

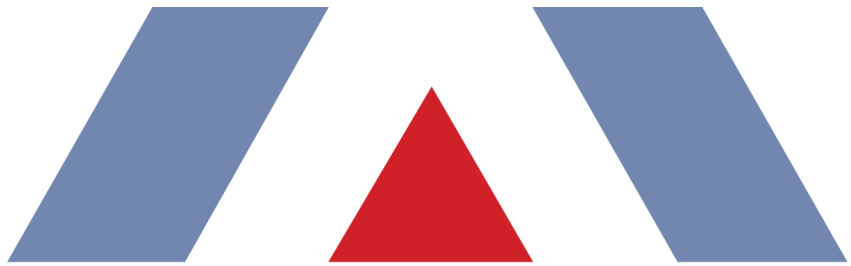
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## APPENDIX G

### Ambient Air Quality Analysis

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## **AMBIENT AIR QUALITY ANALYSIS** **Oliveira Dairy Expansion**

**4235 Oak Avenue  
Merced, CA 95340  
Merced County**

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## 1. EXECUTIVE SUMMARY

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This document contains the ambient air quality analysis (AAQA) performed on behalf of Environmental Planning Partners, Inc. for an expansion of the existing Oliveira Dairy operation in Merced County, California. The intent of the AAQA is to determine if the proposed dairy expansion has the potential to impact ambient air quality through a violation of the Ambient Air Quality standards (AAQS) or a substantial contribution to existing or projected air quality standards.

Under the provisions of the Federal Clean Air Act, the San Joaquin Valley Air Basin, including Merced County, has been designated as attainment/unclassified for the National Ambient Air Quality Standards (NAAQS) for carbon monoxide (CO), nitrogen dioxide (NO<sub>2</sub>), and sulfur dioxide (SO<sub>2</sub>); and attainment for particulate matter between 2.5 and 10 micrometers in diameter (PM<sub>10</sub>). The Merced County portions of the San Joaquin Valley Air Basin have been designated as non-attainment/extreme for the ozone (O<sub>3</sub>) eight-hour average standard and non-attainment for the particulate matter less than 2.5 micrometers in diameter (PM<sub>2.5</sub>) standard. The Merced County portions of the San Joaquin Valley Air Basin have been designated as non-attainment/severe with the State one-hour standard for O<sub>3</sub>; non-attainment for the PM<sub>10</sub>, PM<sub>2.5</sub> and eight-hour O<sub>3</sub> standards; unclassified for hydrogen sulfide (H<sub>2</sub>S) and visibility reducing particles; attainment/unclassified for CO; and attainment for all other compounds for which a California Ambient Air Quality Standards (CAAQS) exists. In order to determine whether a project will cause or contribute significantly to an AAQS violation, the maximum impacts attributable to the project are added to the existing background concentrations and are compared to the applicable AAQS. If an AAQS is not exceeded, the project is judged to not cause or contribute significantly to an AAQS violation for the applicable pollutant. If an ambient air quality standard is exceeded, it must be determined whether the project will cause a Prevention of Significant Deterioration (PSD) increment violation, which is achieved by comparing the maximum predicted concentration from the project to the established significant impact level (SIL) for the applicable pollutant. The San Joaquin Valley Air Pollution Control District (SJVAPCD) has developed alternative SILs for fugitive emissions of PM<sub>10</sub> and PM<sub>2.5</sub>. If a source's maximum impacts are below the applicable SIL, the project is judged to not cause or contribute significantly to an AAQS violation or cause an increment violation.

For the Oliveira Dairy expansion project, maximum predicted concentrations of NO<sub>2</sub>, SO<sub>2</sub>, CO, PM<sub>10</sub>, and PM<sub>2.5</sub> were predicted based on an analysis of the project-related emissions and air dispersion modeling. Emissions were calculated using generally accepted emission factors. Ambient air concentrations were predicted for the 1-hour, 3-hour, 8-hour, 24-hour and annual averaging periods using the most recent version of EPA's AMS/EPA Regulatory Model - AERMOD (recompiled for the Lakes ISC-AERMOD View interface).

Proposed emissions for the project will not cause or contribute to a violation of any NAAQS or CAAQS for any of the averaging periods for NO<sub>2</sub>, SO<sub>2</sub>, CO, or H<sub>2</sub>S, or cause an increment violation of the SJVAPCD SILs for the annual and 24-hour averaging periods for PM<sub>10</sub> and PM<sub>2.5</sub>.

In accordance with the SJVAPCD's *Guide for Assessing and Mitigating Air Quality Impacts* (SJVAPCD 2015), the potential impact to air quality attributable to the proposed project is determined to be less than significant.

## 2. INTRODUCTION

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This Ambient Air Quality Analysis (AAQA) 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 Oliveira Dairy operation in Merced County, California (**Figure 2-1**). This AAQA was prepared pursuant to the San Joaquin Valley Air Pollution Control District's (SJVAPCD) *Guide for Assessing and Mitigating Air Quality Impacts* (GAMAQI), (SJVAPCD 2015a) and the California Environmental Quality Act (CEQA).

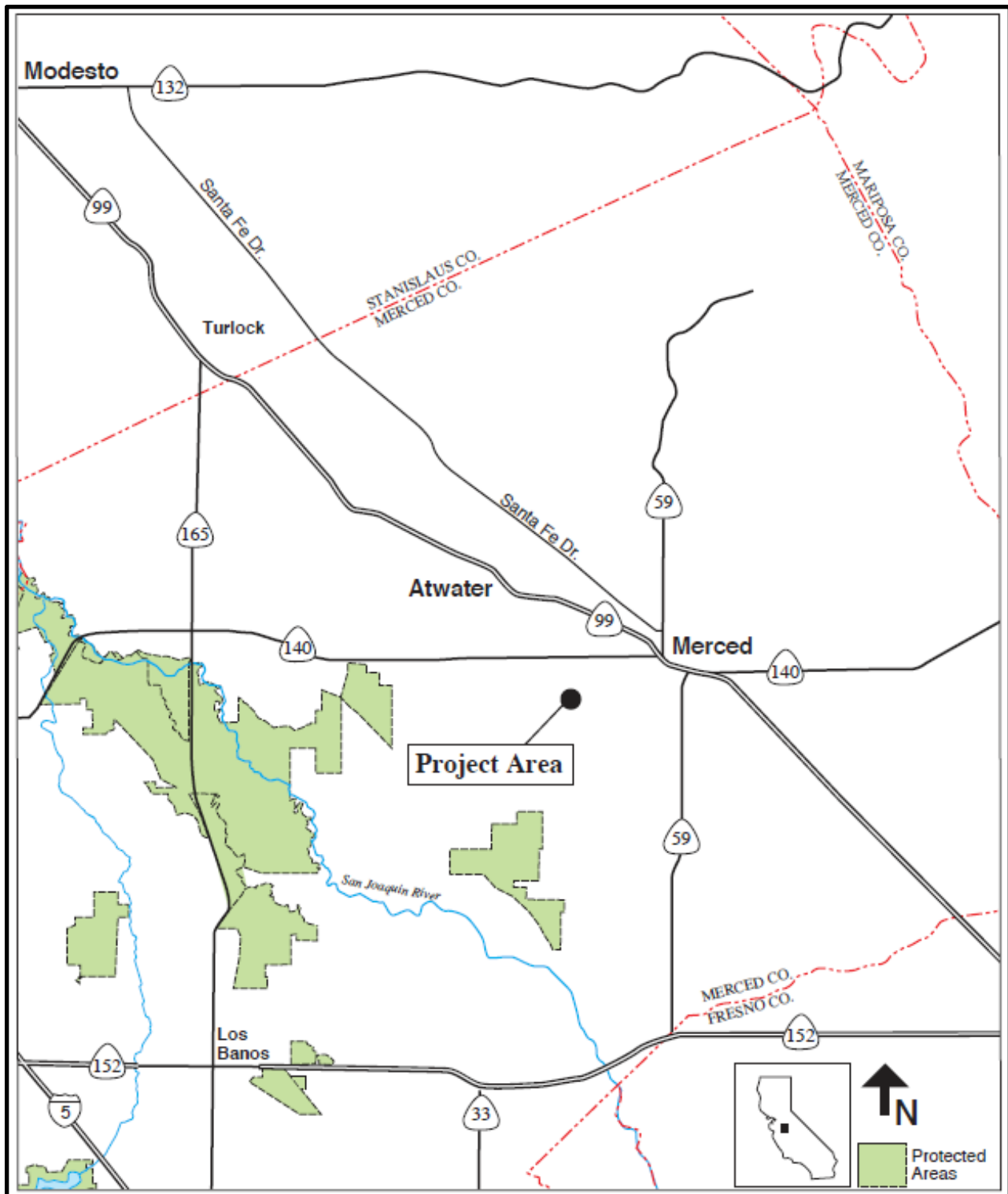
A potentially significant impact to air quality, as defined by the CEQA Appendix G Environmental Checklist Form (not included herein), would occur if the project caused one or more of the following to occur:

- Conflict with or obstruct implementation of the applicable air quality plan;
- Violate any air quality standard or substantial contribution to an existing or projected air quality standard;
- Cause a cumulatively considerable net increase of any criteria pollutant for which the project region is designated non-attainment under an applicable Federal or State ambient air quality standard (including emissions which exceed quantitative thresholds for ozone precursors);
- Expose sensitive receptors to substantial pollutant concentrations; and/or
- Create objectionable odors affecting a substantial number of people.

The intent of the AAQA is to determine if the project has the potential to impact ambient air quality through a violation of any air quality standard or a substantial contribution to an existing or projected air quality standard. Impacts to ambient air quality are evaluated based on the project-related emission of criteria pollutants. This analysis is limited to the potential impacts resulting from project-related emissions of nitrogen dioxide (NO<sub>2</sub>), carbon monoxide (CO), sulfur dioxide (SO<sub>2</sub>), particulate matter between 2.5 and 10 micrometers in diameter (PM<sub>10</sub>), particulate matter less than 2.5 micrometers in diameter (PM<sub>2.5</sub>), and hydrogen sulfide (H<sub>2</sub>S). Project-related emissions are based on the proposed increase in the number of cattle and the additional on-site mobile sources required for the expansion.



Figure 2-1. Location Map



(Source: Planning Partners, 2016)

## 2.1. PROJECT DESCRIPTION

The existing dairy is located at 4235 Oak Avenue 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.

After modification, the dairy will house approximately 4,400 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. After expansion, the dairy will be operated on approximately 28 acres of the 290-acre facility. Approximately 242 acres of the project site will be used for the production of crops and the application of lagoon effluent and/or solid manure. The project cropland application areas are located on portions of six parcel.

**Table 2-1. Herd Configuration – Existing and Proposed**

	<b>Current</b>	<b>Proposed</b>	<b>Increment</b>
Milk Cows	1,063	2,500	1,437
Dry Cows	158	400	242
Bred Heifers 15-24 mos.	467	375	-92
Heifers 7-14 mos.	344	375	31
Heifers 4-6 mos.	0	375	375
Calves 0-3 mos.	186	375	189
Bulls	0	0	0
<b>TOTAL</b>	<b>2,550</b>	<b>4,400</b>	<b>2,182</b>

The proposed structure construction would consist of two new freestall barns, two new shade structures and a new milking parlor. The proposed expansion would include construction of 215,000 square feet of new buildings for a total of 312,700 square feet of building structures once construction is complete. With construction of the proposed facilities, approximately seven acres of cropped acreage would be converted to active dairy facilities.

### 3. BACKGROUND OF AIR QUALITY STANDARDS

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Protection of the public health is maintained through the attainment and maintenance of standards for ambient concentrations of various compounds in the atmosphere and the enforcement of emission limits for individual stationary sources. The Federal Clean Air Act requires that the U.S. Environmental Protection Agency (EPA) establish National Ambient Air Quality Standards (NAAQS) to protect the health, safety, and welfare of the public. NAAQS have been established for ozone (O<sub>3</sub>), carbon monoxide (CO), nitrogen dioxide (NO<sub>2</sub>), sulfur dioxide (SO<sub>2</sub>), particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>) and lead (Pb). California has also adopted ambient air quality standards (CAAQS) for these "criteria" air pollutants that are more stringent than the corresponding NAAQS along with standards for hydrogen sulfide (H<sub>2</sub>S), vinyl chloride (chloroethene) and visibility reducing particles. In 2010, the U.S. Environmental Protection Agency (EPA) promulgated a new 1-hour NO<sub>2</sub> and SO<sub>2</sub> primary NAAQS, which are considerably less than the current CAAQS. Compliance with the new standards must be determined for all new and modified sources that are subject to the ambient air quality standard analysis requirement in SJVAPCD Rule 2201, Section 4.14. Current Federal and State ambient air quality standards are presented in **Table 3-1**.

Responsibility for regulation of air quality in California rests with the California Air Resources Board (CARB), the multi-county Air Quality Management Districts and Unified Air Pollution Control Districts, and single-county Air Pollution Control Districts, with oversight responsibility held by the EPA. CARB is responsible for regulation of mobile source emissions, establishment of State ambient air quality standards, research and development, and oversight and coordination of the activities of the regional and local air quality agencies. The regional and local air quality agencies are primarily responsible for regulating stationary source emissions and for monitoring ambient pollutant concentrations.

The Clean Air Act Amendments of 1977 required states to identify areas that were not in attainment with the NAAQS and to develop State Implementation Plans containing strategies to bring these non-attainment areas into compliance. The project location has been designated as attainment /unclassified for the NAAQS for CO, NO<sub>2</sub>, and SO<sub>2</sub>; and attainment for PM<sub>10</sub>. The project location has been designated as non-attainment/extreme for the O<sub>3</sub> eight-hour average standard and non-attainment for the PM<sub>2.5</sub> standard. A Federal designation for lead has not been made and NAAQS do not exist for O<sub>3</sub> (1-hour average), hydrogen sulfide (H<sub>2</sub>S), sulfates, vinyl chloride or visibility reducing particles. The project location has been designated as non-attainment/severe with the State one-hour standard for O<sub>3</sub>, non-attainment for the PM<sub>10</sub>, PM<sub>2.5</sub>, and eight-hour O<sub>3</sub> standards; unclassified for H<sub>2</sub>S and visibility reducing particles; attainment /unclassified for CO; and attainment for all other compounds for which a State standard exists. **Table 3-2** provides the San Joaquin Valley Air Basin's designation and classification based on the various criteria pollutants under both State and Federal standards.

**Table 3-1. Federal & California Ambient Air Quality Standards**

		NAAQS	CAAQS
Pollutant	Averaging Time	Concentration	
O <sub>3</sub>	8-Hour	0.070 ppm (137 µg/m <sup>3</sup> ) <sup>c</sup>	0.070 ppm (137 µg/m <sup>3</sup> )
	1-Hour	<sup>a</sup>	0.09 ppm (180 µg/m <sup>3</sup> )
CO	8-Hour	9 ppm (10 mg/m <sup>3</sup> )	9 ppm (10 mg/m <sup>3</sup> )
	1-Hour	35 ppm (40 mg/m <sup>3</sup> )	20 ppm (23 mg/m <sup>3</sup> )
NO <sub>2</sub>	Annual Average	53 ppb (100 µg/m <sup>3</sup> )	0.030 ppm (56 µg/m <sup>3</sup> )
	1-Hour	100 ppb (188.68 µg/m <sup>3</sup> )	0.18 ppm (338 µg/m <sup>3</sup> )
SO <sub>2</sub>	3-Hour	0.5 ppm (1,300 µg/m <sup>3</sup> )	
	24 Hour	0.14 ppm (365 µg/m <sup>3</sup> )	0.04 ppm (105 µg/m <sup>3</sup> )
	1-Hour	75 ppb (196 µg/m <sup>3</sup> )	0.25 ppm (655 µg/m <sup>3</sup> )
Particulate Matter (PM <sub>10</sub> )	Annual Arithmetic Mean	<sup>b</sup>	20 µg/m <sup>3</sup>
	24-Hour	150 µg/m <sup>3</sup>	50 µg/m <sup>3</sup>
Fine Particulate Matter (PM <sub>2.5</sub> )	Annual Arithmetic Mean	12 µg/m <sup>3</sup>	12 µg/m <sup>3</sup>
	24-Hour	35 µg/m <sup>3</sup>	
Sulfates	24-Hour		25 µg/m <sup>3</sup>
Pb <sup>d</sup>	Rolling Three-Month Average	0.15 µg/m <sup>3</sup>	
	30 Day Average		1.5 µg/m <sup>3</sup>
H <sub>2</sub> S	1-Hour		0.03 ppm (42 µg/m <sup>3</sup> )
Vinyl Chloride (chloroethene)	24-Hour		0.010 ppm (26 µg/m <sup>3</sup> )
Visibility Reducing particles	8 Hour (1000 to 1800 PST)		<sup>e</sup>
ppm = parts per million ppb = parts per billion		mg/m <sup>3</sup> = milligrams per cubic meter	µg/m <sup>3</sup> = micrograms per cubic meter

<sup>a</sup> 1-Hour O<sub>3</sub> standard revoked effective June 15, 2005.

<sup>b</sup> Annual PM 10 standard revoked effective December 18, 2006.

<sup>c</sup> EPA finalized the revised (2008) 8-hour O<sub>3</sub> standard of 0.075 ppm on March 27, 2008. The 1997 8-hour O<sub>3</sub> standard of 0.08 ppm has not been revoked. In the January 19, 2010 Federal Register, EPA proposed to revise the 2008 O<sub>3</sub> NAAQS of 0.075 ppm to a NAAQS in the range of 0.060 to 0.070 ppm. EPA expects to finalize the revised NAAQS, which will replace the 0.075 ppm NAAQS, by July 29, 2011.

<sup>d</sup> On October 15, 2008, EPA strengthened the Pb standard.

<sup>e</sup> Statewide Visibility Reducing Particle Standard (except Lake Tahoe Air Basin): Particles in sufficient amount to produce an extinction coefficient of 0.23 per kilometer when the relative humidity is less than 70 percent. This standard is intended to limit the frequency and severity of visibility impairment due to regional haze and is equivalent to a 10-mile nominal visual range. (SJVAPCD 2017a and CARB 2017a)

**Table 3-2. San Joaquin Valley Air Basin Attainment Status**

Pollutant	NAAQS <sup>a</sup>	CAAQS <sup>b</sup>
O <sub>3</sub> , 1-hour	No Federal Standard <sup>f</sup>	Nonattainment/Severe
O <sub>3</sub> , 8-hour	Nonattainment/Extreme <sup>e</sup>	Nonattainment
PM <sub>10</sub>	Attainment <sup>c</sup>	Nonattainment
PM <sub>2.5</sub>	Nonattainment <sup>d</sup>	Nonattainment
CO	Attainment/Unclassified	Attainment/Unclassified
NO <sub>2</sub>	Attainment/Unclassified	Attainment
SO <sub>2</sub>	Attainment/Unclassified	Attainment
Pb (Particulate)	No Designation/Classification	Attainment
H <sub>2</sub> S	No Federal Standard	Unclassified
Sulfates	No Federal Standard	Attainment
Visibility Reducing particulates	No Federal Standard	Unclassified
Vinyl Chloride	No Federal Standard	Attainment

<sup>a</sup> See 40 CFR Part 81

<sup>b</sup> See CCR Title 17 Sections 60200-60210

<sup>c</sup> On September 25, 2008, EPA redesignated the San Joaquin Valley to attainment for the PM<sub>10</sub> National Ambient Air Quality Standard (NAAQS) and approved the PM<sub>10</sub> Maintenance Plan.

<sup>d</sup> The Valley is designated nonattainment for the 1997 PM<sub>2.5</sub> NAAQS. EPA designated the Valley as nonattainment for the 2006 PM<sub>2.5</sub> NAAQS on November 13, 2009 (effective December 14, 2009).

<sup>e</sup> Though the Valley was initially classified as serious nonattainment for the 1997 8-hour O<sub>3</sub> standard, EPA approved Valley reclassification to extreme nonattainment in the Federal Register on May 5, 2010 (effective June 4, 2010).

<sup>f</sup> Effective June 15, 2005, the EPA revoked the federal 1-hour O<sub>3</sub> standard, including associated designations and classifications. EPA had previously classified the SJVAB as extreme nonattainment for this standard. EPA approved the 2004 Extreme Ozone Attainment Demonstration Plan on March 8, 2010 (effective April 7, 2010). Many applicable requirements for extreme 1-hour O<sub>3</sub> nonattainment areas continue to apply to the SJVAB.

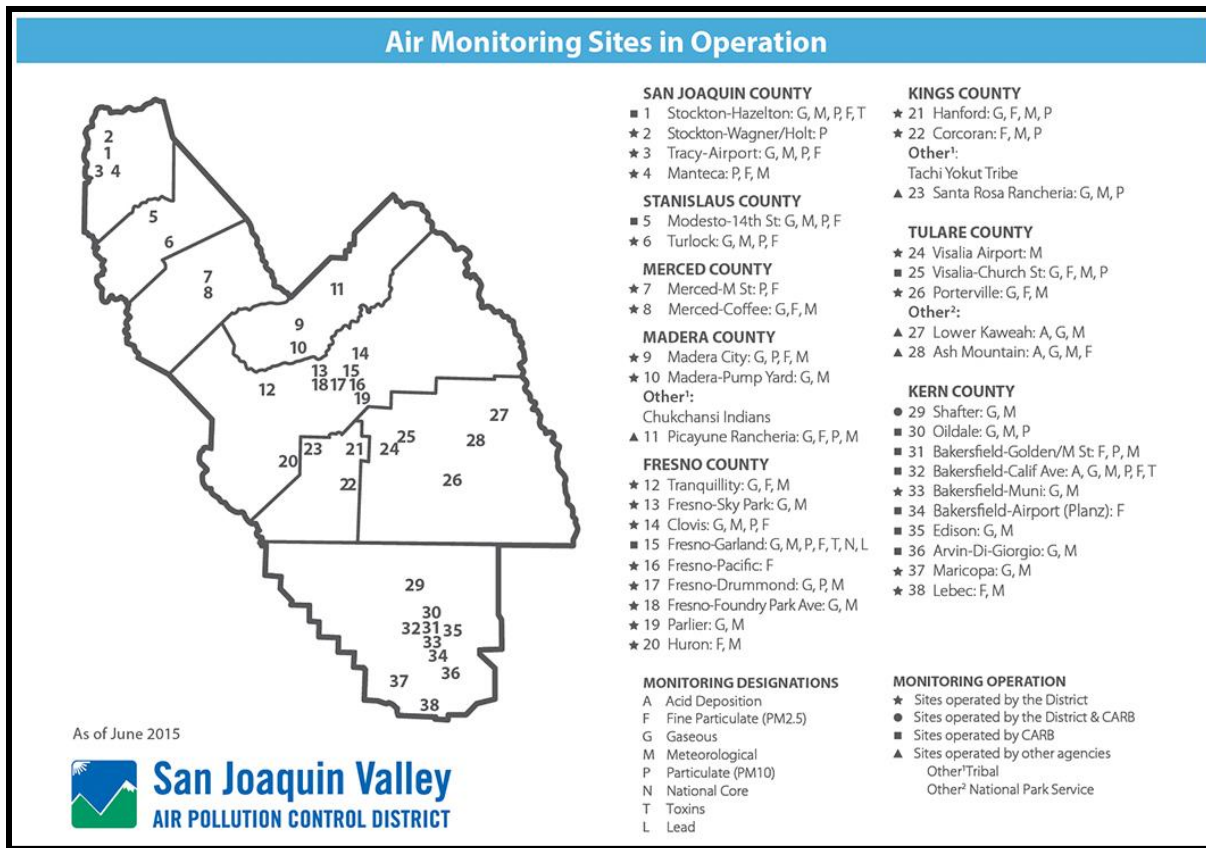
(SJVAPCD 2017a)

The SJVAPCD along with the CARB operates an air quality monitoring network that provides information on average concentrations of those pollutants for which State or Federal agencies have established ambient air quality standards. Information from the various monitoring stations is available from the agency web sites. A map of the various monitoring stations in the San Joaquin Valley is provided in **Figure 3-1**.

For the purposes of establishing background concentrations of applicable criteria pollutants, this AAQA relied on EPA's AirData and CARB monitoring values, the raw data for which were collected during 2016<sup>1</sup> at CARB/SJVAPCD monitoring stations. Background values were selected from various monitoring stations based on closest proximity to the project site. **Table 3-3** provides the background concentrations applicable to the project area. No recent data is available for hydrogen sulfide, vinyl chloride or lead in Merced County or adjacent Counties.

<sup>1</sup> The exception is the one-hour NO<sub>2</sub> background value, which EPA requires to be based on a 3-year average. The SJVAPCD's statistical analysis was based on the period 2011 to 2013.

Figure 3-1. San Joaquin Valley APCD Monitoring Network



(SJVAPCD 2017b)

Table 3-3. Background Concentrations for the Project Vicinity

Pollutant	Averaging Period	Background Concentration µg/m <sup>3</sup>	Reference
NO <sub>2</sub>	1-hour	93.1	SJVAPCD FTP Server, Merced Co. (SJVAPCD 2017c)
	Annual	14.0	Merced County, 2016 (USEPA 2017)
SO <sub>2</sub>	1-hour	22.6	Fresno Co., 2016 (USEPA 2017)
	3-hour	20.3	Scaled from SO <sub>2</sub> 1-hour concentration <sup>2</sup>
	24-hour	5.6	Fresno Co., 2016 (USEPA 2017)
CO	1-hour	2340	Stanislaus County, 2016 (USEPA 2017)
	8-hour	1850	Stanislaus County, 2016 (USEPA 2017)
O <sub>3</sub>	1-hour	205	Merced County, 2016 (USEPA 2017)
	8-hour	182	Merced County, 2016 (USEPA 2017)
PM <sub>2.5</sub>	24-hour	42.8	Merced County, 2016 (USEPA 2017)
	Annual	11.2	Merced County, 2016 (USEPA 2017)
PM <sub>10</sub>	24-hour	64	Merced County, 2016 (USEPA 2017)
	Annual	29.5	Merced County, 2016 (CARB 2017)

<sup>1</sup> The District processed the NO<sub>2</sub> monitoring data using the guidance provided in Appendix S of Part 50.

<sup>2</sup> The SO<sub>2</sub> 3-hour Concentration was scaled from the SO<sub>2</sub> 1-hour Concentration using the recommended 0.9 factor (OEHHA 2015).

Merced County, where the project area is located, is included among the eight counties that comprise the SJVAPCD. The SJVAPCD acts as the regulatory agency for air pollution control in the Basin and is the local agency empowered to regulate air pollutant emissions for the air basin. In order to demonstrate that a proposed project will not cause further air quality degradation, projects must demonstrate consistency with the SJVAPCD's adopted Air Quality Attainment Plans.

Air pollution sources associated with stationary sources are regulated through the permitting authority of the SJVAPCD under the New and Modified Stationary Source Review Rule (Rule 2201). Owners of any new or modified equipment that emits, reduces or controls air contaminants, except those specifically exempted by the SJVAPCD, are required to apply for an Authority to Construct and Permit to Operate (Rule 2010). Additionally, best available control technology (BACT) is required on specific types of equipment. Stationary sources are required to offset stationary source emission increases along with increases in cargo carrier emissions if the specified threshold levels are exceeded (Rule 2201, 4.7.1). The SJVAPCD uses this mechanism to ensure that all stationary sources within the project area are subject to the standards of the SJVAPCD to ensure that new or modified sources will not realize a net increase of criteria air pollutants.

Stationary sources subject to SJVAPCD New and Modified Stationary Source Review Rule must also comply with Rule 2201, Section 4.14, Ambient Air Quality Standards, which requires that "emissions from a new or modified Stationary Source shall not cause or make worse the violation of an Ambient Air Quality Standard...the APCO shall take into account the increases in minor and secondary sources emissions as well as the mitigation of emissions through offsets...." The Air Pollution Control Officer (APCO) also has discretion to exempt new or modified sources that are exempt from public notification requirements<sup>2</sup> from this section of Rule 2201. Public notification and publication is required for projects meeting any of the following criteria:

- New Major Sources and Major Modifications;
- Applications which include a new emissions unit with a Potential to Emit greater than 100 pounds during any one day for any one affected pollutant;
- Modifications that increase the Stationary Source Potential to Emit (SSPE1) from a level below the emissions offset threshold level to a level exceeding the emissions offset threshold level for one or more pollutants;
- New Stationary Sources with post-project Stationary Source Potential to Emit (SSPE2) exceeding the emissions offset threshold level for one or more pollutants; or
- Any permitting action resulting in a Stationary Source Project Increase in Permitted Emissions (SSIPE) exceeding 20,000 pounds per year for any one pollutant.

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<sup>2</sup> *Public Notification and Publication Requirements*, San Joaquin Valley Air Pollution Control District Rule 2201 Section 5.4, amended April 21, 2011.



## 4. AIR QUALITY MODELING

This section describes the methodology used to predict the potential impact to ambient air quality attributable to the dispersion of emissions of NO<sub>2</sub>, SO<sub>2</sub>, CO, PM<sub>10</sub>, PM<sub>2.5</sub> and H<sub>2</sub>S from the proposed dairy operation expansion.

### 4.1. PROJECT EMISSIONS

The basis for evaluating the potential impact to ambient air quality is the identification of air pollution sources. Emissions based on the current configuration of the dairy are considered to be existing emissions.<sup>3</sup> Based on this fact, the facility's existing emissions are not included in the emissions proposed by the subject project. Therefore, emissions from the dairy modifications will be restricted to the increase in emissions for the proposed increase in the number of cattle (**Table 2-1**) and the additional on-site mobile sources required for the expansion. The potential emission sources addressed in the AAQA are listed in **Table 4-1**.

**Table 4-1. Sources of Potential Emissions**

Source ID	Description
STCK1	Milk Truck Idling
STCK2	Commodity Delivery Idling
STCK3	Solid Manure Removal Truck Idling
STCK4	Rendering Truck Idling
STCK5	Feed Loading
STCK6	Solids Removal (Loader)
SLINE1	Milk Delivery Truck Travel
SLINE2	Commodity Delivery
SLINE3	Solid Manure Transport Offsite
SLINE4	Rendering Truck Travel
SLINE5-6	Feed and Bedding Delivery
PAREA1	New Freestalls and Scraping

Emissions attributable to animal movement were estimated using spreadsheets currently used by the SJVAPCD, which are provided in **Appendix A**. The incremental increases in emissions attributable to animal movement were calculated by comparing the pre- and post-project emissions from each animal housing source. SJVAPCD-approved control efficiencies were applied to PM<sub>10</sub> emission factors for providing shaded areas, sprinklers, feeding young at dusk and planting upwind and downwind shelter breaks. To generate PM<sub>2.5</sub> emissions, the PM<sub>10</sub> emission results for these emission sources were multiplied by the PM<sub>2.5</sub> fraction of 11.4% from the livestock fugitive dust profile in the California Emission Inventory Data and Reporting System (CEIDARS) developed by CARB (SCAQMD 2006). Housing sources that had an increase in PM<sub>10</sub> and PM<sub>2.5</sub> emissions for 24-hour and annual periods are summarized in **Table 4-2**.

<sup>3</sup> Personal Communication with Leland Villalvazo, SJVAPCD, June 15, 2007.



**Table 4-2. Modeled Sources of Emissions Attributable to Animal Movement**

Source ID	PM <sub>10</sub> Emissions		PM <sub>2.5</sub> Emissions	
	Lbs/yr	Lbs/24-hr	Lbs/yr	Lbs/24-hr
PAREA1	1,540	4.2	175.56	0.48

On-site mobile sources for this facility include a diesel-fueled feed loading tractor, a manure scraping tractor, a manure loading tractor, a feed delivery tractor, a bedding delivery tractor, milk tankers, commodity delivery trucks, manure removal trucks, and rendering services trucks. The increased herd size will require additional tractor use for feed loading and delivery, bedding delivery, and solid manure scraping and loading. Additional truck trips will be required for milk tankers, commodity delivery trucks, solid manure removal trucks, and rendering service trucks.

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 (CAPCOA 2013). Diesel truck running 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. Diesel truck combustion emissions of PM<sub>2.5</sub> were set equal to PM<sub>10</sub> emissions. There will be no increases in 1-hour emissions because additional truck and tractor usage will not occur in the same 1-hour period as the existing equipment. In order to have a possible increase in the worst case one-hour emissions from the Oliveira Dairy, one of the three following scenarios would need to occur and be evaluated:

- New equipment must operate at the facility as a result of the project;
- An on-site piece of equipment must operate less than one hour during the worst-case 1-hour period pre-project and then must increase the operational time during the worst-case 1-hour period post-project.
- The project must increase the number trucks entering and exiting the facility over the number of pre-project trucks entering and exiting the facility during the worst-case 1-hour period.

The Oliveira Dairy Expansion Project does not propose any new pieces of equipment and all existing equipment currently operates the full hour during the worst-case hour. The project also does not propose an increase over the current worst-case 1-hour period of trucks entering or exiting the facility. Based on these findings the worst-case 1-hour period post-project will be equal to or less than the worst-case 1-hour period pre-project. Therefore, the incremental increase for this project in regards to 1-hour periods is zero and does not require analysis of any 1-hour AAQS. Based on the same philosophy outlined above for 1-hour emissions there will not be an increase no max 3-hour emissions increases (except for milk trucks and bedding delivery) and no max 8-hour and daily emission increases from manure removal trucks, rendering trucks, scraping and manure loading. Additionally, solid removal trucks, rendering trucks, manure loading and manure scraping will not have an increase in 24 hour emissions. Annual solid removal trucks double as a result of the expansion, however, the number of days the trucks come to the site also doubles. Therefore, there will be no increase in maximum daily solid removal trucks at the facility.

Calculation worksheets for emissions from the on-site mobile sources are provided in Appendix B and are summarized in **Table 4-3**.

**Table 4-3. On-Site Mobile Source Combustion Emissions**

Source ID	NO <sub>2</sub> Emissions		SO <sub>2</sub> Emissions		CO Emissions		PM <sub>10</sub> /PM <sub>2.5</sub> Emissions	
	Lbs/hr	Lbs/yr	Lbs/hr	Lbs/day	Lbs/hr	Lbs/8-hr	Lbs/24-hr	Lbs/yr
STCK1	0.00E+00	9.84E+00	0.00E+00	1.82E-05	0.00E+00	1.32E-02	5.02E-04	1.83E-01
STCK2	0.00E+00	3.51E+00	0.00E+00	9.12E-06	0.00E+00	6.59E-03	2.51E-04	6.52E-02
STCK3	0.00E+00	1.35E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.51E-01
STCK4	0.00E+00	7.03E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.30E-02
STCK5	0.00E+00	5.96E+02	0.00E+00	2.55E-02	0.00E+00	1.65E+00	9.83E-02	3.59E+01
STCK6	0.00E+00	3.27E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.97E-01
SLINE1	0.00E+00	3.02E+00	0.00E+00	9.39E-06	0.00E+00	4.17E-03	5.07E-04	1.85E-01
SLINE2	0.00E+00	1.19E+01	0.00E+00	1.03E-04	0.00E+00	2.29E-02	2.79E-03	7.26E-01
SLINE3	0.00E+00	4.69E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.86E+00
SLINE4	0.00E+00	4.90E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.00E-02
SLINE5	0.00E+00	4.02E+02	0.00E+00	6.88E-03	0.00E+00	2.03E+00	1.26E-01	3.91E+01
SLINE6	0.00E+00	2.94E+02	0.00E+00	5.04E-03	0.00E+00	1.48E+00	9.25E-02	2.86E+01
PAREA1	0.00E+00	8.72E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.26E-01

The SJVAPCD's *Dairy H2S AERMOD Hourly Emission File Generator* (SJVAPCD 2012) states that H<sub>2</sub>S emission 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 H<sub>2</sub>S emission associated with the proposed expansion.

## 4.2. DISPERSION MODELING

The most recent 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 for the 1-hour, 3-hour, 8-hour, 24-hour and annual averaging periods. 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 animal housing areas including the manure scraping tractor emissions 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, solid manure removal trucks, milk trucks, commodity trucks, and rendering service trucks were modeled as a 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, manure truck idling, milk truck idling, commodity truck idling, rendering service idling were modeled as point sources, with a unit emission rate of 1 g/sec.

#### 4.2.1. Meteorological Data

An SJVAPCD-approved AERMET v14134 Ustar processed meteorological dataset for calendar years 2010 to 2014<sup>4</sup> from Merced, California was input into AERMOD. The data is based on hourly surface data from the Merced Municipal Airport and upper air data from the Oakland Airport.

#### 4.2.2. Receptors

Existing land uses in the area where the dairy and proposed expansion are 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 fenceline grid was used to define a dense receptor grid around the property boundary using Lakes ISC-AERMOD View interface. The fenceline spacing between receptors along the fenceline was set to 25 meters. One tier was specified, which extended a distance of 100 meters from the fenceline. The spacing between receptors perpendicular to the fenceline was set to 25 meters. A total of 799 receptors were generated for the fenceline grid. There is currently one on-site residence, however, this residence is occupied by the dairy owner. Therefore, the owner's residence is exempt from being modeled.<sup>5</sup>

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<sup>4</sup> [ftp://12.219.204.27/public/Modeling/Meteorological Data/AERMET v14134 UStar/Merced%2023257/](ftp://12.219.204.27/public/Modeling/Meteorological%20Data/AERMET%20v14134%20UStar/Merced%2023257/)

<sup>5</sup> Personal communication with Leland Villalvazo, SJVAPCD, November 1, 2012.

### 4.3. MODELING RESULTS

Plot files generated by AERMOD were imported to a Microsoft Access based post-processor AAQA-PSD (developed by the SJVAPCD), where unit emission rates were converted to pollutant-specific emission rates based on the emissions provided in **Tables 4-2** and **4-3**. Background concentrations from **Table 3-3** were input to AAQA-PSD. Based on this data, a report was generated which provides the maximum concentrations per emission source, background concentration and total concentration for each averaging period. For each averaging period, the total concentration is compared to the applicable AAQS and designated as a “pass” or “fail.”

As shown in the AAQA-PSD report provided in Appendix C and **Table 4-4**, air dispersion modeling demonstrates that the maximum impacts attributable to the project, when considered in addition to the existing available background concentrations, are below the applicable ambient air quality standard for all of the averaging periods for NO<sub>2</sub>, SO<sub>2</sub>, CO and H<sub>2</sub>S.

Compliance with the Federal NO<sub>2</sub> one-hour standard was based on a modeling procedure developed by the SJVAPCD (SJVAPCD 2010). The most conservative approach, referred to as Tier I option 1, requires that the maximum one-hour modeling concentration be added to the SJVAPCD’s Air Quality Design Value for the nearest monitoring station (see **Table 3-3**). Since the maximum 1-hour emission rate is not increasing as a result of this project the Tier I analysis demonstrates compliance with the Federal NO<sub>2</sub> one-hour standard.

**Table 4-4. Predicted Ambient Air Quality Impacts**

Pollutant	Averaging Period	Background (µg/m <sup>3</sup> )	Project (µg/m <sup>3</sup> )	Project + Background (µg/m <sup>3</sup> )	NAAQS (µg/m <sup>3</sup> )	CAAQS (µg/m <sup>3</sup> )
NO <sub>2</sub>	1-hour	93.1	0.00	93.10	188.68	339
	Annual	14	0.74	14.74	100	---
SO <sub>2</sub>	1-hour	22.6	0.00	22.6	195	655
	3-hour	20.3	0.11	20.4	1300	---
	24-hour	5.6	0.03	5.63	---	105
CO	1-hour	2340	0.00	2340	40,000	23,000
	8-hour	1850	26.09	1876	10,000	10,000
PM <sub>10</sub>	24-hour	64.00	6.06	70.06	150	50
	Annual	29.50	0.87	30.37	50	20
PM <sub>2.5</sub>	24-hour	42.80	0.93	43.73	35	---
	Annual	11.20	0.15	11.35	12	12
H <sub>2</sub> S	1-hour	N/A	0.00	0.00	---	42

Background 24-hour and annual concentrations of PM<sub>10</sub> and the 24-hour concentration of PM<sub>2.5</sub> exceed their respective ambient air quality standards. Therefore, these averaging periods for PM<sub>2.5</sub> and PM<sub>10</sub> are evaluated in accordance with the Prevention of Significant Deterioration (PSD) procedure in Title 40, Code of Federal Regulations (CFR), Part 52.21. It is EPA’s policy to use significant impact levels (SIL) to determine whether a proposed new or modified source will cause or contribute significantly to an AAQS or PSD increment violation. The SJVAPCD has developed SILs for fugitive emissions of PM<sub>10</sub> and PM<sub>2.5</sub>.<sup>6</sup> As shown in **Tables 4-2** and **4-3**, 99% of the project’s predicted PM<sub>10</sub> concentration is attributable to fugitive PM<sub>10</sub> emissions from animal movement. Therefore, SJVAPCD SILs are applicable to this project. If a source’s maximum impacts are below the SIL, the source is judged to not cause or contribute significantly to an AAQS or increment violation.

<sup>6</sup> Personal Communication with Yu Vu, San Joaquin Valley Air Pollution Control District, August 15, 2012

A comparison of the proposed impact from the project to the SJVAPCD SILs, as shown in **Table 4-5**, demonstrates that the modeled PM<sub>10</sub> and PM<sub>2.5</sub> impacts directly attributable to the project are below the applicable SJVAPCD significance levels for the 24-hour and annual averaging periods of PM<sub>10</sub> and the 24-hour averaging period of PM<sub>2.5</sub> and therefore will not cause an increment violation of any SJVAPCD SIL.

**Table 4-5. Comparison of Maximum Modeled Project Impact with Significance Thresholds**

<b>Pollutant</b>	<b>Averaging Period</b>	<b>Predicted Concentration (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>SJVAPCD SIL (<math>\mu\text{g}/\text{m}^3</math>)</b>
PM <sub>10</sub>	24-hour	6.06	10.4
	Annual	0.87	2.08
PM <sub>2.5</sub>	24-hour	0.93	2.5

Based on the results of the air dispersion modeling, comparisons to AAQs and applicable SILs, *the impact to air quality is not considered to be significant.*

## 5. CONCLUSIONS

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In accordance with the San Joaquin Valley Air Pollution Control District's *Guide for Assessing and Mitigating Air Quality Impacts* air dispersion modeling demonstrates that the ambient air quality impact attributable to the proposed project is determined to be less than significant based on the following conclusions:

- Proposed emissions for the project will not cause or contribute to a violation of any NAAQS or CAAQS for any of the averaging periods for NO<sub>2</sub>, SO<sub>2</sub>, CO, or H<sub>2</sub>S or cause an increment violation of the SJVAPCD SILs for PM<sub>10</sub> and PM<sub>2.5</sub>.

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## APPENDIX A: FUGITIVE EMISSION ESTIMATION WORKSHEETS

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## Pre-Project Facility Information

- Does this facility house Holstein or Jersey cows?   
Most facilities house Holstein cows unless explicitly stated on the PTO or application.
- Does the facility have an anaerobic treatment lagoon?
- Does the facility land apply liquid manure?   
Answering "yes" assumes worst case.
- Does the facility land apply solid manure?   
Answering "yes" assumes worst case.
- Is any scraped manure sent to a lagoon?   
Answering "yes" assumes worst case.

Pre-Project Herd Size							
Herd	Flushed Freestalls	Scraped Freestalls	Flushed Corrals	Scraped Corrals	Total # of Animals		
Milk Cows	1,063				1,063		
Dry Cows	158				158		
Support Stock (Heifers, Calves, and Bulls)					0		
Large Heifers				467	467		
Medium Heifers				344	344		
Small Heifers					0		
Bulls					0		
	Calf Hutches				Calf Corrals		Total # of Calves
	Aboveground Flushed	Aboveground Scraped	On-Ground Flushed	On-Ground Scraped	Flushed	Scraped	
Calves				186			186

Total Herd Summary	
Total Milk Cows	1,063
Total Mature Cows	1,221
Support Stock (Heifers, Calves, and Bulls)	811
Total Calves	186
Total Dairy Head	2,218

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?   
Most facilities house Holstein cows unless explicitly stated on the PTO or application.
- Does the facility have an anaerobic treatment lagoon?
- Does the facility land apply liquid manure?   
Answering "yes" assumes worst case.
- Does the facility land apply solid manure?   
Answering "yes" assumes worst case.
- Is any scraped manure sent to a lagoon?
- Does this project result in any new lagoon/storage pond(s) or an increase in surface area for any existing lagoon/storage pond(s)?

Post-Project Herd Size							
Herd	Flushed Freestalls	Scraped Freestalls	Flushed Corrals	Scraped Corrals	Total # of Animals		
Milk Cows	2,500				2,500		
Dry Cows	400				400		
Support Stock (Heifers, Calves, and Bulls)					0		
Large Heifers				375	375		
Medium Heifers				375	375		
Small Heifers				375	375		
Bulls					0		
	Calf Hutches				Calf Corrals		Total # of Calves
	Aboveground Flushed	Aboveground Scraped	On-Ground Flushed	On-Ground Scraped	Flushed	Scraped	
Calves				375			375

Total Herd Summary	
Total Milk Cows	2,500
Total Mature Cows	2,900
Support Stock (Heifers, Calves, and Bulls)	1,125
Total Calves	375
Total Dairy Head	4,400

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

### Pre-Project PM10 Mitigation Measures

[illegible][illegible]

## Post-Project PM10 Mitigation Measures

Post-Project PM10 Mitigation Measures															
	Housing Name(s) #(s)	Type of Housing	Type of cow	Total # of cows in All 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	Free Stalls 1	freestall	milk cows	1,063			<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	Free Stalls 1	freestall	dry cows	158			<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	Corrals 1	open corral	large heifers	375			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4	Corrals 1	open corral	medium heifers	375			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5	Corrals 1	open corral	calves	375			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
6	Corrals 1	open corral	small heifers	375			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Post-Project PM10 Mitigation Measures for New Housing Units at an Expanding Dairy															
	Housing Name(s) #(s)	Type of Housing	Type of cow	Total # of cows in All 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	Free Stalls 2	freestall	milk cows	1,437			<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	Free Stalls 2	freestall	dry cows	242			<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Post-Project Total # of Cows				4,400		(The post-project total includes 2,721 dairy cows already on-site and 1679 new cows from the expansion.)									

Post-Project PM10 Control Efficiencies and Emission Factors																
	Housing Name(s) #(s)	Type of Housing	Type of cow	Total # of cows in All 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	Free Stalls 1	freestall	milk cows	1,063		1.370		12.5%	10%					15%		0.92
2	Free Stalls 1	freestall	dry cows	158		1.370		12.5%	10%					15%		0.92
3	Corrals 1	open corral	large heifers	375		10.550	8.3%	12.5%	10%					15%		6.48
4	Corrals 1	open corral	medium heifers	375		10.550	8.3%	12.5%	10%					15%		6.48
5	Corrals 1	open corral	calves	375		1.370	8.3%	12.5%	10%					15%	10%	0.76
6	Corrals 1	open corral	small heifers	375		10.550	8.3%	12.5%	10%					15%		6.48
Post-Project PM10 Control Efficiencies and Emission Factors for New Housing Emissions Units																
	Housing Name(s) #(s)	Type of Housing	Type of cow	Total # of cows in All 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	Free Stalls 2	freestall	milk cows	1437		1.370		12.5%	10%					15%		0.92
2	Free Stalls 2	freestall	dry cows	242		1.370		12.5%	10%					15%		0.92

### 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	Free Stalls 1	milk cows	1,063	10.88	23.29	1.37	31.7	11,565	67.8	24,759	4.0	1,456
2	Free Stalls 1	dry cows	158	6.12	11.81	1.37	2.6	967	5.1	1,866	0.6	216
3	Corrals 1	large heifers	467	4.7	6.12	10.55	6.0	2,195	7.8	2,858	13.5	4,927
4	Corrals 1	medium heifers	344	3.2	4.43	10.55	3.0	1,101	4.2	1,523	9.9	3,629
5	Corrals 1	calves	186	0.85	1.01	1.37	0.4	158	0.5	187	0.7	255
Pre-Project Total # of Cows			2,218				43.7	15,986	85.4	31,193	28.7	10,483

Pre-Project Totals						
Total # of Cows	VOC (lb/day)	VOC (lb/yr)	NH3 (lb/day)	NH3 (lb/yr)	PM10 (lb/day)	PM10 (lb/yr)
2,218	43.7	15,986	85.4	31,193	28.7	10,483

#### 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	Free Stalls 1	milk cows	1,063	10.88	23.29	0.92	31.7	11,565	67.8	24,759	2.7	975
2	Free Stalls 1	dry cows	158	6.12	11.81	0.92	2.6	967	5.1	1,866	0.4	145
3	Corrals 1	large heifers	375	4.7	6.12	6.48	4.8	1,763	6.3	2,295	6.7	2,429
4	Corrals 1	medium heifers	375	3.2	4.43	6.48	3.3	1,200	4.6	1,661	6.7	2,429
5	Corrals 1	calves	375	0.85	1.01	0.76	0.9	319	1.0	378	0.8	284
6	Corrals 1	small heifers	375	1.78	3.31	6.48	1.8	668	3.4	1,242	6.7	2,429
Post-Project # of Cows (non-expansion)			2,721				45.1	16,482	88.2	32,201	24.0	8,691

Post-Project Potential to Emit - Cow Housing: New Freestalls at Existing 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	Free Stalls 2	milk cows	1437	10.88	23.29	0.92	42.8	15,635	91.7	33,471	3.6	1,318
2	Free Stalls 2	dry cows	242	6.12	11.81	0.92	4.1	1,481	7.8	2,858	0.6	222
Total # of Cows From Expansion			1,679				46.9	17,116	99.5	36,329	4.2	1,540

Post-Project Totals						
Total # of Cows	VOC (lb/day)	VOC (lb/yr)	NH3 (lb/day)	NH3 (lb/yr)	PM10 (lb/day)	PM10 (lb/yr)
4,400	92.0	33,598	187.7	68,530	28.2	10,231

#### 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	575	197	0
Cow Housing	0	0	-252	0	17,612	37,337	0
Liquid Manure	0	0	0	0	3,918	19,751	0
Solid Manure	0	0	0	0	791	4,533	0
Feed Handling	0	0	0	0	19,798	0	0
<b>Total</b>	<b>0</b>	<b>0</b>	<b>-252</b>	<b>0</b>	<b>42,693</b>	<b>61,817</b>	<b>0</b>

Total Daily Change in Emissions (lb/day)							
	NOx	SOx	PM10	CO	VOC	NH3	H2S
Milking Parlor	0.0	0.0	0.0	0.0	1.5	0.5	0.0
Cow Housing	0.0	0.0	-0.5	0.0	48.3	102.3	0.0
Liquid Manure	0.0	0.0	0.0	0.0	10.6	54.0	0.0
Solid Manure	0.0	0.0	0.0	0.0	2.2	12.4	0.0
Feed Handling	0.0	0.0	0.0	0.0	54.2	0.0	0.0
<b>Total</b>	<b>0.0</b>	<b>0.0</b>	<b>-0.5</b>	<b>0.0</b>	<b>116.8</b>	<b>169.2</b>	<b>0.0</b>

Total Annual Change in Non-Fugitive Emissions (Major Source Emissions) (lb/yr)							
	NOx	SOx	PM10	CO	VOC	NH3	H2S
Milking Parlor	0	0	0	0	0	0	0
Cow Housing	0	0	0	0	0	0	0
Liquid Manure	0	0	0	0	1,888	0	0
Solid Manure	0	0	0	0	0	0	0
Feed Handling	0	0	0	0	0	0	0
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1,888</b>	<b>0</b>	<b>0</b>

## APPENDIX B: ON-SITE MOBILE SOURCE COMBUSTION EMISSION WORKSHEETS

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**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	SLINE1	0.08	1.41	728	1.85E-01	5.07E-04
Commodity Delivery	SLINE2	0.90	1.41	260	7.26E-01	2.79E-03
Solid Manure	SLINE3	0.92	1.41	1000	2.86E+00	0.00E+00
Rendering Service	SLINE4	0.18	1.41	52	3.00E-02	0.00E+00

\*No increase in daily emissions. Annual trucks trips double but the total days double.

\*No increase in daily emissions. Max trucks per day will remain the same.

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 15 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	STCK1	0.46	15	728	1.83E-01	5.02E-04
Commodity Delivery	STCK2	0.46	15	260	6.52E-02	2.51E-04
Solid Manure	STCK3	0.46	15	1000	2.51E-01	0.00E+00
Rendering Service	STCK4	0.46	15	52	1.30E-02	0.00E+00

\*No increase in daily emissions. Annual trucks trips double but the total days double.

\*No increase in daily emissions. Max trucks per day will remain the same.

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	STCK5	137	0.37	4	365	2.20E-01	3.59E+01	9.83E-02
Bedding Delivery	SLINE5-6	80	0.37	2	52	3.00E-01	2.04E+00	3.92E-02
Manure Scraping	PAREA1	80	0.37	8	4	3.00E-01	6.26E-01	0.00E+00
Manure Loading	STCK6	137	0.37	8	1	2.20E-01	1.97E-01	0.00E+00
Feed Delivery	SLINE5-6	167	0.37	6	365	2.20E-01	6.56E+01	1.80E-01

\*No increase in max daily emissions.

\*No increase in max daily emissions.

Note 1: 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?Dockkey=P100OA05.pdf>

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

**Table 4. Truck Travel: NO Increased Emissions**

	Source	Round Trip Distance (mi)	Emission Factor (g/mi)	Increase in Trucks/Year	Emissions (lb/yr)	Emissions (lb/Max hr)
Milk Tankers	SLINE1	0.08	23.13	728	3.02E+00	0.00E+00
Commodity Delivery	SLINE2	0.90	23.13	260	1.19E+01	0.00E+00
Solid Manure	SLINE3	0.92	23.13	1000	4.69E+01	0.00E+00
Rendering Service	SLINE4	0.18	23.13	52	4.90E-01	0.00E+00

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 15 MPH.

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

**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	STCK1	24.52	15	728	9.84E+00	0.00E+00
Commodity Delivery	STCK2	24.52	15	260	3.51E+00	0.00E+00
Solid Manure	STCK3	24.52	15	1000	1.35E+01	0.00E+00
Rendering Service	STCK4	24.52	15	52	7.03E-01	0.00E+00

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 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	STCK5	137	0.37	4	365	3.66E+00	5.964E+02	0.00E+00
Bedding Delivery	SLINE5-6	80	0.37	2	52	4.18E+00	2.84E+01	0.00E+00
Manure Scraping	PAREA1	80	0.37	8	4	4.18E+00	8.72E+00	0.00E+00
Manure Loading	STCK6	137	0.37	8	1	3.66E+00	3.27E+00	0.00E+00
Feed Delivery	SLINE5-6	167	0.37	6	365	2.24E+00	6.68E+02	0.00E+00

Note1 : Emissions based on EPA's *Nonroad Compression-Ignition* Engines - Exhaust Emission Standards for the appropriate year and HP

<https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockkey=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	SLINE1	0.08	0.03	728	3.42E-03	9.39E-06	4.70E-06	0.00E+00
Commodity Delivery	SLINE2	0.90	0.03	260	1.35E-02	1.03E-04	0.00E+00	0.00E+00
Solid Manure	SLINE3	0.92	0.03	1000	5.31E-02	0.00E+00	0.00E+00	0.00E+00
Rendering Service	SLINE4	0.18	0.03	52	5.55E-04	0.00E+00	0.00E+00	0.00E+00

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 15 MPH.

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

**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	STCK1	0.02	15	728	6.64E-03	1.82E-05	9.12E-06	0.00E+00
Commodity Delivery	STCK2	0.02	15	260	2.37E-03	9.12E-06	0.00E+00	0.00E+00
Solid Manure	STCK3	0.02	15	1000	9.12E-03	0.00E+00	0.00E+00	0.00E+00
Rendering Service	STCK4	0.02	15	52	4.74E-04	0.00E+00	0.00E+00	0.00E+00

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 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	STCK5	137	0.37	4	365	5.70E-02	9.30E+00	2.55E-02	0.00E+00	0.00E+00
Bedding Delivery	SLINE5-6	80	0.37	2	52	6.00E-02	4.07E-01	7.83E-03	3.92E-03	0.00E+00
Manure Scraping	PAREA1	80	0.37	8	4	6.00E-02	1.25E-01	0.00E+00	0.00E+00	0.00E+00
Manure Loading	STCK6	137	0.37	8	1	5.70E-02	5.10E-02	0.00E+00	0.00E+00	0.00E+00
Feed Delivery	SLINE5-6	167	0.37	6	365	5.00E-03	1.49E+00	4.09E-03	0.00E+00	0.00E+00

Note1 : Emissions based on CalEEmod's Appendix D, defaults 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-yr)	Emissions (lb/Max hr)
Milk Tankers	SLINE1	0.08	11.61	728	4.17E-03	0.00E+00
Commodity Delivery	SLINE2	0.90	11.61	260	2.29E-02	0.00E+00
Solid Manure	SLINE3	0.92	11.61	1000	0.00E+00	0.00E+00
Rendering Service	SLINE4	0.18	11.61	52	0.00E+00	0.00E+00

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 15 MPH.

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

**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 hr)	Emissions (lb/Max 8-hr)
Milk Tankers	STCK1	11.96	15	728	0.00E+00	1.32E-02
Commodity Delivery	STCK2	11.96	15	260	0.00E+00	6.59E-03
Solid Manure	STCK3	11.96	15	1000	0.00E+00	0.00E+00
Rendering Service	STCK4	11.96	15	52	0.00E+00	0.00E+00

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 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 hr)	Emissions (lb/Max 8-hr)
Feed Loading	STCK5	137	0.37	4	365	3.70E+00	6.04E+02	0.00E+00	1.65E+00
Bedding Delivery	SLINE5-6	80	0.37	2	52	3.70E+00	2.51E+01	0.00E+00	4.83E-01
Manure Scraping	PAREA1	80	0.37	8	4	3.70E+00	7.73E+00	0.00E+00	0.00E+00
Manure Loading	STCK6	137	0.37	8	1	3.70E+00	3.31E+00	0.00E+00	0.00E+00
Feed Delivery	SLINE5-6	167	0.37	6	365	3.70E+00	1.10E+03	0.00E+00	3.02E+00

Note1 : Emissions based on EPA's *Nonroad Compression-Ignition* Engines - Exhaust Emission Standards for the appropriate year and HP

<https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100OA05.pdf>

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

Note 3: Load factors from CalEEMod's Appendix D Table 3.3 *OFFROAD Default Horsepower and Load Factors*

2014 Feed loader EFs are defaults EFs from CalEEMod Appendix D

## APPENDIX C: AAQA-PSD REPORT FOR NO<sub>2</sub>, CO, SO<sub>2</sub>, PM<sub>10</sub>, PM<sub>2.5</sub> AND H<sub>2</sub>S

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**AAQA for Oliveira Dairy Expansion**  
**All Values are in ug/m^3**

	NOx 1 Hour	NOx Annual	CO 1 Hour	CO 8 Hour	SOx 1 Hour	SOx 3 Hour	SOx 24 Hour	PM10 24 Hour	PM10 Annual	PM2.5 24 Hour	PM2.5 Annual	H2S 1 Hour
SLINE1	0.00E+00	2.11E-04	0.00E+00	6.41E-03	0.00E+00	4.92E-05	2.05E-06	1.39E-03	1.54E-05	1.39E-03	1.54E-05	0.00E+00
SLINE2	0.00E+00	5.13E-03	0.00E+00	7.77E-02	0.00E+00	0.00E+00	6.87E-05	3.21E-03	3.56E-04	3.21E-03	3.56E-04	0.00E+00
SLINE3	0.00E+00	1.96E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.30E-03	0.00E+00	1.30E-03	0.00E+00
SLINE4	0.00E+00	4.12E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.07E-07	0.00E+00	3.09E-06	0.00E+00	3.09E-06	0.00E+00
SLINE5	0.00E+00	2.77E-01	0.00E+00	1.16E+01	0.00E+00	5.52E-02	7.00E-03	8.79E-02	3.00E-02	8.79E-02	3.00E-02	0.00E+00
SLINE6	0.00E+00	1.36E-01	0.00E+00	8.84E+00	0.00E+00	5.74E-02	5.59E-03	1.47E-01	1.38E-02	1.47E-01	1.38E-02	0.00E+00
STCK1	0.00E+00	5.71E-04	0.00E+00	1.88E-02	0.00E+00	6.53E-05	3.67E-06	5.89E-04	1.34E-05	5.89E-04	1.34E-05	0.00E+00
STCK2	0.00E+00	6.48E-04	0.00E+00	2.46E-02	0.00E+00	0.00E+00	4.48E-06	7.01E-05	7.25E-05	7.01E-05	7.25E-05	0.00E+00
STCK3	0.00E+00	1.38E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.86E-05	0.00E+00	4.86E-05	0.00E+00
STCK4	0.00E+00	4.18E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.05E-06	0.00E+00	1.05E-06	0.00E+00
STCK5	0.00E+00	2.94E-01	0.00E+00	5.50E+00	0.00E+00	0.00E+00	1.57E-02	3.20E-02	1.30E-02	3.20E-02	1.30E-02	0.00E+00
STCK6	0.00E+00	4.02E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.87E-05	0.00E+00	3.87E-05	0.00E+00
PAREA1	0.00E+00	3.26E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.79E+00	8.14E-01	6.60E-01	9.28E-02	0.00E+00
Background	9.31E+01	1.40E+01	2.34E+03	1.85E+03	2.26E+01	2.03E+01	5.60E+00	6.40E+01	2.95E+01	4.28E+01	1.12E+01	0.00E+00
<b>Facility Totals</b>	<b>9.31E+01</b>	<b>1.47E+01</b>	<b>2.34E+03</b>	<b>1.88E+03</b>	<b>2.26E+01</b>	<b>2.04E+01</b>	<b>5.63E+00</b>	<b>7.01E+01</b>	<b>3.04E+01</b>	<b>4.37E+01</b>	<b>1.14E+01</b>	<b>0.00E+00</b>
<b>AAQS</b>	188.68	100	23000	10000	195	1300	105	50	20	35	12	42
	<b>Pass</b>	<b>Pass</b>	<b>Pass</b>	<b>Pass</b>	<b>Pass</b>	<b>Pass</b>	<b>Pass</b>	<b>Fail</b>	<b>Fail</b>	<b>Fail</b>	<b>Pass</b>	<b>Pass</b>
<b>District and EPA's Significance Level (ug/m^3)</b>												
	NOx 1 Hour	NOx Annual	CO 1 Hour	CO 8 Hour	SOx 1 Hour	SOx 3 Hour	SOx 24 Hour	PM10 24 Hour	PM10 Annual	PM2.5 24 Hour	PM2.5 Annual	
Totals w/o Background								6.06	0.87	0.93	0.15	
SIL	0	1	2000	500	0	25	5	10.4	2.08	2.5	0.63	
								Pass	Pass	Pass	Pass	

### AAQA Emission (g/sec)

<i>Device</i>	NOx 1 Hour	NOx Annual	CO 1 Hour	CO 8 Hour	SOx 1 Hour	SOx 3 Hour	SOx 24 Hour	PM10 24 Hour	PM10 Annual	PM2.5 24 Hour	PM2.5 Annual
SLINE1	0.00E+00	4.34E-05	0.00E+00	6.56E-05	0.00E+00	1.98E-07	4.93E-08	2.66E-06	2.66E-06	2.66E-06	2.66E-06
SLINE2	0.00E+00	1.71E-04	0.00E+00	3.62E-04	0.00E+00	0.00E+00	5.43E-07	1.46E-05	1.04E-05	1.46E-05	1.04E-05
SLINE3	0.00E+00	6.74E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.11E-05	0.00E+00	4.11E-05
SLine4	0.00E+00	7.05E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.98E-09	0.00E+00	4.31E-07	0.00E+00	4.31E-07
SLINE5	0.00E+00	5.78E-03	0.00E+00	3.19E-02	0.00E+00	9.50E-05	3.61E-05	6.64E-04	5.62E-04	6.64E-04	5.62E-04
SLINE6	0.00E+00	4.23E-03	0.00E+00	2.33E-02	0.00E+00	6.94E-05	2.64E-05	4.86E-04	4.11E-04	4.86E-04	4.11E-04
STCK1	0.00E+00	1.42E-04	0.00E+00	2.08E-04	0.00E+00	3.83E-07	9.57E-08	2.63E-06	2.63E-06	2.63E-06	2.63E-06
STCK2	0.00E+00	5.05E-05	0.00E+00	1.04E-04	0.00E+00	0.00E+00	4.79E-08	1.32E-06	9.38E-07	1.32E-06	9.38E-07
STCK3	0.00E+00	1.94E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.61E-06	0.00E+00	3.61E-06
STCK4	0.00E+00	1.01E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.87E-07	0.00E+00	1.87E-07
STCK5	0.00E+00	8.58E-03	0.00E+00	2.61E-02	0.00E+00	0.00E+00	1.33E-04	5.17E-04	5.16E-04	5.17E-04	5.16E-04
STCK6	0.00E+00	4.70E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.83E-06	0.00E+00	2.83E-06
PAREA1	0.00E+00	1.25E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.20E-02	2.21E-02	2.51E-03	2.52E-03

## APPENDIX D: AERMOD ELECTRONIC FILES

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