP	1.03E-06	0.00E+0	0.00E+0	0.00E+0	0.00E+00	0.00E+0	1.03E-06						
1,4-Dioxane	1.48E-07	0.00E+0	0.00E+0	0.00E+0	0.00E+00	0.00E+0	1.48E-07						
p-DiClBenzene	1.67E-07	0.00E+0	0.00E+0	0.00E+0	0.00E+00	0.00E+0	1.67E-07						
Acetaldehyde	7.96E-08	0.00E+0	0.00E+0	0.00E+0	0.00E+00	0.00E+0	7.96E-08						
Acrylonitrile	1.09E-06	0.00E+0	0.00E+0	0.00E+0	0.00E+00	0.00E+0	1.09E-06						
Benzene	1.09E-07	0.00E+0	0.00E+0	0.00E+0	0.00E+00	0.00E+0	1.09E-07						
Benzyl Chloride	4.15E-07	0.00E+0	0.00E+0	0.00E+0	0.00E+00	0.00E+0	4.15E-07						
CCl4	2.62E-08	0.00E+0	0.00E+0	0.00E+0	0.00E+00	0.00E+0	2.62E-08						
Chloroform	7.41E-09	0.00E+0	0.00E+0	0.00E+0	0.00E+00	0.00E+0	7.41E-09						
Ethyl Benzene	1.34E-08	0.00E+0	0.00E+0	0.00E+0	0.00E+00	0.00E+0	1.34E-08						
EDB	4.08E-07	0.00E+0	0.00E+0	0.00E+0	0.00E+00	0.00E+0	4.08E-07						
EDC	2.74E-08	0.00E+0	0.00E+0	0.00E+0	0.00E+00	0.00E+0	2.74E-08						
Formaldehyde	3.35E-08	0.00E+0	0.00E+0	0.00E+0	0.00E+00	0.00E+0	3.35E-08						
Naphthalene	1.55E-06	0.00E+0	0.00E+0	0.00E+0	0.00E+00	0.00E+0	1.55E-06						
Perc	2.26E-07	0.00E+0	0.00E+0	0.00E+0	0.00E+00	0.00E+0	2.26E-07						
Arsenic	7.44E-09	4.02E-08	1.71E-09	0.00E+0	0.00E+00	0.00E+0	4.94E-08						
Cr(VI)	1.38E-08	5.86E-10	8.33E-12	0.00E+0	0.00E+00	0.00E+0	1.44E-08						
Lead	5.70E-11	4.98E-10	1.06E-11	5.46E-12	0.00E+00	0.00E+0	5.71E-10						
Nickel	2.47E-10	0.00E+0	0.00E+0	0.00E+0	0.00E+00	0.00E+0	2.47E-10						
TCE	3.95E-09	0.00E+0	0.00E+0	0.00E+0	0.00E+00	0.00E+0	3.95E-09						
SUM	1.09E-05	4.13E-08	1.73E-09	5.46E-12	0.00E+00	1.09E-05							

Table 3-5. Risk by Pollutant – Maximum Acute Noncancer Risk at Receptor #2

CHEM	CV	CNS	IMMUN	KIDNEY	GILV	REPRO /DEVEL	RESP	SKIN	EYE	BONE /TEETH	ENDO	BLOOD	ODOR	GENERAL	MAX
NH3	0.00E+0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.01E-01	0.00E+0	3.01E-01	0.00E+00	0.00E+0	0.00E+00	0.00E+00	0.00E+00	3.01E-01
1,4-Dioxane	0.00E+0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.52E-04	0.00E+0	1.52E-04	0.00E+00	0.00E+0	0.00E+00	0.00E+00	0.00E+00	1.52E-04
Acetaldehyde	0.00E+0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.42E-03	0.00E+0	1.42E-03	0.00E+00	0.00E+0	0.00E+00	0.00E+00	0.00E+00	1.42E-03
Benzene	0.00E+0	0.00E+00	3.40E-03	0.00E+00	0.00E+00	3.40E-03	0.00E+0	0.00E+0	0.00E+0	0.00E+00	0.00E+0	3.40E-03	0.00E+00	0.00E+00	3.40E-03
Benzyl Chloride	0.00E+0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.21E-04	0.00E+0	8.21E-04	0.00E+00	0.00E+0	0.00E+00	0.00E+00	0.00E+00	8.21E-04
CS2	0.00E+0	1.26E-04	0.00E+00	0.00E+00	0.00E+00	1.26E-04	0.00E+0	0.00E+0	0.00E+0	0.00E+00	0.00E+0	0.00E+00	0.00E+00	0.00E+00	1.26E-04
CCl4	0.00E+0	7.77E-06	0.00E+00	0.00E+00	7.77E-06	7.77E-06	0.00E+0	0.00E+0	0.00E+0	0.00E+00	0.00E+0	0.00E+00	0.00E+00	0.00E+00	7.77E-06
Chloroform	0.00E+0	2.20E-04	0.00E+00	0.00E+00	0.00E+00	2.20E-04	2.20E-04	0.00E+0	0.00E+0	0.00E+00	0.00E+0	0.00E+00	0.00E+00	0.00E+00	2.20E-04
Formaldehyde	0.00E+0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+0	0.00E+0	2.41E-03	0.00E+00	0.00E+0	0.00E+00	0.00E+00	0.00E+00	2.41E-03
Isopropyl Alcoh	0.00E+0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.37E-04	0.00E+0	1.37E-04	0.00E+00	0.00E+0	0.00E+00	0.00E+00	0.00E+00	1.37E-04
MEK	0.00E+0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.87E-04	0.00E+0	2.87E-04	0.00E+00	0.00E+0	0.00E+00	0.00E+00	0.00E+00	2.87E-04
Perc	0.00E+0	4.30E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.30E-05	0.00E+0	4.30E-05	0.00E+00	0.00E+0	0.00E+00	0.00E+00	0.00E+00	4.30E-05
Styrene	0.00E+0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.38E-06	7.38E-06	0.00E+0	7.38E-06	0.00E+00	0.00E+0	0.00E+00	0.00E+00	0.00E+00	7.38E-06
Toluene	0.00E+0	8.61E-06	0.00E+00	0.00E+00	0.00E+00	8.61E-06	8.61E-06	0.00E+0	8.61E-06	0.00E+00	0.00E+0	0.00E+00	0.00E+00	0.00E+00	8.61E-06
Xylenes	0.00E+0	2.40E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.40E-05	0.00E+0	2.40E-05	0.00E+00	0.00E+0	0.00E+00	0.00E+00	0.00E+00	2.40E-05
Arsenic	1.47E-04	1.47E-04	0.00E+00	0.00E+00	0.00E+00	1.47E-04	0.00E+0	0.00E+0	0.00E+0	0.00E+00	0.00E+0	0.00E+00	0.00E+00	0.00E+00	1.47E-04
Copper	0.00E+0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.42E-06	0.00E+0	0.00E+0	0.00E+00	0.00E+0	0.00E+00	0.00E+00	0.00E+00	2.42E-06
Mercury	0.00E+0	1.22E-05	0.00E+00	0.00E+00	0.00E+00	1.22E-05	0.00E+0	0.00E+0	0.00E+0	0.00E+00	0.00E+0	0.00E+00	0.00E+00	0.00E+00	1.22E-05
Nickel	0.00E+0	0.00E+00	6.42E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+0	0.00E+0	0.00E+0	0.00E+00	0.00E+0	0.00E+00	0.00E+00	0.00E+00	6.42E-05
SULFATES	0.00E+0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.11E-04	0.00E+0	0.00E+0	0.00E+00	0.00E+0	0.00E+00	0.00E+00	0.00E+00	1.11E-04
Vanadium	0.00E+0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.83E-06	0.00E+0	1.83E-06	0.00E+00	0.00E+0	0.00E+00	0.00E+00	0.00E+00	1.83E-06
SUM	1.47E-04	5.88E-04	3.46E-03	0.00E+00	7.77E-06	3.92E-03	3.04E-01	0.00E+0	3.06E-01	0.00E+00	0.00E+0	3.40E-03	0.00E+00	0.00E+00	3.06E-01

Table 3-6. 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
DieselExhPM	0.00E+00	0.00E+0	0.00E+0	0.00E+0	0.00E+00	0.00E+0	5.59E-03	0.00E+00	0.00E+0	0.00E+0	0.00E+0	0.00E+00	0.00E+00	0.00E+00	7.89E-04
NH3	0.00E+00	0.00E+0	0.00E+0	0.00E+0	0.00E+00	0.00E+0	8.40E-02	0.00E+00	0.00E+0	0.00E+0	0.00E+0	0.00E+00	0.00E+00	0.00E+00	8.40E-02
1,4-Dioxane	2.50E-06	0.00E+0	0.00E+0	2.50E-06	2.50E-06	0.00E+0	0.00E+0	0.00E+00	0.00E+0	0.00E+0	0.00E+0	0.00E+00	0.00E+00	0.00E+00	2.50E-06
p-DiClBenzene	0.00E+00	7.13E-06	0.00E+0	7.13E-06	7.13E-06	0.00E+0	7.13E-06	0.00E+00	0.00E+0	0.00E+0	0.00E+0	0.00E+00	0.00E+00	0.00E+00	7.13E-06
Acetaldehyde	0.00E+00	0.00E+0	0.00E+0	0.00E+0	0.00E+00	0.00E+0	7.79E-05	0.00E+00	0.00E+0	0.00E+0	0.00E+0	0.00E+00	0.00E+00	0.00E+00	7.79E-05
Acrylonitrile	0.00E+00	0.00E+0	0.00E+0	0.00E+0	0.00E+00	0.00E+0	3.00E-04	0.00E+00	0.00E+0	0.00E+0	0.00E+0	0.00E+00	0.00E+00	0.00E+00	3.00E-04
Benzene	0.00E+00	0.00E+0	0.00E+0	0.00E+0	0.00E+00	0.00E+0	0.00E+0	0.00E+00	0.00E+0	0.00E+0	0.00E+0	5.00E-04	0.00E+00	0.00E+00	5.00E-04
CS2	0.00E+00	1.61E-05	0.00E+0	0.00E+0	0.00E+00	1.61E-05	0.00E+0	0.00E+00	0.00E+0	0.00E+0	0.00E+0	0.00E+00	0.00E+00	0.00E+00	1.61E-05
CCl4	0.00E+00	5.99E-06	0.00E+0	0.00E+0	5.99E-06	5.99E-06	0.00E+0	0.00E+00	0.00E+0	0.00E+0	0.00E+0	0.00E+00	0.00E+00	0.00E+00	5.99E-06
Chlorobenzn	0.00E+00	0.00E+0	0.00E+0	2.02E-06	2.02E-06	2.02E-06	0.00E+0	0.00E+00	0.00E+0	0.00E+0	0.00E+0	0.00E+00	0.00E+00	0.00E+00	2.02E-06
Chloroform	0.00E+00	0.00E+0	0.00E+0	1.78E-06	1.78E-06	1.78E-06	0.00E+0	0.00E+00	0.00E+0	0.00E+0	0.00E+0	0.00E+00	0.00E+00	0.00E+00	1.78E-06
Ethyl Chloride	0.00E+00	0.00E+0	0.00E+0	0.00E+0	4.32E-08	4.32E-08	0.00E+0	0.00E+00	0.00E+0	0.00E+0	0.00E+0	0.00E+00	0.00E+00	0.00E+00	4.32E-08
Ethyl Benzene	0.00E+00	0.00E+0	0.00E+0	1.05E-06	1.05E-06	1.05E-06	0.00E+0	0.00E+00	0.00E+0	0.00E+0	1.05E-06	0.00E+00	0.00E+00	0.00E+00	1.05E-06
EDB	0.00E+00	0.00E+0	0.00E+0	0.00E+0	0.00E+00	2.80E-03	0.00E+0	0.00E+00	0.00E+0	0.00E+0	0.00E+0	0.00E+00	0.00E+00	0.00E+00	2.80E-03
EDC	0.00E+00	0.00E+0	0.00E+0	0.00E+0	1.30E-06	0.00E+0	0.00E+0	0.00E+00	0.00E+0	0.00E+0	0.00E+0	0.00E+00	0.00E+00	0.00E+00	1.30E-06
Formaldehyde	0.00E+00	0.00E+0	0.00E+0	0.00E+0	0.00E+00	0.00E+0	2.43E-04	0.00E+00	0.00E+0	0.00E+0	0.00E+0	0.00E+00	0.00E+00	0.00E+00	2.43E-04
Hexane	0.00E+00	5.16E-07	0.00E+0	0.00E+0	0.00E+00	0.00E+0	0.00E+0	0.00E+00	0.00E+0	0.00E+0	0.00E+0	0.00E+00	0.00E+00	0.00E+00	5.16E-07
Isopropyl Alcoh	0.00E+00	0.00E+0	0.00E+0	1.02E-06	0.00E+00	1.02E-06	0.00E+0	0.00E+00	0.00E+0	0.00E+0	0.00E+0	0.00E+00	0.00E+00	0.00E+00	1.02E-06
Naphthalene	0.00E+00	0.00E+0	0.00E+0	0.00E+0	0.00E+00	0.00E+0	1.97E-03	0.00E+00	0.00E+0	0.00E+0	0.00E+0	0.00E+00	0.00E+00	0.00E+00	1.97E-03
Perc	0.00E+00	0.00E+0	0.00E+0	4.21E-04	4.21E-04	0.00E+0	0.00E+0	0.00E+00	0.00E+0	0.00E+0	0.00E+0	0.00E+00	0.00E+00	0.00E+00	4.21E-04
Styrene	0.00E+00	2.88E-06	0.00E+0	0.00E+0	0.00E+00	0.00E+0	0.00E+0	0.00E+00	0.00E+0	0.00E+0	0.00E+0	0.00E+00	0.00E+00	0.00E+00	2.88E-06
Toluene	0.00E+00	1.74E-05	0.00E+0	0.00E+0	0.00E+00	1.74E-05	1.74E-05	0.00E+00	0.00E+0	0.00E+0	0.00E+0	0.00E+00	0.00E+00	0.00E+00	1.74E-05
Vinyl Acetate	0.00E+00	0.00E+0	0.00E+0	0.00E+0	0.00E+00	0.00E+0	4.02E-05	0.00E+00	0.00E+0	0.00E+0	0.00E+0	0.00E+00	0.00E+00	0.00E+00	4.02E-05
Xylenes	0.00E+00	1.24E-05	0.00E+0	0.00E+0	0.00E+00	0.00E+0	1.24E-05	0.00E+00	1.24E-05	0.00E+0	0.00E+0	0.00E+00	0.00E+00	0.00E+00	1.24E-05
Arsenic	2.50E-03	2.50E-03	0.00E+0	0.00E+0	0.00E+00	2.50E-03	2.50E-03	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+00	0.00E+00	0.00E+00	2.50E-03
Cr(VI)	0.00E+00	0.00E+0	0.00E+0	0.00E+0	0.00E+00	0.00E+0	1.86E-07	0.00E+00	0.00E+0	0.00E+0	0.00E+0	1.74E-08	0.00E+00	0.00E+00	1.86E-07
Manganese	0.00E+00	4.49E-04	0.00E+0	0.00E+0	0.00E+00	0.00E+0	0.00E+0	0.00E+00	0.00E+0	0.00E+0	0.00E+0	0.00E+00	0.00E+00	0.00E+00	4.49E-04
Mercury	0.00E+00	2.00E-05	0.00E+0	2.00E-05	0.00E+00	2.00E-05	0.00E+0	0.00E+00	0.00E+0	0.00E+0	0.00E+0	0.00E+00	0.00E+00	0.00E+00	2.00E-05
Nickel	0.00E+00	0.00E+0	0.00E+0	0.00E+0	0.00E+00	3.17E-07	2.66E-05	0.00E+00	0.00E+0	0.00E+0	0.00E+0	2.66E-05	0.00E+00	0.00E+00	2.66E-05
Selenium	1.04E-07	1.04E-07	0.00E+0	0.00E+0	1.04E-07	0.00E+0	0.00E+0	0.00E+00	0.00E+0	0.00E+0	0.00E+0	0.00E+00	0.00E+00	0.00E+00	1.04E-07
TCE	0.00E+00	1.29E-06	0.00E+0	0.00E+0	0.00E+00	0.00E+0	0.00E+0	0.00E+00	1.29E-06	0.00E+0	0.00E+0	0.00E+00	0.00E+00	0.00E+00	1.29E-06
SUM	2.50E-03	3.03E-03	0.00E+0	4.57E-04	4.43E-04	5.36E-03	9.48E-02	2.50E-03	1.37E-05	0.00E+0	1.05E-06	5.27E-04	0.00E+00	0.00E+00	9.48E-02

4. 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 Nunes Dairy expansion 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.

5. REFERENCES

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APPENDIX A: EMISSION ESTIMATION WORKSHEETS

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/Max 24-hr)
Milk Tankers	MTT	0.12	2.52	1456	9.57E-01	2.63E-03
Commodity Delivery	CTT	0.35	2.52	364	7.13E-01	1.96E-03
Solid Manure	SRTT	0.59	2.52	110	3.63E-01	3.30E-03

Note 1: Running emission factors for vehicle category "T7 Ag" were obtained from the EMFAC2017 Web Database for Merced County (2019) with an Aggregate Fleet Mix Traveling 5 MPH.

Note 2: Increases in trucks/yr is from the Initial Study, page 18

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/Max 24-hr)
Milk Tankers	MTI	0.46	15	1456	3.65E-01	1.00E-03
Commodity Delivery	CTI	0.46	15	364	9.13E-02	2.51E-04
Solid Manure	SRTI	0.46	15	110	2.76E-02	2.51E-04

Note 1: Running emission factors for vehicle category "T7 Ag" were obtained from the EMFAC2017 Web Database for Merced County (2019) with an Aggregate Fleet Mix Idling.

Note 2: Increases in trucks/yr is from the Initial Study, page 18

Table 3. Tractors: Diesel Particulate Matter Increased Emissions

	Source (# Volume Sources)	HP	Load Factor	Hours/day	Days/Year	Emission Factor (g/hp-hr)	Emissions (lb/yr)	Emissions (lb/Max 24-hr)
Feed Loading	FLT	140	0.37	2	365	1.49E-02	1.24E+00	3.41E-03
Bedding Delivery	FBTD1	100	0.37	0.06	52	2.24E-01	5.47E-02	1.05E-03
Manure Scraping	MS1	120	0.37	1	4	2.24E-01	8.76E-02	2.19E-02
Manure Loading	MLT	202	0.37	0.04	365	1.49E-02	3.69E-02	1.01E-04
Feed Delivery	FBTD1	150	0.37	1	365	1.49E-02	6.66E-01	1.82E-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

Pre-Project Facility Information

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

Pre-Project Herd Size					
Herd	Flushed Freestalls	Scraped Freestalls	Flushed Corrals	Scraped Corrals	Total # of Animals
Milk Cows	676				676
Dry Cows	100				100
Support Stock (Heifers, Calves, and Bulls)					0
Large Heifers			238		238
Medium Heifers			190		190
Small Heifers			72		72
Bulls					0
	Calf Hutches			Calf Corrals	
	Aboveground Flushed	Aboveground Scraped	On-Ground Flushed	On-Ground Scraped	Flushed
Calves					Scraped
					Total # of Calves
					0

Total Herd Summary	
Total Milk Cows	676
Total Mature Cows	776
Support Stock (Heifers, Calves, and Bulls)	500
Total Calves	0
Total Dairy Head	1,276

Pre-Project Silage Information			
Feed Type	Max # Open Piles	Max Height (ft)	Max Width (ft)
Corn			
Alfalfa			
Wheat			

Post-Project Facility Information

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

NOTE: An increase in total lagoon/storage pond surface area may result in an increase in H2S emissions. The District's Technical Services Division may need to conduct H2S modeling.

Post-Project Herd Size							
Herd	Flushed Freestalls	Scraped Freestalls	Flushed Corrals	Scraped Corrals	Total # of Animals		
Milk Cows	1,500				1,500		
Dry Cows			300		300		
Support Stock (Heifers, Calves, and Bulls)					0		
Large Heifers					0		
Medium Heifers					0		
Small Heifers			150		150		
Bulls					0		
	Calf Hutches			Calf Corrals			
	Aboveground Flushed	Aboveground Scraped	On-Ground Flushed	On-Ground Scraped	Flushed	Scraped	Total # of Calves
Calves			150				150

Post-Project Silage Information			
Feed Type	Max # Open Piles	Max Height (ft)	Max Width (ft)
Corn			
Alfalfa			
Wheat			

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 coral/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	15%
Feeding young stock (heifers and calves) near dusk	10%

Pre-Project PM10 Mitigation Measures

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 1	freestall	milk cows	750	750		□	□	□	□	□	□	□	□	□
2 Shade 1	loafing barn	dry cows	300	300		□	□	□	□	□	□	□	□	□
5 Shade 2	on ground hutches	calves	150	150		□	□	□	□	□	□	□	□	□
6 Shade 3	on ground hutches	small heifers	150	150		□	□	□	□	□	□	□	□	□
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 2	freestall	milk cows	750	750		□	□	□	□	□	□	□	□	□
2						□	□	□	□	□	□	□	□	□
3						□	□	□	□	□	□	□	□	□
4						□	□	□	□	□	□	□	□	□
5						□	□	□	□	□	□	□	□	□
Post-Project Total # of Cows			2,100	(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 1	freestall	milk cows	750	750	1.370		12.5%	10%					15%		0.92
2 Shade 1	loafing barn	dry cows	300	300	2.730		12.5%	10%					15%		1.83
5 Shade 2	on ground hutches	calves	150	150	0.343		12.5%	10%					15%	10%	0.21
6 Shade 3	on ground hutches	small heifers	150	150	1.370		12.5%	10%					15%	10%	0.83
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 2	freestall	milk cows	750	750	1.370		12.5%	10%	□	□			15%		0.92
2									□	□					
3									□	□					
4									□	□					
5									□	□					

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 1	milk cows	676	14.2	38.38	1.37	26.3	9,599	71.1	25,942	2.5	926
2 Freestall 1	dry cows	100	7.88	19.44	1.37	2.2	788	5.3	1,944	0.4	137
10 Shade Barn 1 &2	medium heifers	190	4.16	7.27	5.28	2.2	790	3.8	1,382	2.7	1,003
11 Shade Barn 4, 5 &6	large heifers	238	6.13	10.08	5.28	4.0	1,459	6.6	2,399	3.4	1,257
12 Shade Barn 3	small heifers	72	2.33	5.47	1.37	0.5	168	1.1	394	0.3	99
13											
14											
15											
16											
Pre-Project Total # of Cows			1,276			35.2	12,804	87.9	32,061	9.3	3,422

*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)
1,276	35.2	12,804	87.9	32,061	9.3

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 1	milk cows	750	10.81	38.38	0.92	22.2	8,108	78.9	28,782	1.9	688
2 Shade 1	dry cows	300	6.08	19.44	1.83	5.0	1,824	16.0	5,832	1.5	548
5 Shade 2	calves	150	0.85	1.66	0.21	0.4	128	0.7	248	0.1	31
6 Shade 3	small heifers	150	1.77	5.47	0.83	0.7	266	2.2	821	0.3	124
Post-Project # of Cows (non-expansion)			1,350			28.3	10,326	97.8	35,683	3.8	1,391

*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 2	milk cows	750	10.81	38.38	0.92	22.2	8,108	78.9	28,782	1.9	688
2											
3											
4											
5											
Total # of Cows From Expansion			750			22.2	8,108	78.9	28,782	1.9	688

*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)
2,100	50.5	18,434	176.7	64,465	5.7	2,079

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	316	113	0
Cow Housing	0	0	-1,343	0	5,630	32,404	0
Liquid Manure	0	0	0	0	1,584	10,406	N/A
Solid Manure	0	0	0	0	338	2,388	0
Feed Handling	0	0	0	0	6,695	0	0
Total	0	0	-1,343	0	14,563	45,310	N/A

	Total Daily Change in Emissions (lb/day)						
	NOx	SOx	PM10	CO	VOC	NH3	H2S
Milking Parlor	0.0	0.0	0.0	0.0	0.8	0.3	0.0
Cow Housing	0.0	0.0	-3.6	0.0	15.3	88.8	0.0
Liquid Manure	0.0	0.0	0.0	0.0	4.4	28.4	N/A
Solid Manure	0.0	0.0	0.0	0.0	0.9	6.5	0.0
Feed Handling	0.0	0.0	0.0	0.0	18.4	0.0	0.0
Total	0.0	0.0	-3.6	0.0	39.8	124.0	N/A

	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	763	0	N/A
Solid Manure	0	0	0	0	0	0	0
Feed Handling	0	0	0	0	0	0	0
Total	0	0	0	0	763	0	N/A

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	-	-	0.04	316	0.01	113	-
Cow Housing	-0.15	-1,343	0.64	5,630	3.70	32,404	-
Liquid Manure	-	-	0.18	1,584	1.19	10,406	-
Solid Manure	-	-	0.04	338	0.27	2,388	-
Feed Handling	-	-	0.76	6,695	-	-	-
Lagoon/Storage Pond	-	-	0.09	767	0.58	5,037	0
Land Application (Liquid)	-	-	0.10	876	0.62	5,402	-
Land Application (Solid)	-	-	0.01	110	0.15	1,278	-
Solid Manure Storage	-	-	0.02	146	0.13	1,168	-

SSIPE Total Herd Summary	
Change in Milk Cows	1,000
Change in Dairy Head	2,450
Change in Dairy Head (Flushed)	2,450

Agricultural Miscellaneous Emissions from Dairy Operations (Cow Housing)																			
Use this spreadsheet to characterize the miscellaneous 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 updaters			Matthew Cegelski																
Last Update			September 24, 2018																
Facility:			Nunes Dairy																
ID#:			0																
Project #:			0																
Formula																			
Emissions are calculated by the multiplication of the VOC Rates, and Emission Factors.			Freestall 1		Freestall 2		Shade 1 & 2		Shade 3		0		0		0		0		
			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	7.58E-01	6,649.0	1.33E-01	1,162.0	8.33E-03	98.0	0.00E+00	0.0	0.00E+00	0.0	0.00E+00	0.0	0.00E+00	0.0	
Substances			Voltiles (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	6.62E-06	5.80E-02	1.16E-06	1.01E-02	7.28E-08	8.56E-04	0.00E+00								
1,1,2-Trichloroethane	79005	2.26E-04	0.00E+00	0.00E+00	1.71E-04	1.50E+00	3.01E-05	2.63E-01	1.88E-06	2.21E-02	0.00E+00								
1,2,3-Trichloropropane	96184	2.76E-04	0.00E+00	0.00E+00	2.09E-04	1.84E+00	3.68E-05	3.21E-01	2.30E-06	2.70E-02	0.00E+00								
1,2,4-Trichlorobenzene	120821	7.79E-04	0.00E+00	0.00E+00	5.91E-04	5.18E+00	1.04E-04	9.05E-01	6.49E-06	7.63E-02	0.00E+00								
1,2-Dibromo-3-chloropropane	96128	4.94E-05	0.00E+00	0.00E+00	3.75E-05	3.28E-01	6.59E-06	5.74E-02	4.12E-07	4.84E-03	0.00E+00								
1,2-Dichlorobenzene	95501	5.48E-04	0.00E+00	0.00E+00	4.16E-04	3.64E+00	7.31E-05	6.37E-01	4.57E-06	5.37E-02	0.00E+00								
1,3-Dichlorobenzene	541731	4.90E-04	0.00E+00	0.00E+00	3.72E-04	3.26E+00	6.53E-05	5.69E-01	4.08E-06	4.80E-02	0.00E+00								
1,4 Dioxane	123911	1.41E-03	0.00E+00	0.00E+00	1.07E-03	9.38E+00	1.88E-04	1.64E+00	1.18E-05	1.38E-01	0.00E+00								
1,4-Dichlorobenzene	106467	5.19E-04	0.00E+00	0.00E+00	3.94E-04	3.45E+00	6.92E-05	6.03E-01	4.33E-06	5.09E-02	0.00E+00								
Acetaldehyde	75070	2.41E-03	0.00E+00	0.00E+00	1.83E-03	1.60E+01	3.21E-04	2.80E+00	2.01E-05	2.36E-01	0.00E+00								
Acrylonitrile	107131	2.43E-04	0.00E+00	0.00E+00	1.84E-04	1.62E+00	3.24E-05	2.82E-01	2.03E-06	2.38E-02	0.00E+00								
Benzene	71432	3.19E-04	0.00E+00	0.00E+00	2.42E-04	2.12E+00	4.25E-05	3.71E-01	2.66E-06	3.13E-02	0.00E+00								
Benzyl chloride	100447	2.89E-04	0.00E+00	0.00E+00	2.19E-04	1.92E+00	3.85E-05	3.36E-01	2.41E-06	2.83E-02	0.00E+00								
Butyraldehyde	123728	1.14E-04	0.00E+00	0.00E+00	8.65E-05	7.58E-01	1.52E-05	1.32E-01	9.50E-07	1.12E-02	0.00E+00								
Carbon Disulfide	75150	2.49E-03	0.00E+00	0.00E+00	1.89E-03	1.66E+01	3.32E-04	2.89E+00	2.08E-05	2.44E-01	0.00E+00								
Carbon tetrachloride	56235	5.87E-05	0.00E+00	0.00E+00	4.45E-05	3.90E-01	7.83E-06	6.82E-02	4.89E-07	5.75E-03	0.00E+00								
Chlorobenzene	108907	2.72E-04	0.00E+00	0.00E+00	2.06E-04	1.81E+00	3.63E-05	3.16E-01	2.27E-06	2.67E-02	0.00E+00								
Chloroform	67663	1.31E-04	0.00E+00	0.00E+00	9.93E-05	8.71E-01	1.75E-05	1.52E-01	1.09E-06	1.28E-02	0.00E+00								
Chloromethane	74873	7.93E-04	0.00E+00	0.00E+00	6.01E-04	5.27E+00	1.06E-04	9.21E-01	6.61E-06	7.77E-02	0.00E+00								
Crotonaldehyde	4170303	1.41E-04	0.00E+00	0.00E+00	1.07E-04	9.38E-01	1.88E-05	1.64E-01	1.18E-06	1.38E-02	0.00E+00								
Cyclohexane	110827	6.83E-03	0.00E+00	0.00E+00	5.18E-03	4.54E+01	9.11E-04	7.94E+00	5.69E-05	6.69E-01	0.00E+00								
Ethyl Chloride	75003	2.39E-04	0.00E+00	0.00E+00	1.81E-04	1.59E+00	3.19E-05	2.78E-01	1.99E-06	2.34E-02	0.00E+00								
Ethylbenzene	100414	3.47E-04	0.00E+00	0.00E+00	2.63E-04	2.31E+00	4.63E-05	4.03E-01	2.89E-06	3.40E-02	0.00E+00								
Ethylene Dibromide (EDB)	106934	3.06E-04	0.00E+00	0.00E+00	2.32E-04	2.03E+00	4.08E-05	3.56E-01	2.55E-06	3.00E-02	0.00E+00								
Ethylene Dichloride (EDC)	107062	5.89E-05	0.00E+00	0.00E+00	4.47E-05	3.92E-01	7.85E-06	6.84E-02	4.91E-07	5.77E-03	0.00E+00								
Formaldehyde	50000	3.98E-04	0.00E+00	0.00E+00	3.02E-04	2.65E+00	5.31E-05	4.62E-01	3.32E-06	3.90E-02	0.00E+00								
Hexane	110543	8.12E-04	0.00E+00	0.00E+00	6.16E-04	5.40E+00	1.08E-04	9.44E-01	6.77E-06	7.96E-02	0.00E+00								
Isopropyl Alchol	67630	1.62E-03	0.00E+00	0.00E+00	1.23E-03	1.08E-01	2.16E-04	1.88E+00	1.35E-05	1.59E-01	0.00E+00								
Isopropylbenzene (Cumene)	98828	5.61E-05	0.00E+00	0.00E+00	4.25E-05	3.73E-01	7.48E-06	6.52E-02	4.68E-07	5.50E-03	0.00E+00								
Methyl Ethyl Ketone (2-butanone)	78933	1.46E-02	0.00E+00	0.00E+00	1.11E-02	9.71E-01	1.95E-03	1.70E-01	1.22E-04	1.43E+00	0.00E+00								
Methyl Isobutyl Ketone	108101	7.09E-04	0.00E+00	0.00E+00	5.38E-04	4.71E+00	9.45E-05	8.24E-01	5.91E-06	6.95E-02	0.00E+00								
Naphthalene	91203	1.16E-03	0.00E+00	0.00E+00	8.80E-04	7.71E+00	1.55E-04	1.35E+00	9.67E-06	1.14E-01	0.00E+00								
Perchloroethylene	127184	6.51E-04	0.00E+00	0.00E+00	4.94E-04	4.33E+00	8.68E-05	7.56E-01	5.43E-06	6.38E-02	0.00E+00								
Styrene	100425	3.59E-04	0.00E+00	0.00E+00	2.72E-04	2.39E+00	4.79E-05	4.17E-01	2.99E-06	3.52E-02	0.00E+00								
(1,4-Dichloro-2-butene	764410	8.92E-04	0.00E+00	0.00E+00	6.76E-04	5.93E+00	1.19E-04	1.04E-01	7.43E-06	8.74E-02	0.00E+00								
Toluene	108883	1.07E-03	0.0																

Name	Agricultural Miscellaneous Emissions from Dairy Operation					
Applicability	Use this spreadsheet to characterize the miscellaneous emissions from Dairy sources when VOC rates are known. VOC emissions are calculated by the multiplication of the VOC Rates and Emission Factors.					
Author or upater	Matthew Cegielski	Last Update	August 26, 2016			
Facility:	Nunes 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	0	0	lb/hr	lb/yr	lb/hr	lb/yr
Milk Parlor 2	0	0				
VOC Emission Rates		3.61E-02	3.16E+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	3.15E-07	2.76E-03	0.00E+00	0.00E+00
1,1,2-Trichloroethane	79005	2.26E-04	8.15E-06	7.14E-02	0.00E+00	0.00E+00
1,2,3-Trichloropropane	96184	2.76E-04	9.96E-06	8.72E-02	0.00E+00	0.00E+00
1,2,4-Trichlorobenzene	120821	7.79E-04	2.81E-05	2.46E-01	0.00E+00	0.00E+00
1,2-Dibromo-3-chloropropane	96128	4.94E-05	1.78E-06	1.56E-02	0.00E+00	0.00E+00
1,2-Dichlorobenzene	95501	5.48E-05	1.98E-05	1.73E-01	0.00E+00	0.00E+00
1,3-Dichlorobenzene	541731	4.90E-04	1.77E-05	1.55E-01	0.00E+00	0.00E+00
1,4 Dioxane	123911	1.41E-03	5.09E-05	4.46E-01	0.00E+00	0.00E+00
1,4-Dichlorobenzene	106467	5.19E-04	1.87E-05	1.64E-01	0.00E+00	0.00E+00
Acetaldehyde	75070	2.41E-03	8.70E-05	7.62E-01	0.00E+00	0.00E+00
Acrylonitrile	107131	2.43E-04	8.77E-06	7.68E-02	0.00E+00	0.00E+00
Benzene	71432	3.19E-04	1.15E-05	1.01E-01	0.00E+00	0.00E+00
Benzyl chloride	100447	2.89E-04	1.04E-05	9.13E-02	0.00E+00	0.00E+00
Butyraldehyde	123728	1.14E-04	4.11E-06	3.60E-02	0.00E+00	0.00E+00
Carbon Disulfide	75150	2.49E-03	8.98E-05	7.87E-01	0.00E+00	0.00E+00
Carbon tetrachloride	56235	5.87E-05	2.12E-06	1.86E-02	0.00E+00	0.00E+00
Chlorobenzene	108907	2.72E-04	9.81E-06	8.60E-02	0.00E+00	0.00E+00
Chloroform	67663	1.31E-04	4.73E-06	4.14E-02	0.00E+00	0.00E+00
Chloromethane	74873	7.93E-04	2.86E-05	2.51E-01	0.00E+00	0.00E+00
Crotonaldehyde	4170303	1.41E-04	5.09E-06	4.46E-02	0.00E+00	0.00E+00
Cyclohexane	110827	6.83E-03	2.46E-04	2.16E+00	0.00E+00	0.00E+00
Ethyl Chloride	75003	2.39E-04	8.62E-06	7.55E-02	0.00E+00	0.00E+00
Ethylbenzene	100414	3.47E-04	1.25E-05	1.10E-01	0.00E+00	0.00E+00
Ethylene Dibromide (EDB)	106934	3.06E-04	1.10E-05	9.67E-02	0.00E+00	0.00E+00
Ethylene Dichloride (EDC)	107062	5.89E-05	2.13E-06	1.86E-02	0.00E+00	0.00E+00
Formaldehyde	50000	3.98E-04	1.44E-05	1.26E-01	0.00E+00	0.00E+00
Hexane	110543	8.12E-04	2.93E-05	2.57E-01	0.00E+00	0.00E+00
Isopropyl Alchol	67630	1.62E-03	5.85E-05	5.12E-01	0.00E+00	0.00E+00
Isopropylbenzene (Cumene)	98828	5.61E-05	2.02E-06	1.77E-02	0.00E+00	0.00E+00
Methyl Ethyl Ketone (2-butane)	78933	1.46E-02	5.27E-04	4.61E+00	0.00E+00	0.00E+00
Methyl Isobutyl Ketone	108101	7.09E-04	2.56E-05	2.24E-01	0.00E+00	0.00E+00
Naphthalene	91203	1.16E-03	4.19E-05	3.67E-01	0.00E+00	0.00E+00
Perchloroethylene	127184	6.51E-04	2.35E-05	2.06E-01	0.00E+00	0.00E+00
Styrene	100425	3.59E-04	1.30E-05	1.13E-01	0.00E+00	0.00E+00
t-1,4-Dichloro-2-butene	764410	8.92E-04	3.22E-05	2.82E-01	0.00E+00	0.00E+00
Toluene	108883	1.07E-03	3.86E-05	3.38E-01	0.00E+00	0.00E+00
Trichlorofluoromethane*	75694	1.08E-07	3.90E-09	3.41E-05	0.00E+00	0.00E+00
Vinyl acetate	108054	1.97E-03	7.11E-05	6.23E-01	0.00E+00	0.00E+00
Xylenes	1330207	1.80E-03	6.49E-05	5.69E-01	0.00E+00	0.00E+00
Ammonia	7664417		1.29E-02	1.13E+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 upater	Matthew Cegielski	Last Update	September 12, 2018							
Facility:	Nunes Dairy									
ID#:	0									
Project #:	0									
Inputs	lb/hr	lb/yr	Formula							
VOC Rate	0	767	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	3.01E-03	2.63E+01	3.01E-03	2.63E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,1,2-Trichloroethane	79005	7.94E-03	6.95E-04	6.08E+00	6.95E-04	6.08E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2,4-Trimethylbenzene	95636	2.94E-02	2.57E-03	2.25E+01	2.57E-03	2.25E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2-Dichlorobenzene	95501	6.25E-02	5.47E-03	4.79E+01	5.47E-03	4.79E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,3-Dichlorobenzene	541731	4.94E-02	4.32E-03	3.78E+01	4.32E-03	3.78E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,3-Dichloropropene	542756	7.44E-03	6.51E-04	5.70E+00	6.51E-04	5.70E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,4 Dioxane	123911	2.50E-02	2.19E-03	1.92E+01	2.19E-03	1.92E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,4-Dichloro-2-butene	764410	6.88E-02	6.02E-03	5.27E+01	6.02E-03	5.27E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,4-Dichlorobenzene	106467	5.19E-02	4.54E-03	3.98E+01	4.54E-03	3.98E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Acetaldehyde	75070	1.56E-02	1.37E-03	1.20E+01	1.37E-03	1.20E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Acrylonitrile	107131	7.31E-03	6.40E-04	5.61E+00	6.40E-04	5.61E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzene	71432	2.88E-03	2.52E-04	2.20E+00	2.52E-04	2.20E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzyl chloride	100447	3.13E-02	2.73E-03	2.40E+01	2.73E-03	2.40E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Carbon disulfide	75150	3.94E-02	3.45E-03	3.02E+01	3.45E-03	3.02E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chlorobenzene	108907	1.31E-02	1.15E-03	1.01E+01	1.15E-03	1.01E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cumene	98828	1.94E-02	1.70E-03	1.49E+01	1.70E-03	1.49E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cyclohexane	110827	8.19E-03	7.16E-04	6.28E+00	7.16E-04	6.28E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ethyl Chloride	75003	4.63E-03	4.05E-04	3.55E+00	4.05E-04	3.55E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ethylbenzene	100414	1.00E-02	8.75E-04	7.67E+00	8.75E-04	7.67E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ethylene Dibromide (EDB)	106934	1.44E-02	1.26E-03	1.10E+01	1.26E-03	1.10E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ethylene Dichloride (EDC)	107062	4.06E-03	3.55E-04	3.11E+00	3.55E-04	3.11E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Formaldehyde	50000	8.13E-03	7.11E-04	6.23E+00	7.11E-04	6.23E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Hexane	110543	4.31E-03	3.77E-04	3.31E+00	3.77E-04	3.31E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Isopropyl Alchol	67630	7.50E-03	6.56E-04	5.75E+00	6.56E-04	5.75E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Methyl Ethyl Ketone	78933	1.38E-02	1.20E-03	1.05E+01	1.20E-03	1.05E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Methyl Isobutyl Ketone	108101	1.13E-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
Naphthalene	91203	1.88E-01	1.64E-02	1.44E+02	1.64E-02	1.44E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Perchloroethylene	127184	1.75E-01	1.53E-02	1.34E+02	1.53E-02	1.34E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Styrene	100425	1.63E-02	1.42E-03	1.25E+01	1.42E-03	1.25E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Toluene	108883	1.25E-02	1.09E-03	9.58E+00	1.09E-03	9.58E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Trichloroethylene	79016	1.12E-02	9.79E-04	8.58E+00	9.79E-04	8.58E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Xylenes	1330207	1.88E-02	1.64E-03	1.44E+01	1.64E-03	1.44E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ammonia	7664417				5.750E-01	5.037E+03	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Nunes Construction DPM - Merced County, Annual

Nunes Construction DPM
Merced County, Annual

1.0 Project Characteristics**1.1 Land Usage**

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Light Industry	85.80	1000sqft	1.97	85,800.00	0

1.2 Other Project Characteristics

Urbanization	Urban	Wind Speed (m/s)	2.2	Precipitation Freq (Days)	49
Climate Zone	3			Operational Year	2020
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	CH4 Intensity (lb/MWhr)	0.029	N2O Intensity (lb/MWhr)	0.006

1.3 User Entered Comments & Non-Default Data

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Project Characteristics -

Land Use -

Construction Phase - Estimated Construction Schedule of 6 months

Trips and VMT - Run is for on-site DPM estimates. Therefore, worker trips have been set to zero.

Grading - Run is for on-site DPM estimates. Therefore, grading acres for fugitive dust have been set to zero.

Vehicle Trips - Construction Run Only

Consumer Products - Construction Run Only

Area Coating - Construction Run Only

Landscape Equipment - Construction Run Only

Energy Use - Construction Run Only

Water And Wastewater - Construction Run Only

Solid Waste - Construction Run Only

Construction Off-road Equipment Mitigation -

Demolition -

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Table Name	Column Name	Default Value	New Value
tblAreaCoating	ReapplicationRatePercent	10	0
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	200.00	118.00
tblConstructionPhase	NumDays	20.00	10.00
tblConstructionPhase	PhaseEndDate	4/14/2021	12/31/2020
tblConstructionPhase	PhaseStartDate	7/9/2020	7/21/2020
tblEnergyUse	LightingElect	2.70	0.00
tblEnergyUse	NT24E	4.16	0.00
tblEnergyUse	NT24NG	3.84	0.00
tblEnergyUse	T24E	1.96	0.00
tblEnergyUse	T24NG	17.03	0.00
tblSolidWaste	SolidWasteGenerationRate	106.39	0.00
tblTripsAndVMT	VendorTripNumber	14.00	0.00
tblTripsAndVMT	WorkerTripNumber	8.00	0.00
tblTripsAndVMT	WorkerTripNumber	8.00	0.00
tblTripsAndVMT	WorkerTripNumber	36.00	0.00
tblTripsAndVMT	WorkerTripNumber	13.00	0.00
tblVehicleTrips	ST_TR	1.32	0.00
tblVehicleTrips	SU_TR	0.68	0.00
tblVehicleTrips	WD_TR	6.97	0.00
tblWater	IndoorWaterUseRate	19,841,250.00	0.00

2.0 Emissions Summary

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2.1 Overall Construction

Unmitigated Construction

Mitigated Construction

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Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
		Highest		

2.2 Overall Operational

Unmitigated Operational

Nunes Construction DPM - Merced County, Annual

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						0.0000	0.0000									
Energy						0.0000	0.0000									
Mobile						0.0000	0.0000									
Waste						0.0000	0.0000									
Water						0.0000	0.0000									
Total						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	N2O	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**

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Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	7/1/2020	7/2/2020	5	2	
2	Grading	Grading	7/3/2020	7/8/2020	5	4	
3	Building Construction	Building Construction	7/21/2020	12/31/2020	5	118	
4	Demolition	Demolition	7/9/2020	7/22/2020	5	10	

Acres of Grading (Site Preparation Phase): 1

Acres of Grading (Grading Phase): 1.5

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

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Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Rubber Tired Dozers	1	7.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Site Preparation	Graders	1	8.00	187	0.41
Grading	Graders	1	6.00	187	0.41
Grading	Rubber Tired Dozers	1	6.00	247	0.40
Grading	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Building Construction	Cranes	1	6.00	231	0.29
Building Construction	Forklifts	1	6.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Building Construction	Welders	3	8.00	46	0.45
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Rubber Tired Dozers	1	8.00	247	0.40
Demolition	Tractors/Loaders/Backhoes	3	8.00	97	0.37

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	3	0.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	3	0.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	7	0.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Demolition	5	0.00	0.00	187.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Reduce Vehicle Speed on Unpaved Roads

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3.2 Site Preparation - 2020

Unmitigated Construction On-Site

Unmitigated Construction Off-Site

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3.2 Site Preparation - 2020

Mitigated Construction On-Site

Mitigated Construction Off-Site

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3.3 Grading - 2020

Unmitigated Construction On-Site

Unmitigated Construction Off-Site

Nunes Construction DPM - Merced County, Annual

3.3 Grading - 2020

Mitigated Construction On-Site

Mitigated Construction Off-Site

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3.4 Building Construction - 2020

Unmitigated Construction On-Site

Unmitigated Construction Off-Site

Nunes Construction DPM - Merced County, Annual

3.4 Building Construction - 2020

Mitigated Construction On-Site

Mitigated Construction Off-Site

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3.5 Demolition - 2020

Unmitigated Construction On-Site

Unmitigated Construction Off-Site

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3.5 Demolition - 2020**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							0.0000	0.0203								
Off-Road							5.7600e-003	5.7600e-003								
Total							5.7600e-003	0.0260								

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							9.0000e-005	1.6900e-003								
Vendor							0.0000	0.0000								
Worker							0.0000	0.0000								
Total							9.0000e-005	1.6900e-003								

4.0 Operational Detail - Mobile

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4.1 Mitigation Measures Mobile

	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					
Mitigated							0.0000	0.0000								
Unmitigated							0.0000	0.0000								

4.2 Trip Summary Information

Land Use	Average Daily Trip Rate			Unmitigated		Mitigated	
	Weekday	Saturday	Sunday	Annual VMT	Annual VMT	Annual VMT	Annual VMT
General Light Industry	0.00	0.00	0.00	-	-	-	-
Total	0.00	0.00	0.00	-	-	-	-

4.3 Trip Type Information

Land Use	Miles			Trip %			Trip Purpose %		
	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
General Light Industry	9.50	7.30	7.30	59.00	28.00	13.00	92	5	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
General Light Industry	0.484945	0.031816	0.154973	0.120992	0.021332	0.005119	0.015709	0.151573	0.002377	0.002347	0.006486	0.001616	0.000714

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5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

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5.2 Energy by Land Use - NaturalGas

Unmitigated

Mitigated

Nunes Construction DPM - Merced County, Annual

5.3 Energy by Land Use - Electricity**Unmitigated**

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
General Light Industry	0				
Total					

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
General Light Industry	0				
Total					

6.0 Area Detail**6.1 Mitigation Measures Area**

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6.2 Area by SubCategory

Unmitigated

Nunes Construction DPM - Merced County, Annual

6.2 Area by SubCategory**Mitigated**

	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
SubCategory	tons/yr										MT/yr					
Architectural Coating							0.0000	0.0000								
Total							0.0000	0.0000								

7.0 Water Detail**7.1 Mitigation Measures Water**

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated				
Unmitigated				

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7.2 Water by Land Use**Unmitigated**

	Indoor/Out door Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
General Light Industry	0 / 0				
Total					

Mitigated

	Indoor/Out door Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
General Light Industry	0 / 0				
Total					

8.0 Waste Detail**8.1 Mitigation Measures Waste**

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Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated				
Unmitigated				

8.2 Waste by Land UseUnmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
General Light Industry	0				
Total					

Nunes Construction DPM - Merced County, Annual

8.2 Waste by Land Use**Mitigated**

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
General Light Industry	0				
Total					

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type
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10.0 Stationary Equipment**Fire Pumps and Emergency Generators**

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type
----------------	--------	-----------	------------	-------------	-------------	-----------

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type
----------------	--------	----------------	-----------------	---------------	-----------

User Defined Equipment

Equipment Type	Number
----------------	--------

11.0 Vegetation

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APPENDIX B: AERMOD ELECTRONIC FILES
