

Appendix B: Air Quality Calculation Details

Phase Assumptions

Phase: Fine Grading 1/1/2011 - 2/23/2011 - Default Fine Site Grading Description

Total Acres Disturbed: 0.92

Maximum Daily Acreage Disturbed: 0.23

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Graders (174 hp) operating at a 0.61 load factor for 6 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 6 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Paving 2/6/2011 - 2/23/2011 - Default Paving Description

Acres to be Paved: 0.23

Off-Road Equipment:

4 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 6 hours per day

1 Pavers (100 hp) operating at a 0.62 load factor for 7 hours per day

1 Rollers (95 hp) operating at a 0.56 load factor for 7 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

Phase: Building Construction 2/23/2011 - 12/17/2011 - Default Building Construction Description

Off-Road Equipment:

1 Cranes (399 hp) operating at a 0.43 load factor for 4 hours per day

2 Forklifts (145 hp) operating at a 0.3 load factor for 6 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

Phase: Architectural Coating 11/14/2011 - 12/31/2011 - Default Architectural Coating Description

Rule: Residential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 100

Rule: Residential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 150

Rule: Nonresidential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 150

Rule: Nonresidential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 150

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Urbemis 2007 Version 9.2.4

Detail Report for Annual Operational Unmitigated Emissions (Tons/Year)

File Name: Z:\EBell\UCD Resp Dis Center\Modeling\UCD RDC_72310.urb924

Project Name: UCD Respiratory Disease Center

Project Location: Yolo-Solano AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

OPERATIONAL EMISSION ESTIMATES (Annual Tons Per Year, Unmitigated)

<u>Source</u>	ROG	NOX	CO	SO2	PM10	PM25	CO2
General light industry	0.19	0.30	2.26	0.00	0.34	0.07	193.52
TOTALS (tons/year, unmitigated)	0.19	0.30	2.26	0.00	0.34	0.07	193.52

Does not include correction for passby trips

Does not include double counting adjustment for internal trips

Analysis Year: 2012 Season: Annual

Emfac: Version : Emfac2007 V2.3 Nov 1 2006

Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
General light industry		5.00	1000 sq ft	20.00	100.00	1,080.00
					100.00	1,080.00

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	44.8	0.7	99.1	0.2
Light Truck < 3750 lbs	13.0	1.5	90.8	7.7
Light Truck 3751-5750 lbs	20.5	0.5	99.0	0.5
Med Truck 5751-8500 lbs	9.5	1.1	98.9	0.0
Lite-Heavy Truck 8501-10,000 lbs	2.3	0.0	73.9	26.1
Lite-Heavy Truck 10,001-14,000 lbs	0.8	0.0	50.0	50.0
Med-Heavy Truck 14,001-33,000 lbs	1.7	0.0	11.8	88.2
Heavy-Heavy Truck 33,001-60,000 lbs	1.3	0.0	0.0	100.0
Other Bus	0.0	0.0	0.0	0.0
Urban Bus	0.0	0.0	0.0	0.0
Motorcycle	5.0	58.0	42.0	0.0
School Bus	0.1	0.0	0.0	100.0
Motor Home	1.0	0.0	90.0	10.0

Travel Conditions

	Residential			Commuter	Commercial	
	Home-Work	Home-Shop	Home-Other		Non-Work	Customer
Urban Trip Length (miles)	10.8	7.3	7.5	10.8	7.3	7.3
Rural Trip Length (miles)	15.0	10.0	10.0	15.0	10.0	10.0
Trip speeds (mph)	35.0	35.0	35.0	35.0	35.0	35.0
% of Trips - Residential	32.9	18.0	49.1			
% of Trips - Commercial (by land use)						
General light industry				100.0	0.0	0.0

**UC Davis Respiratory Diseases Center
Stationary Source Emissions
Natural Gas Boilers**

Boiler Data

Nominal Rating per Boiler:	1.5	MMBtu/hr
Number of New Boilers:	1	
Operational hours:	24	hr/day
	8,760	hr/yr
Capacity Factor:	75%	
Standard Temp	60	deg F
Molar Volume	379.70	scf/mole
Heat Content of Natural Gas	1,020	Btu/scf

**Table STA-1
Natural Gas Boiler Emissions**

Units	Criteria Pollutants						Greenhouse Gases			
	ROG	NO _x	CO	SO _x	PM10	PM2.5	CO ₂	CH ₄	N ₂ O	CO ₂ e
ppm @ 3% O ₂		30.00								
lbs/MMBtu	0.0054	0.0360	0.0824	0.0006	0.0075	0.0075	116.98	0.0110	0.0002	117.28
lbs/hr	0.01	0.04	0.09	0.00	0.01	0.01	131.60	0.01	0.00	131.94
lbs/day	0.11	0.73	1.67	0.01	0.15	0.15	2,368.79	0.22	0.00	4,906.07
lbs/yr	39.85	266.09	608.69	4.35	55.07	55.07	864,608.24	81.47	1.63	866,824.34
tons/yr	0.02	0.13	0.30	0.00	0.03	0.03	432.30	0.04	0.00	433.41
metric tons/yr							392.18	0.04	0.00	393.19

Notes:

1. Emission factors for ROG, CO, PM10, and SO_x: U.S. Environmental Protection Agency, *AP-42 Compilation of Air Pollutant Emission Factors*, Chapter 1.4, Table 1.4-1 and 1.4-2.
2. Emission factor for NO_x assumes compliance with 30 ppm standard.
3. Emission factor for PM2.5 assumes all PM is less than 1 micron in diameter.
4. Emission factors for CO₂, CH₄, and N₂O: California Climate Action Registry, *General Reporting Protocol*, Version 3.1, (2009) 101, 103.
5. Emissions of CO₂e assumes the following global warming potentials: CO₂ = 1, CH₄ = 21, N₂O = 310.

**UC Davis Respiratory Diseases Center
Stationary Source Emissions
Emergency Generator**

Generator Data

Nominal Rating of Generator:	600	kW
Number of New Generators:	1	
Engine size	805	hp
Operational hours:	1	hr/day
	50	hr/yr
Capacity Factor:	100%	
MMBtu/yr	102	

**Table STA-2
Emergency Generator Emissions**

Units	Criteria Pollutants						Greenhouse Gases			
	ROG	NO _x	CO	SO _x	PM10	PM2.5	CO ₂	CH ₄	N ₂ O	CO _{2e}
lbs/hp-hr	2.47E-03	3.10E-02	6.68E-03	1.21E-05	2.20E-03	2.20E-03				
lbs/hr	1.99	24.96	5.38	0.01	1.77	1.77				
lbs/day	1.99	24.96	5.38	0.01	1.77	1.77				
lbs/yr	99.42	1,247.75	268.87	0.49	88.55	88.55				
tons/yr	0.05	0.62	0.13	0.00	0.04	0.04				
kg/MMBtu							19.95	1.10E-02	6.00E-04	20.37
metric tons/yr							2.04	1.13E-03	6.14E-05	2.08

Notes:

1. Emission factors for ROG, NO_x, CO, PM10, and SO_x: U.S. Environmental Protection Agency, *AP-42 Compilation of Air Pollutant Emission Factors*, Chapter 3.3, Table 3.3-1. Emission Factor for SO_x is based on 15 ppm (0.0015%).
2. Emission factors for SO_x: U.S. Environmental Protection Agency, *AP-42 Compilation of Air Pollutant Emission Factors*, Chapter 3.4, Table 3.4-1. Emission Factor for SO_x is based on 15 ppm (0.0015%).
3. Emission factor for PM2.5 assumes all PM is less than 1 micron in diameter.
4. Emission factors for CO₂, CH₄, and N₂O: California Climate Action Registry, *General Reporting Protocol*, Version 3.1, (2009) 101, 103.
5. Emissions of CO_{2e} assumes the following global warming potentials: CO₂ = 1, CH₄ = 21, N₂O = 310.