

APPENDIX C
AIR QUALITY DATA

Urbemis 2007 Version 9.2.4

Combined Summer Emissions Reports (Pounds/Day)

File Name: Z:\I&R Docs\08-122 Gilead Sciences N-AQ\AQ\Gilead Urbemis-Existing.urb924

Project Name: Gilead Existing Land Uses

Project Location: Bay Area Air District

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

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

AREA SOURCE EMISSION ESTIMATES

	<u>ROG</u>	<u>NOx</u>	<u>CO</u>	<u>SO2</u>	<u>PM10</u>	<u>PM2.5</u>	<u>CO2</u>
TOTALS (lbs/day, unmitigated)	4.33	3.94	7.90	0.00	0.03	0.03	4,661.32
TOTALS (lbs/day, mitigated)	3.72	3.13	4.93	0.00	0.02	0.02	3,730.73
Percent Reduction	14.09	20.56	37.59	NaN	33.33	33.33	19.96

OPERATIONAL (VEHICLE) EMISSION ESTIMATES

	<u>ROG</u>	<u>NOx</u>	<u>CO</u>	<u>SO2</u>	<u>PM10</u>	<u>PM2.5</u>	<u>CO2</u>
TOTALS (lbs/day, unmitigated)	24.26	23.27	268.16	0.47	85.09	16.10	48,004.81

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	<u>ROG</u>	<u>NOx</u>	<u>CO</u>	<u>SO2</u>	<u>PM10</u>	<u>PM2.5</u>	<u>CO2</u>
TOTALS (lbs/day, unmitigated)	28.59	27.21	276.06	0.47	85.12	16.13	52,666.13

Both Area and Operational Mitigation must be turned on to get a combined mitigated total.

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Area Source Unmitigated Detail Report:

AREA SOURCE EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

<u>Source</u>	<u>ROG</u>	<u>NOx</u>	<u>CO</u>	<u>SO2</u>	<u>PM10</u>	<u>PM2.5</u>	<u>CO2</u>
Natural Gas	0.28	3.88	3.26	0.00	0.01	0.01	4,652.89
Hearth - No Summer Emissions							
Landscape	0.37	0.06	4.64	0.00	0.02	0.02	8.43
Consumer Products	0.00						
Architectural Coatings	3.68						
TOTALS (lbs/day, unmitigated)	4.33	3.94	7.90	0.00	0.03	0.03	4,661.32

Area Source Mitigated Detail Report:

AREA SOURCE EMISSION ESTIMATES Summer Pounds Per Day, Mitigated

<u>Source</u>	<u>ROG</u>	<u>NOx</u>	<u>CO</u>	<u>SO2</u>	<u>PM10</u>	<u>PM2.5</u>	<u>CO2</u>
Natural Gas	0.23	3.10	2.61	0.00	0.01	0.01	3,722.31
Hearth - No Summer Emissions							
Landscape	0.18	0.03	2.32	0.00	0.01	0.01	8.42
Consumer Products	0.00						
Architectural Coatings	3.31						
TOTALS (lbs/day, mitigated)	3.72	3.13	4.93	0.00	0.02	0.02	3,730.73

Area Source Changes to Defaults

Operational Unmitigated Detail Report:

OPERATIONAL EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

<u>Source</u>	ROG	NOX	CO	SO2	PM10	PM25	CO2
General office building	14.51	14.23	163.24	0.29	52.00	9.84	29,311.07
Warehouse	0.27	0.21	2.32	0.00	0.76	0.14	425.57
General light industry	9.48	8.83	102.60	0.18	32.33	6.12	18,268.17
TOTALS (lbs/day, unmitigated)	24.26	23.27	268.16	0.47	85.09	16.10	48,004.81

Operational Settings:

Does not include correction for passby trips

Does not include double counting adjustment for internal trips

Analysis Year: 2020 Temperature (F): 85 Season: Summer

Erfac: Version : Erfac2007 V2.3 Nov 1 2006

Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
General office building		11.01	1000 sq ft	340.00	3,743.40	30,330.90
Warehouse		4.61	1000 sq ft	13.00	59.93	443.06
General light industry		8.11	1000 sq ft	276.00	2,238.36	18,858.18
					6,041.69	49,632.14

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	54.0	0.0	100.0	0.0
Light Truck < 3750 lbs	12.6	0.0	98.4	1.6

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Truck 3751-5750 lbs	19.9	0.0	100.0	0.0
Med Truck 5751-8500 lbs	6.6	0.0	100.0	0.0
Lite-Heavy Truck 8501-10,000 lbs	0.9	0.0	77.8	22.2
Lite-Heavy Truck 10,001-14,000 lbs	0.6	0.0	50.0	50.0
Med-Heavy Truck 14,001-33,000 lbs	1.0	0.0	20.0	80.0
Heavy-Heavy Truck 33,001-60,000 lbs	0.3	0.0	0.0	100.0
Other Bus	0.1	0.0	0.0	100.0
Urban Bus	0.1	0.0	0.0	100.0
Motorcycle	3.2	40.6	59.4	0.0
School Bus	0.1	0.0	0.0	100.0
Motor Home	0.6	0.0	83.3	16.7

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commuter	Non-Work	Customer
Urban Trip Length (miles)	10.8	7.3	7.5	9.5	7.4	7.4
Rural Trip Length (miles)	16.8	7.1	7.9	14.7	6.6	6.6
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 office building				35.0	17.5	47.5

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Warehouse				2.0	1.0	97.0
General light industry				50.0	25.0	25.0

Urbemis 2007 Version 9.2.4

Combined Summer Emissions Reports (Pounds/Day)

File Name: Z:\I&R Docs\08-122 Gilead Sciences N-AQ\AQ\Gilead Urbemis-Proposed.urb924

Project Name: Gilead Proposed Project

Project Location: Bay Area Air District

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

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

AREA SOURCE EMISSION ESTIMATES

	<u>ROG</u>	<u>NOx</u>	<u>CO</u>	<u>SO2</u>	<u>PM10</u>	<u>PM2.5</u>	<u>CO2</u>
TOTALS (lbs/day, unmitigated)	7.69	5.88	7.99	0.00	0.02	0.02	7,012.06
TOTALS (lbs/day, mitigated)	6.78	4.69	5.47	0.00	0.02	0.02	5,610.77
Percent Reduction	11.83	20.24	31.54	NaN	0.00	0.00	19.98

OPERATIONAL (VEHICLE) EMISSION ESTIMATES

	<u>ROG</u>	<u>NOx</u>	<u>CO</u>	<u>SO2</u>	<u>PM10</u>	<u>PM2.5</u>	<u>CO2</u>
TOTALS (lbs/day, unmitigated)	47.50	45.83	527.91	0.94	88.63	18.39	94,541.93

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	<u>ROG</u>	<u>NOx</u>	<u>CO</u>	<u>SO2</u>	<u>PM10</u>	<u>PM2.5</u>	<u>CO2</u>
TOTALS (lbs/day, unmitigated)	55.19	51.71	535.90	0.94	88.65	18.41	101,553.99

Both Area and Operational Mitigation must be turned on to get a combined mitigated total.

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Area Source Unmitigated Detail Report:

AREA SOURCE EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

<u>Source</u>	<u>ROG</u>	<u>NOx</u>	<u>CO</u>	<u>SO2</u>	<u>PM10</u>	<u>PM2.5</u>	<u>CO2</u>
Natural Gas	0.42	5.84	4.90	0.00	0.01	0.01	7,006.44
Hearth - No Summer Emissions							
Landscape	0.25	0.04	3.09	0.00	0.01	0.01	5.62
Consumer Products	0.00						
Architectural Coatings	7.02						
TOTALS (lbs/day, unmitigated)	7.69	5.88	7.99	0.00	0.02	0.02	7,012.06

Area Source Mitigated Detail Report:

AREA SOURCE EMISSION ESTIMATES Summer Pounds Per Day, Mitigated

<u>Source</u>	<u>ROG</u>	<u>NOx</u>	<u>CO</u>	<u>SO2</u>	<u>PM10</u>	<u>PM2.5</u>	<u>CO2</u>
Natural Gas	0.34	4.67	3.92	0.00	0.01	0.01	5,605.16
Hearth - No Summer Emissions							
Landscape	0.12	0.02	1.55	0.00	0.01	0.01	5.61
Consumer Products	0.00						
Architectural Coatings	6.32						
TOTALS (lbs/day, mitigated)	6.78	4.69	5.47	0.00	0.02	0.02	5,610.77

Area Source Changes to Defaults

Operational Unmitigated Detail Report:

OPERATIONAL EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

<u>Source</u>	ROG	NOX	CO	SO2	PM10	PM25	CO2
General office building	32.22	31.60	362.48	0.65	61.06	12.67	65,087.81
General light industry	15.28	14.23	165.43	0.29	27.57	5.72	29,454.12
TOTALS (lbs/day, unmitigated)	47.50	45.83	527.91	0.94	88.63	18.39	94,541.93

Operational Settings:

Does not include correction for passby trips

Does not include double counting adjustment for internal trips

Analysis Year: 2020 Temperature (F): 85 Season: Summer

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 office building		11.01	1000 sq ft	755.00	8,312.55	67,352.44
General light industry		8.11	1000 sq ft	445.00	3,608.95	30,405.40
					11,921.50	97,757.84

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	54.0	0.0	100.0	0.0
Light Truck < 3750 lbs	12.6	0.0	98.4	1.6
Light Truck 3751-5750 lbs	19.9	0.0	100.0	0.0
Med Truck 5751-8500 lbs	6.6	0.0	100.0	0.0

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Lite-Heavy Truck 8501-10,000 lbs	0.9	0.0	77.8	22.2
Lite-Heavy Truck 10,001-14,000 lbs	0.6	0.0	50.0	50.0
Med-Heavy Truck 14,001-33,000 lbs	1.0	0.0	20.0	80.0
Heavy-Heavy Truck 33,001-60,000 lbs	0.3	0.0	0.0	100.0
Other Bus	0.1	0.0	0.0	100.0
Urban Bus	0.1	0.0	0.0	100.0
Motorcycle	3.2	40.6	59.4	0.0
School Bus	0.1	0.0	0.0	100.0
Motor Home	0.6	0.0	83.3	16.7

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commuter	Non-Work	Customer
Urban Trip Length (miles)	10.8	7.3	7.5	9.5	7.4	7.4
Rural Trip Length (miles)	16.8	7.1	7.9	14.7	6.6	6.6
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 office building				35.0	17.5	47.5
General light industry				50.0	25.0	25.0

CO Int

Gilead Sciences Master Plan
CARBON MONOXIDE ANALYSIS

PM Peak Hour
 Assumes worst case of all intersections based on total volume, LOS and project traffic contribution

Intersection	Traffic Volume					1-Hour CO Contribution					Total 1-Hour Concentration					Total 8-Hour Concentration		
	Existing (2008)	Baseline (2011)	Project-Lakeside		Cumulative (2020)	Existing (2008)	Baseline (2011)	Project-Lakeside		Cumulative (2020)	Existing (2008)	Baseline (2011)	Project-Lakeside		Cumulative (2020)	Existing (2008)	Baseline (2011)	Project-Lakeside Dr. Closed (2011)
			Dr. Closed (2011)	Project-Lakeside Dr. Open (2011)				Dr. Closed (2011)	Project-Lakeside Dr. Open (2011)				Dr. Closed (2011)	Project-Lakeside Dr. Open (2011)				
Link: Int 16: Foster City Blvd. & Metro Center Blvd/Triton Foster City Blvd. (6-Lanes) Metro Center Blvd/Triton (4-Lanes)	2424 2389	2665 2877	2734 2932	2665 2914	3150 3174	1.8 0.6	1.4 0.5	0.4 1.9	0.4 1.9	0.2 1.0	5.8 6.5	5.3 5.8	5.7 5.9	5.7 5.9	4.6 4.6	4.1 4.6	3.7 4.1	4.0 4.1
Link: Int 15: Metro Blvd. & SR 92 EB Ramps SR 92 EB Ramps (4-Lanes) Metro Blvd. (4-Lanes)	2743 2389	2901 2878	2963 2932	2963 2913	3215 3174	2.5 0.6	1.9 0.5	1.9 0.5	1.9 0.5	1.0 0.3	6.2	5.6	5.7	5.6	4.6	4.4	4.0	4.0
Link: Int 10: Foster City Blvd. & Chess Dr. Foster City Blvd (4-Lanes) Chess Dr. (2-Lanes)	2424 2161	2661 2346	2735 2353	2664 2346	3149 2685	2.2 0.6	1.7 0.5	1.8 0.5	1.7 0.5	0.9 0.3	6.2	5.6	5.7	5.6	4.6	4.4	4.0	4.0

Emission Factors (EMFAC2007 - 5mph)	
San Mateo County	
LOS E or F (5mph)	
2008 (5 mph)	7.699 g/mi
2011 (5mph)	5.493 g/mi
2020 (5mph)	2.525 g/mi

Background CO Levels -	1-Hour	8-Hour
	3.4	2.4

Dispersion Factors	
Primary	Edge
2 Ln	14.0
4 Ln	11.9
6 Ln	9.5
Secondary	
2 Ln	3.7
4 Ln	3.3
6 Ln	2.8

itation

Project- Lakeside Dr. Open (2011)	Cumulative (2020)
4.0	3.2
4.1	3.3
4.0	3.2

Enter project specific data in the yellow fields in this worksheet and the Electricity worksheet. Enter comparison area names, usage data and year as appropriate. Check the Vehicle worksheet parameters. The GHG, Electricity, NatGas & Vehicle worksheets are intended to be included in a report appendix.

Project Parameters	
	2020
Vehicles (trips/day)	11,922
Electricity used (MWh/year)	41,000
Natural Gas burned (cf/day)	160,000

Emission Source	Emissions (tons per year)				
	CO ₂	CH ₄	N ₂ O	CO ₂ e	
Vehicles	15,000	0.46	1.7	16,000	48%
Electricity Production	13,000	0.14	0.076	13,000	39%
Natural Gas Combustion	3,500	0.067	0.064	3,500	11%
Solid Waste	N/A	N/A	N/A	244	1%
Total Annual Emissions	32,000	0.67	1.8	33,000	100%

Note: Numbers in table may not appear to add up correctly due to rounding of all numbers to two significant digits.

Emission Source	Total CO ₂ e (Tg per year)
Vehicles	0.015
Electricity Production	0.012
Natural Gas Combustion	0.0032
Total (CO ₂ e.)	0.03
% of Bay Area* 2002 total	0.039%
% of State 2004 total	0.0061%

1.1025 tons/metric tonne
1,000,000 metric tonne/Tg

Comparison Area GHG Usage		Year of data
Bay Area*	77.47 Tg/year	2002
State	492 Tg/year	2004

Global warming potentials (GWPs) are used to compare the abilities of different GHGs to trap heat in the atmosphere. GWPs are based on the radiative efficiency (heat-absorbing ability) of each gas relative to that of CO₂, as well as the decay rate of each gas (the amount removed from the atmosphere over a given number of years) relative to that of CO₂. The GWP provides a construct for converting emissions of various gases into a common measure, which allows climate analysts to aggregate the radiative impacts of various GHGs into a uniform measure denominated in carbon or CO₂ equivalents. The generally accepted authority on GWPs is the Intergovernmental Panel on Climate Change (IPCC). In 2001, the IPCC updated its estimates of GWPs for key GHGs. The table below lists the GWPs to calculate carbon dioxide equivalents (CO₂e.)

Global Warming Potential

Gas	Atmospheric Lifetime (years)	Global Warming Potential (100 year time horizon)
Carbon Dioxide	50-200	1
Methane	12 ± 3	21
Nitrous Oxide	120	310
HFC-23	264	11700
HFC-134a	14.6	1300
HFC-152a	1.5	140
PFC: Tetrafluoromethane (CF ₄)	50000	6500
PFC: Hexafluoromethane (C ₂ F ₆)	10000	9200
Sulfur Hexafluoride (SF ₆)	3200	23900

Enter project specific data in the yellow fields in this worksheet and the Electricity worksheet. Enter comparison area names, usage data and year as appropriate. Check the Vehicle worksheet parameters. The GHG, Electricity, NatGas & Vehicle worksheets are intended to be included in a report appendix.

Project Parameters	
	2020
Vehicles (trips/day)	6,042
Electricity used (MWh/year)	21,000
Natural Gas burned (cf/day)	84,000

Emission Source	Emissions (tons per year)				
	CO ₂	CH ₄	N ₂ O	CO ₂ e	
Vehicles	7,800	0.24	0.85	8,100	51%
Electricity Production	6,400	0.07	0.039	6,400	40%
Natural Gas Combustion	1,800	0.035	0.034	1,800	11%
Solid Waste	N/A	N/A	N/A	95	1%
Total Annual Emissions	16,000	0.35	0.92	16,000	100%

Note: Numbers in table may not appear to add up correctly due to rounding of all numbers to two significant digits.

Emission Source	Total CO ₂ e (Tg per year)
Vehicles	0.0073
Electricity Production	0.0058
Natural Gas Combustion	0.0016
Total (CO ₂ e.)	0.015
% of Bay Area* 2002 total	0.019%
% of State 2004 total	0.003%

1.1025 tons/metric tonne
1,000,000 metric tonne/Tg

Comparison Area GHG Usage		Year of data
Bay Area*	77.47 Tg/year	2002
State	492 Tg/year	2004

Global warming potentials (GWPs) are used to compare the abilities of different GHGs to trap heat in the atmosphere. GWPs are based on the radiative efficiency (heat-absorbing ability) of each gas relative to that of CO₂, as well as the decay rate of each gas (the amount removed from the atmosphere over a given number of years) relative to that of CO₂. The GWP provides a construct for converting emissions of various gases into a common measure, which allows climate analysts to aggregate the radiative impacts of various GHGs into a uniform measure denominated in carbon or CO₂ equivalents. The generally accepted authority on GWPs is the Intergovernmental Panel on Climate Change (IPCC). In 2001, the IPCC updated its estimates of GWPs for key GHGs. The table below lists the GWPs to calculate carbon dioxide equivalents (CO₂e.)

Global Warming Potential

Gas	Atmospheric Lifetime (years)	Global Warming Potential (100 year time horizon)
Carbon Dioxide	50-200	1
Methane	12 ± 3	21
Nitrous Oxide	120	310
HFC-23	264	11700
HFC-134a	14.6	1300
HFC-152a	1.5	140
PFC: Tetrafluoromethane (CF ₄)	50000	6500
PFC: Hexafluoromethane (C ₂ F ₆)	10000	9200
Sulfur Hexafluoride (SF ₆)	3200	23900

Project Parameters	
	2020
Vehicles (trips/day)	5,880
Electricity used (MWh/year)	20,000
Natural Gas burned (cf/day)	76,000

Emission Source	Emissions (tons per year)				
	CO₂	CH₄	N₂O	CO₂e	
Vehicles	7,200	0	1	7,900	46%
Electricity Production	6,600	0	0	6,600	39%
Natural Gas Combustion	1,700	0	0	1,700	10%
Solid Waste				150	1%
Total Annual Emissions	16,000	0	1	17,000	100%

Note: Numbers in table may not appear to add up correctly due to rounding of all numbers to two significant digits.

Emission Source	Total CO₂e
Vehicles	0.0077
Electricity Production	0.0062
Natural Gas Combustion	0.0016
Total (CO₂e)	0.015