

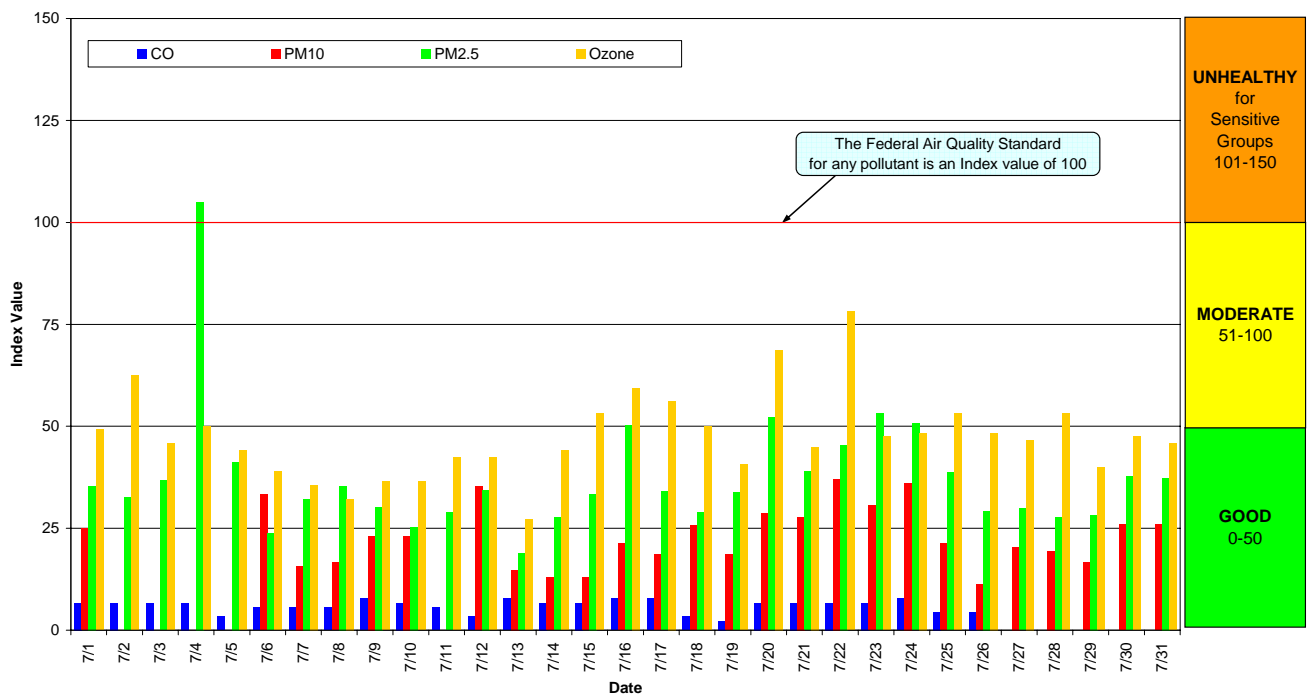
Spokane Regional Clean Air Agency Air Quality Report - July 2009

The Clean Air Act requires EPA to set National Ambient Air Quality Standards (NAAQS) for six common air pollutants, carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO₂), particulate matter (PM₁₀ and PM_{2.5}), ground-level ozone (O₃) and sulfur dioxide (SO₂). These are known as “criteria” pollutants because the US EPA established regulatory limits to concentrations in ambient air using human health or environmentally based criteria. See Appendix Table A-1 for a summary of the NAAQS. Carbon monoxide, particulate matter and ozone are monitored in Spokane County by the Spokane Regional Clean Air Agency (SRCAA) and the Washington State Department of Ecology (Ecology).

Figure 1 shows the daily maximum Air Quality Index (AQI) for each pollutant in July. The AQI is EPA’s color-coded tool for communicating daily air quality to the public and can be calculated for any of the criteria pollutants except lead, provided monitoring data are available. An index value above 100 indicates that the concentration of a criteria pollutant exceeded the limit established in the NAAQS. Categories of the AQI are “good” (green, 0-50), “moderate” (yellow, 51-100), “unhealthy for sensitive groups” (orange, 101-150), “unhealthy” (red, 151-200), “very unhealthy” (purple, 201-300) and “hazardous” (maroon, 301-500). See Appendix Table A-2 for more information about the AQI. The Spokane region’s air quality is usually in the good range of the AQI and sometimes in the moderate range, about 20-30 percent of the days each year. Only rarely, about once every three years, does it reach the unhealthy for sensitive groups category. For more information about the AQI, see EPA’s AirNow AQI web page (<http://airnow.gov/index.cfm?action=static.aqi>).

The data used for calculating the AQIs are obtained using automated air pollution monitoring methods that provide “real time” data, which the SRCAA uses in its day-to-day programs, e.g., air quality forecasting and burning curtailment. For measurement of particulate matter concentrations, the SRCAA operates a network of continuous particulate matter monitors consisting of Tapered Element Oscillating Microbalances (TEOM) and nephelometers. The Department of Ecology operates ozone monitors at Greenbluff, northeast of Spokane, and at Turnbull Wildlife Refuge, south of Cheney. Ecology also operates a CO monitor near the intersection of 3rd & Washington in downtown Spokane.

Figure 1: Air Quality Index (AQI) values for July 2009



An AQI of 105, based on the PM_{2.5} concentration, was recorded on July 4 at the Airway Heights monitoring station. The apparent cause of the elevated PM_{2.5} concentration was use of fireworks. The PM_{2.5} concentrations on July 20, 23 and 24 reached levels corresponding to the lower moderate range of the AQI because of smoke transported to the region from wildfires near Kelowna, British Columbia. Mid-range moderate levels of ground-level ozone at about the same time were caused by hot, sunny and stagnant conditions associated with an upper-atmosphere high pressure ridge over the Pacific Northwest.

Tables 1 and 2 contain the maximum AQI values for each pollutant for the month and for the year to date. Table 3 summarizes the year to date daily AQIs by category and compares them to last year's AQIs.

Table 1: Maximum AQI values and pollutant concentrations for this reporting period

Pollutant	AQI/Concentration	Location	Date
CO	8/0.7 ppm	3 rd & Washington	7/3, 7/9, 7/16, 7/17 and 7/24/09
PM ₁₀	37/40 µg/m ³	Turnbull Wildlife Refuge	7/22/09
PM _{2.5}	105/43 µg/m ³	Airway Heights	7/4/09
O3	78/0.068 ppm	Greenbluff	7/22/09

Table 2: Maximum AQI values and pollutant concentrations this year to date

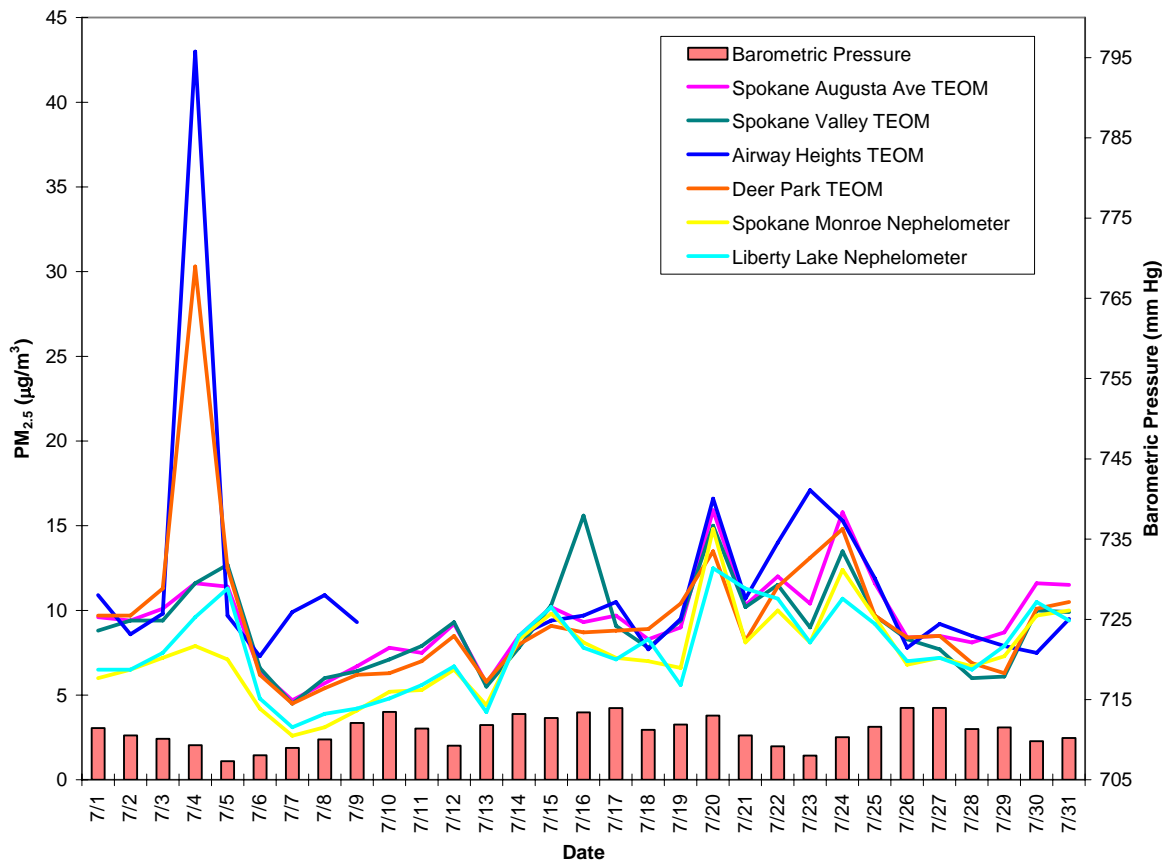
Pollutant	AQI/Concentration	Location	Date
CO	33/3 ppm	3 rd & Washington	4/1/09
PM ₁₀	44/47 µg/m ³	Freya & Ferry	3/15/09
PM _{2.5}	105/43 µg/m ³	Airway Heights	7/4/09
O3	78/0.068 ppm	Greenbluff	7/22/09

Table 3: AQI summary as of July 31, 2009

Category	Number of Days This Year	Last Year to Date
Good (0-50)	195	189
Moderate (51-100)	16	24
Unhealthy for Sensitive Groups (101-150)	1	0
Unhealthy (151-200)	0	0
Very Unhealthy (201-300)	0	0
Hazardous (>300)	0	0

Figure 2 shows the 24 hour average PM_{2.5} concentrations across the monitoring network as they change through the month. The higher PM_{2.5} concentrations measured at Airway Heights and Deer Park on July 4 are believed to have been caused by fireworks. The 24-hour average PM_{2.5} concentration at the Airway Heights station was 43 µg/m³, which exceeds the limit set by the NAAQS. However, the Airway Heights data are not submitted to EPA and are not used to determine compliance with the NAAQS. Airway Heights and Deer Park are the only places in Spokane County where personal use of fireworks is legal.

Figure 2: PM_{2.5} multi-station time series for July 2009



The Augusta monitoring station is located in a mixed commercial/light industrial and residential area on the eastern side of the City of Spokane and contains both automated and manual methods for monitoring PM_{2.5}. The manually-operated Federal Reference Method (FRM) is the “gold-standard” for measurement of the 24-hour average particulate matter concentration and meets the requirements for demonstrating attainment of federal air quality standards. The accuracy of the TEOM sample data can be verified by comparison with co-located FRM data. The correlation coefficient (R²) for the PM_{2.5} TEOM and FRM data was 0.89 for the month of July. The trend for the month was for the TEOM to over-report by about 2 μg/m³ compared to the FRM (Figure 3).

Figure 3: Comparison between Augusta Ave PM_{2.5} TEOM and FRM data for July 2009. The combined May, June and July data are shown in orange. Blue circles and trend line represent the data for July only.

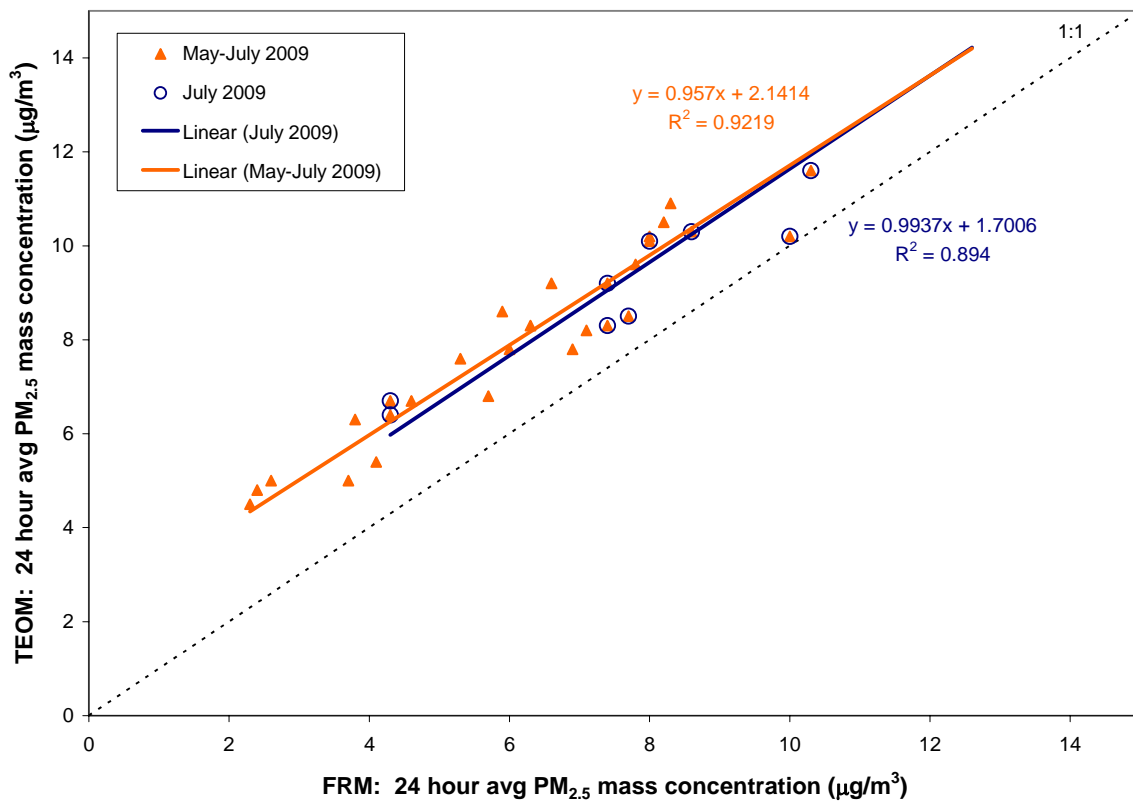


Figure 4 shows the eight hour running average daily maximum ozone concentrations measured within Spokane County in July. Daily maximum temperature can be used as a surrogate for solar radiation (ozone is formed through a photochemical reaction) for determining potential ozone maximum concentrations. The threshold for the moderate category for the AQI for ozone is 0.06 ppm averaged over eight hours. An ozone measurement above 0.075 ppm, also averaged over eight hours, exceeds the standard set under the NAAQS.

Figure 4: Eight hour maximum ozone concentrations for the Spokane region in July. Daily average wind speed and daily maximum temperature are also shown.

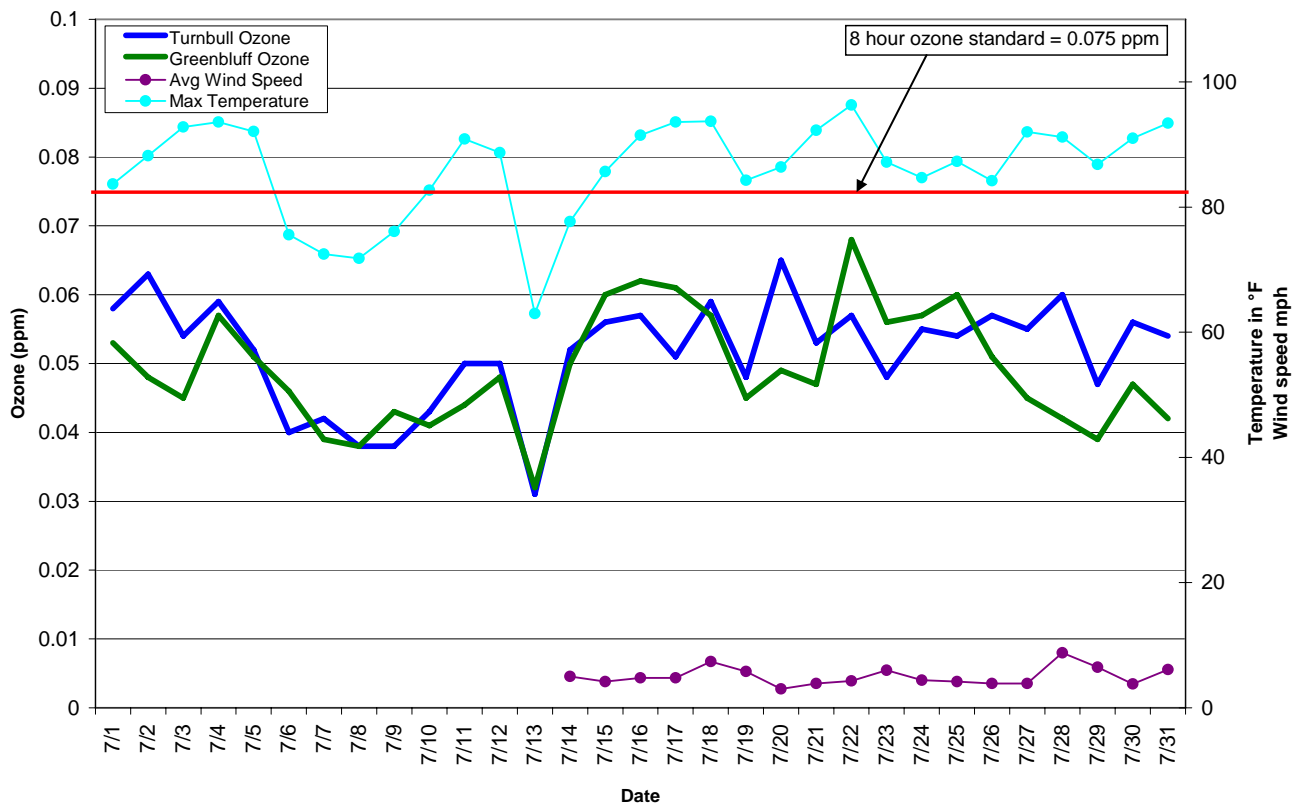


Table 4: Summary air quality data for July from all of the analyzers operated in Spokane County. The CO and data are 8-hour maximums in parts per million (ppm) and the PM data are 24-hour averages in micrograms per cubic meter of air ($\mu\text{g}/\text{m}^3$). There are no Turnbull PM_{2.5} FRM or Liberty Lake dichotomous PM data because SRCAA's microbalance was under repair.

Date	CO 3rd & Washington (ppm)	Ozone Greenbluff (ppm)	Ozone Turnbull Wildlife Refuge (ppm)	PM10 Augusta & Fiske TEOM ($\mu\text{g}/\text{m}^3$)	PM10 Augusta & Fiske FRM ($\mu\text{g}/\text{m}^3$)	PM2.5 Augusta & Fiske TEOM ($\mu\text{g}/\text{m}^3$)	PM2.5 Augusta & Fiske FRM ($\mu\text{g}/\text{m}^3$)	PM2.5 Monroe & College TEOM ($\mu\text{g}/\text{m}^3$)	PM2.5 Monroe & Wellesley nephelometer ($\mu\text{g}/\text{m}^3$)	PM10 Turnbull Wildlife Refuge TEOM ($\mu\text{g}/\text{m}^3$)	PM10 Turnbull Wildlife Refuge FRM ($\mu\text{g}/\text{m}^3$)	PM2.5 Turnbull Wildlife Refuge FRM ($\mu\text{g}/\text{m}^3$)	PM10 Liberty Lake ($\mu\text{g}/\text{m}^3$)	PM10-2.5 Liberty Lake ($\mu\text{g}/\text{m}^3$)	PM2.5 Liberty Lake ($\mu\text{g}/\text{m}^3$)	PM2.5 Liberty Lake nephelometer ($\mu\text{g}/\text{m}^3$)	PM2.5 Deer Park TEOM ($\mu\text{g}/\text{m}^3$)	PM2.5 Spokane Valley TEOM ($\mu\text{g}/\text{m}^3$)	PM2.5 Airway Heights TEOM ($\mu\text{g}/\text{m}^3$)
7/1	0.6	0.05	0.06	27		9.6		9.7	6	27						6.5	9.7	8.8	10.9
7/2	0.6	0.05	0.06			9.4		10	6.5							6.5	9.7	9.4	8.6
7/3	0.6	0.05	0.05			10.1	8	11	7.2							7.5	11.3	9.4	9.8
7/4	0.6	0.06	0.06			11.6		10.7	7.9							9.6	30.3	11.6	43
7/5	0.3	0.05	0.05			11.4		9.6	7.1							11.3	12.5	12.7	9.7
7/6	0.5	0.05	0.04	36	28	6.4	4	5.6	4.2	36	32	NA	NA	NA	NA	4.8	6.2	6.6	7.3
7/7	0.5	0.04	0.04	17		4.7		4.4	2.6	17						3.1	4.5	4.5	9.9
7/8	0.5	0.04	0.04	18		5.7		5.9	3.1	18						3.9	5.4	6	10.9
7/9	0.7	0.04	0.04	25		6.7	4	6.5	4.1	25						4.2	6.2	6.4	9.3
7/10	0.6	0.04	0.04	25		7.8		7.5	5.2	25						4.8	6.3	7.1	
7/11	0.5	0.04	0.05			7.5		8.9	5.3							5.6	7	7.9	
7/12	0.3	0.05	0.05	38	24	9.2	7	10.6	6.5	38	29	NA	NA	NA	NA	6.7	8.5	9.3	
7/13	0.7	0.03	0.03	16		5.7		5.2	4.4	16						4	5.8	5.5	
7/14	0.6	0.05	0.05	14		8.5		8.2	8.3	14						8.5	8	7.8	8.5
7/15	0.6	0.06	0.06	14		10.2	10	9.6	9.8	14						10.2	9.1	10.3	9.4
7/16	0.7	0.06	0.06	23		9.3		8.4	8.1	23						7.8	8.7	15.6	9.7
7/17	0.7	0.06	0.05	20		9.7		9.5	7.2	20						7.1	8.8	9.1	10.5
7/18	0.3	0.06	0.06	23	28	8.3	7	8	7	23	23	NA	NA	NA	NA	8.3	8.9	7.8	7.7
7/19	0.2	0.05	0.05	20		9		9.5	6.6	20						5.6	10.4	9.4	9.5
7/20	0.6	0.05	0.07	31		15.9		16.6	14.8	31						12.5	13.5	15	16.6
7/21	0.6	0.05	0.05	30		10.3	9	12	8.1	30						11.3	8.2	10.2	10.7
7/22	0.6	0.07	0.06	40		12		12.2	10	40						10.7	11.4	11.5	14
7/23	0.6	0.06	0.05	33		10.4		10.6	8.1	33						8.1	13.1	9	17.1
7/24	0.7	0.06	0.06	39	36	15.8	13	14.6	12.4	39	36	NA	NA	NA	NA	10.7	14.8	13.5	15.3
7/25	0.4	0.06	0.05	23		11.6			9.6	23						9.2	9.7	9.7	11.9
7/26	0.4	0.05	0.06	12		8.4		9	6.8	12						7	8.4	8.3	7.8
7/27		0.05	0.06	22		8.5	8	7.8	7.2	22						7.2	8.5	7.7	9.2
7/28		0.04	0.06	21		8.1		6.7	6.7	21						6.5	6.9	6	8.5
7/29		0.04	0.05	18		8.7		6.5	7.3	18						7.9	6.3	6.1	7.9
7/30		0.05	0.06	28	28	11.6	10	11.1	9.7	28	27	NA	NA	NA	NA	10.5	10.1	10	7.5
7/31		0.04	0.05	28		11.5		11.5	10	28						9.4	10.5	9.9	9.5
Max	0.7	0.07	0.07	40	35.7	15.9	12.6	16.6	14.8	40	36.2	NA	NA	NA	NA	12.5	30.3	15.6	43.0
Avg	0.5	0.05	0.05	25	28.5	9.4	8.1	9.2	7.3	25	29.6	NA	NA	NA	NA	7.6	9.6	9.1	11.6

Appendix

Table A-1: National Ambient Air Quality Standards

Pollutant	Primary Standards		Secondary Standards	
	Level	Averaging Time	Level	Averaging Time
Carbon Monoxide	9 ppm (10 mg/m ³)	8-hour ⁽¹⁾	None	
	35 ppm (40 mg/m ³)	1-hour ⁽¹⁾		
Lead	0.15 µg/m ³ ⁽²⁾	Rolling 3-Month Average	Same as Primary	
	1.5 µg/m ³	Quarterly Average	Same as Primary	
Nitrogen Dioxide	0.053 ppm (100 µg/m ³)	Annual (Arithmetic Mean)	Same as Primary	
Particulate Matter (PM ₁₀)	150 µg/m ³	24-hour ⁽³⁾	Same as Primary	
Particulate Matter (PM _{2.5})	15.0 µg/m ³	Annual ⁽⁴⁾ (Arithmetic Mean)	Same as Primary	
	35 µg/m ³	24-hour ⁽⁵⁾	Same as Primary	
Ozone	0.075 ppm (2008 std)	8-hour ⁽⁶⁾	Same as Primary	
	0.08 ppm (1997 std)	8-hour ⁽⁷⁾	Same as Primary	
	0.12 ppm	1-hour ⁽⁸⁾ (Applies only in limited areas)	Same as Primary	
Sulfur Dioxide	0.03 ppm	Annual (Arithmetic Mean)	0.5 ppm (1300 µg/m ³)	3-hour ⁽¹⁾
	0.14 ppm	24-hour ⁽¹⁾		

⁽¹⁾ Not to be exceeded more than once per year.

⁽²⁾ Final rule signed October 15, 2008.

⁽³⁾ Not to be exceeded more than once per year on average over 3 years.

⁽⁴⁾ To attain this standard, the 3-year average of the weighted annual mean PM_{2.5} concentrations from single or multiple community-oriented monitors must not exceed 15.0 µg/m³.

⁽⁵⁾ To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population oriented monitor within an area must not exceed 35 µg/m³ (effective December 17, 2006).

⁽⁶⁾ To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm. (Effective May 27, 2008)

⁽⁷⁾ (a) To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.08 ppm.
(b) The 1997 standard—and the implementation rules for that standard—will remain in place for implementation purposes as EPA undertakes rulemaking to address the transition from the 1997 ozone standard to the 2008 ozone standard.

⁽⁸⁾ (a) The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is ≤ 1.
(b) As of June 15, 2005 EPA revoked the 1-hour ozone standard in all areas except the 8-hour ozone nonattainment Early Action Compact (EAC) Areas.

Table A-2: Air pollutant breakpoints for the Air Quality Index.

Air Quality Index Levels of Health Concern	Color Code	Index Numerical Value	Breakpoints					Health Effects
			O ₃ (ppm) 8-hour	O ₃ (ppm) 1-hour ⁽¹⁾	PM _{2.5} (µg/m ³) 24-hour	PM ₁₀ (µg/m ³) 24-hour	CO (ppm) 8-hour	
Good	Green	0-50	0.000-0.059	⁽³⁾	0.0-15.4	0-54	0.0-4.4	Air quality is considered satisfactory and air pollution poses little or no risk.
Moderate	Yellow	51-100	0.060-0.075	⁽³⁾	15.5-35.4	55-154	4.5-9.4	Air quality is acceptable; however, for some pollutants there may be a moderate health concern for a very small number of people who are unusually sensitive to air pollution.
Unhealthy for Sensitive Groups	Orange	101-150	0.076-0.095	0.125-0.164	35.5-65.4	155-254	9.5-12.4	People especially sensitive to air pollution may experience health effects. The general public is not likely to be affected. An AQI in this category or above indicates that air pollution exceeds levels acceptable under federal air quality standards.
Unhealthy	Red	151-200	0.096-0.115	0.165-0.204	65.5-150.4	255-354	12.5-15.4	Everyone may begin to experience health effects; members of sensitive groups may experience more serious health effects.
Very Unhealthy	Purple	201-300	0.116-0.374	0.205-0.404	150.5-250.4	355-424	15.5-30.4	Health alert: everyone may experience more serious health effects.
Hazardous	Maroon	>300	⁽²⁾	0.405+	250.5+	425+	30.5+	Health warnings of emergency conditions. The entire population is more likely to be affected.

¹Areas are generally required to report the AQI based on 8-hour ozone values. However, there are a small number of areas where an AQI based on 1-hour ozone values would be more precautionary. In these cases, in addition to calculating the 8-hour ozone index value, the 1-hour ozone index value may be calculated, and the maximum of the two values reported.

²8-hour O₃ values do not define higher AQI values (≥ 301). AQI values of 301 or greater are calculated with 1-hour O₃ concentrations.

³There is no AQI for 1-hour O₃ concentrations below the Unhealthy for Sensitive Groups level.