
APPENDIX F

Air Quality and Greenhouse Gas Emissions
Technical Appendix

APPENDIX F-1

CalEEMod Operational Emissions Calculations

“Remarks” for the Silva Dairy Expansion Project CalEEMod (v.2020.4.0) Model Run

“Remarks” are typically used in California Emissions Estimator Model (CalEEMod) to explain non-default inputs. For the current modeling, this document replaces the “remarks” section of the referenced CalEEMod model to provide more space to both identify non-default inputs and to explain how CalEEMod is used to calculate emissions for the current project. When defaults were retained and no further explanation was necessary, no “remarks” are recorded below. The proposed project construction emissions and increment of increase of operational emissions were estimated as set forth below.

Silva Dairy Expansion Model Run

Land Use

- The General Heavy Industrial land use subtype was used to represent the dairy project, an industrial agriculture project. With implementation of the proposed dairy expansion, new structures would include approximately 353,572 square feet. While some existing structures would be removed with construction of the project, this analysis uses a conservative estimate of emissions from new structures.

Construction Phase

- The proposed structure construction would occur over multiple phases. Construction modeling was completed separately and can be found in EIR Appendix G, *Health Risk Assessment and Ambient Air Quality Analysis*.

Vehicle Trips

- Animal Confinement Facilities operate 7 days a week. The proposed expanded operations would generate an increase of approximately 12.6 average daily trips (ADTs) (or 0.035 trips per 1,000 square feet). Fleet mix modified to reflect project increase, 48 percent auto/light truck and 52 percent heavy duty trucks.

Operational Off-Road Equipment

- The increase in the number of hours for feed loading, bedding delivery, manure scraping, manure loading, and feed delivery was used based on estimates from the project applicant.

Type	HP	Increment of Increase (hrs/day)	Increment of Increase (hrs/yr)
Feed loader	231	2	730
Bedding Delivery	148	4.2	50.4
Manure Scraping	148	2	24
Manure loader	192	3	30
Feed delivery	170	2	730

Area Sources, Energy, Water and Wastewater, Solid Waste

- These rates are not applicable to the proposed dairy, and were not included. Electricity use provided by project applicant and calculated for GHG separately. Solid waste based on information provided by the applicant (99.34 tons/year/1,000 square feet).

Silva Dairy Expansion - Merced County, Annual

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

**Silva Dairy Expansion
Merced County, Annual**

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Heavy Industry	353.57	1000sqft	8.12	353,572.00	0

1.2 Other Project Characteristics

Urbanization	Rural	Wind Speed (m/s)	2.2	Precipitation Freq (Days)	49
Climate Zone	3			Operational Year	2028
Utility Company	Pacific Gas and Electric Company				
CO2 Intensity (lb/MWhr)	203.98	CH4 Intensity (lb/MWhr)	0.033	N2O Intensity (lb/MWhr)	0.004

1.3 User Entered Comments & Non-Default Data

- Project Characteristics -
- Land Use -
- Construction Phase - Construction emissions not calculated
- Trips and VMT - Construction emissions not calculated.
- Vehicle Trips - See notes
- Consumer Products - n/a
- Area Coating - n/a
- Landscape Equipment - n/a
- Energy Use - See notes
- Water And Wastewater - n/a
- Solid Waste - As provided by applicant
- Operational Off-Road Equipment - Provided by applicant for feed loader and feed delivery

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

Fleet Mix - See notes

Table Name	Column Name	Default Value	New Value
tblAreaCoating	Area_Nonresidential_Exterior	176786	0
tblAreaCoating	Area_Nonresidential_Interior	530358	0
tblConstructionPhase	NumDays	20.00	0.00
tblConstructionPhase	PhaseEndDate	5/8/2028	4/10/2028
tblConsumerProducts	ROG_EF	2.14E-05	0
tblConsumerProducts	ROG_EF_Degreaser	3.542E-07	0
tblConsumerProducts	ROG_EF_PesticidesFertilizers	5.152E-08	0
tblEnergyUse	LightingElect	2.70	0.00
tblEnergyUse	NT24E	4.16	0.00
tblEnergyUse	NT24NG	3.84	0.00
tblEnergyUse	T24E	1.75	0.00
tblEnergyUse	T24NG	16.86	0.00
tblFleetMix	HHD	0.05	0.52
tblFleetMix	LDA	0.54	0.00
tblFleetMix	LDT1	0.05	0.24
tblFleetMix	LDT2	0.16	0.24
tblFleetMix	LHD1	0.02	0.00
tblFleetMix	LHD2	6.3670e-003	0.00
tblFleetMix	MCY	0.02	0.00
tblFleetMix	MDV	0.13	0.00
tblFleetMix	MH	2.5080e-003	0.00
tblFleetMix	MHD	0.01	0.00
tblFleetMix	OBUS	8.4700e-004	0.00
tblFleetMix	SBUS	2.0790e-003	0.00
tblFleetMix	UBUS	4.5500e-004	0.00
tblLandscapeEquipment	NumberSummerDays	180	0

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

tblOperationalOffRoadEquipment	OperDaysPerYear	260.00	365.00
tblOperationalOffRoadEquipment	OperDaysPerYear	260.00	12.00
tblOperationalOffRoadEquipment	OperDaysPerYear	260.00	12.00
tblOperationalOffRoadEquipment	OperDaysPerYear	260.00	10.00
tblOperationalOffRoadEquipment	OperDaysPerYear	260.00	365.00
tblOperationalOffRoadEquipment	OperHorsePower	97.00	231.00
tblOperationalOffRoadEquipment	OperHorsePower	97.00	148.00
tblOperationalOffRoadEquipment	OperHorsePower	97.00	148.00
tblOperationalOffRoadEquipment	OperHorsePower	97.00	192.00
tblOperationalOffRoadEquipment	OperHorsePower	97.00	170.00
tblOperationalOffRoadEquipment	OperHoursPerDay	8.00	2.00
tblOperationalOffRoadEquipment	OperHoursPerDay	8.00	4.20
tblOperationalOffRoadEquipment	OperHoursPerDay	8.00	2.00
tblOperationalOffRoadEquipment	OperHoursPerDay	8.00	3.00
tblOperationalOffRoadEquipment	OperHoursPerDay	8.00	2.00
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	1.00
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	1.00
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	1.00
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	1.00
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	1.00
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblSolidWaste	SolidWasteGenerationRate	438.43	99.34
tblVehicleTrips	ST_TR	6.42	0.04
tblVehicleTrips	SU_TR	5.09	0.04
tblVehicleTrips	WD_TR	3.93	0.04
tblWater	IndoorWaterUseRate	81,763,062.50	0.00

2.0 Emissions Summary

Silva Dairy Expansion - Merced County, Annual

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

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2028	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2028	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

	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

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

Silva Dairy Expansion - Merced County, Annual

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

		Highest	
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2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	3.9300e-003	0.0852	0.0509	4.1000e-004	0.0191	7.7000e-004	0.0199	5.1700e-003	7.4000e-004	5.9100e-003	0.0000	38.6503	38.6503	3.1000e-004	5.2300e-003	40.2158
Offroad	0.0199	0.1529	0.2514	6.1000e-004		6.5900e-003	6.5900e-003		6.0600e-003	6.0600e-003	0.0000	53.8272	53.8272	0.0174	0.0000	54.2624
Waste						0.0000	0.0000		0.0000	0.0000	20.1651	0.0000	20.1651	1.1917	0.0000	49.9582
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	0.0238	0.2381	0.3023	1.0200e-003	0.0191	7.3600e-003	0.0264	5.1700e-003	6.8000e-003	0.0120	20.1651	92.4775	112.6426	1.2094	5.2300e-003	144.4365

Silva Dairy Expansion - Merced County, Annual

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

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	3.9300e-003	0.0852	0.0509	4.1000e-004	0.0191	7.7000e-004	0.0199	5.1700e-003	7.4000e-004	5.9100e-003	0.0000	38.6503	38.6503	3.1000e-004	5.2300e-003	40.2158
Offroad	0.0199	0.1529	0.2514	6.1000e-004		6.5900e-003	6.5900e-003		6.0600e-003	6.0600e-003	0.0000	53.8272	53.8272	0.0174	0.0000	54.2624
Waste						0.0000	0.0000		0.0000	0.0000	20.1651	0.0000	20.1651	1.1917	0.0000	49.9582
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	0.0238	0.2381	0.3023	1.0200e-003	0.0191	7.3600e-003	0.0264	5.1700e-003	6.8000e-003	0.0120	20.1651	92.4775	112.6426	1.2094	5.2300e-003	144.4365

	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

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Architectural Coating	Architectural Coating	4/11/2028	4/10/2028	5	0	

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

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 530,358; Non-Residential Outdoor: 176,786; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48

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
Architectural Coating	1	30.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

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

4.0 Operational Detail - Mobile

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	3.9300e-003	0.0852	0.0509	4.1000e-004	0.0191	7.7000e-004	0.0199	5.1700e-003	7.4000e-004	5.9100e-003	0.0000	38.6503	38.6503	3.1000e-004	5.2300e-003	40.2158
Unmitigated	3.9300e-003	0.0852	0.0509	4.1000e-004	0.0191	7.7000e-004	0.0199	5.1700e-003	7.4000e-004	5.9100e-003	0.0000	38.6503	38.6503	3.1000e-004	5.2300e-003	40.2158

4.2 Trip Summary Information

Land Use	Average Daily Trip Rate			Unmitigated	Mitigated
	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
General Heavy Industry	12.38	12.38	12.38	47,810	47,810
Total	12.38	12.38	12.38	47,810	47,810

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 Heavy Industry	14.70	6.60	6.60	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 Heavy Industry	0.000000	0.240000	0.240000	0.000000	0.000000	0.000000	0.000000	0.520000	0.000000	0.000000	0.000000	0.000000	0.000000

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

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
General Heavy Industry	0	0.0000	0.0000	0.0000	0.0000
Total		0.0000	0.0000	0.0000	0.0000

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
General Heavy Industry	0	0.0000	0.0000	0.0000	0.0000
Total		0.0000	0.0000	0.0000	0.0000

6.0 Area Detail

6.1 Mitigation Measures Area

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

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	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

7.0 Water Detail

7.1 Mitigation Measures Water

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

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
General Heavy Industry	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		0.0000	0.0000	0.0000	0.0000

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

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
General Heavy Industry	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		0.0000	0.0000	0.0000	0.0000

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	20.1651	1.1917	0.0000	49.9582
Unmitigated	20.1651	1.1917	0.0000	49.9582

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

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
General Heavy Industry	99.34	20.1651	1.1917	0.0000	49.9582
Total		20.1651	1.1917	0.0000	49.9582

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
General Heavy Industry	99.34	20.1651	1.1917	0.0000	49.9582
Total		20.1651	1.1917	0.0000	49.9582

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type
Tractors/Loaders/Backhoes	1	2.00	365	231	0.37	Diesel

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

Trailers/Loaders/Backhoes	1	4.20	12	148	0.37	Diesel
Trailers/Loaders/Backhoes	1	2.00	12	148	0.37	Diesel
Trailers/Loaders/Backhoes	1	3.00	10	192	0.37	Diesel
Trailers/Loaders/Backhoes	1	2.00	12	148	0.37	Diesel
Trailers/Loaders/Backhoes	1	2.00	365	170	0.37	Diesel

Unmitigated/Mitigated

Equipment Type	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
Trailers/Loaders/Backhoes	0.0199	0.1529	0.2514	6.1000e-004	6.5900e-003	6.5900e-003	6.5900e-003	6.0600e-003	6.0600e-003	6.0600e-003	0.0000	53.8272	53.8272	0.0174	0.0000	54.2624
Total	0.0199	0.1529	0.2514	6.1000e-004	6.5900e-003	6.5900e-003	6.5900e-003	6.0600e-003	6.0600e-003	6.0600e-003	0.0000	53.8272	53.8272	0.0174	0.0000	54.2624

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

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

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type
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User Defined Equipment

Equipment Type	Number
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11.0 Vegetation