

AS-50

Air Quality Assessment Program Air Monitoring Report 1992



TEXAS NATURAL RESOURCE CONSERVATION COMMISSION



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Air Quality Assessment Program Air Monitoring Report 1992

AS-50 March 1995



John Hall, Chairman Pam Reed, Commissioner Peggy Garner, Commissioner

Dan Pearson, Executive Director

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Texas Natural Resource Conservation Commission Monitoring Operations Division Data Management & Analysis Section

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Attn:	Monica Havelka Data Management & Analysis Section Monitoring Operations Division, Bldg. B MC 165	

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Introduction

This report provides a summary of routine air quality measurements collected by the Texas Natural Resource Conservation Commission (TNRCC) and these other government organizations: City of Dallas, City of Fort Worth, City of Houston, El Paso City-County Health District, Galveston County Health District, National Park Service, and the New Mexico Air Quality Bureau. It also includes measurements from these private monitoring networks: Houston Regional Monitoring Corporation (HRM), Southeast Texas Regional Planning Commission (SETRPC), and the Texas City/La Marque Community Air Monitoring Network (TCLMCM).

The U.S. Environmental Protection Agency (EPA) has established National Ambient Air Quality Standards (NAAQS) for six air pollutants: ozone (O_3) , carbon monoxide (CO), sulfur dioxide (SO_2) , nitrogen dioxide (NO_2) , respirable particulate matter (PM_{10}) , and lead. The gaseous pollutants — ozone, carbon monoxide, sulfur dioxide, and nitrogen dioxide — are monitored on a continuous basis with one-hour averages recorded for every hour of the day every day. Particulate matter and lead are sampled on a noncontinuous basis with one 24-hour average

recorded once every sixth day at most sites, although a few sites monitor every day or every other day.

In addition, the TNRCC and the EPA collect rain samples across the state to monitor for acid rain.

Table 1 shows the pollutant concentrations required to exceed the national standards as expressed in the units used in this report. Figure 1 shows the total number of TNRCC, other government and private monitoring sites in the State of Texas for each of the pollutants.

Table 1. Air Pollution ConcentrationsRequired to Exceed the NAAQS

Pollutant	Averaging	Primary	Secondary
	Period	NAAQS	NAAQS
03	1-hr ☆	125 ppb	125 ppb
CO	1-hr ☆☆	35.5 ppm	35.5 ppm
	8-hr ☆☆	9.5 ppm	9.5 ppm
SO ₂	3-hr ☆☆	—	550 ppb
	24-hr ☆☆	145 ppb	_
	Annual ☆☆☆	35 ppb	_
NO ₂	Annual ☆☆☆	54 ppb	54 ppb
PM10	24-hr ☆	155 μg/m ³	155 μg/m ³
	Annual ☆☆☆	51 μg/m ³	51 μg/m ³
Lead	Qtr ☆☆☆	1.55 μg/m ³	1.55 μg/m ³

☆ Not to be exceeded on more than three days over three years ☆☆ Not to be exceeded more than once per calendar year ☆☆☆ Not to be exceeded

Primary NAAQS — The levels of air quality that the EPA judges necessary, with an adequate margin of safety, to protect the public health. Secondary NAAQS — The levels of air quality that the EPA judges necessary to protect the public welfare from any known or anticipated adverse effects.

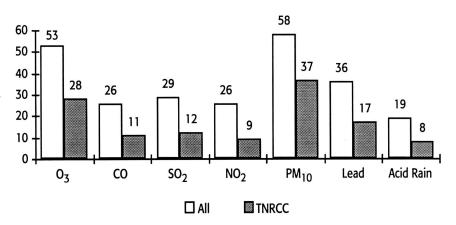
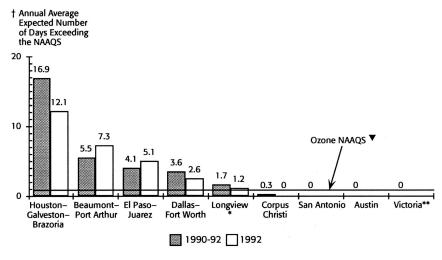


Figure 1. Number of Texas Air Monitoring Sites in 1992

Air Pollutant Summary

During 1992, the state, other government and private monitoring networks measured levels of ozone, carbon monoxide, and particulate matter above the concentration levels defined by the national standards. Measured levels of nitrogen dioxide, sulfur dioxide, and lead were below the standards. Figures 2 through 11 display comparisons of peak air pollutant measurements for metropolitan and regional areas where the pollutants are monitored. Each graph shows the highest measurement recorded at any one site in each of the areas. The graphs for carbon monoxide and sulfur dioxide also include the second



- † Expected number of days with highest one-hour concentration over 0.12 ppm as defined by EPA for NAAQS comparisons
- Annual average not to exceed 1.0 day per year over a three-year period
- * Each * indicates one year not meeting EPA completeness criteria; not valid for NAAQS comparison

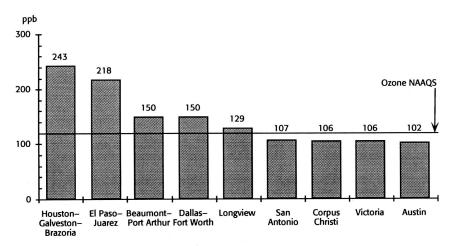


Figure 2. Highest Number of Ozone Exceedances in 1992

Figure 3. Highest Ozone One–Hour Averages in 1992

highest measurements, which are used for standard determinations.

Ozone measurements above 124 parts per billion (ppb) were recorded in the Beaumont-Port Arthur, Dallas-Fort Worth, El Paso, Houston-Galveston-Brazoria, and Longview-Marshall metropolitan areas. Measurements of ozone did not exceed 124 ppb during 1992 at any of the monitoring sites in the Austin, Corpus Christi, San Antonio, and Victoria areas. The highest ozone onehour average measurement during 1992 was 243 ppb in the Houston area.

Houston-Galveston-Brazoria, Beaumont-Port Arthur, Dallas-Fort Worth, El Paso, and Longview-Marshall are ozone nonattainment areas based on the number of expected exceedance days of the ozone standard. (Calculating the expected number of exceedance days is EPA's method for compensating for missing ozone measurements. The calculation is used to determine whether or not an area is in attainment of the standard. An exceedance day is any day when the maximum one-hour ozone concentration is greater than 124 ppb.)

Monitors recorded eighthour concentrations of carbon monoxide above 9 parts per million (ppm) only in El Paso, where a high measurement of 10.5 ppm was observed. In nearby Juarez, Mexico, the highest eighthour running average was 11.4 ppm. Two of the six U.S. sites in El Paso recorded violations of the eight-hour carbon monoxide standard.

One of the eight Texas sites in the El Paso-Juarez area recorded a daily respirable particulate matter measurement above 150 micrograms per cubic meter $(\mu g/m^3)$. Respirable particulate matter is made up of small, airborne particles that can be inhaled and lodge in the lungs. The high daily average was 166 $\mu g/m^3$. In Juarez the highest 24-hour measurement was 314 $\mu g/m^3$, and at adjacent New Mexico sites the peak was 110 $\mu g/m^3$.

Table 2 provides a summary listing of pollutant measurements taken at each site with a comparison to the standard for all of the air pollutants. Additional summary information is provided about each pollutant in the following sections of this chapter.

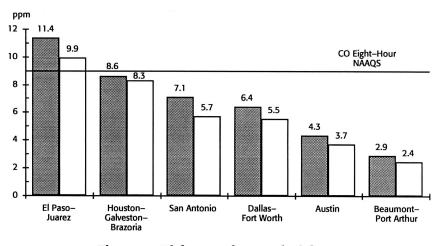


Figure 4. Highest and Second Highest CO Eight–Hour Averages in 1992

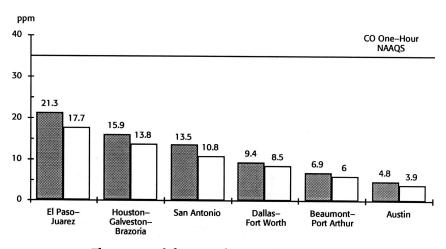
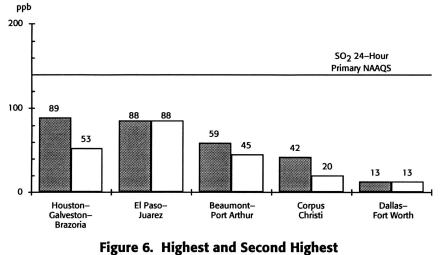


Figure 5. Highest and Second Highest CO One-Hour Averages in 1992



SO₂ 24–Hour Averages in 1992

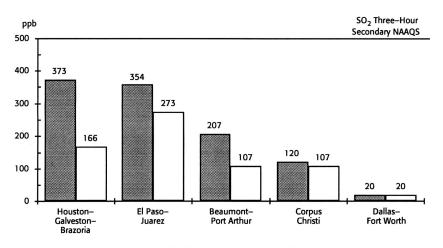


Figure 7. Highest and Second Highest SO₂ Three–Hour Averages in 1992

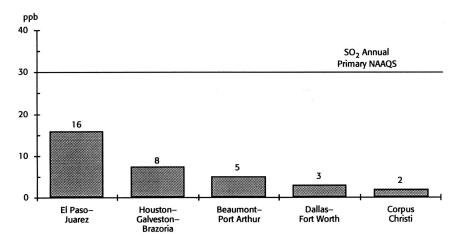
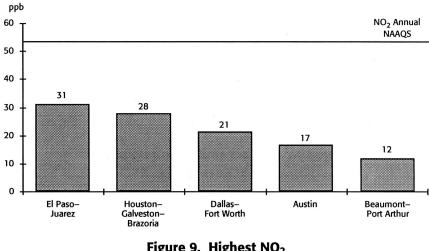
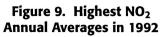


Figure 8. Highest SO₂ Annual Averages in 1992





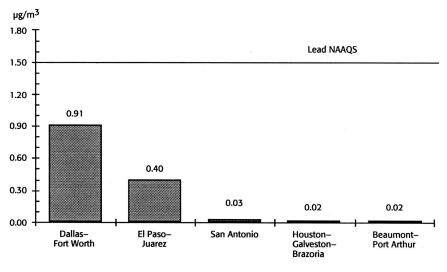
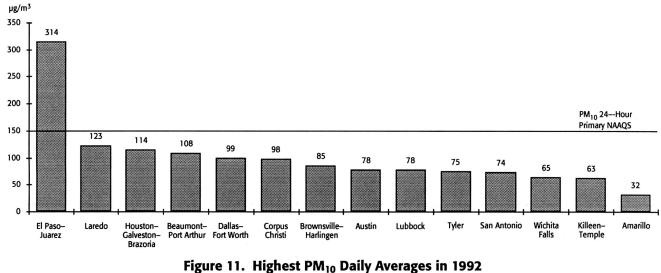
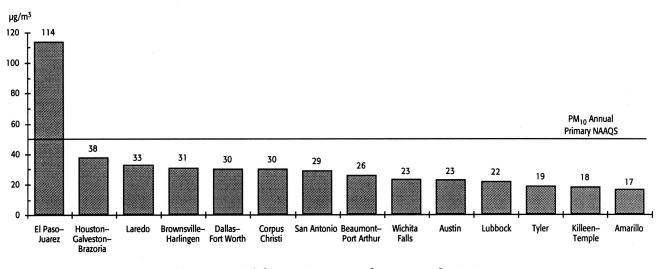


Figure 10. Highest Lead Quarterly Averages in 1992



(Including Exceptional Event Days)*

* Days when unusual, uncontrollable events occurred (primarily dust storms)





* Days when unusual, uncontrollable events occurred (primarily dust storms)

Table 2.	1992	Pollutant	Summary	by	Monitoring	Site
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		ble 2			llutan		mary	by M	onitor		τ		
	C)3	C)+		SO ₂ ⇔		NO ₂		PM10		Lea	ad
	High	Exp	2nd	2nd	2nd	2nd			High	Exp	Exp	High	Exc
Location	Hr	Exc	Hr	8-Hr	24-Hr	3-Hr	Ann	Ann	Day	Exc	Ann	Qtr	Qtr
	(ppb)	(days)	(ppm)	(ppm)	(ppb)	(ppb)	(ppb)	(ppb)	(µg/m ³)	(days)	(μg/m ³)	(µg/m ³)	
NAAQS	125	1.1	35.5	9.5	145	550	35	54	155	1.1	51	1.55	0
Amarillo MSA (T	NRCC R	legion	1)						I				
Amarillo									32	\$0.0	¢17		
Austin-San Marcos	MSA (T	NRCC Re			1			1 +17	I			1	
Downtown 32			6.0	3.7				¢17	78	0.0	23	<i>x</i>	
East North 25	101	0.0							/0	0.0	25		
Northwest 3	102	0.0											
Ridgetop									78	0.0	22		
Beaumont-Port Art	hur MSA	(TNRCC	Region	10)									
Beaumont 2	138	2.1	3.9	2.4	45	107	5	8	108	0.0	26	0.02	0
Kountze 85	111	0.0											
Marina							-					0.02	0
Port Arthur 28	132	3.2			43	103	4						
SETRPC 40	150	3.0						5					
SETRPC 42 SETRPC 43	151 148	5.0 7.1						10					
West Orange 9	137	1.1						12					
Big Bend National			ion 6)										
Brewster County	65	0.0			I			T	I				
Brazoria PMSA (TN			1		1			1	1				
Clute 11	134	3.7			I								
Brownsville-Harling	zen-San	Benito I	MSA (TN	RCC Reg	zion 15)								
Brownsville	1				1				85	0.0	31		
San Benito					ē.				73	0.0	24		
Corpus Christi M	SA (TN	RCC Re	gion 1	4)									
Leopard									97	\$0.0	\$ 28		
Navigation									98	\$0.0	\$ 30		
Tuloso 21	92 106	0.0 0.0			14 20	57 107	1						
West 4			<u>ا</u>		20	107	Z		I				
Dallas PMSA (TN Bonnieview	I 100	egion 4 0.0	{		I			12	1			I	
Boys Club	1 100	ų.u						'2	75	0.0	27	0.19	0
Cedar Hill									37	¢0.0	¢19	0.15	U
Chalk Hill									82	0.0	23	0.02	0
Coit									84	0.0	26		
Colony	120	0.0											
Convention									51	\$0.0	\$ 26	0.04	0
Denton Airport	150	*											
Dallas N 5	123	0.0						14				0.09	0
Douglas Earhart												0.04 0.05	0
Ervay	1		8.5	5.5								0.05	0
Farmers Branch	1			5.5								0.03	0
Frisco Acker	1											0.13	ŏ
Frisco Gould 2₩	1								1			0.25	Ō
Frisco Gould 4₩								1				0.58	0
Frisco 31	144	\$											-
Frisco 5th St. Garland	1		1									0.91	0
Hinton	140	1.0	7.5	5.4	10	20	2	21	1			0.08	0
Lancaster		1.0	1.5	J.4		20	2	1	78	0.0	22		
M.L. King										0.0	~~	0.05	0
Midlothian 4	,		1		1			N 1	47	0.0	17		5
Midlothian 5			1						30	\$0.0	¢19		
Midlothian 6					1				99	\$0.0	28		
Midlothian 7 Midlothian 8									50	¢0.0	17		
Midlothian 9									52 21	¢0.0 ¢0.0	16 ¢19		
Midlothian 11	1		1						34	≎0.0 ¢0.0	¢19 ¢16		
Midlothian 84									52	0.0 0.0	19		
Morrell	1		1		1				91	0.0	30	0.06	0
Nolen					1					0.0		0.04	ŏ
Palmer Paper	1				1			1				0.05	ŏ
Rector	1				1							0.06	0
					1			1	1			0.05	0
Sargent													
												0.03	0

Air pollution concentration required to exceed the NAAQS Number of actual exceedances; expected exceedances may be slightly higher t

Measurements for 1992 do not meet EPA completeness criteria ¢

Block averages, rounded to hundredths Relocated during 1992 ۰.

₩

Running averages, truncated to tenths +

					Sumi			nitori					
	0)+		SO24		NO ₂		PM ₁₀		Lea	Id
	High	Ехр	2nd	2nd	2nd	2nd			High	Exp	Exp	High	Exc
Location	Hr	Exc	, Hr	8-Hr	24-Hr	3-Hr	Ann	Ann	Day	Exc	Ann	Qtr	Qtr
	(ppb)	(days)	(ppm)	(ppm)	(ppb)	(ppb)	(ppb)	(ppb)	(µg/m ³)	(days)	(μg/m ³)	(µg/m ³)	
NAAQS	125	1.1	35.5	9.5	145	550	35	54	155	1.1	51	1.55	0
El Paso-Juarez				C Regi	on 6)								
Advance MX	218	*	14.8	7.7					314	10.0	114		
Anthony NM	1								110	0.0	39		
Chamizal	124	0.0	17.7	9.9					113	\$0.0	\$ 26		•
Downtown 6	112	0.0	16.0	9.3	48	240	10	31	÷.,			0.22	0
East 30	123 157	0.0 \$	12.3	7.0									
EPNG Building Ivanhoe	157	*	8.2	4.5					49	0.0	22		
Kern			0.2	4.5	56	227	11		73	0.0	~~~	0.17	0
La Union NM	117	0.0			16	81	3					0.17	Ŭ
Lindbergh	1	0.0				•••			41	0.0	22		
NE Clinic									47	0.0	21	0.10	0
Pestalozzi MX									189	\$2.0	\$58		
Race Track NM												0.40	0
Riverside									116	0.0	32		
Socorro									88	0.0	41		
Sunland NM	126	*			88	267	16		109	0.0	32	0.38	0
Techno MX	124	\$	16.0	8.8					135	0.0	40	0.00	~
Tillman	1.40	F 1	14.4	7.7		277	12	21	166	2.1	40	0.26	0
UTEP 12	142	5.1	10.9	6.4	54	273	12	21	146	0.0	44		
Vilas Zanco MX									212	2.0	58		
Zenco MX		TNDC							212	2.0	50		
Fort Worth-Arling	ston PMSA	(INKC			1				1			0.07	~
Downtown 16			5.6	4.0					51	0.0	20	0.03	0
FAA									47	¢0.0	¢20		
Geddes Keller 17	147	1.0							47	₩0.0	₩ 20		
NW 13	147	2.1	6.5	3.8	13	20	3	14					
Worth Heights	145	2.1	0.5	5.0		20	5	14	70	0.0	25	0.03	0
Galveston-Texas	City DMSA	TNPC	C Degi	on 12)									-
Fire Station	City Finda	linue	e negn		1				50	¢0.0	¢ 23	1	
Galveston Airport	198	\$							50	+0.0	+25		
Nessler Pool	150	-							103	\$0.0	\$ 24		
TCLMCM 34th St.	180	\$			20	53	¢ 2	8					
TCLMCM Ave. A	1.00	•			18	47	\$2	_					
TCLMCM Seawall		ľ			10	50	\$4	\$\$					
Texas City 10	126				19	50	4 4						
Guadalupe Moi		1.1			39	103	4		111	\$0.0	\$ 25	0.02	0
Culberson County			Park	(TNRCC	39	103			111	¢0.0	\$ 25	0.02	0
	untains N		l Park	(TNRCC	39	103			111	¢0.0	\$ 25	0.02	0
Houston PMSA	untains N 80	lationa ¢		(TNRCC	39	103						0.02	0
Houston PMSA Aldine 8	untains N 80	lationa ¢		(TN R C C	39 Regio	103 n 6)	4	¢15	111 62	¢0.0 ¢0.0	\$25 \$30	0.02	0
Houston PMSA Aldine 8 Baytown 24	untains N 80 (TNRCC	lationa ¢ Region	12)		39	103			62	¢0.0	\$ 30		
Houston PMSA Aldine 8 Baytown 24 Bingle	UNTAINS N 80 (TNRCC 200	lationa ¢ Region 9.4	12) 10.1	8.1	39 Regio 23	103 n 6) 50	8	¢15	62 100	¢0.0 0.0	\$ 30 26	0.01	0
Houston PMSA Aldine 8 Baytown 24 Bingle Clinton	untains N 80 (TN R CC 200 220	lationa ¢ Region 9.4 8.2	12) 10.1 6.8	8.1 4.7	39 Regio 23 31	103 n 6) 50 110	4 8 6	\$15 23	62 100 103	¢0.0 0.0 0.0	¢30 26 38		
Houston PMSA Aldine 8 Baytown 24 Bingle Clinton Crawford	UNTAINS N 80 (TN R CC 200 220 220 208	lationa	12) 10.1	8.1	39 Regio 23 31 32	103 n 6) 50 110 60	4 8 6 7	¢15	62 100	¢0.0 0.0	\$ 30 26	0.01	0
Houston PMSA Aldine 8 Baytown 24 Bingle Clinton Crawford Croquet	Untains N 80 (TN R CC 200 220 220 208 178	ationa Region 9.4 8.2 4.6 6.7	12) 10.1 6.8	8.1 4.7	39 Regio 23 31 32 13	103 n 6) 50 110 60 27	4 8 6 7 3	\$15 23	62 100 103	¢0.0 0.0 0.0	¢30 26 38	0.01	0
Houston PMSA Aldine 8 Baytown 24 Bingle Clinton Crawford Croquet Deer Park 18	Unitains N 80 (TNRCC 200 220 208 178 198	ationa Region 9.4 8.2 4.6 6.7 2.3	12) 10.1 6.8 8.3	8.1 4.7 5.1	39 Regio 23 31 32 13 10	103 n 6) 50 110 60 27 33	4 8 6 7 3 1	\$15 23 28	62 100 103 103	≎0.0 0.0 0.0 0.0	\$ 30 26 38 30	0.01 0.02	0 0
Houston PMSA Aldine 8 Baytown 24 Bingle Clinton Crawford Croquet Deer Park 18 East 1	Untains N 80 (TN R CC 200 220 220 208 178	ationa Region 9.4 8.2 4.6 6.7	12) 10.1 6.8	8.1 4.7	39 Regio 23 31 32 13	103 n 6) 50 110 60 27	4 8 6 7 3	\$15 23	62 100 103	¢0.0 0.0 0.0	¢30 26 38	0.01 0.02	0 0 0
Houston PMSA Aldine 8 Baytown 24 Bingle Clinton Crawford Croquet Deer Park 18 East 1 Fulton	Unitains N 80 (TNRCC 200 220 208 178 198 225	ationa ★ Region 9.4 8.2 4.6 6.7 2.3 6.8	12) 10.1 6.8 8.3	8.1 4.7 5.1	39 Regio 23 31 32 13 10	103 n 6) 50 110 60 27 33	4 8 6 7 3 1	\$15 23 28	62 100 103 103	≎0.0 0.0 0.0 0.0	\$ 30 26 38 30	0.01 0.02	0 0
Houston PMSA Aldine 8 Baytown 24 Bingle Clinton Crawford Croquet Deer Park 18 East 1 Fulton Harris NW 26	Unitains N 80 (TNRCC 200 208 178 198 225 176	ationa	12) 10.1 6.8 8.3 12.1	8.1 4.7 5.1 6.6	39 Regio 23 31 32 13 10 19	103 n 6) 50 110 60 27 33 80	4 8 6 7 3 1 4	 ★15 23 28 17	62 100 103 103 99	☆ 0.0 0.0 0.0 0.0	 \$30 26 38 30 \$34 	0.01 0.02	0 0 0
Houston PMSA Aldine 8 Baytown 24 Bingle Clinton Crawford Croquet Deer Park 18 East 1 Fulton Harris NW 26 HRM 1	Untains N 80 (TNRCC 200 220 208 178 198 225 176 229	ationa ★ Region 9.4 8.2 4.6 6.7 2.3 6.8 10.2 10.3	12) 10.1 6.8 8.3 12.1 7.9	8.1 4.7 5.1 6.6 5.2	39 Regio 23 31 32 13 10 19 24	103 n 6) 50 110 60 27 33 80 89	4 8 6 7 3 1 4 5	 ★15 23 28 17 27 	62 100 103 103 99 97	 ★0.0 0.0 0.0 0.0 \$0.0 \$0.0 NA 	\$ 30 26 38 30	0.01 0.02	0 0 0
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Houston PMSA Aldine 8 Baytown 24 Bingle Clinton Crawford Croquet Deer Park 18 East 1 Fulton Harris NW 26 HRM 1 HRM 3 HRM 4 HRM 7	Untains N 80 (TNRCC 200 220 208 178 198 225 176 229 209	ationa ★ Region 9.4 8.2 4.6 6.7 2.3 6.8 10.2 10.3 10.4	12) 10.1 6.8 8.3 12.1 7.9 7.0	8.1 4.7 5.1 6.6 5.2 5.2 2.3	39 Regio 23 31 32 13 10 19 24 53 10	103 n 6) 50 110 60 27 33 80 89 166 48	4 8 6 7 3 1 4 5 6 1	 ★15 23 28 17 27 22 17 	62 100 103 103 99 99 97 102	 \$0.0 0.0 0.0 0.0 \$0.0 \$	 ☆30 26 38 30 ☆34 30 34 	0.01 0.02	0 0 0
Houston PMSA Aldine 8 Baytown 24 Bingle Clinton Crawford Croquet Deer Park 18 East 1 Fulton Harris NW 26 HRM 1 HRM 3 HRM 4 HRM 7 HRM 8	Unitains N 80 (TNRCC 200 220 208 178 198 225 176 229 209 209 208 243	ationa Region 9.4 8.2 4.6 6.7 2.3 6.8 10.2 10.3 10.4 10.1 12.2	12) 10.1 6.8 8.3 12.1 7.9 7.0 3.0 5.3	8.1 4.7 5.1 6.6 5.2 5.2 2.3 3.0	39 Regio 23 31 32 13 10 19 24 53 10 21	103 n 6) 50 110 60 27 33 80 89 166 48 62	4 8 6 7 3 1 4 5 6 1 2	 ↓15 23 28 17 27 27 27 17 19 	62 100 103 103 99 99 97 102	 \$0.0 0.0 0.0 0.0 \$0.0 \$	 ☆30 26 38 30 ☆34 30 34 	0.01 0.02	0 0 0
Houston PMSA Aldine 8 Baytown 24 Bingle Clinton Crawford Croquet Deer Park 18 East 1 Fulton Harris NW 26 HRM 1 HRM 3 HRM 4 HRM 7	Unitains N 80 (TNRCC 200 208 178 198 225 176 229 209 209 208 243 202	ationa Region 9.4 8.2 4.6 6.7 2.3 6.8 10.2 10.3 10.4 10.1 12.2 7.2	12) 10.1 6.8 8.3 12.1 7.9 7.0 3.0 5.3 3.7	8.1 4.7 5.1 6.6 5.2 2.3 3.0 2.5	39 Regio 23 31 32 13 10 19 24 53 10 21 10	103 n 6) 50 110 60 27 33 80 89 166 48 62 26	4 8 6 7 3 1 4 5 6 1 2 1	*15 23 28 17 27 27 22 17 19 13	62 100 103 103 99 97 102 48	 ☆0.0 0.0 0.0 ☆0.0 ☆0.0 NA NA NA 	 \$\$30 26 38 30 \$34 30 34 22 	0.01 0.02 0.02 0.01	0 0 0 0
Houston PMSA Aldine 8 Baytown 24 Bingle Clinton Crawford Croquet Deer Park 18 East 1 Fulton Harris NW 26 HRM 1 HRM 3 HRM 4 HRM 7 HRM 8 HRM 10	Unitains N 80 (TNRCC 200 208 178 198 225 176 229 209 209 208 243 202 159	ationa ★ Region 9.4 8.2 4.6 6.7 2.3 6.8 10.2 10.3 10.4 10.1 12.2 7.2 3.1 6.1	12) 10.1 6.8 8.3 12.1 7.9 7.0 3.0 5.3 3.7 1.2 1.8	8.1 4.7 5.1 6.6 5.2 5.2 2.3 3.0 2.5 0.8 0.9	39 Regio 23 31 32 13 10 19 24 53 10 21 10 4	103 n 6) 50 110 60 27 33 80 89 166 48 62 26 16	4 8 6 7 3 1 4 5 6 1 2 1 2 1 <1	 \$\$15 23 28 17 27 22 17 19 13 8 12 	62 100 103 103 99 99 97 102	 \$0.0 0.0 0.0 0.0 \$0.0 \$	 ☆30 26 38 30 ☆34 30 34 	0.01 0.02	0 0 0
Houston PMSA Aldine 8 Baytown 24 Bingle Clinton Crawford Croquet Deer Park 18 East 1 Fulton Harris NW 26 HRM 1 HRM 3 HRM 4 HRM 7 HRM 8 HRM 10 HRM 11	untains N 80 (TNRCC 200 208 178 198 225 176 229 209 209 208 243 202 159 173 183	ationa ★ Region 9.4 8.2 4.6 6.7 2.3 6.8 10.2 10.3 10.4 10.1 12.2 7.2 3.1 6.1 6.7	12) 10.1 6.8 8.3 12.1 7.9 7.0 3.0 5.3 3.7 1.2	8.1 4.7 5.1 6.6 5.2 5.2 2.3 3.0 2.5 0.8	39 Regio 23 31 32 13 10 19 24 53 10 21 10 4 5	103 n 6) 50 110 60 27 33 80 89 166 48 62 26 16 23	4 8 6 7 3 1 4 5 6 1 2 1 1 <1	*15 23 28 17 27 27 27 19 13 8	62 100 103 103 99 97 102 48	 ☆0.0 0.0 0.0 ☆0.0 ☆0.0 NA NA NA 	 \$\$30 26 38 30 \$34 30 34 22 	0.01 0.02 0.02 0.01	0 0 0 0
Houston PMSA Aldine 8 Baytown 24 Bingle Clinton Crawford Croquet Deer Park 18 East 1 Fulton Harris NW 26 HRM 1 HRM 3 HRM 4 HRM 7 HRM 8 HRM 10 HRM 11 Kress	Unitains N 80 (TNRCC 200 220 208 178 198 225 176 229 209 208 243 202 159 173 183 218	ationa ★ Region 9.4 8.2 4.6 6.7 2.3 6.8 10.2 10.3 10.4 10.1 12.2 7.2 3.1 6.1 6.7 8.7	12) 10.1 6.8 8.3 12.1 7.9 7.0 3.0 5.3 3.7 1.2 1.8	8.1 4.7 5.1 6.6 5.2 5.2 2.3 3.0 2.5 0.8 0.9	39 Regio 23 31 32 13 10 19 24 53 10 21 10 4 5 5 40	103 n 6) 50 110 60 27 33 80 89 166 48 62 26 16 23 117	4 8 6 7 3 1 4 5 6 1 2 1 4 1 2 1 1 <1 1 5 6	 \$\$15 23 28 17 27 22 17 19 13 8 12 	62 100 103 103 99 97 102 48 108	 \$0.0 0.0 0.0 \$0.0 	 \$\$30 26 38 30 \$\$34 30 34 22 34 	0.01 0.02 0.02 0.01	0 0 0 0
Houston PMSA Aldine 8 Baytown 24 Bingle Clinton Crawford Croquet Deer Park 18 East 1 Fulton Harris NW 26 HRM 1 HRM 3 HRM 4 HRM 7 HRM 8 HRM 10 HRM 11 Kress Lang Manchester 22 Monroe	Unitains N 80 (TNRCC 200 208 178 198 225 176 229 209 208 243 202 159 173 183 218 220	ationa ★ Region 9.4 8.2 4.6 6.7 2.3 6.8 10.2 10.3 10.4 10.1 12.2 7.2 3.1 6.1 6.7 8.7 6.2	12) 10.1 6.8 8.3 12.1 7.9 7.0 3.0 5.3 3.7 1.2 1.8	8.1 4.7 5.1 6.6 5.2 5.2 2.3 3.0 2.5 0.8 0.9	39 Regio 23 31 32 13 10 19 24 53 10 21 10 4 5 5 40 18	103 n 6) 50 110 60 27 33 80 89 166 48 62 26 16 23 117 43	4 8 6 7 3 1 4 5 6 1 2 1 <1 <1 <1 <1 6 4	 \$\$15 23 28 17 27 22 17 19 13 8 12 	62 100 103 103 99 97 102 48	 ☆0.0 0.0 0.0 ☆0.0 ☆0.0 NA NA NA 	 \$\$30 26 38 30 \$34 30 34 22 	0.01 0.02 0.02 0.01	0 0 0 0
Houston PMSA Aldine 8 Baytown 24 Bingle Clinton Crawford Croquet Deer Park 18 East 1 Fulton Harris NW 26 HRM 1 HRM 3 HRM 4 HRM 7 HRM 8 HRM 10 HRM 10 HRM 11 Kress Lang Manchester 22 Monroe N Wayside	Unitains N 80 (TNRCC 200 220 208 178 198 225 176 229 209 208 243 202 159 173 183 218	ationa ★ Region 9.4 8.2 4.6 6.7 2.3 6.8 10.2 10.3 10.4 10.1 12.2 7.2 3.1 6.1 6.7 8.7	12) 10.1 6.8 8.3 12.1 7.9 7.0 3.0 5.3 3.7 1.2 1.8	8.1 4.7 5.1 6.6 5.2 5.2 2.3 3.0 2.5 0.8 0.9	39 Regio 23 31 32 13 10 19 24 53 10 21 10 4 5 5 40	103 n 6) 50 110 60 27 33 80 89 166 48 62 26 16 23 117	4 8 6 7 3 1 4 5 6 1 2 1 4 1 2 1 1 <1 1 5 6	 \$\$15 23 28 17 27 22 17 19 13 8 12 	62 100 103 103 99 97 102 48 108 103	 \$0.0 0.0 0.0 \$0.0 \$0.0 \$0.0 NA NA NA 0.0 \$0.0 	 \$\$30 26 38 30 \$34 30 34 22 34 \$28 	0.01 0.02 0.02 0.01	0 0 0 0
Houston PMSA Aldine 8 Baytown 24 Bingle Clinton Crawford Croquet Deer Park 18 East 1 Fulton Harris NW 26 HRM 1 HRM 3 HRM 4 HRM 7 HRM 8 HRM 7 HRM 8 HRM 10 HRM 11 Kress Lang Manchester 22 Monroe	Unitains N 80 (TNRCC 200 208 178 198 225 176 229 209 208 243 202 159 173 183 218 220	ationa ★ Region 9.4 8.2 4.6 6.7 2.3 6.8 10.2 10.3 10.4 10.1 12.2 7.2 3.1 6.1 6.7 8.7 6.2	12) 10.1 6.8 8.3 12.1 7.9 7.0 3.0 5.3 3.7 1.2 1.8	8.1 4.7 5.1 6.6 5.2 5.2 2.3 3.0 2.5 0.8 0.9	39 Regio 23 31 32 13 10 19 24 53 10 21 10 4 5 5 40 18	103 n 6) 50 110 60 27 33 80 89 166 48 62 26 16 23 117 43	4 8 6 7 3 1 4 5 6 1 2 1 <1 <1 <1 <1 6 4	 \$\$15 23 28 17 27 22 17 19 13 8 12 	62 100 103 103 99 97 102 48 108	 \$0.0 0.0 0.0 \$0.0 	 \$\$30 26 38 30 \$\$34 30 34 22 34 	0.01 0.02 0.02 0.01	0 0 0 0

Table 2. 1992 Pollutant Summary by Monitoring Site (continued)

Air pollution concentration required to exceed the NAAQS

Number of actual exceedances; expected exceedances may be slightly higher t

✿ Measurements for 1992 do not meet EPA completeness criteria

Block averages, rounded to hundredths Relocated during 1992 ۰.

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Running averages, truncated to tenths +

14	DIE Z.	199	Z FUI	acant	Juin	mary i	by mit				nunu	cuj	
	C	3	CC)+		SO2+		NO ₂		PM ₁₀		Lea	Id
Location	High Hr (ppm)	Exp Exc (days)	2nd Hr (ppm)	2nd 8-Hr (ppm)	2nd 24-Hr _(ppb)	2nd 3-Hr _(ppb)	Ann (ppb)	Ann (ppb)	High Day (µg/m ³)	Exp Exc (days)	Exp Ann (µg/m ³)	High Qtr (µg/m ³)	Exc Qtr
NAAQS	125	1.1	35.5	9.5	145	550	35	54	155	1.1	51	1.55	0
Killeen-Temple Temple	MSA (T	NRCCR	egion	9)					63	0.0	18		-
Laredo MSA (TNRCO Laredo	Region	15)							123	¢0.0	\$ 33		
Longview-Marshall Longview 19	MSA (TI 129	NRCC Re 1.1	gion 5)										
Lubbock MSA (TI Lubbock	NRCC R	egion 2	.)						78	0.0	22		
San Antonio MS/	A (TNRO	CC Regi	on 13)										
Airport		-										0.02	0
Downtown 27 East Kelly ITC			10.8	5.7					58 72	0.0 0.0	25 29	0.03	0
New Braunfels 3 New Braunfels 4									20 22	¢0.0 ¢0.0	¢13 ¢11		
North 7 Northwest 23	107 98	0.0 0.0	9.1	4.1					74	0.0 0.0	21		
Tyler MSA (TNRC	C Regi	on 5)											
Tyler									75	0.0	19		
Wichita Falls MS Wichita Falls	A (TNR	CC Reg	ion 3)						65	¢0.0	\$ 23		
Victoria MSA (TN		egion 1	4)										
Victoria 87	106	0.0											

Table 2. 1992 Pollutant Summary by Monitoring Site (continued)

Air pollution concentration required to exceed the NAAQS

+ Number of actual exceedances; expected exceedances may be slightly higher

✿ Measurements for 1992 do not meet EPA completeness criteria

Block averages, rounded to hundredths

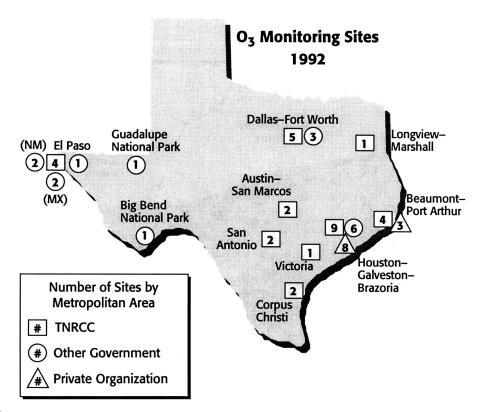
✤ Relocated during 1992

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Running averages, truncated to tenths

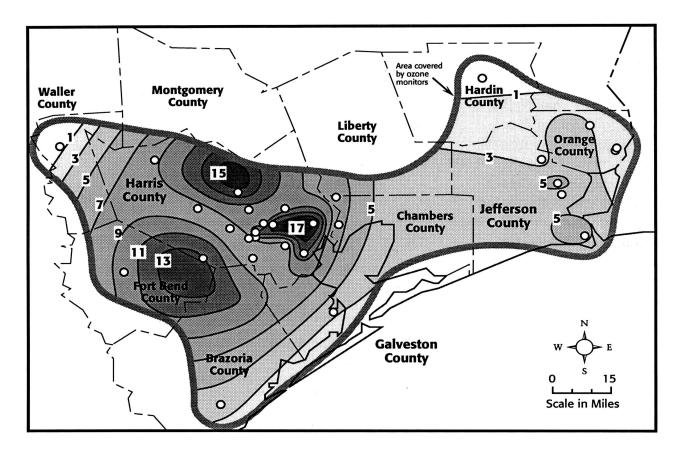
Ozone

During 1992, the TNRCC, other government and private networks continuously monitored ozone at 53 sites in Texas. In addition, New Mexico and Mexico each operated two ozone monitors across their respective borders from El Paso. The map at right shows the distribution of ozone monitors across the state. Unlike other gaseous pollutants, ozone is not emitted directly into the atmosphere. Instead, it is created in the atmosphere by the action of sunlight on volatile organic compounds and nitrogen oxides. In Texas, higher levels of ozone usually occur on sunny days with light winds, primarily from March through October. An ozone exceedance day is counted if the peak one-hour average ozone concentration measured exceeds the standard. Then, the expected exceedance days are determined from the actual number of measured exceedances with adjustments to account for missing data according to EPA guidelines. In order to demonstrate attainment of the standard, the average annual number of expected exceedances must not exceed 1.1 day per year over a three-year period.

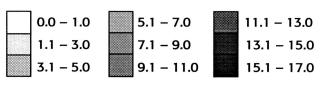


Figures 13, 14, and 15 show the distribution of the number of expected ozone exceedances for 1990-1992 for the Houston, Dallas-Fort Worth, and El Paso areas. Table 3 provides a summary of ozone measurements for 1992 and expected exceedances for 1990-1992. The listings include all of the TNRCC, other government and private monitoring sites. The table listings are grouped alphabetically by metropolitan area. The monitoring sites for each area are arranged in descending order from the highest measured one-hour concentration. The Aerometric Information

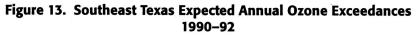
Retrieval System (AIRS) number for each site is listed along with the site name. The AIRS number is part of the EPA's system for keeping track of air monitoring sites nationwide. The percent completeness shown in this table is based on the ozone season and indicates the percentage of the ozone season for which valid data were obtained according to EPA guidelines.

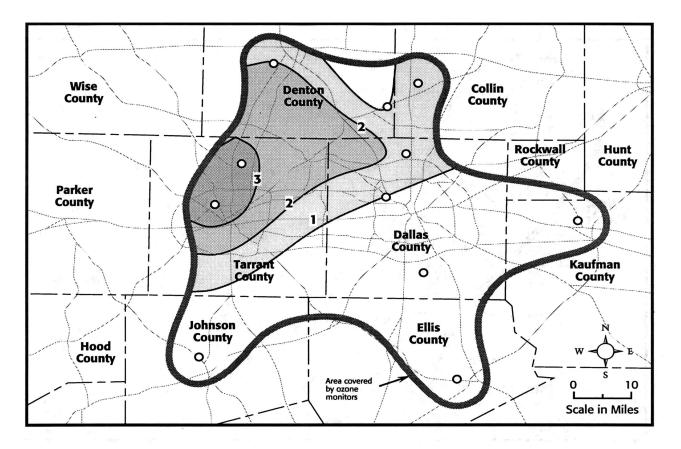


Key

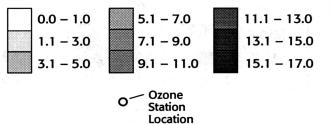


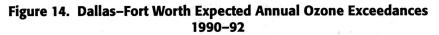


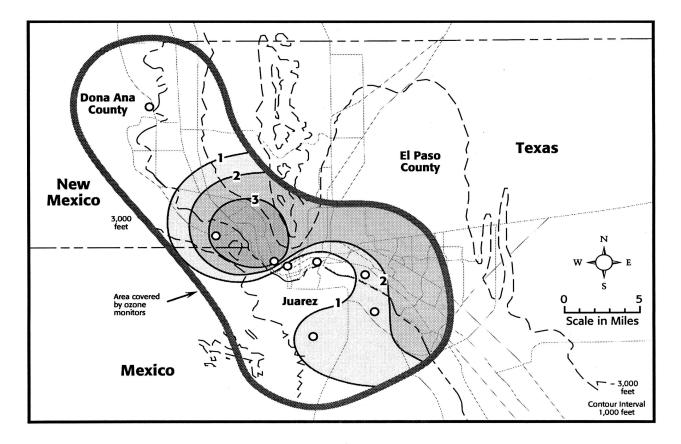












Key

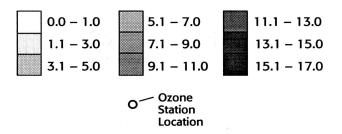


Figure 15. El Paso Expected Annual Ozone Exceedances 1990–92

AIRS Site Name I-Hr High (pp) 1-Hr (pp) Exp Exc (bays/yr) Exp Exc (bays/yr) Exp Exc (bays/yr) Percent Completeness NAAQS E 125 • • • • • 0	Table 3. Ozone Summary 1992										
NAA05 Imacros MAR (NRCC Region 1) 491.1 365 45300145 Austin NW 3 101 99 0.0 0.0 76 Beaumont-Port Arthur MSA (INRCC Region 10) 30.0 0.0 76 76 24501019 SETRPC 42 150 144.5 3.0 3.4 99 24501029 SETRPC 43 148 137 7.1 2.4 98 24500035 Beaumont 2 138 136 2.1 2.7 98 2450015 Port Arthur 28 132 130 3.1 3.5 83 2450016 Beaumont 2 138 136 0.0 -73 84 2450015 Fort Arthur 28 132 130 3.1 3.5 93 2450016 Berwster County 65 65 0.0 -73 85 35500265 Tusto 21 106 97 0.0 0.3 89 35500265 Tusto 21 120 0.0 0.9 97 100 0.0 97 1210025 Bento Arthur MS (TRCC Region 4)<	AIRS	Site Name		1-Hr High		1990-92	Percent				
Austin-San Marcos MSA (TNRCC Region 1)		-		Γ		-					
45300145 Austin NW 3 102 99 0.0 0.0 89 45300055 Austin N 25 101 89 0.0 0.0 76 Beaumont - Port Arthur MSA (TNRCC Region 10)	Austin-San	Marcos MSA (TNR	CC Region 1	1)							
Beaumont-Port Arthur M SA (TNRCC Region 10)	4530014S	Austin NW 3	102	99	0.0	0.0	89				
2450101P SETRPC 40 150 144 3.0 5.4 99 2450102P SETRPC 43 148 137 7.1 6.4 98 2450102P SETRPC 43 148 137 7.1 6.4 98 2450015 Beaumont 2 138 136 2.1 2.7 96 3611001S West Orange 9 137 124 1.1 2.0 88 2450015 Ford Arthur 28 132 130 3.1 3.5 93 3500205 Kountze 85 111 107 0.0 0.4 73 Big Bend National Park (TNRCC Region 14)					0.0	0.0	76				
3611100P SETRPC 42 151 145 5.0 5.0 5.0 5.0 2450002P Beaumont 2 138 136 2.1 2.7 96 3611001S West Orange 9 137 124 1.1 2.0 88 2450002P Kest Orange 9 137 124 1.1 2.0 88 2450011S Port Arthur 28 132 130 3.1 3.5 93 1990022S Kountze 85 11 107 0.0 0.4 73 Big Bend National Park (TNRCC Region 14)											
2450102P SETRPC 43 148 137 7.1 6.4 96 2450005S Beaumont 2 138 136 2.1 2.7 96 2450015 West Orange 9 137 124 1.1 2.0 88 19900025 Kountze 85 111 107 0.0 0.4 73 Big Bend National Park (TNRCC Region 6) 34301016 Brewster County 65 65 0.0 90 Corpus Christi MSA (TNRCC Region 14) 35500255 West 4 106 97 0.0 0.3 89 35500255 West 4 106 97 0.0 0.3 89 35500255 West 4 106 97 0.0 0.3 89 32500255 Keler 17 147 115 1.0 3.1 99 300025 Fisco 31 144 140 **** 68 11300684 Hans-Fort Worth CMS (TNRCC Region 6) 0.0 0.0 93 11300684 Hans-Fort *** 64 **** 64 11300684 Hans-Fort **** 64 11400455 EPNC Building<				A A A	1.2011.00201						
24500095 Beaumoni 2 136 136 2.1 2.7 96 24500115 Port Arthur 28 132 130 3.1 2.0 88 24500115 Port Arthur 28 131 107 0.0 0.4 73 Big Bend National Park (TNRCC Region 6)											
3611001S West Orange 9 137 124 1.1 2.0 es 2450011S Poot Arthur 28 132 130 3.1 3.5 93 Big Bend National Park (TNRCC Region 6) 3401016 [Brewster County 65 65 0.0 **0.0 90 Corpus Christi MSA (TNRCC Region 14)							0.00				
19900025 Kountze 85 111 107 0.0 0.4 73 Big Bend National Park (TNRCC Region 6)	state that is the manufactor and more		137	124							
Big Bend National Park (TNRCC Region 6) 0.0 **0.0 90 3430101G Brewster County 65 65 0.0 **0.0 90 Corpus Christi MSA (TNRCC Region 14) 35500265 Tuloso 21 92 91 0.0 0.0 95 Dallas-Fort Worth CMSA (TNRCC Region 4) 12100025 Perton Airport 150 150 150 93 12100025 Frisco 31 144 140 * *** 68 94 43920035 Keller 17 147 115 1.0 3.1 99 93 0.0 0.0 93 11300451 Dollas N 5 123 121 0.0 1.8 97 97 90 0.0 0.0 93 11300451 Bonnieview 100 90 0.0 0.0 93 93 93 0600011 105 94 93 93 94 94 94 94 94 94 94 95 95 95 95 95 95 95 95 95 95 95 95 95 95 95 95 95 95											
3430101G Brewster County 65 65 0.0 **0.0 90 Corpus Christi MSA (TNRCC Region 14)					0.0	0.4	73				
Corpus Christi MSA (TNRCC Region 14) 35500255 Tuisso 21 92 91 0.0 0.0 95 Dallas-Fort Worth CMSA (TNRCC Region 4) 1210025 Penton Airport 150 141 *** 73 43910025 R Worth NW 13 149 128 2.1 3.6 94 43920035 Keller 17 147 115 1.0 3.1 99 08500055 Frisco 31 144 140 * **** 68 11300451 Dallas N 5 123 121 0.0 1.8 97 120054 Colony 120 110 0.0 0.0 93 11300455 EPNG Building 157 136 * **** 64 14100445 Advance MX 128 164 *** 63 14100465 EPNG Building 157 136 **** 54 14100445 Charizal 124 114 0.0 0.0 87	Big Bend	National Park (*** 0 0					
35500255 West 4 106 97 0.0 0.3 89 Dallas-Fort Worth CMSA (TNRCC Region 4) *** 73 12100025 Denton Airport 150 141 *** 73 43910025 FtWorth NW 13 149 128 2.1 3.6 94 43910025 Frisco 31 144 140 **** 68 11300455 Dallas N 5 123 121 0.0 1.8 97 12100541 Colony 120 110 0.0 1.8 97 12100551 Bonnieview 100 90 0.0 0.0 93 El Paso-Juarez Area TX NM MX (TNRCC Region 6) *** 24 14100375 UTEP 12 142 136 * *** 54 14100455 EPNG Building 157 136 * *** 54 14100457 UTEP 12 142 136 5.1 3.7 97 00500017 Sunland Park NM 126 115 * **** 54 14100445 Chairal 124	3430101G				0.0	++0.0	90				
35500265 Tuloso 21 92 91 0.0 0.0 95 Dallas-Fort Worth CMSA (TNRCC Region 4)	35500255	West 4			00	0.7	80				
Dallas-Fort Worth CMSA TNRCC Region 4) *** 73 12100025 Denton Airport 150 141 *** 73 12100025 Denton Airport 150 141 *** 73 13910025 Reller 17 147 115 1.0 3.1 99 08500055 Frisco 31 144 140 * **** 68 11300455 Dallas N 5 123 121 0.0 1.8 97 11300455 Dallas N 5 123 121 0.0 1.0 97 11300455 Dallas N 5 123 126 5.1 3.7 97 11400465 EPNG Building 157 136 * *** 54 14100445 Chang Zat 112 115 * *** 54 14100245 East 30 123 118 0.0 1.1 92 01300175 Sunland Park NM 126 115 *** 54 <											
12100025 Denton Airport 150 141 * **** 73 43910025 R Worth NW 13 149 128 2.1 3.6 94 43910025 R Worth NW 13 147 115 1.0 3.1 99 08500055 Frisco 31 144 140 **** 68 11300691 Hinton 140 110 1.0 93 11300691 Kolton 140 110 0.0 1.0 97 11300551 Bonnieview 100 90 0.0 0.0 97 06600041 Advance MX 218 164 * *** 63 14100455 EPNG Building 157 1366 5.1 3.7 97 006600041 Advance MX 124 115 * *1.3 49 01300175 Sunland Park NM 126 115 * *** 54 14100441 Chamizal 124 114 0.0 *0.0 87 14100285 East 30 123 118 0.0 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>											
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1670056P TCLÍMCM 34th St 186 136 * **** 33 2010051L Croquet 178 152 6.7 13.0 75 2010029S Harris NW 26 176 161 10.2 8.9 88 0710901P HRM 11 173 141 6.1 7.0 98 2010055S Texas Commerce 160 139 * **** 24 0710900P HRM 10 159 158 3.1 6.5 96 0391003S Clute 11 134 129 3.7 3.7 82 1671002S Texas City 10 126 97 1.1 3.2 91 Longview-Marshall MSA (TNRCC Region 5) 1830001S Longview 19 129 123 1.1 *1.7 84 San Antonio MSA (TNRCC Region 13) 0290032S North 7 107 96 0.0 0.0 94 0290032S Northwest 23 98 95 0.0 0.0 92 Victoria MSA (TNRCC Region 14) 5 94											
2010051L Croquet 178 152 6.7 13.0 75 2010029S Harris NW 26 176 161 10.2 8.9 88 0710901P HRM 11 173 141 6.1 7.0 98 0210065S Texas Commerce 160 139 * **** 24 0710900P HRM 10 159 158 3.1 6.5 96 0391003S Clute 11 134 129 3.7 3.7 82 1671002S Texas City 10 126 97 1.1 3.2 91 Longview-Marshall MSA (TNRCC Region 5) 123 1.1 *1.7 84 San Antonio MSA (TNRCC Region 13) 0290036S North 7 107 96 0.0 0.0 94 0290032S Northwest 23 98 95 0.0 0.0 92 Victoria MSA (TNRCC Region 14) 14 14 14 14 15 15					0./ *						
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2010065S Texas Commerce 160 139 * **** 24 0710900P HRM 10 159 158 3.1 6.5 96 0391003S Clute 11 134 129 3.7 3.7 82 1671002S Texas City 10 126 97 1.1 3.2 91 Longview-Marshall MSA (TNRCC Region 5) 123 1.1 *1.7 84 San Antonio MSA (TNRCC Region 13) 0290036S North 7 107 96 0.0 0.0 94 0290032S Northwest 23 98 95 0.0 0.0 92 Victoria MSA (TNRCC Region 14) 14) 14 14 14											
0710900P HRM 10 159 158 3.1 6.5 96 0391003S Clute 11 134 129 3.7 3.7 82 1671002S Texas City 10 126 97 1.1 3.2 91 Longview-Marshall MSA (TNRCC Region 5) 129 123 1.1 *1.7 84 San Antonio MSA (TNRCC Region 13) 0290036S North 7 107 96 0.0 0.0 94 0290032S Northwest 23 98 95 0.0 0.0 92 Victoria MSA (TNRCC Region 14) 5 5 5 5 5											
1671002S Texas City 10 126 97 1.1 3.2 91 Longview-Marshall MSA (TNRCC Region 5) 1830001S Longview 19 129 123 1.1 *1.7 84 San Antonio MSA (TNRCC Region 13) 0290036S North 7 107 96 0.0 0.0 94 0290032S Northwest 23 98 95 0.0 0.0 92 Victoria MSA (TNRCC Region 14)	0710900P	HRM 10	159		3.1	6.5	96				
Longview-Marshall MSA (TNRCC Region 5) 1830001S Longview 19 129 123 1.1 *1.7 84 San Antonio MSA (TNRCC Region 13) 02900365 North 7 107 96 0.0 0.0 94 0290032S Northwest 23 98 95 0.0 0.0 92 Victoria MSA (TNRCC Region 14) 107 107 96 0.0 0.0 94											
1830001S Longview 19 129 123 1.1 *1.7 84 San Antonio MSA (TNRCC Region 13) 0290036S North 7 107 96 0.0 0.0 94 0290032S Northwest 23 98 95 0.0 0.0 92 Victoria MSA (TNRCC Region 14)					1.1	3.2	91				
San Antonio MSA (TNRCC Region 13) 02900365 North 7 107 96 0.0 0.0 94 0290032S Northwest 23 98 95 0.0 0.0 92 Victoria MSA (TNRCC Region 14)	18300015	narsnall MSA (TNR			11	*1 7	84				
0290036S North 7 107 96 0.0 0.0 94 0290032S Northwest 23 98 95 0.0 0.0 92 Victoria MSA (TNRCC Region 14)					1.1	1.7	70				
0290032S Northwest 23 98 95 0.0 0.0 92 Victoria MSA (TNRCC Region 14)					0.0	0.0	94				
Victoria MSA (TNRCC Region 14)											
4690003S Victoria 87 106 99 0.0 ** 85	Victoria N	ASA (TNRCC Reg	ion 14)								
	4690003S	Victoria 87	106	99	0.0	**	85				

Table 3. Ozone Summary 1992

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Private monitoring site (at end of AIRS number) State monitoring site (at end of AIRS number)

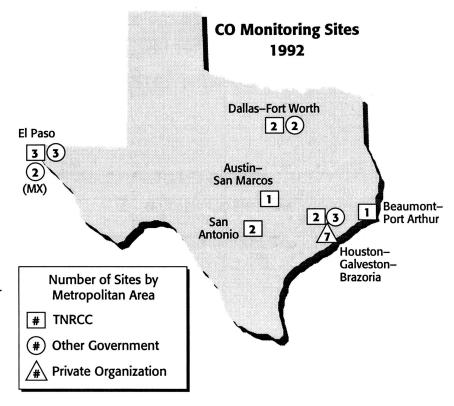
Local governmental agency monitoring site (at end of AIRS number) P Air pollution concentration required to exceed the NAAQS S Based on complete days during ozone season according to EPA convention ٠

Expected number of days with highest one-hour concentration of 125 ppb or more; annual average must be 1.1 or more days per year over a three-year period to exceed the standard Each * indicates one year not meeting EPA completeness criteria; not valid for NAAQS comparison ÷

*

Carbon Monoxide

Carbon monoxide is produced by the incomplete combustion of carbon-containing fuels, most notably by automotive engines and power plants. During 1992, carbon monoxide was continuously monitored at 26 sites in Texas. It also was measured by Mexico across the border from El Paso. These sites are displayed in the adjacent map. Two standards have been established for carbon monoxide. To violate one of these standards, two or more one-hour averages of 35.5 ppm or greater or two or more eight-hour averages of 9.5 ppm or greater must be measured at one site during a calendar year. The eight-hour standard has been exceeded periodically in El Paso during the winter months when very stable atmospheric



conditions exist. The onehour standard for carbon monoxide has never been exceeded in Texas.

Table 4 provides a summary of 1992 carbon monoxide measurements. The table listings are grouped alphabetically by metropolitan area and arranged in descending order from the highest eight-hour average.

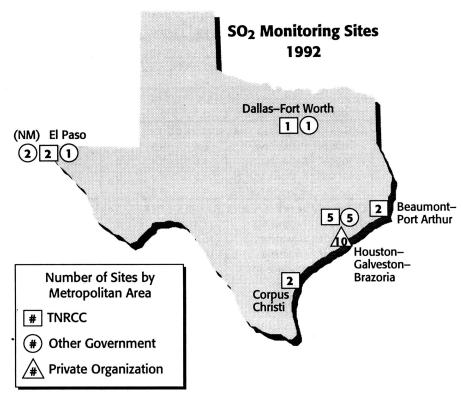
		avie	.	Juii	mary	1992		
			🕈 8-Hr			1-Hr		
AIRS	Site Name	High	2nd	Exc	High	2nd	Exc	Percent
	e	(ppm)	(ppm)	(#)	(ppm)	(ppm)	(#)	Completeness
NAAQS 🔳			9.5			35.5		5 A
Austin-S	an Marcos MS	A (TNR	CC Reg	ion 11)			
4530017S	Downtown 32	4.3	3.7	0	6.9	6.0	0	85
Beaumon	t-Port Arthur	MSA (1	INRCC	Region	10)			
	Beaumont 2	2.9	2.4	0	4.8	3.9	0	94
Dallas-F	ort Worth CMS	A (TNR	CC Reg	ion 4)				
1310053L		6.4	5.5	0	9.4	8.5	0	93
1130069L		5.6	5.4	0	7.8	7.5	0	93
4391003S	Ft Worth Dtn 16	4.5	4.0	0	5.9	5.6	0	80
4391002S	Ft Worth NW 13	4.1	3.8	0	7.7	6.5	0	92
El Paso-J	luarez Area TX	NM M	X (TNR	CC Reg	(ion 6)			_
0060001L	Techno MX	11.4	8.8	0	16.0	16.0	0	82
1410027S	Downtown 6	10.5	9.3	2	17.3	16.0	0	93
1410044L	Chamizal	10.1	9.9	3	21.3	17.7	0	72
0060004L	Advance MX	8.9	7.7	0	16.2	14.8	0	79
1410002L	Tillman	8.6	7.7	0	17.5	14.4	0	97
1410028S	East 30	8.4	7.0	0	13.2	12.3	0	87
1410037S	UTEP 12	6.6	6.4	0	11.6	10.9	0	86
1410029L	Ivanhoe	4.6	4.5	0	8.2	8.2	0	93
Houston-	-Galveston-Br	azoria	CMSA (TNRCC	Regio	n 12)		
2010047L	Lang	8.6	8.3	0	15.9	13.8	0	93
2010024S	Aldine 8	8.1	8.1	0	10.4	10.1	0	88
2011034S	East 1	7.2	6.6	0	12.4	12.1	0	88
2011035L	Clinton	6.2	4.7	0	8.0	6.8	0	95
2010803P	HRM 3	5.9	5.2	0	8.1	7.0	0	95
2010801P	HRM 1	5.8	5.2	0	9.2	7.9	0	96
2011037L	Crawford	5.1	5.1	0	8.8	8.3	0	94
2010807P	HRM 7	3.7	3.0	0	5.4	5.3	0	97
2010808P	HRM 8	3.0	2.5	0	4.3	3.7	0	98
2010804P	HRM 4	2.4	2.3	0	3.3	3.0	0	96
0710901P	HRM 11	1.0	0.9	0	2.0	1.8	0	98
0710900P	HRM 10	0.9	0.8	0	1.5	1.2	0	96
San Anto	nio MSA (TNR	CC Reg	ion 13)	1	r	1		1
0290046S	Downtown 27	7.1	5.7	0	12.7	10.8	0	93
0290036S	North 7	4.5	4.1	0	13.5	9.1	0	87

Table 4. CO Summary 1992

Local governmental agency monitoring site (at end of AIRS number)
P Private monitoring site (at end of AIRS number)
S State monitoring site (at end of AIRS number)
Air pollution concentration required to exceed the NAAQS
Running average, truncated to tenths
Number of exceedances

Sulfur Dioxide

Sulfur dioxide is produced by burning sulfurcontaining fuels, smelting metallic ores containing sulfur, and removing sulfur from fuels. Sulfur dioxide was monitored continuously at 29 TNRCC, other government and private sites in Texas during 1992. In addition, two sites were operated by New Mexico across the state line from El Paso. All are shown in the adjacent map. There are three sulfur dioxide standards. Sulfur dioxide violates the short-term standard if it averages 145 ppb or more during a 24hour period (from midnight to midnight) more than once a year. The annual average level of sulfur dioxide must be 35 ppb or higher to exceed the long-term standard. A three-hour average sulfur dioxide level must be 550 ppb or higher more than once during a calendar year to violate the secondary standard. There is also a secondary standard of 500 ppb for a three-hour average that



is intended to protect public welfare from any known or anticipated adverse effects of the pollutant at the specified level. The Houston, Beaumont-Port Arthur, El Paso, and Galveston-Texas City areas have historically shown the highest measured sulfur dioxide levels in the state. Table 5 shows a summary of sulfur dioxide measurements during 1992. The table listings are grouped alphabetically by metropolitan area and arranged in descending order from the highest three-hour average.

		Iavie		<u>7</u> 5u	T			T	
			3-Hr 💠			24-Hr 💠		Annual	
AIRS	Site Name	High (ppb)	2nd (ppb)	Exc (‡)	High (ppb)	2nd (ppb)	Exc (‡)	Average (ppb)	Percent Completeness
NAAQS	0		550			145		35	
	-Port Arthur MSA	(TNRCC	Region	10)				•	
2450009S	Beaumont 2	207	107	o	59	45	0	5	94
2450011S	Port Arthur 28	147	103	o	57	43	0	4	89
Corpus Ch	risti MSA (TNRCC I	Region	14)						
3550025S	West 4	120	107	o	42	20	0	2	85
3550026S	Tuloso 21	57	57	0	16	14	0	1	94
Dallas-Fo	rt Worth CMSA (TN	RCC Re	gion 4)						
1130069L	Hinton	20	20	0	10	10	0	2	93
4391002S	Ft Worth NW 13	20	20	0	13	13	0	3	88
	arez Area TX NM		RCC Res	vion 6	1				
1300017S	Sunland Park NM	354	267	0	88	88	0	16	96
14100375	UTEP 12	300	273	0	64	54	o	12	84
14100275	Downtown 6	293	240	0	50	48	0	10	77
1410033L	Kern	233	227	0	57	56	0	11	94
0130008S	La Union NM	92	81	0	20	16	0	3	89
	Galveston-Brazoria		(TNRC	C Regi	on 12)				•
2011035L	Clinton	373	110	o	89	31	o	6	91
2010803P	HRM 3	177	166	0	71	53	0	6	95
2010059S	Manchester 22	127	117	0	42	40	o	6	78
1671002S	Texas City 10	120	103	0	59	39	0	4	94
2010801P	HRM 1	101	89	0	27	24	0	5	96
2011034S	East 1	87	80	0	24	19	0	4	89
1670057P	TCLMCM Seawall	79	50	0	22	19	0	♦ 4	33
2011037L	Crawford	77	60	0	33	32	0	7	86
2010807P	HRM 7	75	62	0	34	21	0	2	97
1670055P	TCLMCM Ave. A	64	47	0	26	18	0	◆ 2	33
1670056P	TCLMCM 34th St.	62	53	0	25	20	0	♦ 2	33
2010046L	North Wayside	57	53	0	19	17	0	5	90
2010808P	HRM 8	57	26	0	10	10	0	1	97
2010004S	Baytown 24	53	50	0	26	23	0	8	87
2010804P	HRM 4	52	48	0	10	10	0	1	97
2010062L	Monroe	50	43	0	19	18	0	4	93
2011003S	Deer Park 18	50	33	0	11	10	0	1	85
2010051L	Croquet	43	27	0	13	13	0	♦ 3	67
0710901P	HRM 11	23	23	0	8	5	0	<1	98
0710900P	HRM 10	21	16	0	5	4	0	<1	96

Table 5. SO₂ Summary 1992

L Local governmental agency monitoring site (at end of AIRS number)
P Private monitoring site (at end of AIRS number)
S State monitoring site (at end of AIRS number)
Air pollution concentration required to exceed the NAAQS
Block averages, rounded to hundredths
Number of exceedances; must be 2 or more to violate the NAAQS
Less than 75% completeness; not valid for NAAQS comparison

Nitrogen Dioxide

Although there are several oxides of nitrogen produced by high temperature fuel combustion in air, the only standard is for an annual average of nitrogen dioxide. The annual average level of nitrogen dioxide must be 54 ppb or higher to violate the standard. This annual standard has never been exceeded in Texas. In fact, the highest annual average has been no more than 31 ppb in Houston and El Paso during the past five years. Continuous nitrogen dioxide monitors were operated by the TNRCC, and other government and private organizations at 26 sites in the Austin, Beaumont-Port Arthur, Dallas-Fort Worth, El Paso, and Houston areas during 1992, as shown in the adjacent map.

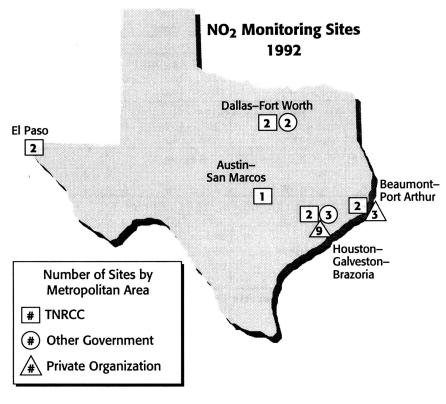


Table 6 shows a summary of nitrogen dioxide measurements during 1992. The table listings are grouped alphabetically by metropolitan area and arranged in descending order from the highest one-hour average.

		1-	Hr	Annual	
AIRS	Site Name	High	2nd	Average	Percent
		(ppb)	(ppb)	(ppb)	Completeness
NAAQS				54	
Austin-Sa	Marcos MSA (T	NRCCI	Region	11)	
4530017S	Downtown 32	80	80	♦ 17	66
Beaumont-	Port Arthur MS/	A (TNR	CC Regi	on 10)	
2450101P	SETRPC 40	127	117	5	86
3611001S	West Orange 9	80	60	12	98
2450102P	SETRPC 43	70	60	10	90
2450009S	Beaumont 2	50	50	8	97
3611100P	SETRPC 42	49	47	8	98
Dallas-For	t Worth CMSA (1	NRCC	Region	4)	
1130055L	Bonnieview	260	250	12	89
1130069L	Hinton	90	90	21	90
4391002S	Ft Worth NW 13	80	80	14	89
1130045S	Dallas N 5	70	70	14	86
El Paso-Ju	arez Area TX NM	MX (T	NRCC F	(egion 6)	
1410027S	Downtown 6	230	160	31	84
1410037S	UTEP 12	130	130	21	90
Houston-O	alveston-Brazon	ia CMS	A (TNR	CC Regio	on 12)
2011034S	East 1	360	110	17	87
2011035L	Clinton	140	110	23	82
2011037L	Crawford	110	100	28	81
2010047L	Lang	100	90	♦ 22	33
2010024S	Aldine 8	70	70	♦ 15	33
2010801P	HRM 1	\mathbf{X}	\mathbf{X}	27	95
2010803P	HRM 3	X	\mathbf{X}	22	95
2010807P	HRM 7	\mathbf{X}	\mathbf{X}	19	98
2010804P	HRM 4	X	X	17	96
2010808P	HRM 8	\mathbf{X}	\mathbf{X}	13	97
0710901P	HRM 11	\mathbf{X}	\mathbf{X}	12	98
0710900P	HRM 10	\mathbf{X}	\mathbf{X}	8	95
1670056P	TCLMCM 34th St.	\mathbf{X}	\mathbf{X}	8	87
1670057P	TCLMCM Seawall	X	X	♦ 8	64

Table 6. NO₂ Summary 1992

Local governmental agency monitoring site (at end of AIRS number)
 Private monitoring site (at end of AIRS number)
 S State monitoring site (at end of AIRS number)
 Air pollution concentration required to exceed the NAAQS
 ☑ Data not available

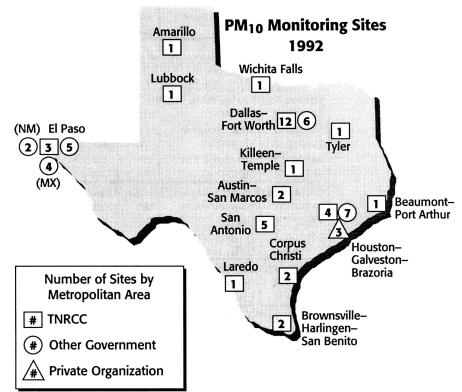
Less than 75% completeness; not valid for NAAQS comparison

Respirable Particulate Matter

Particulate matter in the atmosphere is produced by a wide variety of natural and man-made sources. It includes both solid and liquid particles, except for water or ice, that can be emitted directly into the air or formed by chemical reactions in the atmosphere. Respirable particulate matter, particles below about 10 microns in size, are more likely to be deposited deep in the lungs, where they present the most direct health concern.

To violate the 24-hour standard for respirable particulate matter, the expected number of exceedance days must be 1.1 days or more over a three-year period. An exceedance day is each day that a 24-hour average of 155 μ g/m³ or more is measured. EPA-required calculations are used to arrive at the number of expected exceedance days to account for missing data.

To violate the annual standard, the annual average concentration must be $51 \ \mu g/m^3$ or greater for a three-year period. Each annual average must be calculated from four complete calendar quarterly averages. For a calendar quarter to be complete, at least 75 percent of the scheduled samples must be valid.



During 1992, this pollutant was monitored by the TNRCC, and other government and private organizations at 58 sites in Texas. It was also monitored adjacent to El Paso at two sites in New Mexico and four sites in Mexico. The sampling schedules are either daily, every other day, or every sixth day, depending upon the expected probability of the site exceeding the standard. A respirable particulate matter exceedance day occurs if the 24-hour average exceeds the standard. Then, the expected exceedance days are determined from the actual number of measured exceedances with

adjustments to account for missing data according to EPA guidelines. In order to demonstrate attainment of the standard, the average annual number of expected exceedances must not exceed 1.0 day per year over a three-year period.

Table 7 provides a summary of the 1992 respirable particulate matter measurements at each monitoring site. The table listings are grouped alphabetically by metropolitan area and arranged in descending order from the highest 24-hour average.

AIRS	Site Name	24-Hr High (μg/m ³)	Exp Exc	Exp Exc 1990-92 (days/yr)	Annual Average (µg/m ³)	Valid Days	Percent Completeness	Valid Qtrs
NAAQS 🔳		155		*1.1	51	Days	completeness	QUIS
	MSA (TNRCC Re		L	<u></u>			L	
3750004S		32	*0.0	***	*16.8	53	87	3
	•				10.0	55	0/	5
	n Marcos MSA		-	***	21.0	60		
4530010S		78	0.0	*0.0	21.9	60	98	4
	East Austin	78	0.0	0.0	23.1	60	98	4
	t-Port Arthur N							
	Beaumont 2	108	0.0	0.0	25.7	59	97	4
	le-Harlingen-S							
0610004S	Brownsville	85	0.0	0.0	30.8	58	95	4
	San Benito	73	0.0	0.0	23.7	58	95	4
	risti MSA (TNR						1	
3550020S	Navigation	98	*0.0	*0.0	*29.9	53	87	3
3550012S		97	*0.0	**0.0	*28.2	54	89	3
	rt Worth CMSA	(TNRCC R	egion 4)	1			1	
1390006S	Midlothian 6	99	*0.0	***	27.9	49	80	3
1130018L	Morrell	91	0.0	0.0	29.5	57	93	4
1130035L	Coit	84	0.0	0.0	26.3	59	97	4
1130070S	Chalk Hill	82	0.0	**0.0	23.4	55	90	4
1130020L	Lancaster	78	0.0	0.0	22.2	57	93	4
1130057S	Boys Club	75	0.0	0.0	26.5	58	95	4
43900235	Worth Hgts	70	0.0	0.0	24.7	58	95	4
1390084S	Midlothian 84	52	0.0	**0.0	18.9	61	98	4
1390008S	Midlothian 8	52	*0.0	***	*15.9	45	74	3
1130050L	Convention	51	*0.0	**0.0	*25.9	43	70	2
4390029L	FAA	51	0.0	*0.0	19.5	56	92	4
1390007S	Midlothian 7	50	*0.0	**0.0	*17.3	48	77	3
4390060L	Geddes	47	*0.0	**0.0	*20.2	51	84	3
1390004S	Midlothian 4	47	0.0	*0.0	17.2	58	95	4
1130072S	Cedar Hill	37	*0.0	***	*19.2	23	38	2
1390011S	Midlothian 11	34	*0.0	***	*16.4	21	34	1
1390005S	Midlothian 5	30	*0.0	***	*19.0	24	39	2
	Midlothian 9	21	*0.0	***	18.7	3	5	0
	uarez TX NM M	X (TNRCC	Region 6)				1	
	Advance MX	314	10.0	**64.6	114.3	58	95	4
0060003L	Zenco MX	212	2.0	*14.2	58.3	56	92	4
0060002L	Pestalozzi MX	189	*2.0	**12.2	*58.2	50	82	3
1410002L	Tillman	166	2.0	2.1	39.9	337	92	4
1410041S	Vilas	146	0.0	0.0	43.6	59	97	4
0060001L	Techno MX	135	0.0	0.0	40.3	55	90	4
1410038L	Riverside	116	0.0	0.0	32.3	57	93	4
1410044L	Chamizal	113	*0.0	**0.0	*25.5	320	87	3
0130016S	Anthony NM	110	0.0	0.0	39.1	175	97	4
0130017S	Sunland NM	109	0.0	0.0	32.0	359	98	4
1410043S	Socorro	88	0.0	*0.0	41.0	57	93	4
1410029L	Ivanhoe	49	0.0	*0.0	22.0	59	97	4
1410010L	NE Clinic	47	0.0	0.0	21.1	59	97	4
1410045S	Lindbergh	41	0.0	0.0	22.0	58	95	4

Table 7. PM₁₀ Summary 1992@

Local governmental agency monitoring site (added to end of AIRS site number) Private monitoring site (added to end of AIRS site number) State monitoring site (added to end of AIRS site number) L

P

S

Air pollution concentration required to exceed the NAAQS Expected number of days over 155 μ g/m³; annual average not to exceed 1.1 days per year over a three-year * period *

Each * indicates one year not meeting EPA completeness criteria; not valid for NAAQS comparison

0 Including exceptional event days when unusual, uncontrollable events occurred (primarily dust storms)

X Data not available

		24-Hr		Exp Exc	Annual		/	
AIRS	Site Name	High	Exp Exc	1990-92	Average	Valid	Percent	Valid
71110		(μg/m ³)		(days/yr)	(μg/m ³)	Days	Completeness	Qtrs
NAAQS 🔳		155		*1.1	51	Duys		
Houston-Galveston-Brazoria CMSA (TNRCC Region 12)								
	Pasadena	114	*0.0	***	*31.9	48	79	3
1671002S	Texas City 10	111	*0.0	***	*24.8	48	79	3
2010054L	Kress	108	0.0	*0.0	33.9	60	98	4
2011035L	Clinton	103 ·	0.0	**0.0	38.3	176	97	4
1670053L	Tx City Nessler	103	*0.0	***	*23.8	39	64	1
2010062L	Monroe	103	*0.0	**0.0	*27.5	52	85	3
2011037L	Crawford	103	0.0	0.0	29.7	57	93	4
2010803P	HRM 3	102	X	\mathbf{X}	34.0	\mathbf{X}	X	\mathbf{X}
2010045L	Bingle	100	0.0	*0.0	25.8	57	93	4
2011034S	East 1	99	*0.0	**0.0	*33.8	45	74	2
2010801P	HRM 1	97	\mathbf{X}	X	30.0	\mathbf{X}	X	\mathbf{X}
2010024S	Aldine 8	62	*0.0	***	*29.9	46	75	2
1670004L	Tx City Fire Sta	50	*0.0	**0.0	*22.7	41	67	2
2010807P	HRM 7	48	X	X	22.0	X	X	X
Killeen-T	emple MSA (TN	RCC Regio	on 9)					
0270001S	Temple	63	0.0	*0.0	18.0	60	98	4
Laredo M	Laredo MSA (TNRCC Region 15)							
4790015S	Laredo	123	*0.0	***	*32.5	48	79	2
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	ASA (TNRCC Reg	ion 2)						
3030001S	Lubbock	78	0.0	0.0	22.1	170	94	4
	IO CMSA (TNRC	C Region 1	3)					
0290036S	North 7	74	0.0	0.0	21.4	61	100	4
0290034S	Texas Culture	72	0.0	0.0	28.6	59	97	4
0290042S	East Kelly	58	0.0	*0.0	25.0	59	97	4
0910004S	New Braunfels 4	22	*0.0	***	*10.9	14	23	1
0910003S	New Braunfels 3	20	*0.0	***	*12.6	14	23	1
	(TNRCC Region	5)						
4230003S	Tyler	75	0.0	*0.0	19.4	53	87	4
Wichita Falls MSA (TNRCC Region 3)								
4850002S	Wichita Falls	65	*0.0	**0.0	*22.5	49	80	3

Table 7. PM₁₀ Summary 1992⊖ (continued)

L

Local governmental agency monitoring site (at end of AIRS number) Private monitoring site (at end of AIRS number) State monitoring site (at end of AIRS number) Air pollution concentration required to exceed the NAAQS Expected number of days over 155 µg/m³; annual average not to exceed 1.1 days per year over a three-year ۲ P S ■ 米 period

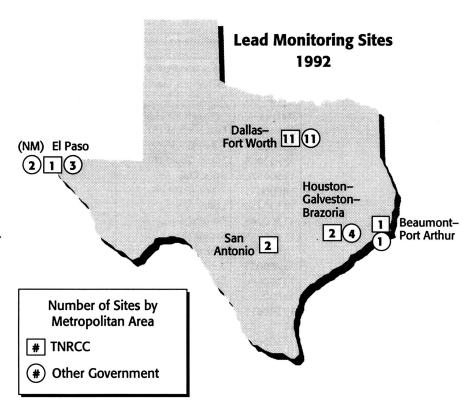
* Each * indicates one year not meeting EPA completeness criteria; not valid for NAAQS comparison

0 Including exceptional event days when unusual, uncontrollable events occurred (primarily dust storms)

X Data not available

#### Lead

Lead was analyzed from particulate filters collected at 36 monitoring sites in Texas by the TNRCC and other government organizations during 1992. In addition, New Mexico operated two monitors across the state line from El Paso. All these sites are shown in the adjacent map. In most areas of the state, lead in the ambient air is the result of automotive sources burning leaded fuels. In a few areas, lead is also released into the air by lead smelters. Since leaded gasoline is being phased out, atmospheric lead from automotive sources has been decreasing in recent years. Lead occurs in the ambient air as particulate matter and is collected on high-volume filters with other particulate matter. The filters are subjected to x-ray fluorescence or atomic absorption analysis to determine lead content. The standard is violated if the average concentration of lead measured during one



calendar year quarter is 1.55  $\mu$ g/m³ or greater.

In the past, the lead standard was exceeded only at monitoring sites near active lead smelters. The highest lead levels in 1992 were recorded at sites that were near lead smelters in the Dallas and El Paso metropolitan areas. Table 8 provides a summary of the 1992 lead measurements at each monitoring site. The table listings are grouped alphabetically by metropolitan area and arranged in descending order from the highest quarterly average.

			No. of			
ALDC	Cite Nome	Qtr		Valid	Valid	
AIRS	Site Name	High	Qtrs Exc	Valid	Valid	
		(µg/m³)	NAAQS	Days	Qtrs	
NAAQS 🔳		1.55				
	-Port Arthur MSA (		egion 10)			
2451010L	Beaumont Marina	0.02	0	15	1	
2450009S	Beaumont 2	0.02	0	57	4	
Dallas-For	t Worth CMSA (TN	RCC Regi	on 4)			
0850003S	Frisco 5thSt (3) 🕈	0.91	0	60	4	
0850002S	Frisco Gould (2) 🕈 🕸	0.58	0	10	0	
0850006S	Frisco Gould (6) 🕈 🕸	0.25	0	34	2	
1130057L	Boys Club 🕈	0.19	0	103	4	
0850001S	Frisco Acker 🕈	0.13	0	58	4	
1130045S	Dallas N 5	0.09	0	54	4	
1130074S	Garland Shiloh 🕈	0.08	0	45	3	
1130065L	Rector 🕈	0.06	0	363	4	
1130018L	Morrell	0.06	0	60	4	
2570003S	Terrell Virginia	0.06	0	23	1	
1130064L	Sargent 🕂	0.05	0	364	4	
11300735	Palmer Paper 🕈	0.05	0	57	4	
1130061L	Earhart	0.05	0	58	4	
1130046L	M L King	0.05	0	61	4	
1130066L	Nolen 🕈	0.04	0	364	4	
1130050L	Convention	0.04	0	60	4	
1130029L	Douglas	0.04	0	57	4	
43910035	Ft Worth Dtn 16	0.03	0	56	4	
1130047L	Sunnyvale	0.03	0	76	3	
11300715	Farmers Branch	0.03	0	60	4	
43900235	Worth Heights	0.02	o	58	4	
1310070L	Chalk Hill	0.02	0	54	4	
	arez Area TX NM M	•			· ·	
0130004S	Race Track NM	0.40		61	4	
01300175	Sunland NM	0.38	0	61	4	
1410002L	Tillman	0.26	0	60	4	
14100275	Downtown 6	0.20	0	57	4	
14100275	Kern	0.17	0	55	4	
1410033L	Northeast	0.17	0	60	4	
	Galveston-Brazoria					
2010054L	Kress	0.02		60		
2010034L 2011035L	Clinton	0.02	0	56	4	
1671002S	Texas City 2	0.02	0	56	4	
2011034S	Houston East	0.02	0	58	4	
20110345 2010048L	Fulton					
	Der Desameren en der Bereichen der	0.01	0	57	4	
2010045L	Bingle	0.01	0	59	4	
San Antonio MSA (TNRCC Region 13)						
0290034S	ITC	0.03	0	60	4	
0290050S	Airport	0.02	0	61	4	

#### Table 8. Lead Summary 1992

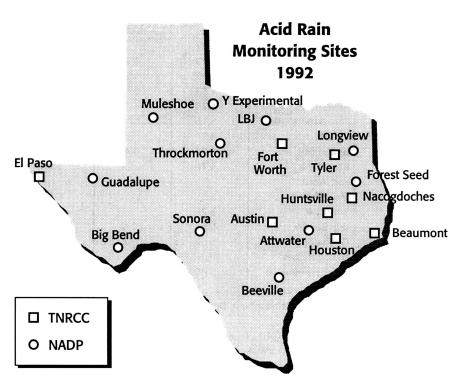
L Local governmental agency monitoring site (at end of AIRS number)
 S State monitoring site (at end of AIRS number)
 Air pollution concentration required to exceed the NAAQS

✤ Site near lead smelter

✤ Relocated during 1992

#### Acid Rain

Acid rain was monitored by the TNRCC or the federal government at 19 sites in Texas during 1992. During that year, the TNRCC participated in the National Atmospheric Deposition Program (NADP) and National Trends Network (NTN) by sponsoring automated samplers in Longview and Forest Seed that captured rainfall over one-week periods. These samples were forwarded to the NADP for analysis and the results were published. The TNRCC also conducted seven-day rainfall sampling at Huntsville and event monitoring at seven additional locations shown in the adjacent map. Event samples were collected during individual rainstorms, and pH and conductivity of the samples were measured immediately in the field. The samples were then forwarded to Austin where pH



and conductivity measurements were repeated.

The pH scale is a logarithmic measure of acidity or alkalinity. A pH of 7 is neutral, with higher numbers corresponding to increased alkalinity and lower numbers to increased acidity. Unpolluted rainwater has a slightly acidic pH of 5.6. This acidity is caused by the formation of carbonic acid from carbon monoxide in the atmosphere.

Table 9 provides a summary of acid rain measurements during 1992.

			Jammar	1332	
Site	Average pH	Standard Deviation	Maximum pH	Minimum pH	Number of Samples
Longview&	4.60		6.15	4.15	43
Austin	5.00	0.03	5.36	4.41	15
Forest Seed	4.87		6.65	4.06	44
Huntsville	4.79	0.21	5.02	4.34	16
Tyler	4.82	0.36	5.28	4.43	4
Houston	4.83	0.50	5.95	4.04	17
Attwater 🏶	4.79		6.66	4.20	36
Throckmorton &	5.16		6.19	4.64	9
L.B.J.🙅	4.94		7.46	4.07	40
Beaumont	5.03	0.40	5.54	4.45	11
Beeville	4.71		7.00	3.87	38
Fort Worth					0
Muleshoe	5.55		6.97	4.76	30
Sonora	5.26		7.26	4.30	41
Big Bend	5.54		7.42	4.94	35
Guadalupe 🏚	5.52		7.66	4.77	34
Nacogdoches					0
Y Experimental 🛧	5.40		7.22	4.86	11
El Paso					0

Table 9. Acid Rain Summary 1992

✤ National Atmospheric Deposition Program/National Trends Network site

Note: Acidity (pH) of unpolluted rainwater is 5.6. Lower values are more acidic and higher values are less acidic.

# Abbreviations/Acronyms

### Pollutants

CO	Carbon monoxide
NO ₂	Nitrogen dioxide
O ₃	Ozone
PM ₁₀	Particulate matter of ten microns or less
SO ₂	Sulfur dioxide

### Measurement Units

pН	a measure of acidity
ppb	parts per billion (volume ratio)
ppm	parts per million (volume ratio)
µg/m ³	micrograms (10 ⁻⁶ grams) per cubic meter

### Other

2nd Day	Second highest daily maximum one-hour average
Ann	Annual
AIRS	Aerometric Information Retrieval System
CMSA	Consolidated Metropolitan Statistical Area
days/yr	days per year
EPA	U. S. Environmental Protection Agency
Exc	Exceedances (number of times NAAQS was exceeded)
Exp Exc	Expected Exceedances (for $O_3$ and $PM_{10}$ using EPA methods)
Hr	Hour
HRM	Houston Regional Monitoring Corporation
MSA	Metropolitan Statistical Area
MX	Mexico
NAAQS	National Ambient Air Quality Standards
NADP	National Atmospheric Deposition Program
NM	New Mexico
No.	Number
NTN	National Trends Network
PMSA	Primary Metropolitan Statistical Area
Qtr(s)	Quarter (calendar)
SETRPC	Southeast Texas Regional Planning Commission
TCLMCM	Texas City/La Marque Community Air Monitoring Network
TNRCC	Texas Natural Resource Conservation Commission