APPENDIX 5.1B

Modeling Support Data

APPENDIX 5.1B

Modeling Support Data

Tables presented in this Appendix are as follows:

5.1B-1	Antioch, California (040232) WSO Climate Summary
5.1B-2	BAAQMD Historical Air Quality Data
5.1B-3	BAAQMD Air Monitoring Summary Data for 2005-2007
5.1B-4	Facility Impact/Modeling Results Summary
5.1B-5	Construction Impact/Modeling Summary

In addition, this appendix contains the following figures:

5.1B-1	Facility BPIP Modeling Plot
5.1B-2	Coarse and Fine Receptor Grids Plot
5.1B-3	BAAQMD Monitoring Stations Map
5.1B-4-8	Annual and Quarterly Wind Roses

Modeling input/output files are included in the enclosed CD's.

Table 5.1B-1 (11 Pages)

ANTIOCH PUMP PLANT 3, CALIFORNIA (040232)

Period of Record Monthly Climate Summary

Period of Record : 3/ 1/1955 to 12/31/2008

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	53.7	60.2	65.4	71.5	78.7	86.1	91.2	90.0	86.1	77.4	64.3	54.7	73.3
Average Min. Temperature (F)	37.1	41.0	43.4	46.3	51.4	56.2	57.5	56.8	55.2	50.2	43.1	37.3	48.0
Average Total Precipitation (in.)	2.78	2.39	1.96	0.90	0.37	0.09	0.02	0.04	0.19	0.65	1.58	2.20	13.17
Average Total SnowFall (in.)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Average Snow Depth (in.)	0	0	0	0	0	0	0	0	0	0	0	0	0

Percent of possible observations for period of record.
Max. Temp.: 98% Min. Temp.: 98.4% Precipitation: 98.8% Snowfall: 99.1% Snow Depth: 99.1%
Check Station Metadata or Metadata graphics for more detail about data completeness.

Western Regional Climate Center, wrcc@dri.edu

ANTIOCH PUMP PLANT 3, CALIFORNIA

NCDC 1971-2000 Monthly Normals

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Monthly
Mean Max. Temperature (F)	53.5	59.9	64.6	71.1	78.5	85.6	90.7	89.8	85.9	77.5	63.9	54.3	72.9
Highest Mean Max. Temperature (F)	59.2	64.4	69.8	77.4	86.1	93.3	96.2	94.5	91.7	82.9	71.2	59.6	96.2
Year Highest Occurred	1976	1991	1997	1987	1992	1981	1988	1996	1984	1991	1995	1999	1988
Lowest Mean Max. Temperature (F)	46.7	56.0	60.0	64.0	67.9	79.6	85.3	83.5	79.9	72.5	56.6	47.8	46.7
Year Lowest Occurred	1985	1989	1991	1975	1998	1998	1987	1976	1986	1984	1982	1985	1985
Mean Temperature (F)	45.7	50.6	54.5	59.2	65.2	71.1	74.4	73.7	71.0	64.3	53.8	45.7	60.8
Highest Mean Temperature (F)	51.4	54.7	58.2	64.2	71.9	77.5	79.8	77.5	75.6	69.2	59.8	51.9	79.8
Year Highest Occurred	1995	1991	1993	1987	1997	1981	1988	1992	1984	1991	1995	1995	1988
Lowest Mean Temperature (F)	39.1	47.2	50.3	51.8	59.1	65.6	70.4	69.9	67.1	58.6	48.3	40.3	39.1
Year Lowest Occurred	1972	1971	1985	1975	1998	1982	1975	1980	1986	1971	1982	1972	1972
Mean Min. Temperature (F)	37.8	41.3	44.3	47.2	51.9	56.5	58.1	57.6	56.0	51.1	43.6	37.1	48.5
Highest Mean Min. Temperature (F)	46.1	46.2	48.6	51.9	58.7	62.8	63.4	61.8	60.4	56.1	48.7	44.3	63.4
Year Highest Occurred	1995	1986	1993	1990	1997	1993	1988	1990	1997	1992	1997	1995	1988
Lowest Mean Min. Temperature (F)	30.9	35.6	39.9	39.6	47.5	50.9	53.5	53.0	50.3	42.4	38.5	31.0	30.9
Year Lowest Occurred	1972	1974	1975	1975	1975	1982	1975	1980	1972	1971	1971	1976	1972
Mean Precipitation (in.)	2.72	2.51	2.16	0.73	0.47	0.09	0.03	0.03	0.24	0.76	1.70	1.89	13.33
Highest Precipitation (in.)	6.97	9.03	6.26	3.31	2.09	0.64	0.46	0.74	1.84	4.17	4.56	5.05	9.03
Year Highest Occurred	1993	1998	1983	1983	1998	1995	1980	1976	1989	1972	1972	1995	1998
Lowest Precipitation (in.)	0.13	0.06	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Year Lowest Occurred	1984	1995	1972	1997	1999	1999	2000	2000	1997	1995	1995	1989	1997
Heating Degree Days (F)	600.	404.	332.	206.	99.	18.	4.	1.	10.	99.	344.	597.	2714.
Cooling Degree Days (F)	0.	0.	4.	30.	106.	200.	296.	270.	190.	77.	6.	0.	1179.

Western Regional Climate Center, wrcc@dri.edu

ANTIOCH PUMP PLANT 3, CALIFORNIA

Period of Record Daily Climate Summary

Daily Records for station 040232 ANTIOCH PUMP PLANT 3 state: ca

For temperature and precipitation, multi-day accumulations
are not considered either for records or averages.
The year given is the year of latest occurrence.

Period requested -- Begin : 1/ 1/1890 -- End : 12/31/2008
Period used -- Begin : 3/ 1/1955 -- End : 12/31/2008

Cooling degree threshold = 65.00 Heating degree threshold = 65.00

AVG Multi-year unsmoothed average of the indicated quantity
HI Highest value of indicated quantity for this day of year
LO Lowest value of indicated quantity for this day of year
YR Latest year of occurrence of the extreme value
NO Number of years with data for this day of year.
Units: English (inches and degrees F)

		Maximum Temperature						Minimum Temperature						Precipitation				Snowfall				Snowdepth			
MO	DY	AVG	NO	HI	YR	LO	YR	AVG	NO	HI	YR	LO	YR	AVG	NO	HIGH	YR	AVG	NO	HIGH	YR	AVG	NO	HIGH	YR
1	1	52	50	66	1997	38	1962	35	50	58	1997	21	1979	0.109	49	1.38	2005	0.00	51	0.0	2008	0.0	50	0.	2008
1	2	51	50	65	2007	36	1983	35	50	56	1997	22	1961	0.120	49	1.90	2005	0.00	51	0.0	2008	0.0	51	0.	2008
1	3	51	50	62	1998	38	1963	35	50	48	1986	22	1968	0.066	49	0.62	1965	0.00	51	0.0	2008	0.0	51	0.	2008
1	4	51	50	65	1996	36	1961	35	50	48	1986	23	1968	0.110	49	1.80	2008	0.00	51	0.0	2008	0.0	51	0.	2008
1	5	52	50	65	2003	40	1974	36	49	53	1986	23	1968	0.132	49	2.80	1982	0.00	51	0.0	2008	0.0	51	0.	2008
1	6	51	50	68	1986	33	1961	37	50	50	1965	25	1972	0.073	49	1.10	1959	0.00	51	0.0	2008	0.0	51	0.	2008
1	7	52	50	64	1986	40	1969	37	50	48	1966	25	1972	0.049	49	0.79	1993	0.00	51	0.0	2008	0.0	51	0.	2008
1	8	52	50	61	2007	37	1968	37	50	46	2002	25	1982	0.045	49	0.52	1993	0.00	51	0.0	2008	0.0	51	0.	2008
1	9	53	50	64	1990	37	1968	37	50	50	1978	26	1957	0.080	49	0.84	1959	0.00	51	0.0	2008	0.0	51	0.	2008
1	10	54	50	67	1962	40	1999	37	50	52	1959	23	1957	0.106	49	1.90	1995	0.00	51	0.0	2008	0.0	51	0.	2008
1	11	53	50	65	1962	36	1999	38	49	49	2000	28	1982	0.069	49	0.86	1979	0.00	51	0.0	2008	0.0	51	0.	2008
1	12	52	50	67	1980	37	1972	38	49	52	1998	26	1964	0.048	49	0.36	1998	0.00	51	0.0	2008	0.0	51	0.	2008
1	13	53	50	69	1980	38	1972	37	50	59	1980	21	1963	0.114	49	2.08	1993	0.00	51	0.0	2008	0.0	51	0.	2008
1	14	53	50	65	1980	40	1997	37	50	55	1980	21	1963	0.090	49	0.99	1978	0.00	51	0.0	2008	0.0	51	0.	2008
1	15	53	50	65	1980	40	1985	37	48	51	1956	22	1963	0.118	49	1.48	1979	0.00	51	0.0	2008	0.0	51	0.	2008
1	16	54	50	65	1966	41	1977	38	49	50	1998	24	1963	0.079	49	0.69	1996	0.00	51	0.0	2008	0.0	51	0.	2008
1	17	55	50	67	1970	39	1972	38	49	52	1970	25	1963	0.045	49	0.74	1978	0.00	51	0.0	2008	0.0	51	0.	2008
1	18	54	50	70	1986	37	1972	38	50	53	1999	25	1966	0.054	49	0.88	1993	0.00	51	0.0	2008	0.0	51	0.	2008
1	19	54	50	67	1976	40	1972	38	50	53	1999	24	1963	0.082	49	1.24	1969	0.00	51	0.0	2008	0.0	51	0.	2008
1	20	55	51	68	1991	40	1992	39	51	54	1999	25	1963	0.070	48	0.53	1969	0.00	51	0.0	2008	0.0	51	0.	2008
1	21	55	51	65	1993	39	1992	37	50	53	1969	24	1966	0.145	48	2.00	1964	0.00	51	0.0	2008	0.0	51	0.	2008

1	22	55	51	67	1976	35	1962	38	51	56	1970	23	1962	0.082	48	1.50	1967	0.00	51	0.0	2008	0.0	51	0. 2008
1	23	55	51	68	1968	41	2008	37	51	55	1970	23	1962	0.124	49	1.62	2000	0.00	51	0.0	2008	0.0	51	0. 2008
1	24	55	51	65	1976	36	1992	37	51	49	2000	20	1962	0.133	49	1.65	2000	0.00	51	0.0	2008	0.0	51	0. 2008
1	25	56	51	67	1976	40	1992	37	51	51	2003	22	1962	0.106	49	0.94	1997	0.00	51	0.0	2008	0.0	51	0. 2008
1	26	56	50	66	1976	44	1963	38	50	52	1956	26	1962	0.106	48	1.33	1961	0.00	51	0.0	2008	0.0	51	0. 2008
1	27	56	51	66	2003	44	1980	38	51	47	2003	29	1985	0.092	49	1.40	1983	0.00	51	0.0	2008	0.0	51	0. 2008
1	28	56	51	67	1962	39	1963	38	51	49	1997	28	1975	0.052	49	0.78	1981	0.00	51	0.0	2008	0.0	51	0. 2008
1	29	55	50	65	1976	42	1963	38	50	50	1995	28	1969	0.068	49	0.62	1983	0.00	51	0.0	2008	0.0	51	0. 2008
1	30	56	50	65	1976	42	1971	38	50	52	1995	27	1972	0.129	49	1.52	1968	0.00	51	0.0	2008	0.0	51	0. 2008
1	31	55	50	72	1976	42	1971	38	50	52	1995	26	1957	0.093	49	1.17	1996	0.00	51	0.0	2008	0.0	51	0. 2008
2	1	57	50	71	1976	37	1972	39	50	56	1963	28	1985	0.065	49	1.05	1963	0.00	51	0.0	2008	0.0	51	0. 2008
2	2	57	51	72	1976	44	1971	39	51	54	1963	26	1972	0.067	51	0.45	1975	0.00	51	0.0	2008	0.0	51	0. 2008
2	3	57	50	73	1976	44	1966	39	50	54	1963	27	1972	0.082	51	2.33	1998	0.00	51	0.0	2008	0.0	51	0. 2008
2	4	57	50	71	1976	44	1965	38	51	53	1963	26	1957	0.050	51	0.46	1986	0.00	51	0.0	2008	0.0	51	0. 2008
2	5	58	51	66	1993	44	1962	38	51	50	1996	26	1985	0.088	51	1.05	1991	0.00	51	0.0	2008	0.0	51	0. 2008
2	6	58	50	68	1964	40	1976	40	50	51	1960	25	1989	0.082	51	1.08	1969	0.00	51	0.0	2008	0.0	51	0. 2008
2	7	59	50	71	1963	42	1989	40	50	52	1960	26	1989	0.099	51	0.97	1978	0.00	51	0.0	2008	0.0	51	0. 2008
2	8	59	50	72	2006	44	1989	41	49	53	1960	28	1989	0.095	51	1.33	1998	0.00	51	0.0	2008	0.0	51	0. 2008
2	9	59	50	71	1963	44	1989	42	49	52	1963	30	1974	0.119	51	0.88	1962	0.00	51	0.0	2008	0.0	51	0. 2008
2	10	59	51	69	1988	43	1989	42	51	52	2007	30	1974	0.072	51	0.75	1960	0.00	51	0.0	2008	0.0	51	0. 2008
2	11	60	51	71	1988	44	1989	41	51	51	1987	29	1982	0.095	51	0.75	2007	0.00	51	0.0	2008	0.0	51	0. 2008
2	12	60	51	72	1996	51	1959	41	51	54	1958	30	1965	0.068	51	0.99	1992	0.00	51	0.0	2008	0.0	51	0. 2008
2	13	60	51	70	2006	47	1978	42	51	53	1987	30	1965	0.136	51	1.88	1987	0.00	51	0.0	2008	0.0	51	0. 2008
2	14	61	51	72	1977	51	2007	42	51	53	2000	26	1966	0.103	51	1.32	1986	0.00	51	0.0	2008	0.0	51	0. 2008
2	15	61	51	76	1977	48	1990	41	51	52	1991	28	1990	0.127	51	1.35	2005	0.00	51	0.0	2008	0.0	51	0. 2008
2	16	61	51	75	2007	47	1990	41	50	53	1986	29	1966	0.118	51	1.00	1959	0.00	51	0.0	2008	0.0	51	0. 2008
2	17	61	51	74	1977	49	2006	42	50	55	1996	30	1966	0.104	51	0.94	1980	0.00	51	0.0	2008	0.0	51	0. 2008
2	18	62	51	76	1977	48	1990	42	50	57	1986	30	1975	0.073	51	0.57	1986	0.00	51	0.0	2008	0.0	51	0. 2008
2	19	61	51	75	1977	49	2006	43	51	55	1986	33	1964	0.155	51	1.87	1958	0.00	51	0.0	2008	0.0	51	0. 2008
2	20	62	51	76	1964	45	1994	42	51	52	1968	32	1990	0.079	51	0.68	1994	0.00	51	0.0	2008	0.0	51	0. 2008
2	21	61	51	72	1965	46	1994	42	50	53	1968	29	1967	0.092	51	0.95	1979	0.00	51	0.0	2008	0.0	51	0. 2008
2	22	62	51	74	1985	50	1959	42	51	52	1968	29	1967	0.068	51	0.91	2000	0.00	51	0.0	2008	0.0	51	0. 2008
2	23	62	51	76	1985	52	2008	41	51	54	1968	29	1975	0.059	51	0.76	1957	0.00	51	0.0	2008	0.0	51	0. 2008
2	24	62	51	74	1968	51	1969	41	51	53	1958	30	1974	0.040	51	0.59	1983	0.00	51	0.0	2008	0.0	51	0. 2008
2	25	62	51	73	1991	52	1996	42	51	52	1995	31	1962	0.073	51	1.15	2004	0.00	51	0.0	2008	0.0	51	0. 2008
2	26	62	51	75	1963	51	1996	42	51	52	1957	30	1962	0.054	51	0.64	2006	0.00	51	0.0	2008	0.0	51	0. 2008
2	27	62	51	73	1992	45	1962	42	51	55	1988	29	1962	0.055	51	0.57	2006	0.00	51	0.0	2008	0.0	51	0. 2008
2	28	63	51	76	1985	45	1996	42	51	51	1995	29	1962	0.068	51	1.12	1973	0.00	51	0.0	2008	0.0	51	0. 2008
2	29	64	14	70	2008	56	1996	44	14	52	1988	38	1964	0.036	14	0.14	2000	0.00	14	0.0	2008	0.0	14	0. 2008
3	1	62	50	75	1985	52	1962	42	50	51	1995	31	1955	0.102	46	0.79	1991	0.00	50	0.0	2008	0.0	50	0. 2008
3	2	62	50	77	1961	53	1976	43	50	54	1983	28	1971	0.087	47	0.94	1978	0.00	50	0.0	2008	0.0	50	0. 2008
3	3	62	50	77	1968	45	1976	42	50	52	1992	29	1966	0.058	47	0.66	1995	0.00	50	0.0	2008	0.0	50	0. 2008
3	4	63	50	76	1959	52	1973	43	49	54	1994	27	1966	0.042	47	0.42	1973	0.00	50	0.0	2008	0.0	50	0. 2008
3	5	63	50	76	1959	49	1989	42	50	53	1987	31	1976	0.069	47	0.65	1970	0.00	50	0.0	2008	0.0	50	0. 2008
3	6	63	50	76	1972	50	1985	42	50	52	1994	28	1971	0.082	47	0.96	1992	0.00	50	0.0	2008	0.0	50	0. 2008
3	7	64	50	80	1972	53	1956	42	50	58	1986	31	1971	0.039	47	0.39	1975	0.00	50	0.0	2008	0.0	50	0. 2008
3	8	65	50	80	1972	52	1974	43	50	57	1986	32	1969	0.067	47	0.85	1986	0.00	50	0.0	2008	0.0	50	0. 2008

3	9	65	50	75	1993	57	1998	43	50	55	2005	30	1974	0.045	47	0.58	1978	0.00	50	0.0	2008	0.0	50	0.	2008
3	10	65	50	78	2005	58	1999	44	50	56	1989	31	1977	0.071	47	1.10	1995	0.00	50	0.0	2008	0.0	50	0.	2008
3	11	65	50	79	2005	53	2006	44	50	55	1989	33	1969	0.081	47	0.80	1983	0.00	50	0.0	2008	0.0	50	0.	2008
3	12	66	50	78	2007	50	2006	44	50	54	1972	35	1968	0.043	47	0.67	1996	0.00	50	0.0	2008	0.0	50	0.	2008
3	13	65	50	78	2007	47	1969	44	49	57	1984	30	1956	0.145	47	1.17	1983	0.00	50	0.0	2008	0.0	50	0.	2008
3	14	64	50	80	1994	50	1975	42	50	53	1993	30	1977	0.082	47	1.00	1975	0.00	50	0.0	2008	0.0	50	0.	2008
3	15	65	50	79	2007	47	1971	43	50	52	1994	32	1969	0.052	47	0.62	1986	0.00	50	0.0	2008	0.0	50	0.	2008
3	16	65	50	78	2007	53	1986	43	50	55	1998	34	1957	0.104	47	1.07	1977	0.00	50	0.0	2008	0.0	50	0.	2008
3	17	65	50	82	1972	53	1979	44	50	56	1993	32	1963	0.058	47	0.60	1993	0.00	50	0.0	2008	0.0	50	0.	2008
3	18	67	50	81	1964	54	1991	44	50	53	1998	32	1963	0.028	47	0.32	2005	0.00	50	0.0	2008	0.0	50	0.	2008
3	19	67	51	78	1996	55	1991	44	51	53	1989	34	1963	0.033	47	0.36	1989	0.00	51	0.0	2008	0.0	51	0.	2008
3	20	67	51	80	1960	52	1973	43	51	53	1997	34	1963	0.028	47	0.60	1973	0.00	51	0.0	2008	0.0	51	0.	2008
3	21	67	51	81	1960	54	1973	43	49	54	1997	32	1964	0.076	47	0.68	2005	0.00	51	0.0	2008	0.0	51	0.	2008
3	22	67	51	78	1965	51	1973	44	50	54	1998	35	1975	0.090	47	1.06	2005	0.00	51	0.0	2008	0.0	51	0.	2008
3	23	67	51	78	2007	47	1964	44	51	53	1993	35	1994	0.075	47	0.78	1995	0.00	51	0.0	2008	0.0	51	0.	2008
3	24	66	51	79	1984	52	1995	43	51	56	1997	34	1957	0.060	47	0.53	1999	0.00	51	0.0	2008	0.0	51	0.	2008
3	25	67	51	80	1970	50	1983	45	51	55	1997	32	1964	0.057	47	0.80	1991	0.00	51	0.0	2008	0.0	51	0.	2008
3	26	67	51	83	1988	52	1974	44	51	53	1988	33	1964	0.048	47	0.64	1971	0.00	51	0.0	2008	0.0	51	0.	2008
3	27	67	51	88	1988	48	1991	45	51	54	1986	36	1968	0.078	47	0.66	1991	0.00	51	0.0	2008	0.0	51	0.	2008
3	28	67	51	80	2002	52	1985	45	51	54	2002	33	1972	0.066	47	0.95	1963	0.00	51	0.0	2008	0.0	51	0.	2008
3	29	68	51	81	1969	55	1967	45	50	57	1986	35	1972	0.014	47	0.21	2006	0.00	51	0.0	2008	0.0	51	0.	2008
3	30	69	51	83	1968	55	1982	44	51	54	1969	32	1975	0.025	47	0.46	1982	0.00	51	0.0	2008	0.0	51	0.	2008
3	31	69	51	83	1966	50	1967	44	51	56	1978	32	1982	0.055	47	1.10	1982	0.00	51	0.0	2008	0.0	51	0.	2008
4	1	68	51	87	1966	45	1982	45	51	56	2000	30	1967	0.046	51	0.81	1958	0.00	52	0.0	2008	0.0	51	0.	2008
4	2	68	51	85	1966	52	1982	45	51	57	2000	29	1982	0.038	52	0.73	1996	0.00	52	0.0	2008	0.0	52	0.	2008
4	3	70	51	87	1966	54	1958	45	51	57	1957	34	1976	0.050	52	1.47	1958	0.00	52	0.0	2008	0.0	52	0.	2008
4	4	71	51	88	1961	57	1998	46	51	59	1961	35	1964	0.024	52	0.45	1958	0.00	52	0.0	2008	0.0	52	0.	2008
4	5	71	50	87	1960	53	1967	46	50	60	1961	35	1975	0.035	52	0.54	2006	0.00	52	0.0	2008	0.0	52	0.	2008
4	6	71	50	86	1957	50	1969	46	50	57	1989	34	1955	0.049	52	0.62	1958	0.00	52	0.0	2008	0.0	52	0.	2008
4	7	70	50	89	1960	53	1975	45	50	59	1989	35	1975	0.036	52	0.45	1963	0.00	52	0.0	2008	0.0	52	0.	2008
4	8	70	51	88	1989	54	1999	45	50	59	1989	37	1980	0.022	52	0.36	1999	0.00	52	0.0	2008	0.0	52	0.	2008
4	9	71	51	90	1989	55	1965	45	51	62	1989	35	1975	0.030	52	0.56	1965	0.00	52	0.0	2008	0.0	52	0.	2008
4	10	71	51	90	1989	52	1965	47	51	55	1970	34	1975	0.019	52	0.39	1965	0.00	52	0.0	2008	0.0	52	0.	2008
4	11	71	51	87	1988	55	1976	46	50	56	2002	35	1975	0.032	52	0.62	1982	0.00	52	0.0	2008	0.0	52	0.	2008
4	12	72	51	90	1988	51	1956	47	51	62	2000	33	1956	0.040	52	0.80	2003	0.00	52	0.0	2008	0.0	52	0.	2008
4	13	73	51	88	2008	56	1956	47	51	59	2002	35	1961	0.024	52	0.41	2006	0.00	52	0.0	2008	0.0	52	0.	2008
4	14	72	51	90	1990	51	1956	47	51	61	1962	38	1998	0.062	52	1.00	1963	0.00	52	0.0	2008	0.0	52	0.	2008
4	15	72	49	92	1985	55	1956	46	49	59	1984	34	1955	0.014	52	0.18	1998	0.00	52	0.0	2008	0.0	52	0.	2008
4	16	72	50	90	1964	55	1967	46	50	57	1977	32	1975	0.019	52	0.34	1978	0.00	52	0.0	2008	0.0	52	0.	2008
4	17	72	49	89	1966	58	1986	46	50	57	1999	34	1979	0.044	52	0.90	2000	0.00	52	0.0	2008	0.0	52	0.	2008
4	18	70	50	84	1977	55	1955	46	50	56	1990	36	1979	0.035	51	0.68	1957	0.00	52	0.0	2008	0.0	52	0.	2008
4	19	70	50	88	1962	54	1967	45	50	60	1992	28	1961	0.011	50	0.15	1974	0.00	52	0.0	2008	0.0	52	0.	2008
4	20	71	51	83	1992	55	1967	46	51	60	1999	34	1967	0.015	50	0.20	1955	0.00	52	0.0	2008	0.0	52	0.	2008
4	21	71	50	85	1986	51	1963	46	50	60	1997	35	1963	0.027	51	0.30	1963	0.00	52	0.0	2008	0.0	52	0.	2008
4	22	72	50	86	1987	56	1967	46	50	55	1976	35	1960	0.023	52	0.60	1967	0.00	52	0.0	2008	0.0	52	0.	2008
4	23	72	50	88	1962	58	1961	47	50	56	1990	36	1963	0.028	52	0.36	1961	0.00	52	0.0	2008	0.0	52	0.	2008
4	24	71	50	88	1981	55	1991	46	50	58	1976	32	1964	0.027	52	0.34	1983	0.00	52	0.0	2008	0.0	52	0.	2008

4	25	72	50	89	1966	60	1989	47	50	61	1965	33	1964	0.017	52	0.34	1983	0.00	52	0.0	2008	0.0	52	0.	2008
4	26	73	50	88	1973	56	1963	48	49	62	1965	37	1967	0.029	52	0.51	1963	0.00	52	0.0	2008	0.0	52	0.	2008
4	27	74	50	90	2008	58	1955	48	50	64	1968	37	1955	0.046	52	0.68	2005	0.00	52	0.0	2008	0.0	52	0.	2008
4	28	75	50	90	1965	57	1960	49	50	62	1990	34	1970	0.038	52	1.44	1983	0.00	52	0.0	2008	0.0	52	0.	2008
4	29	75	50	94	1981	61	2003	49	49	62	1996	37	1967	0.007	52	0.26	1983	0.00	52	0.0	2008	0.0	52	0.	2008
4	30	76	50	94	1981	62	1983	49	49	60	1996	37	1971	0.015	52	0.58	1983	0.00	52	0.0	2008	0.0	52	0.	2008
5	1	76	52	95	1996	62	1955	48	52	65	1993	36	1967	0.035	50	1.07	1977	0.00	52	0.0	2008	0.0	51	0.	2008
5	2	75	52	93	1996	60	1991	49	52	63	1993	39	1975	0.015	50	0.27	1971	0.00	52	0.0	2008	0.0	52	0.	2008
5	3	76	52	91	1966	59	1971	49	52	70	1990	39	1967	0.012	50	0.39	1971	0.00	52	0.0	2008	0.0	52	0.	2008
5	4	76	52	92	1992	59	1964	49	52	69	1989	35	1964	0.015	50	0.31	1956	0.00	52	0.0	2008	0.0	52	0.	2008
5	5	75	52	95	1992	62	1973	50	52	69	1989	35	1975	0.003	50	0.10	1986	0.00	52	0.0	2008	0.0	52	0.	2008
5	6	76	52	97	1990	59	1964	49	52	68	1989	38	1979	0.008	50	0.13	2000	0.00	52	0.0	2008	0.0	52	0.	2008
5	7	75	52	100	1987	57	2000	51	52	70	1987	36	1975	0.040	50	0.80	1994	0.00	52	0.0	2008	0.0	52	0.	2008
5	8	77	52	101	1987	58	1955	49	51	63	1987	36	1975	0.012	50	0.29	1955	0.00	52	0.0	2008	0.0	52	0.	2008
5	9	77	52	92	1984	54	1963	49	52	61	1987	36	1975	0.014	50	0.21	1963	0.00	52	0.0	2008	0.0	52	0.	2008
5	10	76	52	91	1987	61	1980	50	52	67	1992	42	1963	0.005	49	0.11	1966	0.00	52	0.0	2008	0.0	52	0.	2008
5	11	77	52	97	1987	60	1963	50	52	65	2006	41	1982	0.004	49	0.20	1963	0.00	52	0.0	2008	0.0	52	0.	2008
5	12	78	52	95	1987	59	1998	50	52	64	1999	35	1961	0.013	50	0.31	1998	0.00	52	0.0	2008	0.0	52	0.	2008
5	13	79	52	95	1996	58	1998	51	52	71	1987	42	1955	0.019	50	0.53	1998	0.00	52	0.0	2008	0.0	52	0.	2008
5	14	79	52	100	1976	59	1968	51	52	68	1987	36	1964	0.027	50	0.55	1995	0.00	52	0.0	2008	0.0	52	0.	2008
5	15	79	51	98	2008	62	1995	52	52	69	2008	38	1964	0.000	50	0.01	1995	0.00	52	0.0	2008	0.0	52	0.	2008
5	16	80	51	100	2008	67	1995	51	51	69	2008	37	1964	0.022	50	1.10	1996	0.00	52	0.0	2008	0.0	52	0.	2008
5	17	81	51	101	2008	61	1988	52	52	70	1997	41	1977	0.010	50	0.30	1988	0.00	52	0.0	2008	0.0	52	0.	2008
5	18	81	51	99	1997	62	1974	52	52	68	1997	38	1974	0.004	50	0.10	1991	0.00	52	0.0	2008	0.0	52	0.	2008
5	19	80	51	99	1997	63	1957	52	52	72	1997	40	1991	0.013	50	0.26	1977	0.00	52	0.0	2008	0.0	52	0.	2008
5	20	79	51	94	2000	63	2002	52	52	64	1984	42	1991	0.003	50	0.10	1957	0.00	52	0.0	2008	0.0	52	0.	2008
5	21	79	51	99	2000	55	1957	51	52	63	2000	42	1974	0.015	49	0.61	1957	0.00	52	0.0	2008	0.0	52	0.	2008
5	22	79	50	97	1955	66	1995	52	52	65	2000	44	1975	0.003	49	0.12	1996	0.00	52	0.0	2008	0.0	52	0.	2008
5	23	80	50	98	2000	68	1961	54	51	69	1984	47	1994	0.018	50	0.52	1958	0.00	52	0.0	2008	0.0	52	0.	2008
5	24	80	51	100	1982	60	1960	53	52	71	1982	42	1961	0.006	50	0.32	1997	0.00	52	0.0	2008	0.0	52	0.	2008
5	25	80	51	100	1982	67	1987	54	52	67	1982	42	1978	0.007	49	0.27	1993	0.00	52	0.0	2008	0.0	52	0.	2008
5	26	80	51	98	1979	67	1998	53	52	65	1984	42	1980	0.002	50	0.09	1977	0.00	52	0.0	2008	0.0	52	0.	2008
5	27	80	51	100	1974	66	1998	53	52	64	1975	41	1959	0.014	50	0.64	1990	0.00	52	0.0	2008	0.0	52	0.	2008
5	28	81	51	98	1984	60	1998	54	52	65	2000	43	1980	0.025	50	0.98	1990	0.00	52	0.0	2008	0.0	52	0.	2008
5	29	81	51	103	1984	58	1998	53	52	67	1997	43	1961	0.002	50	0.11	1998	0.00	52	0.0	2008	0.0	52	0.	2008
5	30	82	51	98	1978	65	1998	54	52	72	1997	41	1976	0.000	50	0.02	1990	0.00	52	0.0	2008	0.0	52	0.	2008
5	31	83	51	97	1984	70	1990	54	52	68	1978	44	1961	0.003	50	0.08	1993	0.00	52	0.0	2008	0.0	52	0.	2008
6	1	82	50	98	1970	65	1971	55	51	69	1970	42	1959	0.009	51	0.22	1985	0.00	51	0.0	2008	0.0	51	0.	2008
6	2	83	50	105	1960	62	1967	55	51	76	1960	42	1971	0.004	51	0.19	1967	0.00	51	0.0	2008	0.0	51	0.	2008
6	3	83	49	109	1960	61	1967	54	51	75	1960	44	1966	0.005	51	0.22	1967	0.00	51	0.0	2008	0.0	51	0.	2008
6	4	84	50	107	1960	67	1998	54	51	69	1955	35	1982	0.010	51	0.31	1997	0.00	51	0.0	2008	0.0	51	0.	2008
6	5	84	50	102	1981	69	1993	55	51	69	1981	41	1982	0.001	51	0.03	1993	0.00	51	0.0	2008	0.0	51	0.	2008
6	6	83	50	109	1978	66	1967	56	51	70	1981	46	1982	0.000	51	0.00	2008	0.00	51	0.0	2008	0.0	51	0.	2008
6	7	82	50	98	1996	67	1967	55	51	67	1977	44	1959	0.012	51	0.44	1988	0.00	51	0.0	2008	0.0	51	0.	2008
6	8	83	50	102	1955	67	1988	55	51	69	1990	44	1982	0.003	51	0.09	2005	0.00	51	0.0	2008	0.0	51	0.	2008
6	9	84	50	105	1973	58	1964	55	51	72	1996	45	1959	0.020	51	0.78	1964	0.00	51	0.0	2008	0.0	51	0.	2008
6	10	84	50	98	1994	63	1964	56	51	75	1994	46	1972	0.002	51	0.12	1972	0.00	51	0.0	2008	0.0	51	0.	2008

6	11	83	50	102	1994	70	1972	55	51	70	1985	45	1956	0.001	51	0.03	1963	0.00	51	0.0	2008	0.0	51	0.	2008
6	12	83	50	98	1960	72	2006	55	51	70	2008	44	1962	0.000	51	0.00	2008	0.00	51	0.0	2008	0.0	51	0.	2008
6	13	85	50	99	2007	71	1967	56	51	71	2000	45	1968	0.004	51	0.22	1958	0.00	51	0.0	2008	0.0	51	0.	2008
6	14	85	50	102	1966	71	1973	56	51	80	2000	41	1973	0.000	51	0.00	2008	0.00	51	0.0	2008	0.0	51	0.	2008
6	15	86	50	110	1961	70	1962	57	51	76	2000	43	1973	0.004	51	0.15	1992	0.00	51	0.0	2008	0.0	51	0.	2008
6	16	87	50	114	1961	68	1995	57	51	72	1985	47	1975	0.012	51	0.58	1995	0.00	51	0.0	2008	0.0	51	0.	2008
6	17	87	50	117	1961	66	1995	56	51	73	1993	38	1979	0.000	51	0.01	2005	0.00	51	0.0	2008	0.0	51	0.	2008
6	18	87	50	110	1963	72	2005	56	50	68	1993	35	1979	0.000	51	0.00	2008	0.00	51	0.0	2008	0.0	51	0.	2008
6	19	87	50	102	1981	70	1995	57	51	79	1981	47	1955	0.001	51	0.07	1974	0.00	51	0.0	2008	0.0	51	0.	2008
6	20	88	49	109	1981	72	1975	57	50	74	2008	48	1956	0.000	51	0.00	2008	0.00	51	0.0	2008	0.0	51	0.	2008
6	21	88	49	104	1961	74	2002	58	50	79	2006	48	1979	0.000	51	0.00	2008	0.00	51	0.0	2008	0.0	51	0.	2008
6	22	90	49	110	1961	73	2002	58	50	75	1989	45	1975	0.000	51	0.00	2008	0.00	51	0.0	2008	0.0	51	0.	2008
6	23	90	49	104	1981	75	1963	58	50	70	1968	50	1974	0.000	51	0.00	2008	0.00	51	0.0	2008	0.0	51	0.	2008
6	24	89	49	105	1957	72	1972	58	50	77	1976	45	1972	0.001	51	0.03	1975	0.00	51	0.0	2008	0.0	51	0.	2008
6	25	89	49	107	1961	70	1975	58	50	75	1993	41	1975	0.000	51	0.00	2008	0.00	51	0.0	2008	0.0	51	0.	2008
6	26	89	50	105	1995	70	1965	57	50	68	1995	45	1965	0.000	51	0.00	2008	0.00	51	0.0	2008	0.0	51	0.	2008
6	27	89	50	105	1993	71	1955	56	49	71	1993	46	1964	0.000	51	0.00	2008	0.00	51	0.0	2008	0.0	51	0.	2008
6	28	89	50	104	1976	73	1996	57	50	64	2002	47	1982	0.000	51	0.00	2008	0.00	51	0.0	2008	0.0	51	0.	2008
6	29	88	50	105	1976	72	1989	57	50	70	1993	48	1971	0.000	51	0.00	2008	0.00	51	0.0	2008	0.0	51	0.	2008
6	30	88	49	103	1999	72	1982	56	50	69	1993	45	1962	0.001	51	0.07	1992	0.00	51	0.0	2008	0.0	51	0.	2008
7	1	89	51	103	1972	72	1965	56	52	73	1993	42	1976	0.000	52	0.00	2008	0.00	52	0.0	2008	0.0	51	0.	2008
7	2	89	51	104	1961	73	1978	57	52	70	1993	48	1957	0.008	52	0.40	1980	0.00	52	0.0	2008	0.0	52	0.	2008
7	3	89	51	109	1991	63	1977	57	52	68	2008	46	1963	0.001	52	0.06	1980	0.00	52	0.0	2008	0.0	52	0.	2008
7	4	89	51	104	1991	66	1977	57	52	68	1970	47	1975	0.000	52	0.00	2008	0.00	52	0.0	2008	0.0	52	0.	2008
7	5	90	51	106	1991	74	1975	57	52	70	1973	41	1961	0.000	52	0.00	2008	0.00	52	0.0	2008	0.0	52	0.	2008
7	6	90	51	106	2007	78	1955	57	52	69	1957	49	1964	0.000	52	0.00	2008	0.00	52	0.0	2008	0.0	52	0.	2008
7	7	90	51	106	2007	79	1986	56	52	72	1989	45	1983	0.000	52	0.00	2008	0.00	52	0.0	2008	0.0	52	0.	2008
7	8	90	51	107	2008	77	1983	57	52	77	1989	44	1983	0.001	52	0.06	1974	0.00	52	0.0	2008	0.0	52	0.	2008
7	9	91	51	109	2008	70	1974	58	52	71	2008	47	1964	0.001	52	0.03	1974	0.00	52	0.0	2008	0.0	52	0.	2008
7	10	91	51	106	2002	74	1974	57	52	74	1985	49	1980	0.000	52	0.00	2008	0.00	52	0.0	2008	0.0	52	0.	2008
7	11	92	51	110	1961	74	1974	58	52	72	1961	48	1960	0.000	52	0.00	2008	0.00	52	0.0	2008	0.0	52	0.	2008
7	12	92	51	109	1961	78	1966	58	52	73	1999	49	1965	0.000	52	0.00	2008	0.00	52	0.0	2008	0.0	52	0.	2008
7	13	92	51	107	1990	76	1978	59	52	71	1999	48	1956	0.000	52	0.00	2008	0.00	52	0.0	2008	0.0	52	0.	2008
7	14	93	51	107	1984	82	1966	59	52	70	1984	50	1975	0.000	52	0.00	2008	0.00	52	0.0	2008	0.0	52	0.	2008
7	15	92	51	110	1972	80	1958	58	52	72	1984	48	1966	0.001	52	0.05	1975	0.00	52	0.0	2008	0.0	52	0.	2008
7	16	91	51	103	1984	70	1975	58	52	70	1984	50	1966	0.002	52	0.12	1975	0.00	52	0.0	2008	0.0	52	0.	2008
7	17	91	51	104	2006	76	1958	59	52	69	1988	49	1966	0.000	52	0.00	2008	0.00	52	0.0	2008	0.0	52	0.	2008
7	18	91	50	109	1988	73	1987	58	52	70	1989	50	1967	0.001	52	0.03	1965	0.00	52	0.0	2008	0.0	52	0.	2008
7	19	91	51	108	1961	75	1999	58	52	74	1961	49	1983	0.000	52	0.01	1956	0.00	52	0.0	2008	0.0	52	0.	2008
7	20	91	51	106	1961	75	1999	58	52	74	1961	48	1963	0.000	52	0.00	2008	0.00	52	0.0	2008	0.0	52	0.	2008
7	21	91	51	108	1960	75	1972	58	52	76	2006	48	1982	0.001	52	0.03	1979	0.00	52	0.0	2008	0.0	52	0.	2008
7	22	92	51	108	2006	74	1979	58	52	75	2006	49	1972	0.002	52	0.08	1979	0.00	52	0.0	2008	0.0	52	0.	2008
7	23	92	51	110	2006	77	1999	58	52	72	2006	48	1963	0.000	52	0.02	1986	0.00	52	0.0	2008	0.0	52	0.	2008
7	24	91	51	110	2006	79	1994	58	52	76	1993	51	1983	0.000	52	0.00	2008	0.00	52	0.0	2008	0.0	52	0.	2008
7	25	92	51	105	2006	81	1969	57	52	68	1974	46	1983	0.000	52	0.00	2008	0.00	52	0.0	2008	0.0	52	0.	2008
7	26	93	52	108	1975	78	1965	57	52	68	1988	48	1982	0.000	52	0.00	2008	0.00	52	0.0	2008	0.0	52	0.	2008
7	27	92	52	106	1973	79	1965	57	52	66	1988	48	1972	0.000	52	0.00	2008	0.00	52	0.0	2008	0.0	52	0.	2008

7	28	92	52	100	1995	80	1999	58	52	69	1980	50	1969	0.000	52	0.00	2008	0.00	52	0.0	2008	0.0	52	0.	2008
7	29	91	52	101	1996	79	1986	57	52	67	1996	48	1978	0.000	52	0.00	2008	0.00	52	0.0	2008	0.0	52	0.	2008
7	30	91	52	103	1977	74	1985	57	52	65	1996	42	1972	0.001	52	0.03	1960	0.00	52	0.0	2008	0.0	52	0.	2008
7	31	91	52	108	1977	72	1966	58	52	69	1980	49	1981	0.004	52	0.20	1966	0.00	52	0.0	2008	0.0	52	0.	2008
8	1	92	52	104	1996	77	1976	58	52	69	2000	46	1959	0.000	53	0.00	2008	0.00	53	0.0	2008	0.0	53	0.	2008
8	2	92	51	103	1995	78	2004	57	52	67	2000	46	1959	0.000	53	0.00	2008	0.00	53	0.0	2008	0.0	53	0.	2008
8	3	92	52	103	1987	75	2002	57	52	67	1998	49	1963	0.000	53	0.00	2008	0.00	53	0.0	2008	0.0	53	0.	2008
8	4	91	52	106	1998	78	1976	57	52	71	1998	48	1963	0.000	53	0.00	2008	0.00	53	0.0	2008	0.0	53	0.	2008
8	5	91	52	109	1998	78	1962	56	52	68	1998	49	1979	0.000	53	0.00	2008	0.00	53	0.0	2008	0.0	53	0.	2008
8	6	91	52	104	1997	76	2007	57	52	70	1990	43	1958	0.000	53	0.00	2008	0.00	53	0.0	2008	0.0	53	0.	2008
8	7	92	52	104	1997	77	1962	59	52	69	1982	51	1975	0.000	53	0.00	2008	0.00	53	0.0	2008	0.0	53	0.	2008
8	8	92	52	106	1981	78	1962	58	52	69	1990	48	1979	0.001	53	0.04	1989	0.00	53	0.0	2008	0.0	53	0.	2008
8	9	92	52	104	1990	75	1963	58	52	73	1990	47	1980	0.001	53	0.05	1962	0.00	53	0.0	2008	0.0	53	0.	2008
8	10	93	52	105	1990	78	1999	58	52	69	1965	50	1960	0.000	53	0.00	2008	0.00	53	0.0	2008	0.0	53	0.	2008
8	11	92	51	106	1996	78	1999	57	52	66	1990	51	1989	0.000	53	0.00	2008	0.00	53	0.0	2008	0.0	53	0.	2008
8	12	91	51	106	1996	79	1965	57	52	68	1998	49	1957	0.005	53	0.28	1965	0.00	53	0.0	2008	0.0	53	0.	2008
8	13	91	51	103	1998	77	1988	57	52	69	1984	50	1974	0.001	53	0.03	1991	0.00	53	0.0	2008	0.0	53	0.	2008
8	14	90	51	105	1996	70	1968	57	52	70	1996	48	1955	0.001	53	0.05	1976	0.00	53	0.0	2008	0.0	53	0.	2008
8	15	89	52	104	1996	73	1976	57	52	67	1992	48	1955	0.003	53	0.16	1976	0.00	53	0.0	2008	0.0	53	0.	2008
8	16	89	51	101	1983	74	1976	56	51	67	1992	45	1955	0.000	53	0.00	2008	0.00	53	0.0	2008	0.0	53	0.	2008
8	17	90	51	101	1992	75	1976	57	51	66	1966	46	1955	0.000	53	0.00	2008	0.00	53	0.0	2008	0.0	53	0.	2008
8	18	89	52	101	1967	75	1985	56	52	66	1990	48	1957	0.004	53	0.17	1976	0.00	53	0.0	2008	0.0	53	0.	2008
8	19	88	51	100	1984	69	1976	56	51	65	1967	47	1955	0.005	53	0.23	1976	0.00	53	0.0	2008	0.0	53	0.	2008
8	20	88	52	104	1992	72	1959	57	52	66	2008	49	1970	0.001	53	0.04	1983	0.00	53	0.0	2008	0.0	53	0.	2008
8	21	89	52	101	1992	75	1959	56	52	71	1992	45	1959	0.007	53	0.35	2003	0.00	53	0.0	2008	0.0	53	0.	2008
8	22	88	52	100	1999	74	1968	56	52	64	2000	47	1959	0.011	53	0.45	1968	0.00	53	0.0	2008	0.0	53	0.	2008
8	23	89	52	98	1982	78	1976	56	52	64	1999	47	1970	0.000	53	0.00	2008	0.00	53	0.0	2008	0.0	53	0.	2008
8	24	89	52	100	1974	76	1963	56	52	65	1989	50	1980	0.000	53	0.00	2008	0.00	53	0.0	2008	0.0	53	0.	2008
8	25	89	51	102	1999	76	1990	57	52	67	1993	47	1963	0.000	53	0.00	2008	0.00	53	0.0	2008	0.0	53	0.	2008
8	26	88	52	103	1988	76	1990	56	52	69	1988	45	1955	0.000	53	0.00	2008	0.00	53	0.0	2008	0.0	53	0.	2008
8	27	88	52	104	1988	76	1975	57	52	69	1999	46	1970	0.000	53	0.00	2008	0.00	53	0.0	2008	0.0	53	0.	2008
8	28	89	52	103	1981	75	1975	57	52	70	2007	45	1955	0.000	53	0.00	2008	0.00	53	0.0	2008	0.0	53	0.	2008
8	29	90	52	105	2008	81	2000	57	52	69	1990	44	1955	0.000	53	0.00	2008	0.00	53	0.0	2008	0.0	53	0.	2008
8	30	89	51	103	2007	72	2000	57	52	71	2007	45	1957	0.000	53	0.00	2008	0.00	53	0.0	2008	0.0	53	0.	2008
8	31	88	51	102	1976	73	1966	56	52	66	2007	45	1960	0.004	53	0.15	1964	0.00	53	0.0	2008	0.0	52	0.	2008
9	1	89	54	104	1955	68	2000	57	53	70	1985	48	1970	0.001	54	0.08	2000	0.00	54	0.0	2008	0.0	53	0.	2008
9	2	90	54	108	1955	71	2000	56	53	66	1993	47	1959	0.000	54	0.00	2008	0.00	54	0.0	2008	0.0	54	0.	2008
9	3	90	54	108	1955	76	2000	56	53	68	2004	47	1970	0.000	54	0.00	2008	0.00	54	0.0	2008	0.0	54	0.	2008
9	4	89	54	109	1955	75	2000	56	53	65	2007	46	1960	0.000	54	0.00	2008	0.00	54	0.0	2008	0.0	54	0.	2008
9	5	90	54	106	1988	79	1970	57	53	68	2008	46	1964	0.001	54	0.05	1970	0.00	54	0.0	2008	0.0	54	0.	2008
9	6	90	54	107	1988	73	1978	57	54	70	1998	48	1973	0.001	54	0.04	1978	0.00	54	0.0	2008	0.0	54	0.	2008
9	7	89	54	103	1958	69	1965	57	54	69	1998	48	1978	0.000	54	0.00	2008	0.00	54	0.0	2008	0.0	54	0.	2008
9	8	88	54	108	1957	74	1985	56	54	69	1984	48	1965	0.000	54	0.01	1958	0.00	54	0.0	2008	0.0	54	0.	2008
9	9	88	54	102	1984	72	1985	56	54	64	1997	45	1964	0.005	54	0.16	1985	0.00	54	0.0	2008	0.0	54	0.	2008
9	10	87	54	103	1984	69	1978	55	54	66	1976	47	1964	0.000	54	0.01	1978	0.00	54	0.0	2008	0.0	54	0.	2008
9	11	86	54	100	1960	73	1985	56	54	64	1997	46	1962	0.000	54	0.00	2008	0.00	54	0.0	2008	0.0	54	0.	2008
9	12	86	54	99	2006	72	1976	56	54	67	1988	45	1972	0.001	54	0.04	1976	0.00	54	0.0	2008	0.0	54	0.	2008

9	13	87	54	105	1979	75	1986	55	54	71	2000	43	1970	0.002	54	0.10	1963	0.00	54	0.0	2008	0.0	54	0. 2008
9	14	85	54	104	1971	72	1980	54	54	63	2000	41	1980	0.000	54	0.00	2008	0.00	54	0.0	2008	0.0	54	0. 2008
9	15	85	54	100	1983	71	1980	55	54	69	1971	43	1970	0.000	54	0.02	1955	0.00	54	0.0	2008	0.0	54	0. 2008
9	16	85	54	103	1979	69	1982	54	54	64	1989	46	1970	0.005	54	0.15	1982	0.00	54	0.0	2008	0.0	54	0. 2008
9	17	84	54	102	1979	62	1977	56	54	66	2002	44	1972	0.014	54	0.42	1989	0.00	54	0.0	2008	0.0	54	0. 2008
9	18	84	54	98	2000	68	1989	56	54	71	2000	44	1965	0.015	54	0.50	1959	0.00	54	0.0	2008	0.0	54	0. 2008
9	19	84	54	101	2000	66	1959	54	54	69	1984	43	1965	0.056	54	1.25	1959	0.00	54	0.0	2008	0.0	54	0. 2008
9	20	84	54	100	1958	70	1986	55	54	67	1983	43	1965	0.001	54	0.07	1977	0.00	54	0.0	2008	0.0	54	0. 2008
9	21	85	54	98	1990	72	2007	54	54	68	1983	43	1960	0.000	54	0.00	2008	0.00	54	0.0	2008	0.0	54	0. 2008
9	22	86	54	103	2003	73	2000	54	54	65	1983	47	1965	0.003	54	0.16	1999	0.00	54	0.0	2008	0.0	54	0. 2008
9	23	85	54	95	1957	71	2007	54	54	64	1989	44	1960	0.001	54	0.05	1973	0.00	54	0.0	2008	0.0	54	0. 2008
9	24	85	54	99	1964	71	2007	54	53	64	1997	46	1977	0.014	53	0.42	1982	0.00	54	0.0	2008	0.0	54	0. 2008
9	25	85	54	99	1975	71	1986	55	54	65	1992	44	1972	0.005	54	0.22	1982	0.00	54	0.0	2008	0.0	54	0. 2008
9	26	84	54	97	1978	68	1998	54	54	66	1999	43	1955	0.009	54	0.31	1982	0.00	54	0.0	2008	0.0	54	0. 2008
9	27	84	54	97	1963	63	1998	55	54	70	1999	45	1955	0.016	54	0.34	1998	0.00	54	0.0	2008	0.0	54	0. 2008
9	28	83	54	97	1968	67	1965	54	53	68	1999	44	1964	0.002	54	0.04	1961	0.00	54	0.0	2008	0.0	54	0. 2008
9	29	83	54	98	1966	70	1976	54	54	66	1999	42	1955	0.025	54	0.85	1976	0.00	54	0.0	2008	0.0	54	0. 2008
9	30	84	54	102	1966	67	1971	54	54	64	1999	44	1959	0.012	54	0.63	1983	0.00	54	0.0	2008	0.0	54	0. 2008
10	1	83	54	99	2001	68	1971	54	53	62	1992	40	1971	0.001	54	0.05	1983	0.00	54	0.0	2008	0.0	54	0. 2008
10	2	83	54	98	1980	62	2004	53	53	62	1974	41	1971	0.009	54	0.48	1976	0.00	54	0.0	2008	0.0	54	0. 2008
10	3	82	54	100	1980	68	1989	53	54	67	1990	43	1973	0.006	54	0.24	1981	0.00	54	0.0	2008	0.0	54	0. 2008
10	4	82	54	101	1980	70	1981	53	54	68	1985	42	1973	0.000	54	0.01	1972	0.00	54	0.0	2008	0.0	54	0. 2008
10	5	82	54	102	1964	69	2007	53	53	66	1987	37	1969	0.010	54	0.42	1994	0.00	54	0.0	2008	0.0	54	0. 2008
10	6	81	53	97	1987	67	1993	52	53	67	1987	40	1969	0.001	54	0.03	1975	0.00	54	0.0	2008	0.0	54	0. 2008
10	7	82	54	98	1964	71	1957	53	53	64	1992	41	1969	0.015	54	0.70	1973	0.00	54	0.0	2008	0.0	54	0. 2008
10	8	81	54	97	1964	58	1973	52	53	63	1996	40	1964	0.008	54	0.43	1973	0.00	54	0.0	2008	0.0	54	0. 2008
10	9	80	54	97	1996	60	1973	53	53	65	1996	41	1968	0.010	54	0.39	1997	0.00	54	0.0	2008	0.0	54	0. 2008
10	10	80	54	94	1992	64	2000	52	54	67	1991	40	1968	0.026	54	0.43	1957	0.00	54	0.0	2008	0.0	54	0. 2008
10	11	79	53	96	1991	62	2000	51	53	67	1991	43	1985	0.046	54	0.71	1972	0.00	54	0.0	2008	0.0	54	0. 2008
10	12	79	54	96	1991	64	2000	51	53	61	1991	42	1960	0.011	54	0.30	1972	0.00	54	0.0	2008	0.0	54	0. 2008
10	13	79	54	96	1991	58	2007	52	52	64	1990	43	1981	0.070	53	3.03	1962	0.00	54	0.0	2008	0.0	54	0. 2008
10	14	79	53	92	1978	65	1968	51	53	60	1994	40	1968	0.049	54	1.46	1962	0.00	54	0.0	2008	0.0	54	0. 2008
10	15	78	53	93	1991	62	1972	50	53	61	1999	38	1966	0.023	53	0.64	1972	0.00	54	0.0	2008	0.0	54	0. 2008
10	16	77	53	95	1961	58	1969	50	53	64	1999	41	1970	0.040	54	1.22	1972	0.00	54	0.0	2008	0.0	54	0. 2008
10	17	77	53	96	1961	58	1984	49	53	61	1999	36	1971	0.021	54	0.76	1984	0.00	54	0.0	2008	0.0	54	0. 2008
10	18	78	53	93	1961	62	1971	49	53	58	1989	35	1971	0.005	54	0.21	1969	0.00	54	0.0	2008	0.0	54	0. 2008
10	19	77	53	88	1991	64	1984	49	53	59	1995	36	1971	0.038	54	1.75	2004	0.00	54	0.0	2008	0.0	54	0. 2008
10	20	76	53	90	1991	60	2004	48	52	61	2003	39	1971	0.001	53	0.05	1970	0.00	54	0.0	2008	0.0	54	0. 2008
10	21	76	54	91	1991	62	2004	49	54	62	1991	39	1971	0.008	53	0.36	1985	0.00	54	0.0	2008	0.0	54	0. 2008
10	22	75	54	87	2003	55	1985	49	54	59	1987	38	1971	0.010	54	0.25	1989	0.00	54	0.0	2008	0.0	54	0. 2008
10	23	76	54	88	1964	63	1972	49	53	61	1987	36	1961	0.021	54	0.65	1973	0.00	54	0.0	2008	0.0	54	0. 2008
10	24	74	54	88	1965	59	2004	49	54	60	1982	38	1956	0.032	54	0.75	2004	0.00	54	0.0	2008	0.0	54	0. 2008
10	25	75	54	90	1965	64	1970	49	54	62	1982	38	1975	0.021	54	0.58	1998	0.00	54	0.0	2008	0.0	54	0. 2008
10	26	74	54	87	2003	60	2000	49	54	58	1993	33	1971	0.044	53	1.29	1991	0.00	54	0.0	2008	0.0	54	0. 2008
10	27	73	54	89	1993	60	1962	48	54	62	1987	35	1971	0.006	54	0.14	1956	0.00	54	0.0	2008	0.0	54	0. 2008
10	28	72	54	88	2003	60	1962	48	54	61	1987	36	1976	0.026	54	0.37	1987	0.00	54	0.0	2008	0.0	54	0. 2008
10	29	72	53	90	2003	55	1971	48	54	59	1987	35	1975	0.034	53	1.03	1964	0.00	54	0.0	2008	0.0	54	0. 2008

10	30	70	54	82	1965	54	1996	46	54	57	1983	28	1971	0.041	54	0.60	1996	0.00	54	0.0	2008	0.0	54	0.	2008
10	31	70	54	83	1965	57	1996	46	54	61	1997	32	1972	0.015	54	0.31	1974	0.00	54	0.0	2008	0.0	54	0.	2008
11	1	71	52	84	1967	59	2003	45	52	60	1997	33	1975	0.017	52	0.62	2008	0.00	52	0.0	2008	0.0	52	0.	2008
11	2	71	52	85	1967	57	1956	46	52	63	1992	35	1959	0.013	52	0.30	1964	0.00	52	0.0	2008	0.0	52	0.	2008
11	3	70	52	84	1967	57	2003	46	52	61	1992	32	1971	0.039	52	0.92	1968	0.00	52	0.0	2008	0.0	52	0.	2008
11	4	69	52	82	1967	57	2004	46	52	60	1997	34	1971	0.024	52	0.56	1979	0.00	52	0.0	2008	0.0	52	0.	2008
11	5	70	52	80	1976	50	1996	46	52	55	1967	35	1971	0.023	52	0.35	1994	0.00	52	0.0	2008	0.0	52	0.	2008
11	6	69	52	80	1958	52	1994	46	52	56	2006	32	1957	0.098	52	2.00	1994	0.00	52	0.0	2008	0.0	52	0.	2008
11	7	69	52	80	2006	54	1966	46	52	55	2006	33	1957	0.063	52	1.76	2002	0.00	52	0.0	2008	0.0	52	0.	2008
11	8	69	52	80	1958	57	1964	46	52	59	2006	32	1959	0.040	52	1.06	1984	0.00	52	0.0	2008	0.0	52	0.	2008
11	9	68	52	83	1955	58	2005	45	52	56	2005	32	1959	0.019	52	0.35	1964	0.00	52	0.0	2008	0.0	52	0.	2008
11	10	67	52	82	1976	48	1982	46	52	54	1988	32	1959	0.073	52	0.96	1982	0.00	52	0.0	2008	0.0	52	0.	2008
11	11	66	52	83	1955	53	1994	45	52	59	1973	32	1959	0.100	52	1.20	1983	0.00	52	0.0	2008	0.0	52	0.	2008
11	12	65	52	77	1956	48	1982	45	52	56	2008	32	1978	0.038	52	0.71	1973	0.00	52	0.0	2008	0.0	52	0.	2008
11	13	65	52	78	1956	52	1982	44	52	56	2008	28	1985	0.086	52	0.92	1984	0.00	52	0.0	2008	0.0	52	0.	2008
11	14	64	52	80	1995	47	1955	44	52	57	2005	30	1985	0.106	52	2.01	1981	0.00	52	0.0	2008	0.0	52	0.	2008
11	15	63	52	76	1995	46	1982	43	52	56	1976	28	1978	0.031	52	0.64	1968	0.00	52	0.0	2008	0.0	52	0.	2008
11	16	63	52	78	2008	45	1982	44	52	57	2006	30	1978	0.057	52	0.88	1972	0.00	52	0.0	2008	0.0	52	0.	2008
11	17	63	52	75	1977	46	1982	44	52	55	1983	24	1958	0.108	52	2.34	1996	0.00	52	0.0	2008	0.0	52	0.	2008
11	18	63	52	75	2005	53	1982	43	52	54	1965	29	1958	0.049	52	0.90	1982	0.00	52	0.0	2008	0.0	52	0.	2008
11	19	63	52	73	2005	52	1994	43	52	54	1996	26	1964	0.017	52	0.50	1982	0.00	52	0.0	2008	0.0	52	0.	2008
11	20	62	52	74	1989	51	1963	41	52	52	1966	27	1964	0.064	52	1.06	1963	0.00	52	0.0	2008	0.0	52	0.	2008
11	21	61	52	73	1989	51	1985	41	52	54	1986	27	1979	0.039	52	0.84	1978	0.00	52	0.0	2008	0.0	52	0.	2008
11	22	61	52	71	1962	51	1972	41	52	55	1996	28	1956	0.052	52	0.53	1977	0.00	52	0.0	2008	0.0	52	0.	2008
11	23	61	52	80	1959	48	1983	40	52	55	1998	29	1956	0.034	52	0.59	1988	0.00	52	0.0	2008	0.0	52	0.	2008
11	24	61	51	72	1986	49	1955	40	52	51	1981	31	1975	0.053	52	1.03	1985	0.00	52	0.0	2008	0.0	52	0.	2008
11	25	60	52	75	1959	46	2000	40	52	53	1986	30	1993	0.029	52	0.47	1983	0.00	52	0.0	2008	0.0	52	0.	2008
11	26	61	52	78	1995	49	2000	40	52	49	2008	30	1956	0.073	52	1.09	1997	0.00	52	0.0	2008	0.0	52	0.	2008
11	27	60	52	74	1957	46	1963	39	51	53	1995	30	1969	0.043	52	1.21	1970	0.00	52	0.0	2008	0.0	52	0.	2008
11	28	59	50	73	1958	47	2000	39	52	52	2008	30	1976	0.074	52	2.00	1970	0.00	52	0.0	2008	0.0	52	0.	2008
11	29	59	50	71	1977	49	2004	38	52	48	2003	28	1976	0.036	52	0.37	1966	0.00	52	0.0	2008	0.0	52	0.	2008
11	30	58	49	70	1995	48	1963	39	50	53	1966	29	1976	0.081	52	1.10	1982	0.00	52	0.0	2008	0.0	52	0.	2008
12	1	60	51	75	1977	44	1963	40	53	50	1995	28	1976	0.067	51	0.93	1973	0.00	52	0.0	2007	0.0	51	0.	2007
12	2	60	51	73	1995	44	1963	39	53	51	1966	28	1969	0.047	51	0.53	1985	0.00	52	0.0	2007	0.0	52	0.	2007
12	3	58	51	70	1958	43	1963	39	53	52	1987	28	1957	0.058	51	0.59	1974	0.00	52	0.0	2007	0.0	52	0.	2007
12	4	58	51	70	1958	40	1963	38	52	52	1995	29	1990	0.029	51	0.36	1967	0.00	52	0.0	2007	0.0	52	0.	2007
12	5	57	51	74	1958	40	1963	39	53	54	1995	25	1972	0.058	51	0.56	1987	0.00	52	0.0	2007	0.0	52	0.	2007
12	6	58	51	72	1979	40	1963	39	53	51	2003	29	1972	0.110	51	1.88	2007	0.00	52	0.0	2007	0.0	52	0.	2007
12	7	57	51	70	1989	42	1963	38	53	53	1995	28	1972	0.052	51	1.01	2004	0.00	52	0.0	2007	0.0	52	0.	2007
12	8	57	52	67	2006	41	1965	38	53	50	1970	26	1972	0.027	51	0.58	1997	0.00	52	0.0	2007	0.0	52	0.	2007
12	9	56	52	68	1988	40	1965	38	53	50	1993	20	1972	0.057	51	0.70	1955	0.00	52	0.0	2007	0.0	52	0.	2007
12	10	56	52	67	2006	44	1965	37	53	52	1996	19	1972	0.047	51	0.50	1999	0.00	52	0.0	2007	0.0	52	0.	2007
12	11	56	52	66	1987	43	1957	37	53	50	1995	18	1972	0.059	51	0.96	1990	0.00	52	0.0	2007	0.0	52	0.	2007
12	12	56	52	73	1958	41	1957	37	53	51	1995	18	1972	0.077	51	2.18	1995	0.00	52	0.0	2007	0.0	52	0.	2007
12	13	55	52	74	1958	40	1957	37	53	53	1996	22	1972	0.033	51	0.58	1995	0.00	52	0.0	2007	0.0	52	0.	2007
12	14	54	52	68	1988	42	1970	37	53	50	1983	23	1972	0.105	51	1.60	2002	0.00	52	0.0	2007	0.0	52	0.	2007
12	15	54	52	65	1983	38	1963	37	53	53	1983	23	1975	0.045	51	0.85	1957	0.00	52	0.0	2007	0.0	52	0.	2007

12	16	55	52	68	1976	39	1963	36	53	53	1962	22	1967	0.073	51	1.55	2002	0.00	52	0.0	2007	0.0	52	0.	2007
12	17	53	52	70	1958	38	1963	36	53	52	1962	24	1967	0.082	51	0.70	2005	0.00	52	0.0	2007	0.0	52	0.	2007
12	18	54	52	70	1958	36	1963	36	53	51	1962	24	1965	0.052	51	0.58	2005	0.00	52	0.0	2007	0.0	52	0.	2007
12	19	54	52	67	1999	38	1963	37	51	49	1955	27	1989	0.059	51	0.79	1955	0.00	52	0.0	2007	0.0	52	0.	2007
12	20	53	53	67	1999	38	1985	37	53	52	1955	23	1965	0.097	51	1.79	1969	0.00	52	0.0	2007	0.0	52	0.	2007
12	21	52	52	66	1969	34	1965	37	53	54	1969	21	1965	0.062	51	0.62	1996	0.00	52	0.0	2007	0.0	52	0.	2007
12	22	53	52	67	1999	35	1965	37	51	55	1964	20	1990	0.110	51	1.20	1982	0.00	52	0.0	2007	0.0	52	0.	2007
12	23	53	52	66	1964	36	1978	36	51	58	1955	20	1990	0.104	51	1.64	1955	0.00	52	0.0	2007	0.0	52	0.	2007
12	24	52	52	67	1964	38	1990	37	51	58	1964	25	1998	0.090	51	1.27	1979	0.00	52	0.0	2007	0.0	52	0.	2007
12	25	52	51	69	1964	38	1992	36	50	52	2005	22	1990	0.086	51	0.93	1971	0.00	51	0.0	2007	0.0	52	0.	2007
12	26	51	52	65	1967	35	1993	37	51	53	1964	24	1956	0.035	51	0.70	1955	0.00	52	0.0	2007	0.0	52	0.	2007
12	27	52	52	68	2006	35	1992	36	52	49	1983	24	1962	0.088	51	0.94	2004	0.00	52	0.0	2007	0.0	52	0.	2007
12	28	53	52	69	1967	37	1985	37	52	51	2005	24	1976	0.132	51	2.20	2005	0.00	52	0.0	2007	0.0	52	0.	2007
12	29	53	52	71	1967	40	1988	37	51	49	1977	24	1960	0.085	51	0.87	1965	0.00	52	0.0	2007	0.0	52	0.	2007
12	30	53	52	66	1967	41	1961	36	51	53	1996	24	1962	0.113	51	1.51	2005	0.00	52	0.0	2007	0.0	52	0.	2007
12	31	53	52	64	2007	39	1961	37	51	54	1996	21	1978	0.064	51	0.97	2004	0.00	52	0.0	2007	0.0	52	0.	2007

Western Regional Climate Center, wrcc@dri.edu

San Francisco Bay Area Air Basin

Ozone Air Quality Trend

Ozone concentrations in the San Francisco Bay Area are much lower than in the South Coast and San Joaquin Valley Air Basins. The peak 1-hour and 8-hour indicators have declined by nearly 18 percent during the last 20 years. The number of days when State and national standards are exceeded show a similar trend. Although the long-term trends indicate improving air quality, since 2000 the peak indicators have been relatively flat. This may be attributable to changes in the mix and reactivity of precursor emissions in the San Francisco Bay. Continuing implementation of the aggressive emissions control measures will ensure continued progress throughout the Basin.

Meteorology can cause ozone and ozone precursor emissions to be transported from one air basin to another. The ARB has identified the San Francisco Bay Area Air Basin as a transport contributor to the following six areas: the Sacramento region, the Mountain Counties Air Basin, the North Central Coast Air Basin, the North Coast Air Basin, the San Joaquin Valley Air Basin, and the South Central Coast Air Basin. The amount of transport impact varies from day to day, depending in large part on meteorology. To the extent that the Bay Area continues to reduce ozone precursor emissions, the transport impact on downwind areas should also decrease.

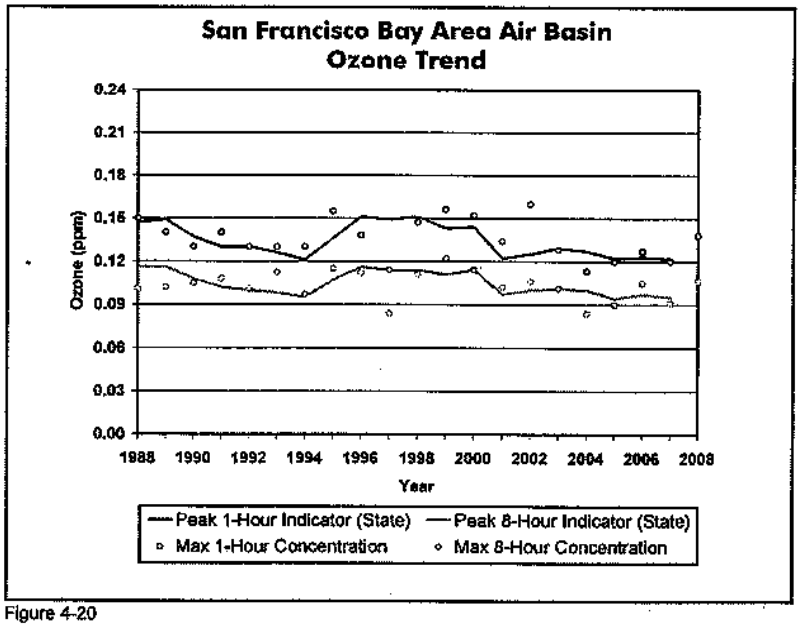


Figure 4-20

OZONE (ppm)	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008[1]
Avg. of 4th High 8-Hr. in 3 Yrs (Nat)	0.092	0.097	0.088	0.084	0.082	0.081	0.082	0.087	0.093	0.090	0.089	0.086	0.087	0.082	0.082	0.086	0.084	0.078	0.080	0.077	
4th High 1-Hr. in 3 Yrs[2]	0.140	0.140	0.130	0.130	0.130	0.120	0.121	0.138	0.138	0.138	0.138	0.139	0.139	0.126	0.124	0.123	0.123	0.113	0.118	0.120	
Maximum 1-Hr. Concentration	0.150	0.140	0.130	0.140	0.130	0.130	0.130	0.155	0.138	0.114	0.147	0.156	0.152	0.134	0.160	0.128	0.113	0.120	0.127	0.120	0.138
Days Above Nat. 8-Hr. Std.[3]	34	24	13	16	18	18	13	22	25	5	24	18	9	13	15	12	7	5	17	2	12

[1] Preliminary data for 2008 are shown here, however they are subject to change. 2007 is the last year for which complete and approved data is available, thus calculated annual statistics are not included for 2008.
[2] The national 1-Hour standard has been revoked. Historical 1-Hour data are provided for reference.
[3] The national 8-Hour standard has recently been lowered to .075. As a result, exceedance day numbers are higher than in previous years.

Table 4-18

San Francisco Bay Area Air Basin

Nitrogen Dioxide Air Quality Trend

The San Francisco Bay Area has attained both the State and national NO_2 standards for more than 20 years. During this time-period, there have been no concentrations that exceeded the level of the State 1-hour or the national annual standard. Ambient concentrations continue to be well below the level of both standards. The peak 1-hour indicator has declined by 56 percent in the San Francisco Bay Area since 1988. This downward trend is expected to continue.

NO_2 is formed from NO_x emissions, which also contribute to ozone. As a result, the majority of the future emission control measures will be implemented as part of the overall ozone control strategy. Many of these control measures will target mobile sources, which account for more than three-quarters of California's NO_x emissions.

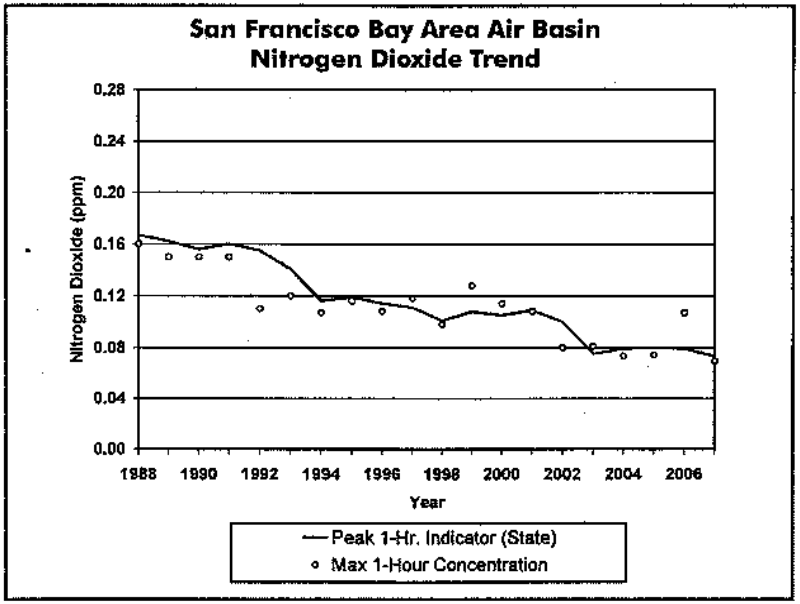


Figure 4-28

NITROGEN DIOXIDE (ppm)	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Max. 1-Hr. Concentration	0.160	0.150	0.150	0.150	0.110	0.120	0.107	0.116	0.108	0.118	0.098	0.128	0.114	0.108	0.080	0.081	0.073	0.074	0.107	0.069
Max. Annual Average (State)	0.032	0.032	0.030	0.031	0.027	0.027	0.028	0.027	0.025	0.025	0.025	0.026	0.025	0.024	0.019	0.018	0.017	0.019	0.016	0.017

Table 4-26

San Francisco Bay Area Air Basin

Carbon Monoxide Air Quality Trend

Similar to other areas of the State, CO concentrations in the San Francisco Bay Area Air Basin have declined substantially over the last 20 years. The peak 8-hour indicator value during 2007 is 32 percent of what it was during 1988 and is now well below the level of the standards. In fact, neither the State nor the national standards have been exceeded in this area since 1991.

Much of the decline in ambient CO concentrations can be attributed to the introduction of clean fuels and newer, cleaner motor vehicles. The San Francisco Bay Area Air Basin is currently designated as attainment for both the State and national CO standards. Based on emission projections, the area is expected to maintain its attainment status in the coming years.

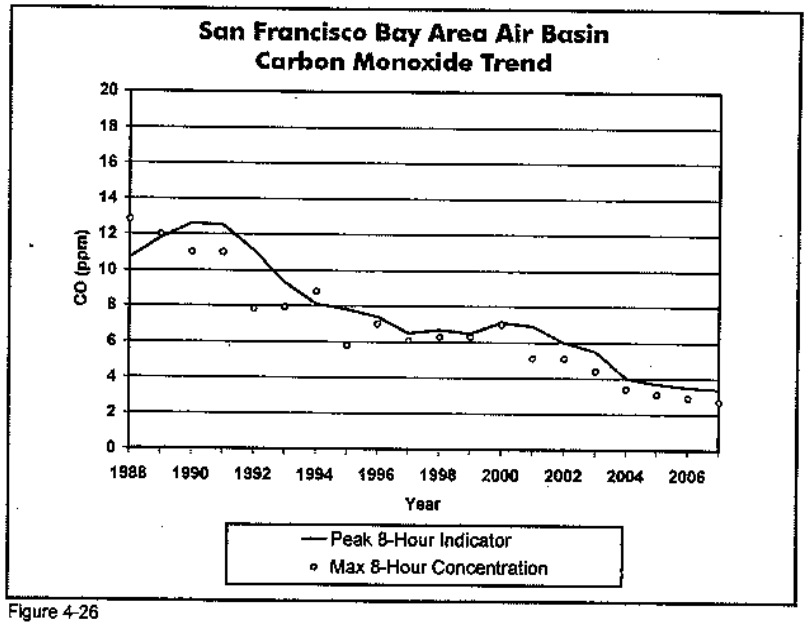


Figure 4-26

CARBON MONOXIDE (ppm)	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Max. 1-Hr. Concentration	15.0	19.0	18.0	15.0	12.0	14.0	12.0	10.1	8.8	10.7	8.7	9.0	9.8	7.6	7.7	8.6	4.8	4.5	5.5	5.5
Days Above State 8-Hr. Std.	4	10	4	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 4-24

San Francisco Bay Area Air Basin

PM_{10} Air Quality Trend

As with other pollutants, the PM_{10} statistics also show overall improvement. During the period for which data are available, the three-year average of the annual average (State) decreased by 23 percent.

Calculated exceedance days for the State 24-hour standard dropped from a high of 76 days during 1989 to 24 days during 2007. The national 24-hour standard was last exceeded in 1991. Because many of the same sources contribute to both ozone and PM_{10}, future ozone precursor emission controls should help ensure continued PM_{10} improvements.

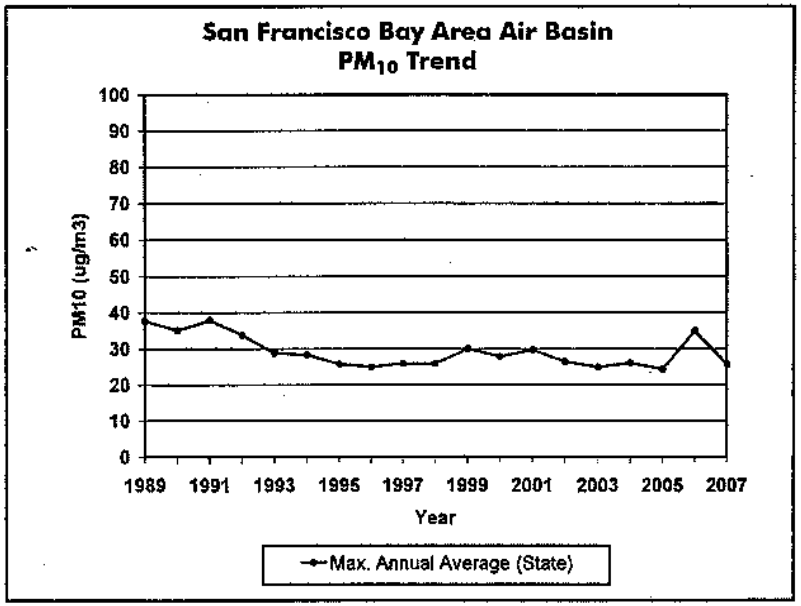


Figure 4-23

PM_{10} (µg/m³)	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
[illegible]																				
Max. 24-Hr. Concentration (Nat)	146	150	165	155	112	101	97	75	77	95	92	119	76	109	80	58	63	78	104	73
[illegible]																				
Max. Annual Average (Nat)	33.8	40.8	35.2	38.3	33.7	28.8	28.6	28.4	24.9	25.8	25.1	28.7	26.8	28.9	30.6	24.2	25.3	23.5	34.1	24.8
[illegible]																				
Calc Days Above Nat 24-Hr Std		0	6	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 4-21

San Francisco Bay Area Air Basin

$PM_{2.5}$ Air Quality Trend

Annual average $PM_{2.5}$ concentrations (national) in the San Francisco Bay Area have decreased in the last nine years. The 98th percentile of 24-hour $PM_{2.5}$ concentrations also declined during the last nine-year period. The State annual average concentration trend however, remained relatively constant during the last eight years, due to differences in State and national monitoring methods. Similar to PM_{10}, year-to-year changes in meteorology can mask the impacts of emission control programs. Measures adopted as part of SB 656, as well as programs to reduce ozone and diesel PM will help in reducing public exposure to $PM_{2.5}$ in this region.

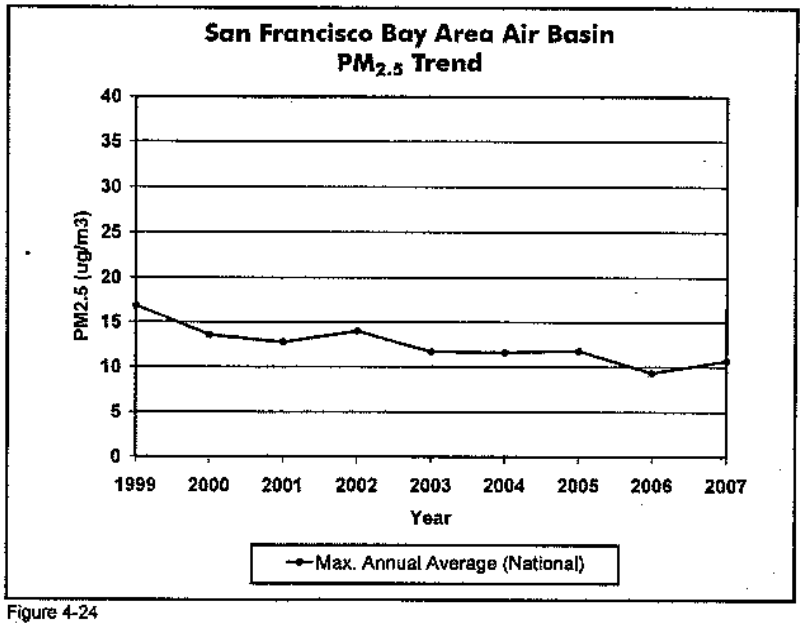


Figure 4-24

$PM_{2.5}$ (µg/m³)	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Max. 24-Hr. Concentration (Nat)												90.5	67.2	107.5	76.7	56.1	73.7	54.6	75.3	57.5
Annual Average (State)													11.6	12.9	14.0	11.7	12.7	11.8	12.4	13.3

Table 4-22

Table 5.1B-3 (6 Pages)

MONITORING STATIONS	OZONE						CARBON MONOXIDE			NITROGEN DIOXIDE			SULFUR DIOXIDE			PM_{10}				$PM_{2.5}$				
North Counties	(ppb)		(ppb)				(ppm)			(ppb)			(ppb)			($\mu g/m^3$)				($\mu g/m^3$)			($\mu g/m^3$)	
Napa	91	0	67	0	0	61	3.2	2.0	0	60	10	0	-	-	-	18.0	40	0	0	-	-	-	-	-
San Rafael	81	0	59	0	0	51	3.0	1.7	0	54	13	0	-	-	-	16.5	39	0	0	-	-	-	-	-
Santa Rosa	72	0	51	0	0	49	2.5	2.0	0	47	11	0	-	-	-	15.9	39	0	0	33.6	0	28.2	7.6	8.2
Vallejo	90	0	70	0	0	60	3.9	3.1	0	70	11	0	5	1.2	0	17.3	52	0	1	43.8	0	32.5	9.7	10.0
Coast & Central Bay																								
Oakland*	68	0	45	0	0	39	3.4	2.4	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Richmond	-	-	-	-	-	-	-	-	-	-	-	-	6	1.1	0	-	-	-	-	-	-	-	-	-
San Francisco	58	0	54	0	0	48	2.5	2.1	0	66	16	0	7	1.4	0	20.1	46	0	0	43.6	0	32.6	9.5	9.9
San Pablo	66	0	57	0	0	52	2.8	1.3	0	54	12	0	6	1.7	0	19.0	42	0	0	-	-	-	-	-
Eastern District																								
Bethel Island	89	0	77	0	2	72	1.1	0.9	0	38	7	0	6	2.0	0	18.5	64	0	1	-	-	-	-	-
Concord	98	1	80	0	2	73	2.2	1.5	0	55	12	0	7	1.0	0	16.4	42	0	0	48.9	0	35.1	9.0	9.8
Crockett*	-	-	-	-	-	-	-	-	-	-	-	-	*	*	0	-	-	-	-	-	-	-	-	-
Fairfield	90	0	73	0	2	68	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Livermore	120	6	90	1	7	78	3.4	1.8	0	72	14	0	-	-	-	18.8	49	0	0	32.1	0	29.4	9.0	9.4
Martinez	-	-	-	-	-		-	-	-	-	-	-	7	1.7	0	-	-	-	-	-	-	-	-	-
Pittsburg	94	0	78	0	2	69	3.3	1.7	0	58	11	0	9	2.4	0	20.1	57	0	1	-	-	-	-	-
South Central Bay																								
Fremont	105	1	78	0	1	60	3.2	2.0	0	69	15	0	-	-	-	17.8	54	0	1	33.4	0	27.6	9.0	9.0
Hayward*	*	*	*	*	*	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Redwood City	84	0	61	0	0	57	4.5	2.3	0	62	15	0	-	-	-	20.9	81	0	2	30.9	0	27.8	8.8	9.0
San Leandro	99	1	61	0	0	52	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Santa Clara Valley																								
Gilroy	87	0	67	0	0	71	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Los Gatos	110	3	87	1	3	72	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
San Jose Central	113	1	80	0	1	61	4.3	3.1	0	74	19	0	-	-	-	22.3	54	0	2	54.6	0	39.0	11.8	11.7
San Jose East*	110	1	83	0	1	59	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
San Jose, Tully Road	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	24.2	71	0	4	50.6	0	35.9	10.5	10.3
San Martin	108	2	77	0	3	75	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sunnyvale	97	1	73	0	1	64	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

[illegible]

The annual Bay Area Air Pollution Summary summarizes measurements for the national and California pollutant standards. Note that measurements given in parts per hundred million (pphm) in prior years are now given in parts per billion (ppb).

***Station Information (see asterisks on front page)**

The Hayward station was inoperative until July 19, 2005, due to construction on site.

The Crockett station was inoperative after March 27, 2005 due to construction on site.

The Oakland and San Jose East stations were closed on November 30, 2005.

Due to roof damage at the Concord station during the fourth quarter of 2004, the $PM_{2.5}$ sampler could not be operated on some of the required sampling days. The $PM_{2.5}$ annual average and three-year average $PM_{2.5}$ statistics are based on available data.

[illegible]

State and national excesses occur when pollutant concentrations surpass the indicated standards. For comparison, values in ppb must be converted to ppm and rounded to the same number of decimal places as the original standard.

MAX HR / MAX 8-HR / MAX 24-HR
The highest average contaminant concentration over a one-hour period, an eight-hour period (on any given day), or a 24-hour period (from midnight to midnight).

ANN AVG
The yearly average (arithmetic mean) of the readings taken at a given monitoring station.

NAT DAYS
The number of days during the year for which the monitoring station recorded contaminant concentrations in excess of the national standard.

CAL DAYS
The number of days during the year for which the station recorded contaminant levels in excess of the California standard.

TOTAL BAY AREA DAYS OVER STANDARD is not a sum of excesses at individual stations, but rather a sum of the number of days for which excesses occurred at any one or more stations.

3-YR AVG (8-hr ozone standard)
The 3-year average of the fourth highest 8-hour average ozone concentration for each monitoring station. *A 3-year average greater than 84 ppb at any monitoring station means that the region will be considered out of attainment by the EPA.*

PM_{10}
Particulate matter ten microns or smaller in size. (PM_{10} is only sampled every sixth day. *Actual* days over standard can be estimated to be six times the number shown.)

$PM_{2.5}$
Particulate matter 2.5 microns or smaller in size. $PM_{2.5}$ is a sub-category of PM_{10}.

PM_{10} ANN AVG and MAX 24-HR
California PM_{10} Annual Average and Maximum 24-Hour concentrations are reported at local temperature and pressure conditions. National PM_{10} Annual Average and Maximum 24-Hour concentrations are reported at standard temperature and pressure conditions. This table shows the California readings for PM_{10} Ann Avg and Max 24-Hr, which are generally slightly higher than the national readings.

3-YR AVG ($PM_{2.5}$ 24-hour standard)
The 3-year average of the annual 98th percentiles of the individual 24-hour concentrations of $PM_{2.5}$. *A 3-year average greater than 65 $\mu g/m^3$ at any monitoring station means that the region will be considered out of attainment by the EPA.*

3-YR AVG ($PM_{2.5}$ annual standard)
The 3-year average of the quarterly averages of $PM_{2.5}$. *A 3-year average greater than 15 $\mu g/m^3$ at any monitoring station means that the region will be considered out of attainment by the EPA.*

HEALTH-BASED AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Time	California Std	National Std
[illegible]	1 Hour[1]	0.09 ppm	
	8 Hour[2]	0.070 ppm	0.08 ppm
[illegible]	1 Hour	20 ppm	35 ppm
	8 Hour	9.0 ppm	9 ppm
[illegible]	1 Hour	0.26 ppm	—
	Annual	—	0.053 ppm
[illegible]	24 Hour	0.04 ppm	0.14 ppm
	Annual	—	0.03 ppm
[illegible]	24 Hour	50 $\mu g/m^3$	150 $\mu g/m^3$
	Annual	20 $\mu g/m^3$	50 $\mu g/m^3$
[illegible]	24 Hour	—	65 $\mu g/m^3$
	Annual	12 $\mu g/m^3$	15 $\mu g/m^3$

ppm parts per million | **ppb** parts per billion | **$\mu g/m^3$** micrograms per cubic meter

[illegible]

YEAR	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1996	-	34	-	0	0	0	0	0	0	0	3	-
1997	-	8	-	0	0	0	0	0	0	0	4	-
1998	16	29	-	0	0	0	0	0	0	0	5	-
1999	9	20	-	0	0	0	0	0	0	0	12	-
2000	4	12	-	0	0	0	0	0	0	0	7	1
2001	7	15	-	0	0	0	0	0	0	0	10	5
2002	7	16	-	0	0	0	0	0	0	0	6	7
2003	7	19	-	0	0	0	0	0	0	0	6	0
2004	0	7	-	0	0	0	0	0	0	0	7	1
2005	1	9	9	0	0	0	0	0	0	0	6	0

*PM_{10} is sampled every sixth day—*actual* days over standard can be estimated to be six times the numbers listed.

**2000 was the first complete year of $PM_{2.5}$ data.

MONITORING STATIONS	OZONE						CARBON MONOXIDE			NITROGEN DIOXIDE			SULFUR DIOXIDE			PM_{10}				$PM_{2.5}$				
	(ppb)		(ppb)				(ppm)			(ppb)			(ppb)			(µg/m³)				(µg/m³)			(µg/m³)	
North Counties																								
Napa	96	1	72	0	2	60	3.5	2.8	0	55	11	0	-	-	-	21.9	52	0	1	-	-	-	-	-
San Rafael	89	0	58	0	0	50	2.6	1.5	0	54	14	0	-	-	-	18.1	68	0	1	-	-	-	-	-
Santa Rosa	77	0	58	0	0	47	2.4	1.7	0	44	11	0	-	-	-	18.8	90	0	2	59.0	1	28.7	9.2	8.3
Vallejo	80	0	69	0	0	57	3.7	2.9	0	55	12	0	4	1.0	0	19.8	50	0	0	42.2	2	35.6	9.8	10.2
Coast & Central Bay																								
Richmond	-	-	-	-	-	-	-	-	-	-	-	-	6	1.6	0	-	-	-	-	-	-	-	-	-
San Francisco	53	0	46	0	0	45	2.7	2.1	0	107	16	0	6	1.3	0	22.9	61	0	3	54.3	3	30.9	9.7	9.7
San Pablo	61	0	50	0	0	48	2.5	1.4	0	55	13	0	5	1.6	0	21.3	62	0	2	-	-	-	-	-
Eastern District																								
Bethel Island	116	9	90	1	14	73	1.3	1.0	0	44	8	0	7	2.1	0	19.4	84	0	1	-	-	-	-	-
Concord	117	8	92	4	14	74	1.7	1.3	0	47	11	0	7	0.8	0	18.5	81	0	3	62.1	5	35.0	9.3	9.7
Crockett*	-	-	-	-	-	-	-	-	-	-	-	-	8*	1.8*	0*	-	-	-	-	-	-	-	-	-
Fairfield	106	3	87	1	8	69	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Livermore	127	13	101	5	15	80	3.3	1.8	0	64	14	0	-	-	-	21.8	69	0	3	50.8	3	33.5	9.8	9.7
Martinez	-	-	-	-	-		-	-	-	-	-	-	7	1.9	0	-	-	-	-	-	-	-	-	-
Pittsburg	105	3	93	1	10	70	3.3	1.9	0	52	11	0	9	2.4	0	19.9	59	0	2	-	-	-	-	-
South Central Bay																								
Fremont	102	4	74	0	3	60	2.9	1.8	0	63	15	0	-	-	-	20.0	57	0	1	43.9	2	30.3	10.3	9.6
Hayward*	101	2	71	0	1	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Redwood City	85	0	63	0	0	53	5.5	2.4	0	69	14	0	-	-	-	19.8	70	0	2	75.3	1	29.4	9.6	9.2
San Leandro	88	0	66	0	0	53	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Santa Clara Valley																								
Gilroy	120	4	101	2	8	70	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Los Gatos	116	7	87	4	11	73	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
San Jose Central	118	5	87	1	5	63	4.1	2.9	0	74	18	0	-	-	-	21.0	73	0	2	64.4	6	38.5	10.8	11.4
San Jose, Tully Road*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	35.0*	106*	0	13*	30.6*	0*	*	*	*
San Martin	123	7	105	5	11	76	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sunnyvale	106	3	78	0	1	58	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

The annual Bay Area Air Pollution Summary summarizes measurements for the national and California pollutant standards.

***Station Information (see asterisks on front page)**

Crockett was closed from March 27, 2005 to March 3, 2006 due to construction on site.

Hayward was closed part of 2005 due to construction on site. There was insufficient data for calculating three-year average ozone statistics.

San Jose-Tully $PM_{2.5}$ monitoring was discontinued on September 30, 2006 in preparation for moving the monitor to Gilroy in 2007, so there was insufficient data for calculating annual and three-year average $PM_{2.5}$ statistics. There was also construction activity near the site, which the Air District believes affected PM_{10} measurements.

State and national excesses occur when pollutant concentrations surpass the indicated standards. For comparison, values in ppb must be converted to ppm and rounded to the same number of decimal places as the original standard.

MAX HR / MAX 8-HR / MAX 24-HR
The highest average contaminant concentration over a one-hour period, an eight-hour period (on any given day), or a 24-hour period (from midnight to midnight).

ANN AVG
The yearly average (arithmetic mean) of the readings taken at a given monitoring station.

NAT DAYS
The number of days during the year for which the monitoring station recorded contaminant concentrations in excess of the national standard.

CAL DAYS
The number of days during the year for which the station recorded contaminant levels in excess of the California standard.

TOTAL BAY AREA DAYS OVER STANDARD is not a sum of excesses at individual stations, but rather a sum of the number of days for which excesses occurred at any one or more stations.

3-YR AVG (Nat. 8-hr ozone standard)
The 3-year average of the fourth highest 8-hour average ozone concentration for each monitoring station. *A 3-year-average greater than 84 ppb at any monitoring station means that the region does not meet the standard and may be designated non-attainment by the EPA.*

PM_{10}
Particulate matter ten microns or smaller in size. (PM_{10} is only sampled every sixth day. *Actual* days over standard can be estimated to be six times the number shown.)

$PM_{2.5}$
Particulate matter 2.5 microns or smaller in size. $PM_{2.5}$ is a sub-category of PM_{10}.

PM_{10} ANN AVG and MAX 24-HR
This table shows PM_{10} data reported at local temperature and pressure conditions, according to the California standards. National PM_{10} data is converted to standard temperature and pressure conditions, which generally results in slightly lower readings.

3-YR AVG ($PM_{2.5}$ 24-hour standard)
The 3-year average of the annual 98th percentiles of the individual 24-hour concentrations of $PM_{2.5}$. *A 3-year average greater than 35 $\mu g/m^3$ at any monitoring station means that the region does not meet the standard and may be designated non-attainment by the EPA.*

3-YR AVG ($PM_{2.5}$ annual standard)
The 3-year average of the quarterly averages of $PM_{2.5}$. *A 3-year average greater than 15 $\mu g/m^3$ at any monitoring station means that the region does not meet the standard and may be designated non-attainment by the EPA.*

HEALTH-BASED AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Time	California Std	National Std
	1 Hour	0.09 ppm	—
	8 Hour	0.070 ppm	0.08 ppm
	1 Hour	20 ppm	35 ppm
	8 Hour	9.0 ppm	.9 ppm
	1 Hour	0.25 ppm	—
	Annual	—	0.053 ppm
	24 Hour	0.04 ppm	0.14 ppm
	Annual	—	0.03 ppm
	24 Hour	50 $\mu g/m^3$	150 $\mu g/m^3$
	Annual[1]	20 $\mu g/m^3$	—
	24 Hour[1]	—	35 $\mu g/m^3$
	Annual	12 $\mu g/m^3$	15 $\mu g/m^3$

ppm parts per million | ppb parts per billion | $\mu g/m^3$ micrograms per cubic meter

YEAR																							
1997	-	8	-	0	0	0	0	0	0	0	0	0	4	-
1998	16	29	-	0	0	0	0	0	0	0	0	0	5	-
1999	9	20	-	0	0	0	0	0	0	0	0	0	12	-
2000	4	12	-	0	0	0	0	0	0	0	0	0	7	1
2001	7	15	-	0	0	0	0	0	0	0	0	0	10	5
2002	7	16	-	0	0	0	0	0	0	0	0	0	6	7
2003	7	19	-	0	0	0	0	0	0	0	0	0	6	0
2004	0	7	-	0	0	0	0	0	0	0	0	0	7	1
2005	1	9	9	0	0	0	0	0	0	0	0	0	6	0
2006	12	18	22	0	0	0	0	0	0	0	0	0	15	10

*PM_{10} is sampled every sixth day—actual days over standard can be estimated to be six times the numbers listed.

**2000 was the first complete year of $PM_{2.5}$ data.

MONITORING STATIONS	OZONE						CARBON MONOXIDE			NITROGEN DIOXIDE			SULFUR DIOXIDE			PM_{10}				$PM_{2.5}$				
North Counties	(ppb)		(ppb)				(ppm)			(ppb)			(ppb)			($\mu g/m^3$)				($\mu g/m^3$)			($\mu g/m^3$)	
Napa	74	0	61	0	0	57	3.2	2.0	0	53	10	0	-	-	-	21.4	50	0	0	-	-	-	-	-
San Rafael	72	0	57	0	0	48	2.8	1.3	0	57	14	0	-	-	-	17.5	56	0	1	-	-	-	-	-
Santa Rosa	71	0	59	0	0	47	2.6	1.7	0	46	11	0	-	-	-	17.1	37	0	0	32.0	0	30.4	7.6	8.1
Vallejo	78	0	66	0	0	54	3.3	2.7	0	58	11	0	4	1.3	0	19.0	52	0	2	40.8	4	36.2	9.8	9.8
Coast & Central Bay																								
Richmond	-	-	-	-	-	-	-	-	-	-	-	-	7	1.6	0	-	-	-	-	-	-	-	-	-
San Francisco	60	0	49	0	0	45	2.5	1.6	0	69	16	0	6	1.5	0	21.9	70	0	2	45.2	5	29.3	8.7	9.3
San Pablo	74	0	51	0	0	47	2.4	1.2	0	52	12	0	5	1.6	0	20.6	57	0	2	-	-	-	-	-
Eastern District																								
Benicia*	83	0	71	0	1	*	1.1	0.6	0	39	*	0	7	*	0	*	31	0	0					
Bethel Island	93	0	78	0	4	73	1.1	0.8	0	48	8	0	5	1.5	0	18.8	49	0	0	-	-	-	-	-
Concord	105	1	81	0	4	73	2.2	1.4	0	49	11	0	5	1.3	0	16.8	52	0	2	46.2	7	34.0	8.4	8.9
Crockett	-	-	-	-	-	-	-	-	-	-	-	-	9	2.0	0	-	-	-	-	-	-	-	-	-
Fairfield	89	0	67	0	0	66	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Livermore	120	2	91	1	3	77	3.3	1.8	0	52	13	0	-	-	-	19.8	75	0	2	54.9	3	34.8	9.0	9.3
Martinez	-	-	-	-	-		-	-	-	-	-	-	8	1.7	0	-	-	-	-	-	-	-	-	-
Pittsburg	100	1	74	0	2	70	2.8	1.5	0	51	10	0	7	2.2	0	19.4	59	0	4	-	-	-	-	-
South Central Bay																								
Fremont	79	0	68	0	0	58	2.5	1.6	0	58	14	0	-	-	-	19.6	61	0	1	51.2	2	30.4	8.7	9.4
Hayward*	75	0	65	0	0	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Redwood City	77	0	69	0	0	51	5.5	2.3	0	57	13	0	-	-	-	19.6	56	0	1	45.4	1	31.0	8.3	8.9
San Leandro	71	0	54	0	0	52	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Santa Clara Valley																								
Gilroy*	91	0	70	0	0	70	-	-	-	-	-	-	-	-	-	-	-	-	-	21.5	0	*	*	*
Los Gatos	84	0	65	0	0	68	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
San Jose Central	83	0	68	0	0	61	3.5	2.7	0	65	17	0	-	-	-	22.0	69	0	3	57.5	9	38.3	10.7	11.1
San Jose, Tully Road*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25.6	78	0	3	-	-	-	-	-
San Martin	96	1	73	0	4	75	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sunnyvale	77	0	68	0	0	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

The annual Bay Area Air Pollution Summary summarizes measurements for the national and California pollutant standards.

***Station Information (see asterisks on front page)**

$PM_{2.5}$ monitoring began at Gilroy on March 1, 2007. Since there are only 3 complete quarters of data for 2007, annual statistics are not provided for $PM_{2.5}$.

The Benicia site was opened on April 1, 2007. Since there are only 3 quarters of data for 2007, annual statistics are not provided for this site.

The San Jose-Tully site was closed on December 31, 2007.

The Hayward station was closed part of 2005 due to construction on site. Therefore, three-year average ozone statistics are not available

An Oakland site was opened on November 1, 2007, and a Berkeley site was opened on December 13, 2007. Since there is only a brief period of data available for these sites in 2007, summary reporting will not begin until 2008.

State and national excesses occur when pollutant concentrations surpass the indicated standards. For comparison, values in ppb must be converted to ppm and rounded to the same number of decimal places as the original standard.

MAX HR / MAX 8-HR / MAX 24-HR
The highest average contaminant concentration over a one-hour period, an eight-hour period (on any given day), or a 24-hour period (from midnight to midnight).

ANN AVG
The yearly average (arithmetic mean) of the readings taken at a given monitoring station.

NAT DAYS
The number of days during the year for which the monitoring station recorded contaminant concentrations in excess of the national standard.

CAL DAYS
The number of days during the year for which the station recorded contaminant levels in excess of the California standard.

TOTAL BAY AREA DAYS OVER STANDARD is not a sum of excesses at individual stations, but rather a sum of the number of days for which excesses occurred at any one or more stations.

3-YR AVG (Nat. 8-hr ozone standard)
The 3-year average of the fourth highest 8-hour average ozone concentration for each monitoring station. *A 3-year average greater then 84 ppb at any monitoring station means that the region does not meet the standard and may be designated non-attainment by the EPA.*

PM_{10}
Particulate matter ten microns or smaller in size. (PM_{10} is only sampled every sixth day. *Actual* days over standard can be estimated to be six times the number shown.)

$PM_{2.5}$
Particulate matter 2.5 microns or smaller in size. $PM_{2.5}$ is a sub-category of PM_{10}.

PM_{10} ANN AVG and MAX 24-HR
This table shows PM_{10} data reported at local temperature and pressure conditions, according to the California standards. National PM_{10} data is converted to standard temperature and pressure conditions, which generally results in slightly lower readings.

3-YR AVG ($PM_{2.5}$ 24-hour standard)
The 3-year average of the annual 98th percentiles of the individual 24-hour concentrations of $PM_{2.5}$. *A 3-year average greater then 35 $\mu g/m^3$ at any monitoring station means that the region does not meet the standard and may be designated non-attainment by the EPA.*

3-YR AVG ($PM_{2.5}$ annual standard)
The 3-year average of the quarterly averages of $PM_{2.5}$. *A 3-year average greater than 15 $\mu g/m^3$ at any monitoring station means that the region does not meet the standard and may be designated non-attainment by the EPA.*

HEALTH-BASED AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Time	California Std	National Std
	1 Hour	0.09 ppm	—
	8 Hour	0.070 ppm	0.08 ppm*
	1 Hour	20 ppm	35 ppm
	8 Hour	9.0 ppm	9 ppm
	1 Hour	0.25 ppm	—
	Annual	—	0.053 ppm
	24 Hour	0.04 ppm	0.14 ppm
	Annual	—	0.03 ppm
	24 Hour	50 $\mu g/m^3$	150 $\mu g/m^3$
	Annual[1]	20 $\mu g/m^3$	—
	24 Hour[1]	—	35 $\mu g/m^3$
	Annual	12 $\mu g/m^3$	15 $\mu g/m^3$

ppm parts per million | **ppb** parts per billion | **$\mu g/m^3$** micrograms per cubic meter

YEAR															
1998	16	29	-	0	0	0	0	0	0	0	0	5	-
1999	9	20	-	0	0	0	0	0	0	0	0	12	-
2000	4	12	-	0	0	0	0	0	0	0	0	7	1
2001	7	15	-	0	0	0	0	0	0	0	0	10	5
2002	7	16	-	0	0	0	0	0	0	0	0	6	7
2003	7	19	-	0	0	0	0	0	0	0	0	6	0
2004	0	7	-	0	0	0	0	0	0	0	0	7	1
2005	1	9	9	0	0	0	0	0	0	0	0	6	0
2006	12	18	22	0	0	0	0	0	0	0	0	15	10
2007	1	4	9	0	0	0	0	0	0	0	0	4	14

*PM_{10} is sampled every sixth day—*actual* days over standard can be estimated to be six times the numbers listed.

[1]On Dec. 17, 2006, the U.S. EPA implemented a more stringent national 24-hour $PM_{2.5}$ standard—revising it from 65 $\mu g/m^3$ to 35 $\mu g/m^3$. $PM_{2.5}$ exceedance days for 2006 and 2007 reflect the new standard.

CCGS AERMOD Turbine Screening Results
Regular Receptor Grids
155.5' Stack Height

Case	**B**	**D**	**R**	**H**	**J**	**X**	**1E**	**1F**	**1E**
Evap Cooling	**Yes**	**Off**	**Off**	**On**	**Off**	**Off**	**Off**	**Off**	**Off**
Load %	**100**	**80**	**49**	**100**	**80**	**52**	**100**	**80**	**49**
Duct Firing	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**
Ambient Temp, °F	59	59	59	104	104	104	34	34	34
Stack Exit Temp (deg.F)	190.900	179.720	171.400	212.800	196.360	179.700	191.600	184.790	171.300
Volumetric Flowrate ACFM	1,150,000	910,000	743,000	1,181,000	889,000	760,000	1,162,000	1,005,000	739,000
Stack Inside Diameter (ft)	18.37	18.37	18.37	18.37	18.37	18.37	18.37	18.37	18.37
Stack Height (m)	47.396	47.396	47.396	47.396	47.396	47.396	47.396	47.396	47.396
Stack Exit Temp (deg.K)	361.4	355.2	350.6	373.6	364.5	355.2	361.8	358.0	350.5
Stack Exit Velocity (m/s)	22.04	17.44	14.24	22.64	17.04	14.57	22.27	19.26	14.16
Stack Inside Diameter (m)	5.5992	5.5992	5.5992	5.5992	5.5992	5.5992	5.5992	5.5992	5.5992
Normal Operations - Short-term Emissions									
NOx(lb/hr/turbine)	15.17	12.50	9.66	14.75	11.47	9.25	15.52	13.88	9.91
CO(lb/hr/turbine)	9.24	7.61	5.88	8.98	6.98	5.63	9.45	8.45	6.04
SO2(lb/hr/turbine)	5.90	4.80	3.70	5.70	4.40	3.60	6.00	5.40	3.80
PM10(lb/hr/turbine)	7.50	6.18	4.78	7.50	5.67	4.58	7.50	6.86	4.90
1-Hr Unitized Conc (ug/m3)	5.62463	7.05599	8.31072	5.00969	6.68256	7.90813	5.56412	6.44339	8.33895
3-Hr Unitized Conc (ug/m3)	4.27351	5.32345	6.42166	3.84959	5.04008	6.08899	4.22494	4.80076	6.44604
8-Hr Unitized Conc (ug/m3)	3.18504	3.92533	4.62115	2.69903	3.72586	4.40545	3.14595	3.57729	4.63869
24-Hr Unitized Conc (ug/m3)	1.16360	1.45696	1.76917	0.98469	1.37628	1.64297	1.14878	1.32026	1.77658
Normal Operations - Short-term Emissions									
NOx(g/s/turbine)	1.912	1.575	1.217	1.858	1.445	1.165	1.956	1.749	1.249
CO(g/s/turbine)	1.164	0.959	0.741	1.131	0.880	0.709	1.191	1.065	0.760
SO2(g/s/turbine)	0.743	0.605	0.466	0.718	0.554	0.454	0.756	0.680	0.479
PM10(g/s/turbine)	0.945	0.779	0.602	0.945	0.714	0.577	0.945	0.864	0.617
1-Hour NOx(ug/m3)	21.509	22.226	20.228	18.616	**19.313**	18.426	21.767	22.539	20.831
1-Hour CO(ug/m3)	13.094	13.533	12.316	11.332	**11.761**	11.214	13.254	13.724	12.675
8-Hour CO(ug/m3)	4.733	4.750	4.307	3.876	**4.128**	4.000	4.757	4.865	4.444
1-Hour SO2(ug/m3)	8.358	8.538	7.746	7.194	**7.404**	7.181	8.413	8.763	7.989
3-Hour SO2(ug/m3)	16.342	16.769	15.630	14.305	**14.566**	14.187	16.528	16.793	16.102
24-Hour SO2(ug/m3)	1.729	1.763	1.649	1.414	**1.525**	1.492	1.737	1.796	1.702
24-Hour PM10 at 11 hours op	1.008	1.040	0.977	0.853	**0.901**	0.869	0.995	1.046	1.005
24-Hour PM10(ug/m3)	2.199	**2.270**	2.130	1.861	**1.965**	1.896	2.171	2.281	2.192
Commissioning									
NOx(lb/hr) - 1-Hour	120.00	120.00	120.00	120.00	120.00	120.00	120.00	120.00	120.00
CO(lb/hr) - 1-Hour	210.0	210.0	210.0	210.0	210.0	210.0	210.0	210.0	210.0
CO(lb/hr) - 8-Hours	210.0	210.0	210.0	210.0	210.0	210.0	210.0	210.0	210.0
1-Hr NOx(ug/m3)	85.044	106.687	125.658	75.747	**101.040**	119.571	84.129	97.424	126.085
1-Hr CO(ug/m3)	148.828	186.701	219.902	132.556	**176.821**	209.249	147.227	170.492	220.649
8-Hr CO(ug/m3)	84.276	103.864	122.276	71.416	**98.586**	116.568	83.242	94.655	122.740

Worst-Case Operating Scenarios are **bolded**.
**Based on USEPA Ambient Ratio Method (ARM)=75% of NOx impact

ccgs
Emission Rates and Stack Parameters for Modeling

	Stack Height meters	Temp, deg K	Exhaust Velocity, m/s	Stack Diam, m	Emission Rates, g/s NOx	SO2	CO	PM10	Emission Rates, lb/hr NOx	SO2	CO	PM10
Averaging Period: One hour												
Turbine N/HRSG	47.396	358.0	19.26	5.5992	1.956	0.756	1.191	-	15.52	6	9.45	-
Turbine S/HRSG	47.396	358.0	19.26	5.5992	1.956	0.756	1.191	-	15.52	6	9.45	-
Fire Pump	4.877	714.26	32.22	0.2032	2.901E-01	5.040E-04	0.093	-	2.302	0.004	0.741	0.091
Aux Boiler	15.240	416.48	15.08	0.7620	6.930E-02	1.764E-02	0.233	-	0.55	0.14	1.85	0.228
Averaging Period: Three hours												
Turbine N/HRSG	47.396	358.0	19.26	5.5992	-	0.756	-	-	-	6	-	-
Turbine S/HRSG	47.396	358.0	19.26	5.5992	-	0.756	-	-	-	6	-	-
Fire Pump	4.877	714.26	32.22	0.2032	-	1.680E-04	-	-	-	1.33E-03	-	-
Aux Boiler	15.240	416.48	15.08	0.7620	-	1.764E-02	-	-	-	1.40E-01	-	-
Averaging Period: Eight hours												
Turbine N/HRSG	47.396	358.0	19.26	5.5992	-	-	1.191	-	-	-	9.45	-
Turbine S/HRSG	47.396	358.0	19.26	5.5992	-	-	1.191	-	-	-	9.45	-
Fire Pump	4.877	714.26	32.22	0.2032	-	-	1.167E-02	-	-	-	0.093	-
Aux Boiler	15.240	416.48	15.08	0.7620	-	-	0.233	-	-	-	1.850	-
Averaging Period: 24 hours												
Turbine N/HRSG	47.396	358.0	19.26	5.5992	-	0.756	-	0.396	-	6	-	3.144
Turbine S/HRSG	47.396	358.0	19.26	5.5992	-	0.756	-	0.396	-	6	-	3.144
Fire Pump	4.877	714.26	32.22	0.2032	-	2.100E-05	-	4.778E-04	-	1.67E-04	-	3.792E-03
Aux Boiler	15.240	416.48	15.08	0.7620	-	5.880E-03	-	9.576E-03	-	0.0467	-	0.0760
Evap Cooler per cell	7.010	304.21	10.19	3.353	-	-	-	2.541E-03	-	-	-	0.0202
Averaging Period: Annual												
Turbine N/HRSG	47.396	361.4	22.04	5.5992	1.424	0.176	-	0.595	11.3	1.4	-	4.723
Turbine S/HRSG	47.396	361.4	22.04	5.5992	1.424	0.176	-	0.595	11.3	1.4	-	4.723
Fire Pump	4.877	714.26	32.22	0.2032	1.655E-03	3.103E-06	-	6.532E-05	1.31E-02	2.46E-05	-	5.184E-04
Aux Boiler	15.240	416.48	15.08	0.7620	3.163E-03	8.190E-04	-	1.069E-02	0.0251	6.50E-03	-	0.085
Evap Cooler per cell	7.010	304.21	10.19	3.353	-	-	-	9.493E-04	-	-	-	0.0075
Cold Start (worst case) One hour												
Turbine N/HRSG	47.396	358.0	19.26	5.5992	12.585	-	68.338	-	99.88	-	542.3625	-
Turbine S/HRSG	47.396	358.0	19.26	5.5992	12.585	-	68.338	-	99.88	-	542.3625	-
Fire Pump	4.877	714.26	32.22	0.2032	-	-	-	-	-	-	-	-
Aux Boiler	15.240	416.48	15.08	0.7620	6.930E-02	-	0.233	-	0.55		1.85	-
Cold Start (worst case) 8 hour												
Turbine N/HRSG	47.396	358.0	19.26	5.5992	-	-	12.794	-	-	-	101.538	-
Turbine S/HRSG	47.396	358.0	19.26	5.5992	-	-	12.794	-	-	-	101.538	-
Fire Pump	4.877	714.26	32.22	0.2032	-	-	0.012	-	-	-	0.093	-
Aux Boiler	15.240	416.48	15.08	0.7620	-	-	0.058	-	-	-	0.463	-

Assumptions:

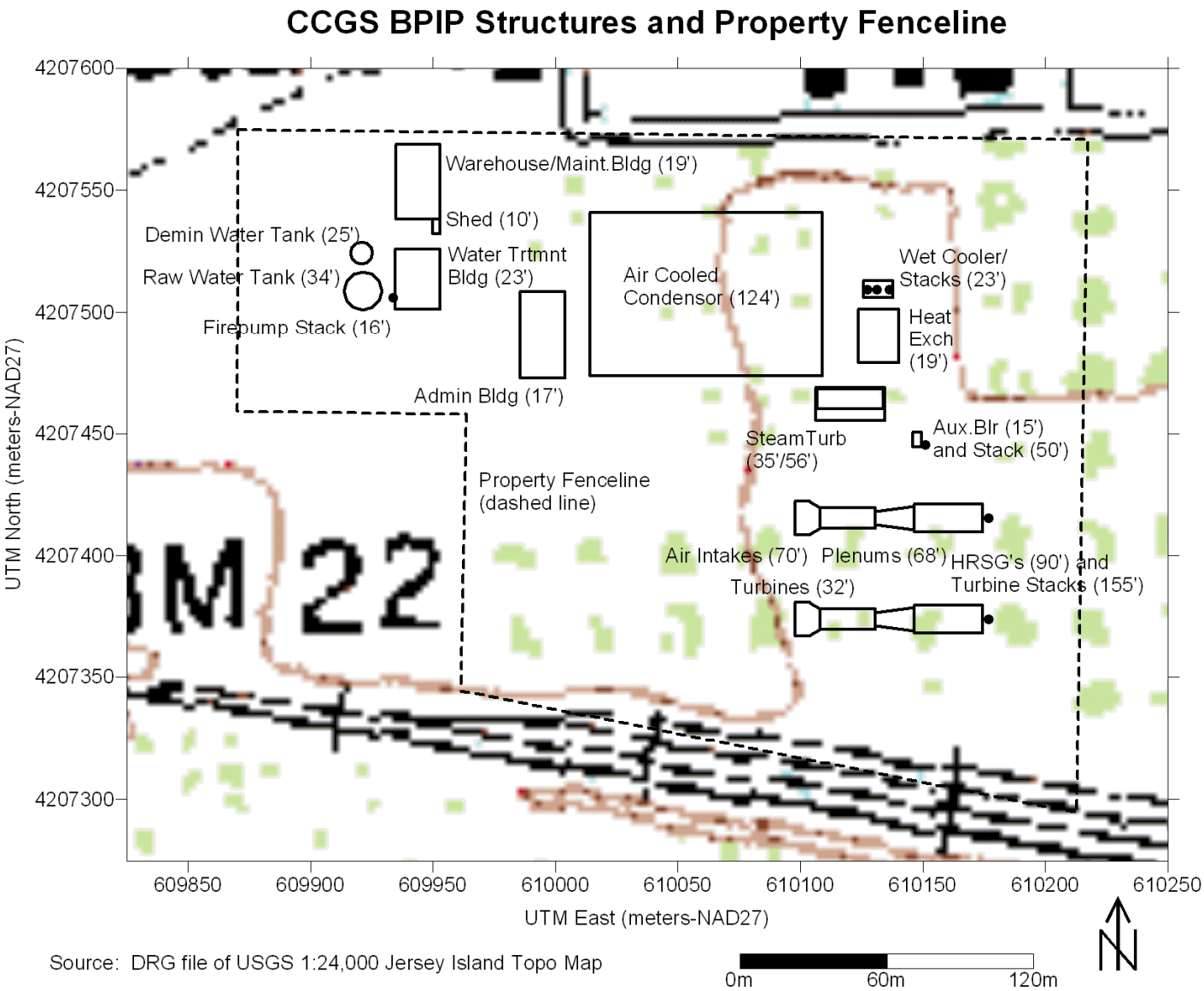
- Aux boiler operation is 8 hours per day and 3260 per year for PM2.5 modeling
- Aux boiler operation is 8 hours per day and 403 hours per year for Nox and SOX modeling
- Fire pump operates 1 hour per day, 50 hours year
- Evap cooler operates 11 hours per day and 1500 hours per year
- Turbine operates 11 hours per day
- Annual PM2.5: 4000 hours base load, 1500 hours peak load, 51 hot starts, 1 cold start, 52 shutdowns for a total of 25 hours in startup/shtdown = 5525 hours
- Annual Nox, Sox: 6924 hours base load, 1500 hours peak load, 51 hot starts, 1 cold start, 52 shutdowns for a total of 25 hours in startup/shtdown = 8449 hours
- Cold start is 45 minutes which is the worst case start
- CO 8-hour impacts calculated as 1 cold start + one shutdown + 6 hours base load
- Fire pump not tested during 1 hour start cycle
- Aux boiler assumed to operate two hours for 8-hour CO startup modeling

Modeling Inputs/Results for CCGS Construction Impacts (Combustion Sources as 29 Point Sources)

Short Term Impacts (24 hrs and less)						Long Term Impacts (annual)					
	NOx	CO	SOx	PM10	PM2.5		NOx	CO	SOx	PM10	PM2.5
Combustion (lbs/day)	106.3	54.1	0.12	6.14	6.10	Combustion (tons/year)	14.04	7.13	0.0036	0.811	0.804
						Combustion (days/year)**	288	288	288	288	288
Combustion (hrs/day)	10	10	10	10	10	Combustion (hrs/day)	10	10	10	10	10
Combustion (lbs/hr)	10.63	5.41	0.01	0.61	0.61	Combustion (lbs/hr)**	7.69	3.91	0.00	0.44	0.44
Combustion (g/sec)	1.34E+00	6.82E-01	1.51E-03	7.74E-02	7.69E-02	Combustion (g/sec)	9.69E-01	4.92E-01	2.49E-04	5.60E-02	5.55E-02
Construction Dust (lbs/day)				12.70	2.70	Construction Dust (tons/year)				0.498	0.095
						Construction Dust (days/year)				288	288
Construction Dust (hrs/day)				10	10	Construction Dust (hrs/day)				10	10
Construction Dust (lbs/hr)				1.27	0.27	Construction Dust (lbs/hr)**				0.273	0.052
Construction Dust (g/sec)	18.46 acres			1.60E-01	3.40E-02	Construction Dust (g/sec)				3.44E-02	6.56E-03
AERMOD Inputs	**74,689 m^2**		**29 Pt.Srcs**								
Combustion (g/s/src)	4.619E-02	2.351E-02	5.214E-05	2.668E-03	2.650E-03	Combustion (g/s/src)	3.343E-02	1.697E-02	8.571E-06	1.931E-03	1.914E-03
Construction Dust (g/s/m^2)				2.142E-06	4.555E-07	Construction Dust (g/s/m^2)				4.603E-07	8.782E-08
AERMOD Results (ug/m^3)											
Combustion Only						Combustion Only					
1-hour Max	91.511	46.573	0.103	5.28577							
3-hour Max			0.071	3.65444							
8-hour Max		16.954		1.92413							
24-hour Max			0.018	0.92760	0.92156	Annual	5.128		0.001	0.29619	0.29363
All Particulate Sources						All Particulate Sources					
24-hour Max				114.43941	24.44071	Annual				2.50090	0.57828
1-hour NO2 w/ OLM	91.511	for Max 1-hr O3 (ppm)		0.116		Annual NO2 w/ ARM	3.846	based on ARM Ratio of:		75%	
Background (ug/m^3)						Background (ug/m^3)					
1-hour Max	98.1	3771	122.2								
3-hour Max			65.0								
8-hour Max		2171									
24-hour Max			23.4	82	35	Annual	20.8		7.8	24.0	9.0
Total + Background (ug/m^3)						Total + Background (ug/m^3)					
1-hour Max	189.6	3818	122.3								
3-hour Max			65.1								
8-hour Max		2188									
24-hour Max			23.4	196	59	Annual	24.6		7.8	26.5	9.6

**Even for construction projects taking less than 12-months or 7 days/wk, the hourly emissions for modeling are still based on total tons (projects<12 months) or tons/year (projects>12months) divided by 365 days since all days in the met dataset (i.e., all 12 months and all 365 days - i.e., 7 days/week) are modeled.

Figure 5.1B-1 Facility BPIP Modeling Plot



Source: DRG file of USGS 1:24,000 Jersey Island Topo Map

RADBACK-CCGS

Figure 5.1B-2 Coarse and Fine Receptor Grid

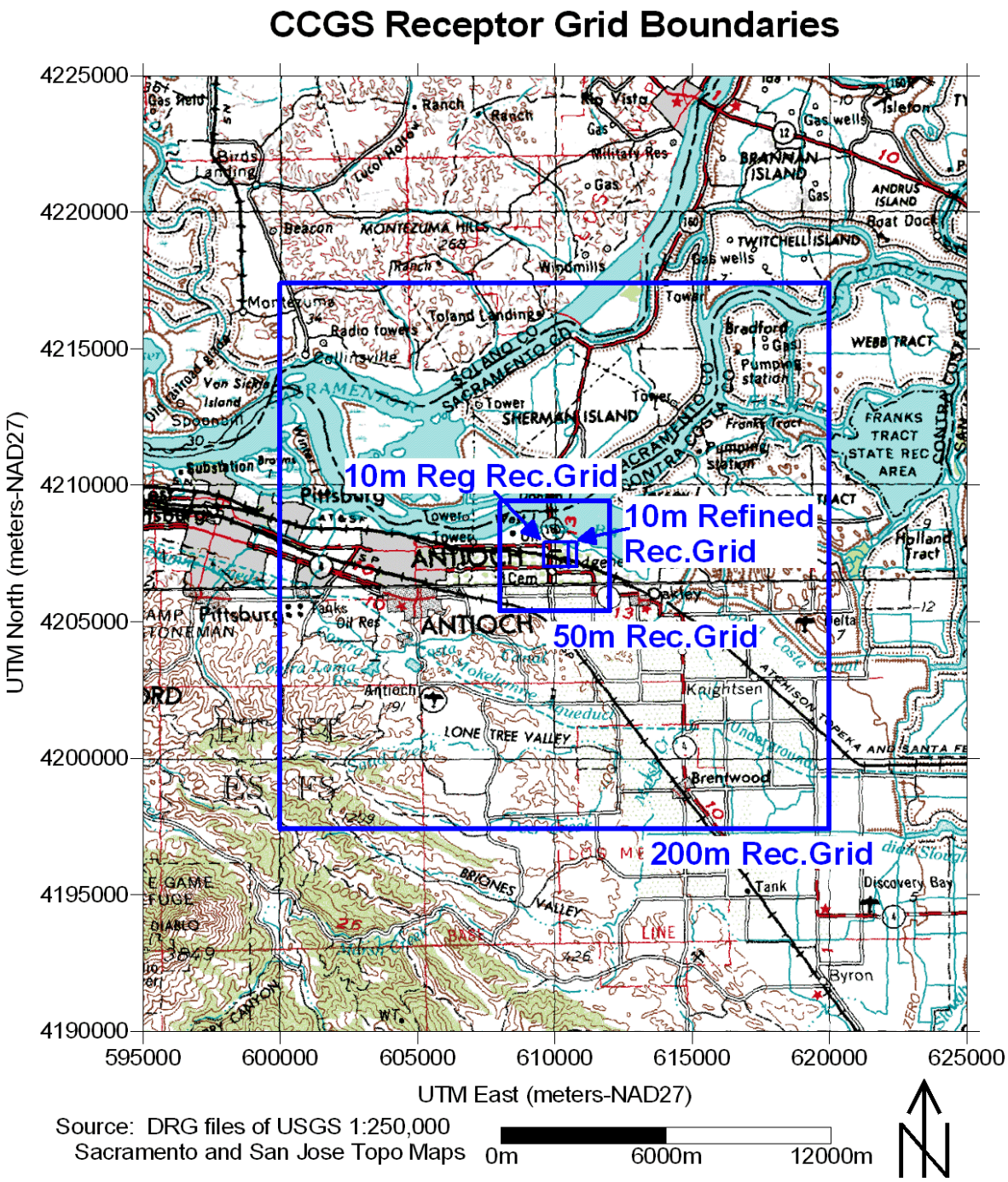
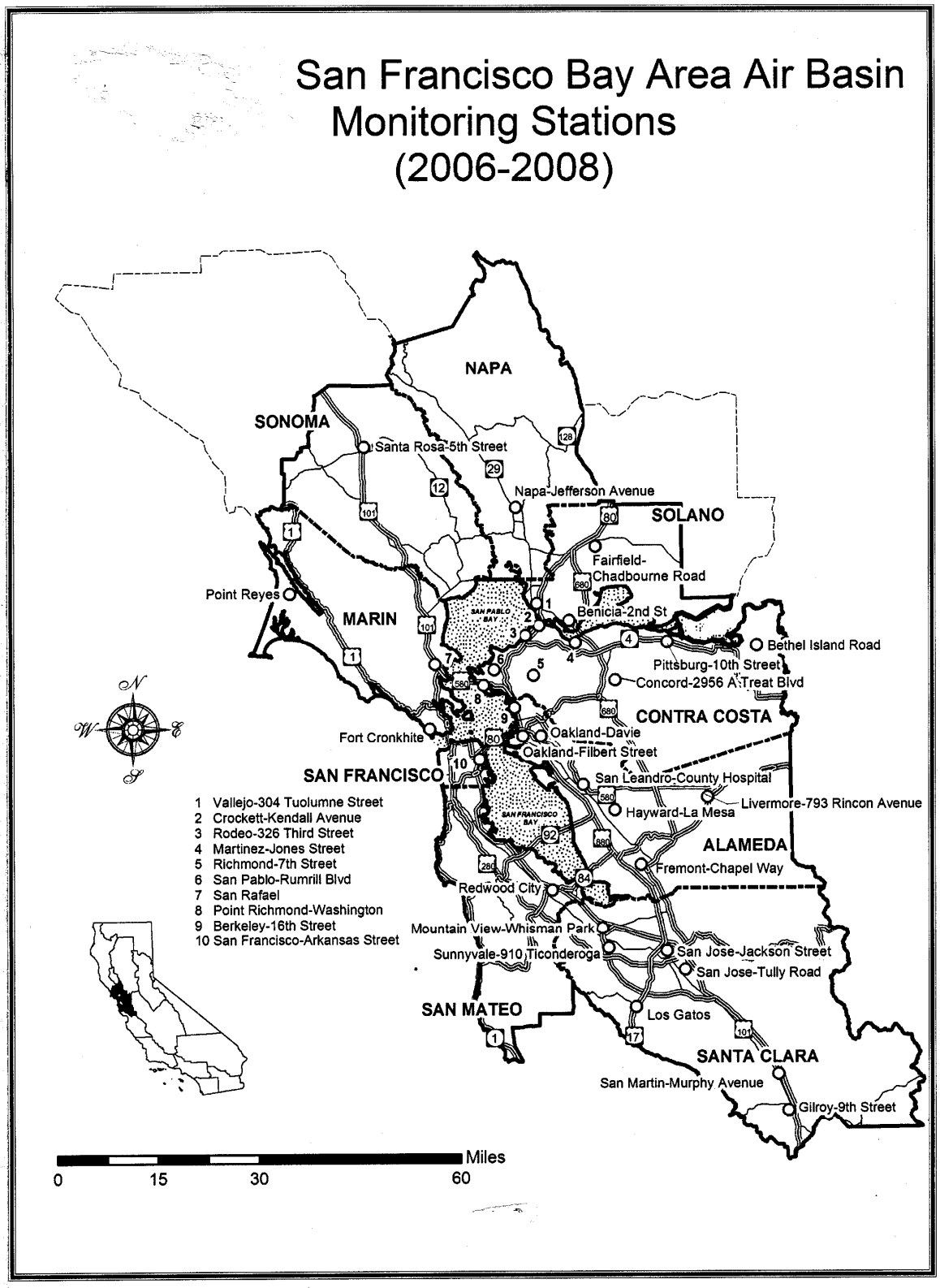
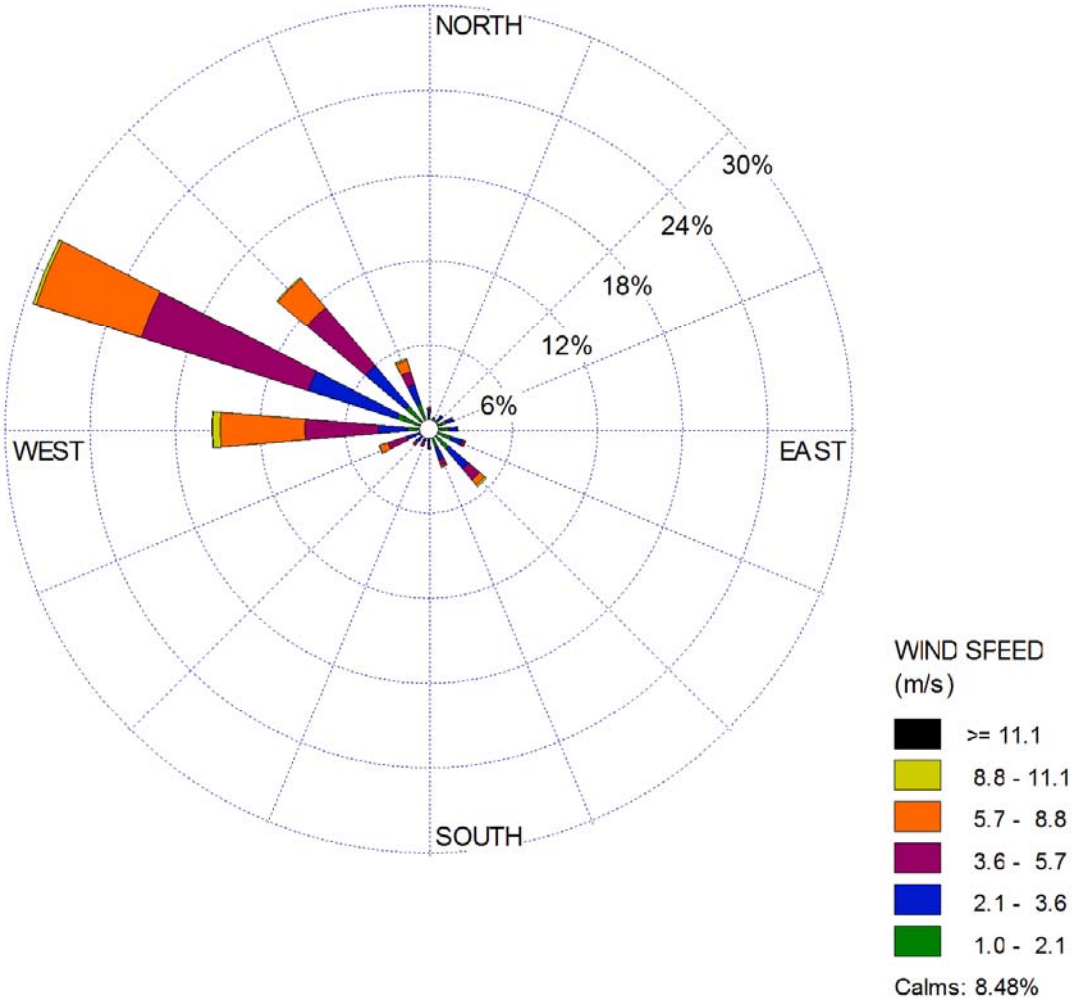


Figure 5.1B-3 Bay Area Air Basin Monitoring Stations

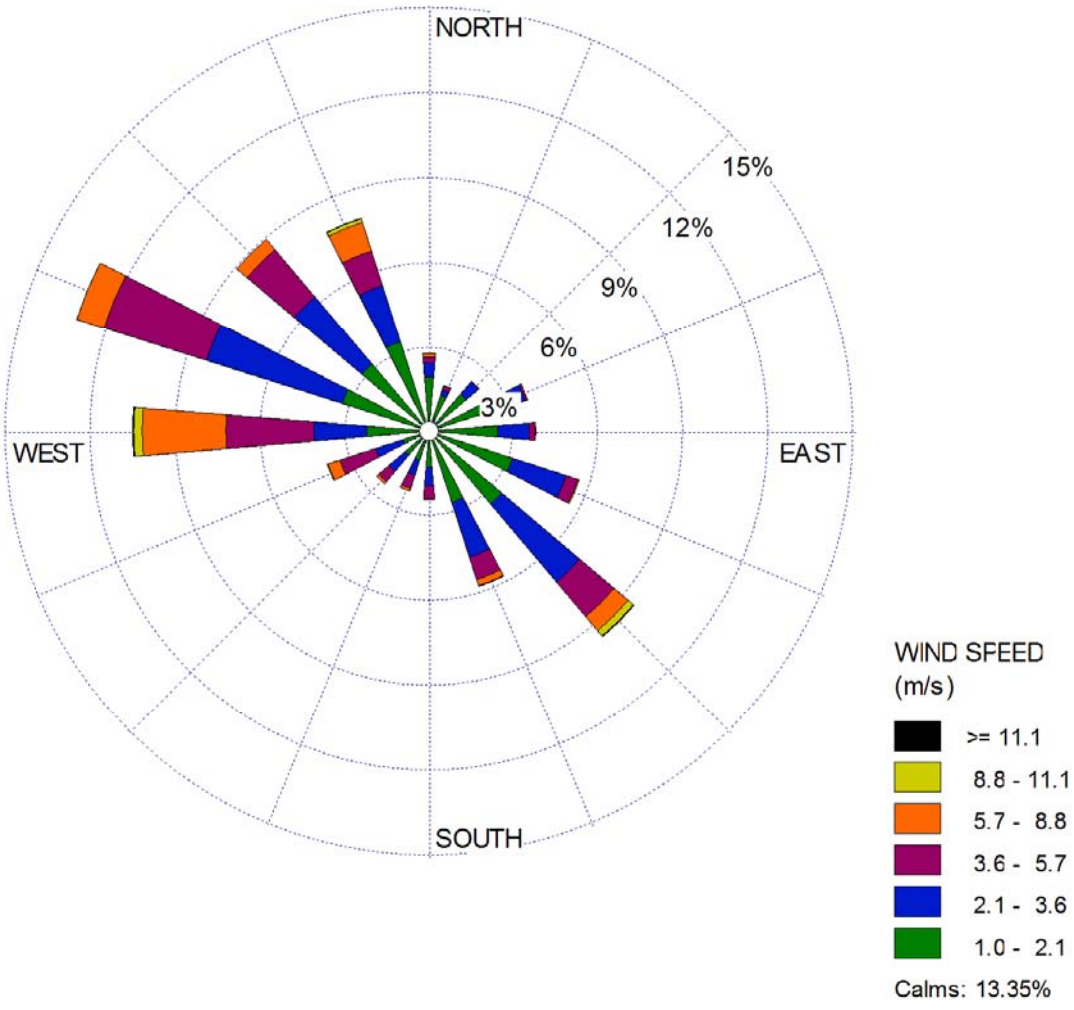


RADBACK-CCGS

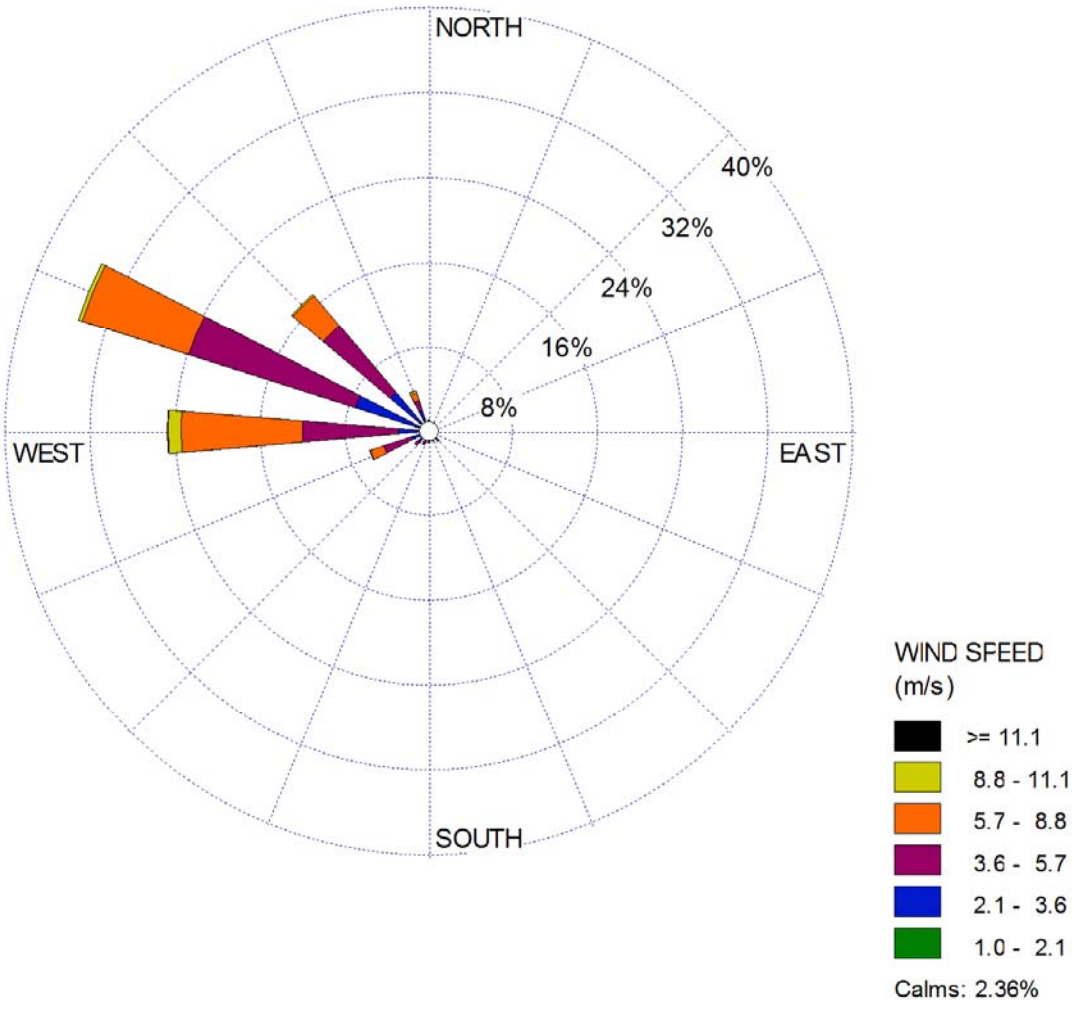
Annual CCP Meteorological Monitoring Station Wind Rose
(2001-2006)



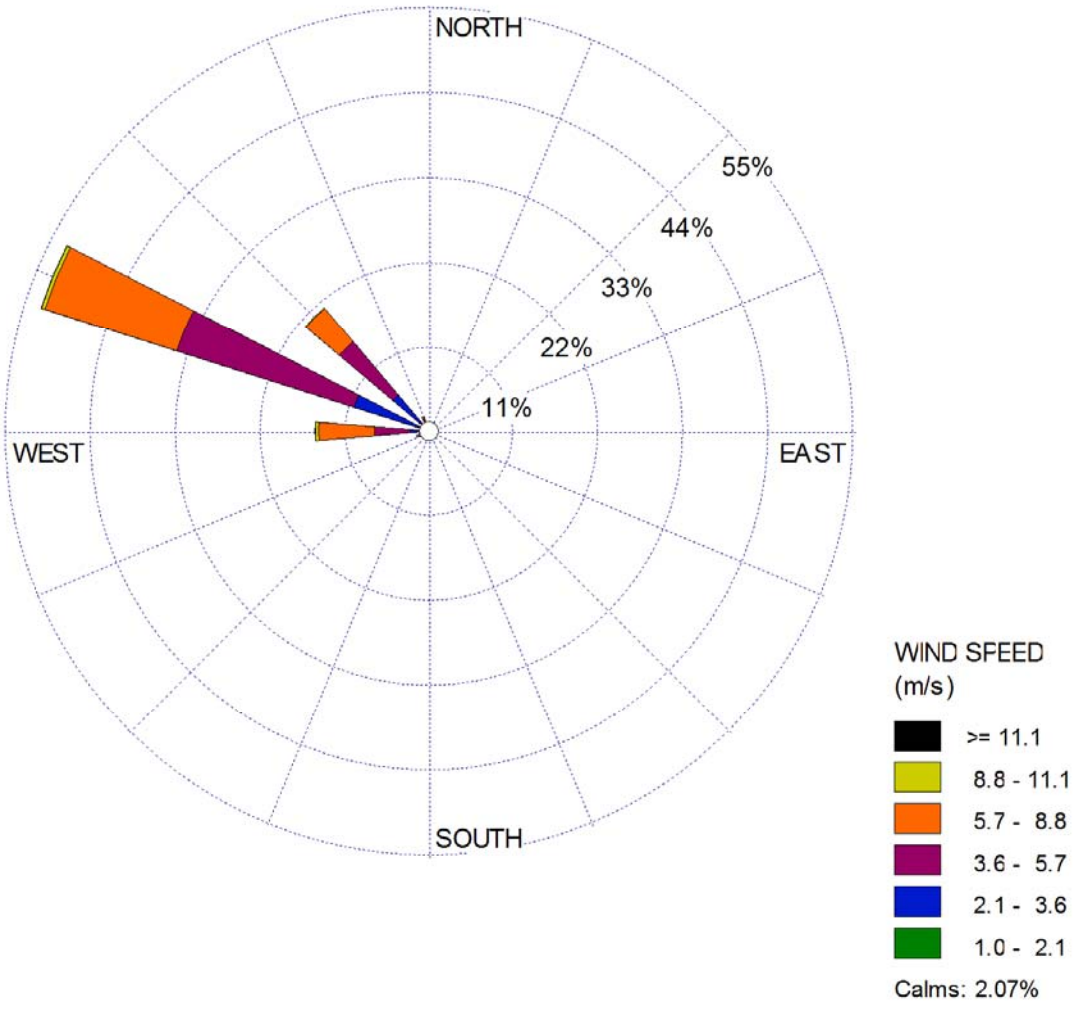
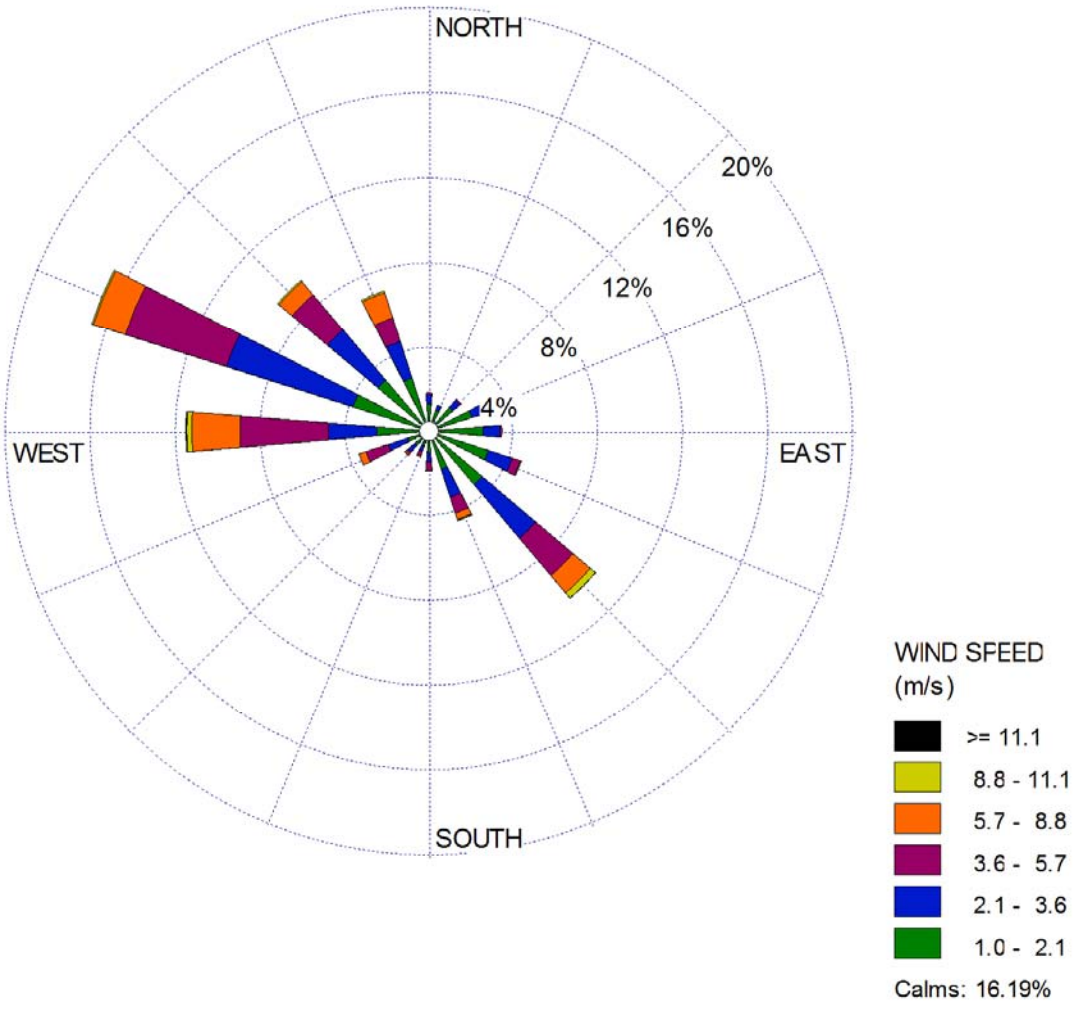
Winter CCP Meteorological Monitoring Station Wind Rose
(2001-2006)



Spring CCP Meteorological Monitoring Station Wind Rose
(2001-2006)



Summer CCP Meteorological Monitoring Station Wind Rose
(2001-2006)



Fall CCP Meteorological Monitoring Station Wind Rose
(2001-2006)