

Appendix 4.4

BAAQMD-Permitted Stationary Sources in
Antioch and Screening Risk

Plant Number	Plant Name	Plant Address	City	County	Plant Cancer Risk (millions)	Plant Chronic Hazard	Plant PM2.5 Concentration (ug/m3)
17872	AEI Consultants	407 G STREET	Antioch	Contra Costa	1.88	0.001	0.000
18776	Allied Container Systems	511 WILBUR AVE, BLDG B4	Antioch	Contra Costa	0.96	0.001	0.000
17126	American Tower Corp Site Brentwood-Oakle	4701 VISTA GRANDE DR	Antioch	Contra Costa	24.08	0.009	0.006
10304	Antioch Auto Body Inc	1401 VERNE ROBERTS CIR	Antioch	Contra Costa	0.00	0.027	0.013
G11394	Antioch Municipal Marina	#5 Marina Plaza	Antioch	Contra Costa	3.491	0.004	na
G11952	Antioch Shell	2701 Hillcrest Blvd	Antioch	Contra Costa	48.479	0.069	na
G10955	Antioch Unified School Dist	701 W 18th Street	Antioch	Contra Costa	0.269	0.000	na
G11867	Antioch Valero	2101 Somersville Rd	Antioch	Contra Costa	43.766	0.062	na
18566	Apex Envirotech Inc	924 10TH STREET	Antioch	Contra Costa	0.00	0.000	0.000
G11103	A-Street Union 76	2413 A Street	Antioch	Contra Costa	18.180	0.026	na
G9023	Bhalla's Gas and Auto Service Inc	2610 Contra Loma Blvd	Antioch	Contra Costa	39.389	0.056	na
G9626	Bridgehead Chevron SS #9-3801	5433 Neroly Rd, Hwy 4	Antioch	Contra Costa	38.716	0.055	na
11302	Bridgehead Marine Services	30 FLEMING LANE	Antioch	Contra Costa	0.00	0.000	0.318
17539	CEMEX Construction Materials, LP	3600 WILBUR AVENUE	Antioch	Contra Costa	0.00	0.000	2.430
G8560	Chevron Inc	4600 Lone Tree Way	Antioch	Contra Costa	33.666	0.048	na
G8388	Chevron Inc SS# New-063	3400 Hillcrest Ave	Antioch	Contra Costa	16.980	0.019	na
13786	City of Antioch	300 L STREET	Antioch	Contra Costa	19.79	0.007	0.035
13787	City of Antioch	1201 W 4TH STREET	Antioch	Contra Costa	54.85	0.019	0.097
13788	City of Antioch	3RD & H STREET	Antioch	Contra Costa	17.90	0.006	0.032
G9956	City of Antioch Corporate Yard	1201 W 4th Street	Antioch	Contra Costa	na	na	na
17381	Commons at Dallas Ranch	4751 DALLAS RANCH RD	Antioch	Contra Costa	24.75	0.009	0.006
14376	Contra Costa County Fire Protection Dist	4288 FOLSOM DRIVE	Antioch	Contra Costa	37.82	0.013	0.009
15179	Contra Costa County Fire Protection Dist	196 BLUE ROCK DRIVE	Antioch	Contra Costa	75.30	0.027	0.017
G9785	Contra Costa County Fire Station #81	315 W 10th Street	Antioch	Contra Costa	na	na	na
19767	Contra Costa County Firestation#83	2717 GENTRYTOWN DR	Antioch	Contra Costa	No data	No data	No data
G9454	Contra Costa Water District	Cor Neroly Rd & Laurel Dr	Antioch	Contra Costa	na	na	na
14038	Contra Costa Water District/Antioch Serv	3965 NEROLY ROAD	Antioch	Contra Costa	341.85	0.121	0.605
G6612	Delta Diablo Sanitation District	2500 Pittsburg & Antioch Hwy	Antioch	Contra Costa	na	na	na
1258	Delta Diablo Sanitation District	2500 PITTSBURG & ANTIOCH HWY	Antioch	Contra Costa	84.59	0.131	3.640
7189	Delta Diablo Sanitation District	1200 BRIDGEHEAD RD	Antioch	Contra Costa	64.51	0.023	0.115
13883	Delta Diablo Sanitation District	725 FULTON SHIPYARD RD	Antioch	Contra Costa	89.96	0.032	0.160
G11435	Delta Fair Chevron	3201 Delta Fair Blvd	Antioch	Contra Costa	30.299	0.043	na
10031	Delta Fair Cleaners	2362 BUCHANAN ROAD	Antioch	Contra Costa	34.50	0.092	0.000
G9428	Dept of Trnspt/Antioch Maintenance Stn	2817 Windsor Drive	Antioch	Contra Costa	na	na	na
G11961	Dutch Pride Gas and Food	507 E 18th Street	Antioch	Contra Costa	9.426	0.013	na

	17685	Eastern Contra Costa Transit Authority	801 WILBUR AVENUE	Antioch	Contra Costa	29.88	0.011	0.007
G11787		Easy Serve Gasoline	1800 W 10th Street	Antioch	Contra Costa	12.120	0.017	na
	18079	Enviro Soil Tech Consultants	900 A STREET	Antioch	Contra Costa	No data	No data	No data
G11572		Fuel & Go	924 W 10th Street	Antioch	Contra Costa	12.120	0.017	na
	11450	Fuhrer Paint Werkz	3257 E 18TH STREET	Antioch	Contra Costa	0.00	0.000	0.000
G10730		Gas City	4198 Lone Tree Way	Antioch	Contra Costa	37.032	0.053	na
G12075		Gas of America	1800 A Street	Antioch	Contra Costa	na	na	na
	18143	Gateway Generating Station	3225 WILBUR AVENUE	Antioch	Contra Costa	0.00	0.000	0.000
	20138	Geno's Auto Body	2201 W 10TH ST, SUITE #D	Antioch	Contra Costa	No data	No data	No data
	173	Georgia Pacific Gypsum LLC /c/o GP Fin M	801 MINAKER STREET	Antioch	Contra Costa	1.03	0.000	356.000
	14512	Gilroy Energy Center,LLC for Riverview E *	801 MINAKER ROAD	Antioch	Contra Costa	0.17	0.01	0.000333
G11203		Golf Course Plaza Gas *	4649 Golf Course Rd	Antioch	Contra Costa	10.863	0.006	na
	3245	GWF Power Systems,LP (Site 3)	1900 WILBUR AVENUE	Antioch	Contra Costa	516.17	5.775	83.100
	3981	GWF Power Systems,LP (Site 4)	3400 WILBUR AVENUE	Antioch	Contra Costa	486.99	4.116	49.500
	5975	Hillcrest Cleaners	4361 HILLCREST AVE	Antioch	Contra Costa	9.06	0.024	0.000
G11235		Hillcrest Fuel-Mart/Valero	1801 Hillcrest Ave	Antioch	Contra Costa	18.180	0.026	na
G10794		Hillcrest Valero	2700 Hillcrest	Antioch	Contra Costa	43.766	0.062	na
	18803	JC Penney	4951 SLATTEN RANCH RD	Antioch	Contra Costa	0.07	0.000	0.003
	16527	Jim's Calif Auto Body, Inc	1530 W 10TH STREET	Antioch	Contra Costa	0.00	0.000	0.000
G8624		Joe's Liquor & Food	1911 D Street	Antioch	Contra Costa	3.269	0.004	na
	16855	Kaiser Antioch Deer Valley	4501 SAND CREEK RD	Antioch	Contra Costa	50.88	0.026	2.120
	13751	Kaiser Medical Center	3400 DELTA FAIR BLVD	Antioch	Contra Costa	16.46	0.006	0.029
	3475	Keep-U-Neat Cleaners	2028 A STREET	Antioch	Contra Costa	0.00	0.000	0.000
	9029	Kie-Con	3551 WILBUR AVENUE	Antioch	Contra Costa	1.76	0.015	35.400
	917	Lamothe Cleaners	1860 A STREET	Antioch	Contra Costa	0.00	0.000	0.000
G11226		Lone Tree Gas & Food	3720 Lone Tree Way	Antioch	Contra Costa	12.120	0.017	na
G11243		Lone Tree Golf Course	4800 Golf Course Rd	Antioch	Contra Costa	na	na	na
G9586		Lone Tree Shell	2838 Lone Tree Way	Antioch	Contra Costa	18.516	0.026	na
G5907		Lone Tree Valero	2843 Lone Tree Way	Antioch	Contra Costa	18.180	0.026	na
	13695	Lowe's HIW, Inc	1951 SOMERSVILLE RD	Antioch	Contra Costa	27.21	0.010	0.048
	16710	Lowe's HIW, Inc	5501 LONE TREE WAY	Antioch	Contra Costa	32.89	0.012	0.008
	18347	Lucky #701	4500 LONE TREE WAY	Antioch	Contra Costa	0.00	0.000	0.000
	12978	Lucky 7 Auto Body & Custom's	104 RAILROAD AVENUE	Antioch	Contra Costa	0.00	0.000	0.000
	12903	MAACO Auto Painting and BodyWork	1825 W 10TH STREET	Antioch	Contra Costa	0.00	0.007	0.000
	16823	Martinizing Dry Cleaning	4857 LONE TREE WAY	Antioch	Contra Costa	0.00	0.000	0.000
	9464	Melgoza's Yacht Refinishing	6325 BRIDGEHEAD RD	Antioch	Contra Costa	0.00	0.000	0.000
	17125	Mike's Autobody	1610 W 10TH STREET	Antioch	Contra Costa	0.00	0.000	0.008
	18	Mirant Delta, LLC	3201 WILBUR AVENUE	Antioch	Contra Costa	37.64	0.122	29.200
G10772		Nella Oil Company	2310 A Street	Antioch	Contra Costa	24.744	0.035	na

G9881	New Bridge Marina	6325 Bridgehead Rd	Antioch	Contra Costa	na	na	na
17522	Nextel of California Inc Site ID: CA-218	415 FLEMING LANE	Antioch	Contra Costa	13.74	0.005	0.003
2320	Oak View Memorial Park	2500 E 18TH STREET	Antioch	Contra Costa	43.50	1.830	0.637
13629	Orchard Supply Hardware	4873 LONETREE WAY	Antioch	Contra Costa	23.30	0.008	0.005
19416	Orchard Supply Hardware	2388 BUCHANAN ROAD	Antioch	Contra Costa	15.06	0.005	0.003
15707	Ordaz Cultured Marble & Onyx, Inc	2601 W 10TH STREET	Antioch	Contra Costa	0.00	0.014	0.000
13449	Pacific Bell	100 W 20TH STREET	Antioch	Contra Costa	30.85	0.011	0.055
G6673	Pacific Gas & Electric Antioch Srvc Cntr	2111 Hillcrest Ave	Antioch	Contra Costa	na	na	na
G6557	Pacific Gas & Electric Company	1456 Wilbur Avenue	Antioch	Contra Costa	na	na	na
11250	Pacific Gas & Electric Company	OAKLEY RD & PHILLIPS LN	Antioch	Contra Costa	0.00	0.000	0.000
3161	Pacific Gas and Electric Company	2111 HILLCREST AVE	Antioch	Contra Costa	1.00	0.001	0.000
17016	Pacific Gas and Electric Company	800 2ND STREET	Antioch	Contra Costa	0.03	0.000	0.001
14762	Ramrock Leasing and Equipment Co	3500 WILBUR AVENUE	Antioch	Contra Costa	171.59	0.061	0.304
11607	Ritter Manufacturing Inc	1300B W 4TH STREET	Antioch	Contra Costa	0.00	0.000	0.000
G11121	Safeway Fuel Center #1259	3431 Deer Valley Rd	Antioch	Contra Costa	39.732	0.045	na
3800	Scotto's Auto Body	415 O STREET	Antioch	Contra Costa	0.00	0.001	0.000
14327	Silgan Containers Mfg Corp	2200 WILBUR AVENUE	Antioch	Contra Costa	0.20	0.010	1.680
16788	Somersville Towne Center	2556 SOMERSVILLE RD	Antioch	Contra Costa	13.30	0.005	0.003
G9952	Southland 7-Eleven Store #32305	4901 Lone Tree Way	Antioch	Contra Costa	15.352	0.022	na
14192	State of California Department of Transp	ANTIOCH BRDG TLL PLAZA	Antioch	Contra Costa	16.50	0.006	0.029
14764	Steve's Auto Paint	511 WILBUR STREET, #B	Antioch	Contra Costa	0.00	0.000	0.000
15039	Sun Chemical	1781 VINEYARD DR, SUITE 100	Antioch	Contra Costa	0.00	0.000	0.000
14088	Sutter Delta Medical Center	3901 LONE TREE WAY	Antioch	Contra Costa	180.36	0.064	0.320
17578	Target Store T-1819	5769 LONE TREE WAY	Antioch	Contra Costa	0.01	0.000	0.001
8129	Templer's Auto Body	2505 DEVPAR COURT	Antioch	Contra Costa	0.00	0.000	0.000
12967	TRC	JAMES DONLON BLVD	Antioch	Contra Costa	65.70	0.077	1.550
G11502	Trinity Valero Enterprises	3629 E 18th Street	Antioch	Contra Costa	12.625	0.018	na
2019	U S Cleaners	2775 LONE TREE WAY	Antioch	Contra Costa	0.00	0.000	0.000
G12040	United Rentals Northwest Inc	1204 Sunset Drive	Antioch	Contra Costa	21.802	0.038	na
G11780	Unocal Corporation	2701 Contra Loma Blvd	Antioch	Contra Costa	11.514	0.016	na
G11811	USA Gasoline #91	1915 Somersville Rd	Antioch	Contra Costa	30.299	0.043	na
2304	Verco Decking, Inc	607 WILBUR AVENUE	Antioch	Contra Costa	0.01	0.000	0.062
17954	Verizon Wireless (East Antioch)	4506 VIA DORA STREET	Antioch	Contra Costa	20.16	0.007	0.005
17443	Verizon Wireless (Hwy 4 Bypass)	4701 VISTA GRANDE DR	Antioch	Contra Costa	15.33	0.005	0.004
16456	Verizon Wireless (HWY 4/Sommersville)	700 W 18TH STREET	Antioch	Contra Costa	13.61	0.005	0.003
16880	Verizon Wireless (Lone Tree/Valley)	5201 DEER VALLEY RD	Antioch	Contra Costa	14.59	0.005	0.003
15007	Verizon Wireless Antioch	75 WALTON LANE	Antioch	Contra Costa	94.21	0.033	0.022
1295	West Cleaners	3676 LONE TREE WAY	Antioch	Contra Costa	33.80	0.090	0.000
G123	William G McCullough Co	2625 E 18th Street	Antioch	Contra Costa	0.252	0.000	na

Attachment 2: Rail Emissions and Risk Calculations

Antioch, CA - Locomotive Emissions on BNSF Rail Line
DPM Modeling - Rail Line Information and DPM and PM2.5 Emission Rates

Year	Description	No. Lines Modeled	Link Width (ft)	Link Width (m)	Link Length (ft)	Link Length (miles)	Link Length (m)	Release Height (m)	Ave No. Trains per Day	Train Travel Speed (mph)	Average Daily Emission Rate (g/mi/day)	Average Daily Emission Rate (g/day)	Link Emission Rate (g/s)	Link Emission Rate (lb/hr)
2016-2019	Passenger								8	25	51.9	19.3	2.24E-04	1.77E-03
	Freight Trains								18	25	206.7	77.0	8.91E-04	7.07E-03
	Total	1	12	3.7	1,966	0.37	599	5.0	26	-	258.6	96.3	1.11E-03	8.84E-03
2020-2024	Passenger								8	25	35.0	13.0	1.51E-04	1.20E-03
	Freight Trains								18	25	149.1	55.5	6.43E-04	5.10E-03
	Total	1	12	3.7	1,966	0.37	599	5.0	26	-	184.1	68.5	7.93E-04	6.30E-03
2025+	Passenger								8	25	8.0	3.0	3.45E-05	2.74E-04
	Freight Trains								18	25	40.1	14.9	1.73E-04	1.37E-03
	Total	1	12	3.7	1,966	0.37	599	5.0	26	-	48.1	17.9	2.07E-04	1.65E-03

Notes: Emission based on Emission Factors for Locomotives, USEPA 2009 (EPA-420-F-09-025)
Average emissions calculated for periods 2016-2019, 2020-2024, and 2025-2040.
Fuel correction factors from Offroad Modeling Change Technical memo, Changes to the Locomotive Inventory, CARB July 2006.
DPM & PM2.5 calculated as 92% of PM emissions (CARB CEIDERS PM2.5 fractions)
Passenger trains assumed to operate for 24 hours per day
Freight trains assumed to operate for 24 hours per day

Amtrak			
Arrive/Depart Station	Diesel	Electric	Total
Passenger trains - weekday =	8	0	8
Passenger trains - weekend =	8	0	8
Passenger trains - Sat only =	0	0	0
Annual average daily trains =	8	0	8
Locomotive horsepower =	3200		
Locomotives per train =	1		
Locomotive engine load =	0.6		

Freight - Diesel Locomotives			
Freight trains per day =	18	7	day/week
Locomotive horsepower =	2300		
Locomotives per train =	2		
Total horsepower =	4600		
Locomotive engine load =	0.6		

Diesel Locomotive Emission Factors (g/hp-hr)*			
Train Type	2015	2020	2025+
Passenger	0.130	0.088	0.020
Freight	0.135	0.097	0.026

* 2015 emissions are average emissions for 2015-2019, 2020 emissions are average emissions for 2020-2024. 2025+ emissions average for 2025-2040.

PM2.5 to PM ratio = 0.92
CARB Adj Factor
2010 2011+
Passenger 0.717 0.709
Freight 0.851 0.840

Antioch, CA - Locomotive Emissions on UPRR Rail Line
DPM Modeling - Rail Line Information and DPM and PM2.5 Emission Rates

Year	Description	No. Lines Modeled	Link Width (ft)	Link Width (m)	Link Length (ft)	Link Length (miles)	Link Length (m)	Release Height (m)	Ave No. Trains per Day	Train Travel Speed (mph)	Average Daily Emission Rate (g/mi/day)	Average Daily Emission Rate (g/day)	Link Emission Rate (g/s)	Link Emission Rate (lb/hr)
2016-2019	Passenger								0	25	0.0	0.0	0.00E+00	0.00E+00
	Freight Trains								2	25	23.0	8.6	9.90E-05	7.86E-04
	Total	1	12	3.7	1,966	0.37	599	5.0	2	-	23.0	8.6	9.90E-05	7.86E-04
2020-2024	Passenger								0	25	0.0	0.0	0.00E+00	0.00E+00
	Freight Trains								2	25	16.6	6.2	7.14E-05	5.67E-04
	Total	1	12	3.7	1,966	0.37	599	5.0	2	-	16.6	6.2	7.14E-05	5.67E-04
2025+	Passenger								0	25	0.0	0.0	0.00E+00	0.00E+00
	Freight Trains								2	25	4.5	1.7	1.92E-05	1.52E-04
	Total	1	12	3.7	1,966	0.37	599	5.0	2	-	4.5	1.7	1.92E-05	1.52E-04

Notes: Emission based on Emission Factors for Locomotives, USEPA 2009 (EPA-420-F-09-025)
Average emissions calculated for periods 2016-2019, 2020-2024, and 2025-2040.
Fuel correction factors from Offroad Modeling Change Technical memo, Changes to the Locomotive Inventory, CARB July 2006.
DPM & PM2.5 calculated as 92% of PM emissions (CARB CEIDERS PM2.5 fractions)
Passenger trains assumed to operate for 24 hours per day
Freight trains assumed to operate for 24 hours per day

Amtrak			
Arrive/Depart Station	Diesel	Electric	Total
Passenger trains - weekday =	0	0	0
Passenger trains - weekend =	8	0	8
Passenger trains - Sat only =	0	0	0
Annual average daily trains =	0	0	0
Locomotive horsepower =	3200		
Locomotives per train =	1		
Locomotive engine load =	0.6		

Freight - Diesel Locomotives			
Freight trains per day =	2	7	day/week
Locomotive horsepower =	2300		
Locomotives per train =	2		
Total horsepower =	4600		
Locomotive engine load =	0.6		

Diesel Locomotive Emission Factors (g/hp-hr)*			
Train Type	2015	2020	2025+
Passenger	0.130	0.088	0.020
Freight	0.135	0.097	0.026

* 2015 emissions are average emissions for 2015-2019, 2020 emissions are average emissions for 2020-2024. 2025+ emissions average for 2025-2040.

PM2.5 to PM ratio = 0.92
CARB Adj Factor
2010 2011+
Passenger 0.717 0.709
Freight 0.851 0.840

BNSF Rail Line, Antioch, CA - Maximum Cancer Risks & PM2.5 Concentrations
Passenger & Freight Rail Traffic - DPM Cancer Risk and PM2.5 by Receptor

Receptor Information

Total Number of Receptors	66
Receptor Height =	1.5 m
Receptor distances =	variable

Meteorological Conditions

Dow Chemical Hourly Met Data	2005 - 2009
Land Use Classification	rural
Wind speed =	variable
Wind direction =	variable

Cancer Risk Calculation Method

$$\text{Inhalation Dose} = C_{\text{air}} \times \text{DBR} \times A \times \text{EF} \times \text{ED} \times 10^{-6} / \text{AT}$$

Where:	C_{air} = concentration in air ($\mu\text{g}/\text{m}^3$)
	DBR = daily breathing rate (L/kg body weight-day)
	A = Inhalation absorption factor
	EF = Exposure frequency (days/year)
	ED = Exposure duration (years)
	AT = Averaging time period over which exposure is averaged.
	10^{-6} = Conversion factor

Inhalation Dose Factors

Exposure Type	Value ¹							
	DBR (L/kg BW-day)	A (-)	Exposure (hr/day)	Exposure days/week	Exposure (week/year)	EF (days/yr)	ED (Years)	AT (days)
Residential (70-Year)	302	1	24	7	50	350	70	25,550

¹ Default values recommended by OEHHA & Bay Area Air Quality Management District

Cancer Risk (per million) = Inhalation Dose x SWFi x CPF x 10^6

= URF x Cair

Where:	CPF = Cancer potency factor ($\text{mg}/\text{kg}\cdot\text{day}$) ⁻¹
	CRAF = Cancer Risk Adjustment Factor [adjustment factors are dependent on emissions period and duration of exposure]
	SWFi = Sensitivity weighting factor dependent on emissions period i and duration of exposure
	URF = Unit risk factor (cancer risk per $\mu\text{g}/\text{m}^3$)

Unit Risk Factor for DPM Exhaust

Exposure Type	CPF ($\text{mg}/\text{kg}\cdot\text{day}$) ⁻¹	DPM
Residential (70-Yr Exposure)	1.10E+00	318.5

Average DPM Concentrations ($\mu\text{g}/\text{m}^3$)

Receptor No.	DPM Concentration ($\mu\text{g}/\text{m}^3$)		
	2016 - 2019	2020 - 2024	2025 - 2085
1	0.0825	0.0588	0.0154
2	0.0598	0.0426	0.0112
3	0.0385	0.0275	0.0072
4	0.0279	0.0199	0.0052
5	0.0215	0.0153	0.0040
6	0.0171	0.0122	0.0032
	0.0825	0.0588	0.0154

PM2.5 Average Concentrations

Receptor No.	PM2.5 Concentration ($\mu\text{g}/\text{m}^3$)		
	2016 - 2019	2020 - 2024	2025 - 2085
1	0.082	0.059	0.015
2	0.060	0.043	0.011
3	0.039	0.028	0.007
4	0.028	0.020	0.005
5	0.022	0.015	0.004
6	0.017	0.012	0.003
	0.082	0.059	0.015

Cancer Risk Calculations for 70-Year Residential Exposure

Sensitivity Weighting Factors	DPM			70-Year Total Cancer Risk (per million)
	Unit Risk Factor = 318.5			
	0.439	0.214	1.036	
70-yr Residential Risk				
Receptor No.	2016 - 2019	2020 - 2024	2025 - 2085	
South				
1	11.54	4.01	5.08	20.6
2	8.37	2.91	3.70	15.0
3	5.39	1.88	2.38	9.6
4	3.90	1.36	1.72	7.0
5	3.01	1.04	1.32	5.4
6	2.39	0.83	1.06	4.3
Max	11.5	4.0	5.1	20.63
Min	2.39	0.83	1.06	4.28

Maximum PM2.5 Concentrations

Distance From Rail Line (feet)	Receptor No.	Maximum PM2.5 ($\mu\text{g}/\text{m}^3$)
South		
50	1	0.08
100	2	0.06
200	3	0.04
300	4	0.03
400	5	0.02
500	6	0.02

UPRR Rail Line, Antioch, CA - Maximum Cancer Risks & PM2.5 Concentrations
Freight Rail Traffic - DPM - Risk By Receptor

Receptor Information

Total Number of Receptors 132
 Receptor Height = 1.5 m
 Receptor distances = variable

Meteorological Conditions

Dow Pittsburg Hourly Met Data 2005 - 2009
 Land Use Classification rural
 Wind speed = variable
 Wind direction = variable

Cancer Risk Calculation Method

Inhalation Dose = $C_{air} \times DBR \times A \times EF \times ED \times 10^{-6} / AT$

Where:
 C_{air} = concentration in air ($\mu\text{g}/\text{m}^3$)
 DBR = daily breathing rate (L/kg body weight-day)
 A = Inhalation absorption factor
 EF = Exposure frequency (days/year)
 ED = Exposure duration (years)
 AT = Averaging time period over which exposure is averaged.
 10^{-6} = Conversion factor

Inhalation Dose Factors

Exposure Type	Value ¹							
	DBR (L/kg BW-day)	A (-)	Exposure (hr/day)	Exposure days/week	Exposure (week/year)	EF (days/yr)	ED (Years)	AT (days)
Residential (70-Year)	302	1	24	7	50	350	70	25,550

¹ Default values recommended by OEHHA& Bay Area Air Quality Management District

Cancer Risk (per million) = Inhalation Dose x SWFi x CPF x 10^6
 = URF x Cair

Where:
 CPF = Cancer potency factor ($\text{mg}/\text{kg}\cdot\text{day}$)⁻¹
 CRAF = Cancer Risk Adjustment Factor [adjustment factors are dependent on emissions period and duration of exposure]
 SWFi = Sensitivity weighting factor dependent on emissions period i and duration of exposure
 URF =Unit risk factor (cancer risk per $\mu\text{g}/\text{m}^3$)

Unit Risk Factor for DPM Exhaust

Exposure Type	CPF ($\text{mg}/\text{kg}\cdot\text{day}$) ⁻¹	DPM
Residential (70-Yr Exposure)	1.10E+00	318.5

Average DPM Concentrations ($\mu\text{g}/\text{m}^3$)

Receptor No.	DPM Concentration ($\mu\text{g}/\text{m}^3$)		
	2015 - 2019	2020 - 2024	2025 - 2084
1	0.0077	0.0056	0.0015
2	0.0055	0.0040	0.0011
3	0.0035	0.0025	0.0007
4	0.0025	0.0018	0.0005
5	0.0019	0.0014	0.0004
6	0.0015	0.0011	0.0003
7	0.0077	0.0056	0.0015
8	0.0055	0.0040	0.0011
9	0.0035	0.0025	0.0007
10	0.0025	0.0018	0.0005
11	0.0019	0.0014	0.0004
12	0.0015	0.0011	0.0003
0.0077 0.0056 0.0015			

PM2.5 Average Concentrations

Receptor No.	PM2.5 Concentration ($\mu\text{g}/\text{m}^3$)		
	2015	2020	2025
1	0.008	0.006	0.001
2	0.006	0.004	0.001
3	0.003	0.003	0.001
4	0.003	0.002	0.000
5	0.002	0.001	0.000
6	0.002	0.001	0.000
7	0.008	0.006	0.002
8	0.006	0.004	0.001
9	0.004	0.003	0.001
10	0.003	0.002	0.000
11	0.002	0.001	0.000
12	0.002	0.001	0.000
0.008 0.006 0.002			

Cancer Risk Calculations for 70-Year Residential Exposure

Sensitivity Weighting Factors	DPM			70-Year Total Cancer Risk (per million)
	Unit Risk Factor = 318.5			
	0.439	0.214	1.036	
70-yr Residential Risk				
Receptor No.	2015 - 2019	2020 - 2024	2025 - 2084	
North				
1	1.08	0.38	0.49	1.9
2	0.77	0.27	0.35	1.4
3	0.48	0.17	0.22	0.9
4	0.35	0.12	0.16	0.6
5	0.27	0.09	0.12	0.5
6	0.21	0.08	0.10	0.4
South				
7	1.08	0.38	0.49	2.0
8	0.77	0.27	0.35	1.4
9	0.49	0.17	0.22	0.9
10	0.35	0.12	0.16	0.6
11	0.27	0.09	0.12	0.5
12	0.21	0.08	0.10	0.4
Max	1.1	0.4	0.5	1.96
Min	0.21	0.08	0.10	0.38

Maximum PM2.5 Concentrations

Distance From Rail Line (feet)	Receptor No.	Maximum PM2.5 ($\mu\text{g}/\text{m}^3$)
<i>North</i>		
50	1	0.01
100	2	0.01
200	3	0.00
300	4	0.00
400	5	0.00
500	6	0.00
<i>South</i>		
50	7	0.01
100	8	0.01
200	9	0.00
300	10	0.00
400	11	0.00
500	12	0.00