1975

AIR QUALITY DATA

FOR ARIZONA

July 1976

ARIZONA DEPARTMENT OF HEALTH SERVICES

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Robert Maddox	Tucson
Cecil McCullar	Morenci
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Jim Moser	Safford
Sandy Nichols	Grand Canyon
William Puzz	Show Low
Raul Resendez	Yuma
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Dave Rust	Chloride
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1. INTRODUCTION

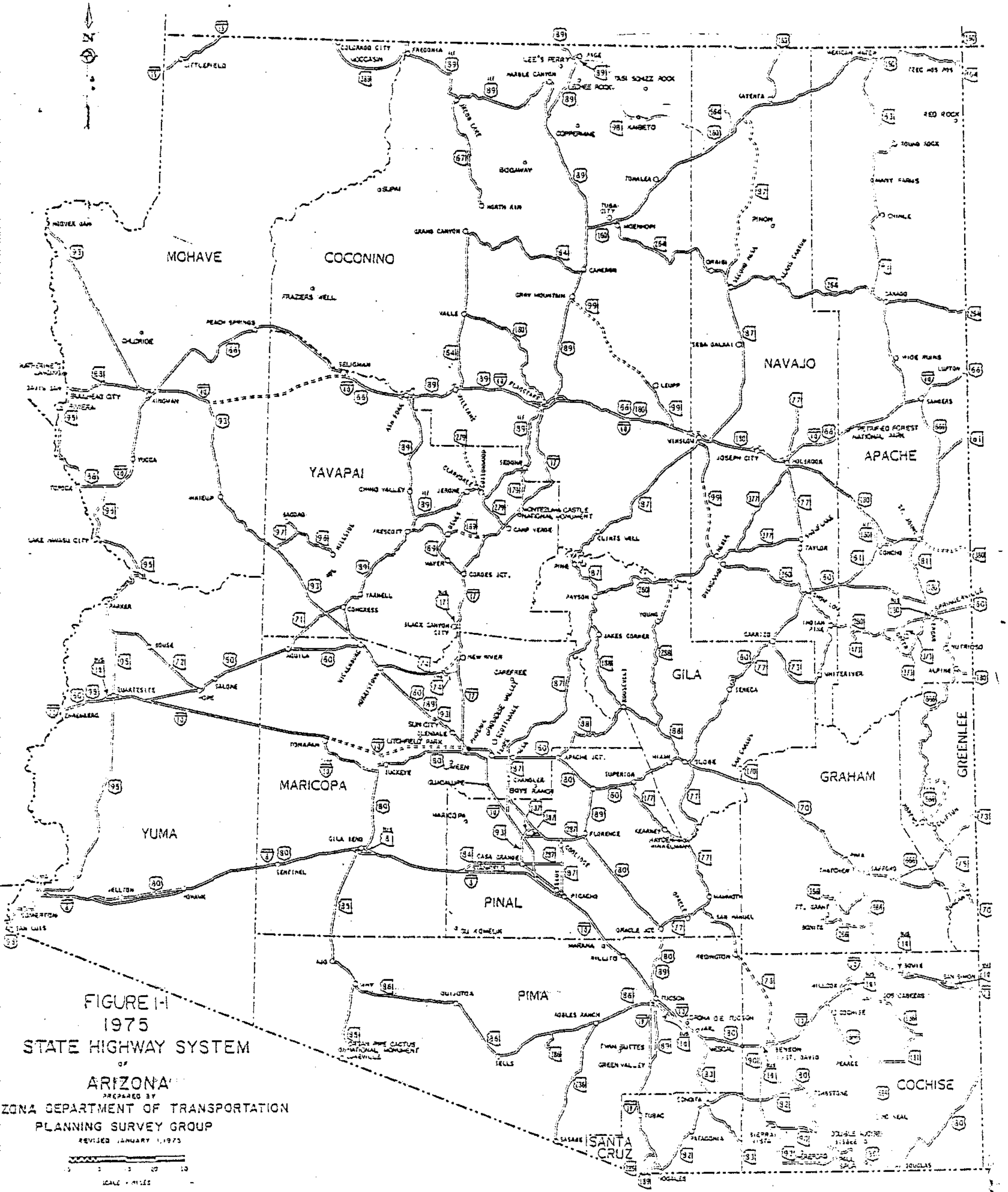


FIGURE I-1
1975
STATE HIGHWAY SYSTEM
OF
ARIZONA
PREPARED BY
ARIZONA DEPARTMENT OF TRANSPORTATION
PLANNING SURVEY GROUP
REVISED JANUARY 1, 1975

CITIES AND TOWNS MONITORED

1. INTRODUCTION

The Arizona Department of Health Services, Bureau of Air Quality Control, published 1974 air quality data for Arizona in one report which was divided into two sections[a]. One section presented data collected by the State and one presented data developed by industry, universities, and governmental agencies. For 1975, all air quality data, regardless of source, is listed in one section. Data trends, seasonal and long-term, are presented in another section of this report. They are based on governmental agency data.

1.1 Cities and Towns Monitored

Arizona cities and towns monitored for air quality, the operators of the monitoring sites, and the pollutants monitored are listed in Table 1. Sites not located in a city or town are given the name of the nearest city or town that can be located on most maps. The operators of the monitoring sites are abbreviated as follows:

JCC	Joint Control Center - A jointly owned system operated by ASARCO Incorporated and Kennecott Copper Corporation
APS	Arizona Public Service Company
Clark	Clark County Nevada District Health Department
CONOCO	Continental Oil Company
Des Res	Desert Research Institute, University of Nevada System
Greenlee	Greenlee County, Air Pollution Control
Hecla	Hecla Mining Company
Magma	Magma Copper Company
Maricopa	Maricopa County Department of Health Services, Bureau of Air Pollution Control
PD	Phelps Dodge Corporation
Pima	Pima County Health Department, Air Quality Control District

P-G	Pinal-Gila Counties Air Quality Control District
SRP	Salt River Project
State	Arizona Department of Health Services, Bureau of Air Quality Control

The locations of cities and towns monitored for air quality are shown on Figure A.

The Bureau would appreciate contacts from any organization which is monitoring air quality in Arizona but is not mentioned in this report.

a. "1974 Air Quality Data for Arizona"
Arizona Department of Health Services
August 1975

Table 1-1

Cities and Towns Monitored

City or Town	Carbon Monoxide	Hydrocarbons (Non-Methane)	Nitrogen Dioxide	Oxidants	Particulates	Sulfur Dioxide
Ajo					PD State	PD State
Apache Junction					P-G	
Boys Ranch					PD	PD
Buckeye				PD	PD	PD
Bullhead City			Des Res		Des Res	Des Res
Carefree					Maricopa	
Casa Grande					State	
Chloride					State	State
Clarkdale					State	
Clifton					Greenlee	Greenlee
Coolidge				PD	PD	PD
Corona de Tucson					Pima	
Davis Dam			Des Res State	Des Res	Des Res State	Des Res State
Double Adobe						PD
Douglas					PD State	PD State
Eagar					State	
Flagstaff	State				State	
Florence	CONOCO	CONOCO	CONOCO State	CONOCO PD	CONOCO PD State	CONOCO PD State
Glendale	Maricopa			Maricopa	Maricopa	Maricopa
Grand Canyon			State		State	State
Green Valley					PD Pima	PD
Guadalupe					Maricopa	
Gu Komelik					Hecla	

Table 1-1

Cities and Towns Monitored

City or Town	Carbon Monoxide	Hydrocarbons (Non-Methane)	Nitrogen Dioxide	Oxidants	Particulates	Sulfur Dioxide
Hayden						JCC
Hereford					State	State
Joseph City					PD	PD
Katherine's Landing			APS		APS	APS
					Clark	
Kearney			Des Res		Des Res	Des Res
Kingman						JCC
Lake Havasu City					State	
Laveen					State	
Mammoth					Maricopa	
Marana					P-G	Magma
Maricopa					P-G	
Mesa	Maricopa				PD	PD
Mescal					Maricopa	
Miami					PD	PD
Montezuma Castle National Monument					State	State
Morenci					State	
					PD	PD
Nogales					State	State
Oracle					State	
Oracle Junction						Magma
Organ Pipe Cactus National Monument					PD	PD
Page					State	
			SRP	SRP	SRP	SRP
Paul Spur			State		State	State
Payson					State	
Petrified Forest National Park					P-G	
			APS		APS	APS

Table 1 - 1

Cities and Towns Monitored

City or Town	Carbon Monoxide	Hydrocarbons (Non-Methane)	Nitrogen Dioxide	Oxidants	Particulates	Sulfur Dioxide
Phoenix	Maricopa PD State	Maricopa PD State	Maricopa PD State	Maricopa PD State	Maricopa PD State	Maricopa PD State
Prescott					State	
Redington						Magma
Rillito					State	
Riviera			Des Res		Des Res	Des Res
Roosevelt Dam					P-G	
Safford					State	
St. David			State			
San Manuel					Magma State	Magma State
Scottsdale	Maricopa		Maricopa	Maricopa	Maricopa	
Show Low					State	
Sierra Vista					State	
Stanfield					P-G	
Superior					State	
Tucson	PD Pima	PD Pima	PD Pima State	PD Pima	PD Pima State	PD Pima State
Twin Buttes					State	State
Vail					PD	PD
Winkelman						JCC
Yuma	State			State	State	

2. 1975 DATA

Table 2-1

Abbreviations

General	
NA	Not applicable
NR	Not reported
IDR	Insufficient data recovery
SSP	Short sampling period, usually associated with annual means and due to a late start in 1975.
No response	Operator did not respond to request for data.
Operators	
JCC	Joint Control Center - A jointly owned system operated by ASARCO Incorporated and Kennecott Copper Corporation
APS	Arizona Public Service Company
Clark	Clark County Nevada District Health Department
CONOCO	Continental Oil Company
Des Res	Desert Research Institute, University of Nevada System
Greenlee	Greenlee County, Air Pollution Control
Hecla	Hecla Mining Company
Magma	Magma Copper Company
Maricopa	Maricopa County Department of Health Services, Bureau of Air Pollution Control
PD	Phelps Dodge Corporation
Pima	Pima County Health Department, Air Quality Control District
P-G	Pinal-Gila Counties Air Quality Control District
SRP	Salt River Project
State	Arizona Department of Health Services, Bureau of Air Quality Control
Equipment Type	
Carbon Monoxide	
NDIR	Non-dispersive infrared, continuous
GC	Gas chromatograph, continuous
Hydrocarbons - Non-Methane	
GC	Gas chromatograph, continuous
Nitrogen Dioxide	
Color	Colorimetric, continuous
Chem	Chemiluminescent, continuous
Bubbler	Bubbler sampler, 24-hour, arsenite method
Oxidants	
Coul	Coulometric, continuous
Color	Colorimetric, continuous
Chem	Chemiluminescent, continuous
UV	Ultraviolet absorption, continuous
Particulates	
Hi-vol	High-volume air sampler, 24-hour
Sulfur Dioxide	
Coul	Coulometric, continuous
Cond	Conductimetric, continuous
Flame	Flame photometric, continuous total sulfur
Bubbler	Bubbler sampler, 24-hour, pararosaniline method
Color	Colorimetric, continuous
Spec	Spectrometric, continuous

Table 2-2

1975 Carbon Monoxide Data Summary
(in mg/m^3)

Nearest City or Town	Site Location	Operator	Method	1-Hr. Avgs. Max.	1-Hr. Avgs. 2nd High.	8-Hr. Avgs. Max.	8-Hr. Avgs. 2nd High.	Number of Samples
Flagstaff	216 N. Agassiz Street	State	NDIR	27	26	8	7	1510
Florence[a]	2½ miles NNW Florence	Conoco	GC	8	1	1	1	5782
Glendale	6000 W. Olive Ave.	Maricopa	NDIR	17	16	11	10	7398
Mesa	3rd Place & Center	Maricopa	NDIR	31	30	17	16	6421
Phoenix	15 E. Monroe, Valley Bank Annex, 3rd Floor	P.D.	G.C.	49	46	29	28	7969
Phoenix	8531 N. 6th Street	Maricopa	NDIR	27	22	11	11	6773
Phoenix	4732 S. Central	Maricopa	NDIR	24	23	13	13	7623
Phoenix	1845 E. Roosevelt	Maricopa	GC	34	34	26	24	7038
Phoenix	1740 W. Adams	State	GC	40	40	34	30	7687
Scottsdale	2857 N. Miller Rd.	Maricopa	NDIR	31	29	15	14	7751
Tucson	32 N. Stone, Home Federal Savings Tower, 3rd Floor	P.D.	GC	19+	19+	11	9	8591
Tucson[b]	22nd & Alvernon	Pima	NDIR	29	27	18	17	6300
Tucson	22nd & Craycroft	Pima	NDIR	19	17	8	7	7180
Tucson	151 West Congress Street	Pima	NDIR	26	21	9	9	8670
Yuma	201 S. Second Ave.	State	NDIR	7	6	4	4	3636

a. For the period 02/75 through 12/75.

b. Station in Operation nine months.

Table 2-3

1975 Hydrocarbons (Non-Methane) Data Summary
(in ug/m^3)

Nearest City or Town	Site Location	Operator	Method	3-Hr. Avgs. (6-9 a.m) Max.	3-Hr. Avgs. (6-9 a.m) 2nd High.	Number of Samples (6-9 a.m.)
Florence[a]	2½ Miles NNW	Conoco	GC	780	689	250
Phoenix	15 E. Monroe	P.D.	GC	3856	3779	316
Phoenix[b]	1845 E. Roosevelt	Maricopa	GC	2886	2492	76
Phoenix	1740 W. Adams	State	GC	4390	4220	282
Tucson	32 N. Stone	P.D.	GC	1288	1092	350
Tucson	151 W. Congress	Pima	GC	848	753	288

a. For the period 02/75 through 12/75.

b. For the period 7/17/75 - 12/31/75.

State and Federal standard: 3-Hour Average 6-9 a.m. 160

The hydrocarbons standard is for use as a guide in devising implementation plans to achieve oxidant standards.

Table 2-4

1975 Nitrogen Dioxide Data Summary
(in ug/m^3)

Nearest City or Town	Site Location	Operator	Method	Ann. Avg.	Maximum 1-Hr.	Maximum 24-Hr.	Number of Samples 1-Hr.	Number of Samples 24-Hr.
Bullhead City	DRI Office, 224 Main St.	Des Res	Bubbler	17	NA	54	NA	60
Davis Dam	DRI Mountain	Des Res	Bubbler	11	NA	20	NA	60
Davis Dam	U. S. Bureau of Reclamation	State	Bubbler	17	NA	57	NA	59
Florence[a]	2½ miles NNW Florence	Conoco	Chem	17	320	36	3329	NA
Florence	22nd St & Willow	State	Bubbler	30	NA	103	NA	38
Grand Canyon	Grand Canyon Village	State	Bubbler	18	NA	45	NA	39
Joseph City	Laboratory	APS	Bubbler	9	NA	69	NA	198
Joseph City	Leroux Substation, 9.5 mi. SE of Joseph City	APS	Bubbler	6	NA	89	NA	212
Joseph City	Woodruff Substation, 16 mi. SE of Joseph City	APS	Bubbler	6	NA	50	NA	189
Katherine's Landing	Ranger Maint. Yard	Des Res	Bubbler	11	NA	16	NA	60
Page	Airport	SRP	Bubbler	5	NA	31	NA	238
Page	Airport	State	Bubbler	13	NA	27	NA	46
Petr. Forest	National Park Visitor Center	APS	Bubbler	7	NA	112	NA	199
Phoenix	15 E. Monroe, Valley Bank Annex, 3rd Floor	P.D.	Chem	37	376	193	8638	NA
Phoenix	1845 E. Roosevelt	Maricopa	Chem	62	376	187	6399	NA
Phoenix[b]	1740 W. Adams St.	State	Color	83	660	277	5451	NA
Phoenix	1845 E. Roosevelt	State	Bubbler	89	NA	232	NA	48
Riviera	Camera Site	Des Res	Bubbler	10	NA	24	NA	59
Riviera	Riverbend	Des Res	Bubbler	15	NA	30	NA	58

Nearest City or Town	Site Location	Operator	Method	Ann. Avg.	Maximum 1-Hr.	Maximum 24-Hr.	Number of Samples 1-Hr.	Number of Samples 24-Hr.
St. David[c]	1.8 mi. SW of St. David	State	Bubbler	29	NA	93	NA	34
Scottsdale[d]	2857 N. Miller Road	Maricopa	Chem	NA	263	NA	688	NA
Tucson	32 N. Stone, Home Federal Savings Tower, 6th Floor	P.D.	Chem	38	301	114	7410	NA
Tucson	22nd & Craycroft	Pima	Color	51	226	123	7621	NA
Tucson	151 West Congress Street	Pima	Chem	58	470	162	8090	NA
Tucson	University of Arizona	State	Bubbler	49	NA	72	NA	53
Tucson	632 W. Flores	P.D.	Chem	46	244	103	8502	NA

a. For the period 08/75 through 12/75

b. For the period 3/13/75 through 12/31/75

c. For the period 3/19/75 through 12/31/75

d. Data collected only for the month of December 1975.

Table 2-5

1975 Oxidants Data Summary
(in ug/m^3)

Nearest City or Town	Site Location	Operator	Method	1-Hr. Avgs. Max.	1-Hr. Avgs. 2nd High.	Number of Samples
Buckeye[a]	Approx. 30 mi. W. of Phoenix	P.D.	Coul	196	187	4608
Coolidge	2 mi. N. of Coolidge	P.D.	Coul	133	130	8525
Florence[b]	2½ miles NNW	Conoco	Chem	275	275	5081
Florence[c]	2004 Main St.	P.D.	Coul	133	128	3204
Glendale[d]	6000 W. Olive Ave	Maricopa	UV	196	196	2412
Page	Airport	SRP	Coul	80	80	6091
Phoenix	15 E. Monroe	P.D.	Coul	188	181	8527
Phoenix[e]	8531 N. 6th St.	Maricopa	UV	192	192	4208
Phoenix	1845 E. Roosevelt	Maricopa	UV	298	251	6389
Phoenix[f]	4732 S. Central	Maricopa	UV	135	133	5852
Phoenix[g]	1740 W. Adams	State	Color	259	245	5145
Phoenix[h]	1740 W. Adams	State	UV	194	187	2926
Scottsdale	2857 N. Miller Rd.	Maricopa	UV	192	141	6776
Tucson	32 N. Stone	P.D.	Coul	168+	146	7941
Tucson	22nd & Craycroft	Pima	Color	255	255	6660
Tucson	151 West Congress	Pima	UV	216	196	8320
Yuma	201 S. Second	State	UV	245	240	6158

a. For the period 06/75 through 12/75

b. For the period 05/75 through 12/75

c. For the period 01/75 through 05/75

d. For the months January, April, May and July.

e. For the period 06/5/75 through 12/75.

f. For the period 04/75 through 12/75.

g. For the period 01/75 through 08/75.

h. For the period 09/75 through 12/75.

STATE AND FEDERAL STANDARD:

1 - Hour Average
160 ug/m^3

Table 2-6

1975 Particulates Data Summary
High Volume Sampler
(in ug/m^3)

Nearest City or Town	Site Location	Operator	Geom. Mean	24-Hr. Avg. Max.	24-Hr. Avg. 2nd High	Number of Samples
Ajo	Camelback Mtn., approx 1.2 mi N88°W from Smelter Stack	P.D.	33	319	276	250
Ajo	Oxidation Pond, approx. 1.2 mi. N8°E from Smelter Stack	P.D.	123	2427	2265	246
Ajo	South Tailings Dam, approx. 1.3 mi. N85°E from Smelter Stack	P.D.	128	5022	1677	245
Ajo	Town Square, approx. 0.5 mi. N54°W from Smelter Stack	P.D.	121	1283	867	254
Ajo	AZ DOT, Well Rd.	State	83	222	200	46
Apache Junction	County Yard - 1 mile N of Y	P-G	69	139	126	12
Boys Ranch	General Motors Proving Grounds	P.D.	93	1328	545	180
Buckeye	Approx. 30 mi. W. of Phoenix	P.D.	204	1256	997	169
Bullhead City	DRI Office, 224 Main St.	Des Res	82	565	500	59
Carefree	Carefree Airport	Maricopa	42	277	138	55
Casa Grande	401 N. Marshall St.	State	147	649	368	56
Chloride[a]	Duval Mineral Park Mine	State	73	420	147	35
Clarkdale	High School Football Stadium	State	53	154	125	57
Clifton	Court House	Greenlee	53	159	138	54
Coolidge	2 mi. N. of Coolidge	P.D.	111	1143	407	179
Corona de Tucson	15 mi SE of Tucson	Pima	28	66	60	57
Davis Dam	DRI Mountain	Des Res	42	1067	195	56
Davis Dam	U. S. Bureau of Reclamation	State	37	658	142	58
Douglas	0.75 mi. N15°E of Smelter Stack	P.D.	94	710	688	340
Douglas[b]	Cochise College, 6.2 mi. N80°W of Smelter Stack	P.D.	89	462	411	55
Douglas	1012 G. Avenue (Mercantile)	P.D.	100	434	363	328
Douglas	Pirtleville, 1.3 mi. N22.5°E of Smelter Stack	P.D.	92	576	540	337
Douglas	15th Street Park	State	86	222	210	45
Douglas	U. S. 666, 2 km. NNE of Stack	State	49	126	101	59
Douglas	2 km. NNW of stack	State	86	150	146	11
Eagar	Town Hall	State	66	224	164	53
Flagstaff	Birch & San Francisco	State	67	233	200	48
Florence[c]	2004 Main St.	P.D.	115	488	259	76
Florence	2½ miles NNW Florence	Conoco	74	250	240	65

Nearest City or Town	Site Location	Operator	Geom. Mean	24-Hr. Avg. Max.	24-Hr. Avg. 2nd High	Number of Samples
Florence	22nd St & Willow	State	180	1251	1018	40
Glendale	6000 W. Olive	Maricopa	101	262	231	32
Grand Canyon	Grand Canyon Village	State	14	87	78	37
Green Valley	2 mi. N. of Townsite	P.D.	58	205	164	176
Green Valley	245 W. Experanza	Pima	53	121	110	52
Guadalupe	Encinas Rd.	Maricopa	172	540	420	53
Gu Komelik	3 mi W. of Hecla Mining Co. plant	Hecla	45	189	90	14
Hayden	Old Town Jail, Canyon Drive	State	165	579	573	53
Hereford	11 mi. W. of Bisbee	P.D.	45	711	702	325
Joseph City	Laboratory	APS	56	393	363	178
Joseph City	Leroux Substation, 9.5 mi. SE of Joseph City	APS	35	355	191	189
Joseph City	Woodruff Substation, 16 mi. SE of Joseph City	APS	34	423	255	192
Katherines Landing	NR	Clark	45	152	118	43
Katherines Landing	Ranger Maint. Yard	Des Res	40	669	124	60
Kingman	305 W. Beale Street	State	57	387	268	40
Lake Havasu City	Lake Havasu Community Hospital	State	42	780	155	58
Lavean	St. Johns Indian School	Maricopa	145	1916	1082	59
Miami	Jones Ranch	State	44	127	101	44
Mammoth	County Court Building	P-G	73	159	119	12
Marada	NR	P-G	106	158	147	11
Maricopa[d]	Approx. 6.5 mi. N83°W of Maricopa	P.D.	79	582	395	31
Mesa	3rd Place & Center	Maricopa	116	235	228	52
Mescal	El Paso Natural Gas Co. Station, 9 mi. W. of Benson	P.D.	48	255	222	180
Montezuma Castle	Park Maint. Bldg.	State	27	164	103	53
Morenci	Cadillac Point - 5500, 2.75 mi. N51°W of Smelter Stack	P.D.	48	293	236	339
Morenci	Clifton Fina, 1.75 mi. S69°E of Smelter Stack	P.D.	54	551	274	327
Morenci	East Plantsite, 2.5 mi. S35°E of Smelter Stack	P.D.	76	961	913	337
Morenci	Silver Basin, 1.9 mi. S51°N of Smelter Stack	P.D.	48	539	406	334
Morenci	Stargo, 1.5 mi. N63°W of Smelter Stack	P.D.	51	359	234	338
Morenci	Stargo, Hwy 666	State	60	413	146	54
Nogales[e]	122 La Costellana Drive	State	181	506	220	6
Nogales[f]	Nogales High School - Plum St.	State	112	233	223	5
Oracle Junction	Near Oracle Junction, approx. 21 mi. North of Tucson	P.D.	36	260	236	180
Organ Pipe	Visitor's Center	State	28	94	67	47

Nearest City or Town	Site Location	Operator	Geom. Mean	Max.	24-Hr. Avg. 2nd High	Number of Samples
Page	Airport	SRP	41	742	421	350
Page	Airport	State	44	160	127	54
Paul Spur	Naco Highway	State	86	207	203	50
Payson	Sheriff's Office	P-G	232	455	423	12
Petr. Forest	National Park Visitor Center	APS	24	338	149	191
Phoenix	4732 S. Central	Maricopa	143	293	252	42
Phoenix	1845 E. Roosevelt	Maricopa	112	399	287	60
Phoenix	8531 N. 6th St.	Maricopa	121	343	336	51
Phoenix	241 N. Central, Valley Bank Center, Roof	P.D.	84	715	389	362
Phoenix	15 E. Monroe, Valley Bank Annex, 3rd Floor	P.D.	138	928	843	360
Phoenix	1740 W. Adams	State	169	442	427	56
Phoenix	1845 E. Roosevelt	State	125	333	238	39
Prescott	500 S. Marina St.	State	48	141	140	60
Rillito[g]	2 mi. NW of Plant	State	85	148	145	25
Rillito	T.G. & E. North Loop Substation	State	76	256	154	55
Riviera	Camera Site	Des Res	44	831	240	57
Riviera	Riverbend	Des Res	175	1807	544	60
Roosevelt Dam	Ranger Station	P-G	38	123	86	10
Safford	521 10th Ave	State	133	246	228	57
San Manuel	Golf Course, 3 km WNW of smelter stacks	Magma	41	84	71	60
San Manuel[h]	LDS Church	State	51	104	88	27
San Manuel[i]	Trailer Park	State	84	143	136	29
Scottsdale	2857 N. Miller Rd.	Maricopa	115	281	234	54
Scottsdale	13665 N. Scottsdale Rd.	Maricopa	148	1083	532	53
Show Low	City Hall, Deuce of Clubs	State	48	245	178	56
Sierra Vista	1st St. & Bartow Drive	State	54	335	122	59
Stanfield	County Court Building	P-G	207	668	440	14
Superior	AZ DOT, 951 Main St	State	84	241	228	56
Tucson	32 N. Stone, Home Federal Savings Tower, Roof	P.D.	64	764	304	349
Tucson	1970 West Ajo Way	Pima	79	170	169	53
Tucson	Alvernon Way-Ft. Lowell Road	Pima	175	404	362	55
Tucson	151 West Congress Street	Pima	67	442	173	174
Tucson	Davis Monthan AFB	Pima	74	146	130	58
Tucson	Florence Hwy-Magee Road	Pima	64	228	195	54
Tucson	Golf Links Road-Harrison Road	Pima	62	160	132	48
Tucson	Hughes Access-Nogales Highway	Pima	54	177	136	56
Tucson	Orange Grove Road-Camino de Terra	Pima	87	311	200	56
Tucson	1010 West Prince Road	Pima	74	189	165	53

Nearest City or Town	Site Location	Operator	Geom. Mean	24-Hr. Avg. Max.	24-Hr. Avg. 2nd High.	Number of Samples
Tucson	7901 E. Scarlet	Pima	84	291	202	56
Tucson	South Tucson Fire Station - 1810 S. 5th Ave	Pima	96	225	189	56
Tucson	7920 E. Tanque Verde Road	Pima	60	146	132	51
Tucson	University of Arizona	State	71	178	175	54
Twin Buttes[j]	Duval Sierrita Mine	State	179	439	373	40
Vail	El Paso Natural Gas Co. Station	P.D.	42	278	268	177
Yuma	201 S. Second Ave.	State	147	1427	666	54

a. From 04/75 through 11/75
b. From 01/75 through 02/75
c. From 01/75 through 04/75
d. From 11/75 through 12/75
E. From 01/75 through 03/75

f. For 12/75 only
g. From 01/75 through 04/75
h. From 07/75 through 11/75
i. From 01/75 through 05/75
j. From 03/75 through 11/75

STANDARDS:
(in ug/m^3)

	Annual Geometric Mean	24-Hour Average
State	60	150
Federal Primary	75	260
Federal Secondary	60	150

Table 2-7

1975 Chemical Composition of Particulates
(in ug/m^3)

Note: Data for State Network ONLY

Site	Location	Benzene Soluble Organics Avg.	Benzene Soluble Organics Max. 24-Hr.	Sulfates Avg.	Sulfates Max. 24-Hr.	Copper Avg.	Copper Max. 24-Hr.	Iron Avg.	Iron Max. 24-Hr.	Lead Avg.	Lead Max. 24-Hr.	Zinc Avg.	Zinc Max. 24-Hr.
Ajo	AZ DOT, Well Rd.	1.8	6.7	8.9	27.6	.30	1.01	3.5	20.1	.2	.5	.06	.10
Casa Grande	401 N. Marshall St	2.4	6.0	6.0	13.2	.09	.24	1.1	2.8	.2	.3	.06	.15
Chloride	Duval Mineral Park Mine	.6	1.8	12.2	22.8	.44	1.10	1.2	2.1	.1	.1	.13	.17
Clarkdale	High School Football Stadium	.6	3.7	3.6	11.0	.07	.14	.4	.9	.1	.1	.04	.14
Davis Dam	U. S. Bureau of Reclamation	.8	3.8	5.2	9.7	.08	.10	.3	.5	.1	.1	.03	.08
Douglas	15th St. Park	.8	2.5	9.5	22.8	.11	.11	.6	.9	.1	.1	.06	.06
Douglas	U. S 666 2 km. NNE of stack	.6	1.6	11.1	25.1	.22	.48	.8	2.0	.1	.3	.09	.22
Douglas	Cochise County Hospital	1.2	2.3	11.1	18.4	.18	.21	.2	.2	.1	.1	.04	.04
Eagar	Town Hall	8.3	42.5	4.6	11.3	.06	.11	.7	2.1	.1	.2	.06	.28
Flagstaff	Birch & San Francisco	3.9	23.2	2.4	6.4	.08	.10	1.1	2.9	.3	.6	.05	.13
Florence	22nd St. & Willow	1.7	7.4	12.5	47.1	.16	.26	.9	1.6	.2	.3	.08	.22
Grand Canyon	Grand Canyon Villiage	1.0	3.6	2.2	3.3	.02	.03	.5	.8	.2	.3	.09	.15
Hayden	Old Town Jail, Canyon Dr.	3.3	14.0	13.4	45.6	1.29	3.20	2.2	6.9	.2	.4	.11	.19
Kingman	305 W. Beale St.	2.3	7.3	4.2	13.7	.14	.32	.8	1.4	.2	.3	.04	.06
Lake Havasu	Lake Havasu Community Hospital	.9	2.3	3.0	14.6	.06	.15	.3	.6	.1	.1	.03	.10
Miami	Jones Ranch	1.1	3.4	13.0	48.6	.20	.50	.2	.5	.1	.1	.04	.07
Montezuma Castle	Park Maint. Bldg.	.7	1.7	2.5	8.0	.07	.16	.2	.3	.1	.2	.07	.18
Morenci	Stargo, Hwy. 666	1.4	4.6	17.0	123.6	.64	1.98	.9	2.4	.1	.4	.10	.23
Nogales	122 La Castellana Drive	9.5	17.7	5.1	13.6	.12	.18	1.6	2.2	--	--	.07	.11
Nogales	Nogales High School, Plum St.	18.7	48.4	--	--	--	--	--	--	--	--	--	--
Organ Pipe	Visitor's Center	.8	2.9	3.9	10.5	.04	.07	.2	.2	<.1	.1	.09	.30
Page	Airport	1.3	6.1	4.2	9.0	.07	.19	.4	1.4	.1	.4	.06	.15
Paul Spur	Naco Hwy	.5	1.6	7.5	25.2	.10	.24	.4	.9	<.1	.1	.06	.11
Phoenix	1740 W. Adams	7.7	45.8	6.5	14.9	.10	.22	1.6	3.0	1.3	3.7	.12	.21
Phoenix	1845 East Roosevelt	4.1	6.3	3.7	5.0	.03	.03	.5	.5	.2	.2	.06	.06
Prescott	500 S. Marina St.	1.3	9.2	2.9	7.6	.07	.12	.3	.5	.1	.2	.02	.03
Rillito	TG & E North Loop Substation	1.3	3.9	5.5	14.9	.10	.20	.9	1.9	.2	.4	.04	.09
Rillito	1 Mi. NW of Plant	1.5	3.1	4.1	15.3	.07	.14	.9	1.6	.2	.4	.05	.08
Safford	521 10th Ave.	2.1	7.2	6.8	19.5	.13	.21	1.1	2.2	.2	.4	.04	.09
San Manuel	Trailer Park	1.3	2.4	11.9	22.0	.36	.89	1.0	1.4	.3	.4	.13	.20
San Manuel	Mormon Church	.6	2.2	10.9	16.6	.08	.19	.3	.6	.1	.1	.11	.19
Show Low	City Hall, Deuce of Clubs	1.8	11.0	3.5	9.5	.04	.10	.7	2.8	.1	.3	.04	.14
Sierra Vista	1st St. & Bartow Drive	.9	2.8	5.4	16.7	.07	.14	.3	.8	.2	.3	.02	.06
Superior	AZ DOT, 951 Main St.	1.1	2.5	7.3	22.5	.12	.25	.9	2.6	.2	.5	.06	.17
Twin Buttes	Duval Sierrita Mine	1.1	3.1	22.5	69.5	.31	.64	3.1	8.5	.1	.1	.08	.13
Tucson	University of Arizona	1.1	3.4	4.6	11.7	.09	.15	.3	.4	.2	.3	.08	.13
Yuma	201 S. Second Ave	2.2	4.5	6.4	13.5	.06	.10	.9	1.5	.3	.4	.05	.10

Table 2-8

1975 Sulfur Dioxide Data Summary
(in ug/m^3)

Nearest City or Town	Site Location	Operator	Method	Ann. Avg.	3-Hr. Avgs. Max.	3-Hr. Avgs. 2nd High	24-Hr. Avgs. Max.	24-Hr. Avgs. 2nd High.	No. of Samples 1-Hr.	No. of Samples 24-Hr.
Ajo	Town Square, approx. 0.5 mi. N54°W from Smelter Stack	P.D.	Coul	40	2405	2169	536	457	7867	N.A.
Ajo	Oxidation Pond, approx. 1.2 mi. N8°E from Smelter Stack	P.D.	Coul	72	3186	2428	1094	989	7788	N.A.
Ajo	S. Tailings Dam, approx. 1.3 mi. N85°E from Smelter Stack	P.D.	Coul	37	5418+	4376	1425	1212	7368	N.A.
Ajo	Camelback Mtn., approx. 1.2 mi. N88°W from Smelter Stack	P.D.	Coul	23	3563	1796	743	648	7842	N.A.
Ajo	AZ DOT, Well Rd.	State	Coul	39	2742	1683	645	386	6425	N.A.
Boys Ranch[a]	General Motors Proving Grounds	P.D.	Coul	6	190	152	50	31	4333	N.A.
Buckeye	Approx. 30 mi. West of Phoenix	P.D.	Coul	4	269	131	82	25	7586	N.A.
Bullhead City	DRI Office, 224 Main St.	Des Res	Bubbler	<13	N.A.	N.A.	<13	<13	N.A.	60
Chloride	Duval Mineral Park Mine	State	Bubbler	12	N.A.	N.A.	26	26	N.A.	49
Clifton	Court House	Greenlee	Coul	50	1847	919	807	555	8540	N.A.
Coolidge	2 mi. North of Coolidge	P.D.	Coul	4	160	102	44	39	7982	N.A.
Davis Dam	DRI Mountain	Des Res	Bubbler	13	N.A.	N.A.	<13	<13	N.A.	60
Davis Dam	U.S. Bureau of Reclamation	State	Bubbler	10	N.A.	N.A.	51	40	N.A.	55
Double Adobe[b]	Approx. 11 mi. N34°W of Smelter Stack	P.D.	Coul	57	3243	1932	568	456	1263	N.A.
Douglas	0.75 mi. N15°E of Smelter Stack	P.D.	Coul	119	7702	6781	1398	1351	8557	N.A.
Douglas[b]	Cochise College, 6 mi. N77°W of Smelter Stack	P.D.	Coul	67	2748	2728	709	480	1316	N.A.
Douglas	Curtis, approx. 2.65 mi. N32°W of Smelter Stack	P.D.	Coul	89	8243	5680	1535	1286	8389	N.A.
Douglas	Fairgrounds, approx. 3 mi. N55°E of Smelter Stack	P.D.	Coul	48	3513	2314	599	478	8481	N.A.
Douglas	Fir, approx. 1 4 mi. N47°E of Smelter Stack	P.D.	Coul	75	5877	3972	1369	849	8477	N.A.
Douglas	1012 G. Avenue (Mercantile)	P.D.	Coul	78	5079	3934	1182	861	8555	N.A.
Douglas	Martin, approx. 4.2 mi. N20°E of Smelter Stack	P.D.	Coul	47	2398	2121	478	450	8555	N.A.
Douglas	Northwest, approx. 1.22 mi. N30°W of Smelter Stack	P.D.	Coul	146	7856	7785	1894	1461	8342	N.A.
Douglas	Pirtleville, 1.3 mi. N22.5°E of Smelter Stack	P.D.	Coul	103	6896	4990	1451	927	8522	N.A.
Douglas	2 km. NNW of Stack	State	Coul	116	7214	6660	1834	1136	6776	N.A.
Douglas	U.S. 666, 2 km. NNE of Stack	State	Coul	103	8000	6308	1120	947	7898	N.A.
Florence	2½ miles NNW Florence	Conoco	Flame	10	230	193	63	58	7183	NR
Florence[c]	2004 Main Street	P.D.	Coul	17	362	287	160	134	2872	N.A.
Florence	22nd St. & Willow	State	Bubbler	26	N.A.	N.A.	122	105	N.A.	33
Glendale	6000 W. Olive Ave.	Maricopa	Coul	22	N.A.	N.A.	288	262	4242	N.A.
Grand Canyon	Grand Canyon Village	State	Bubbler	8	N.A.	N.A.	15	14	N.A.	39
Green Valley	2 mi. N of Townsite	P.D.	Coul	<1	42	34	10	9	8289	N.A.
Hayden	Globe Highway - Approx. 1 mi. N of the junction of Highway 77 and 177.	JCC	Coul	170	7901	7775	1463	1083	8567	N.A.

Nearest City or Town	Site Location	Operator	Method	Ann. Avg.	3-Hr. Avgs. Max.	3-Hr. Avgs. 2nd High	24-Hr. Avgs. Max.	24-Hr. Avgs. 2nd High.	No. of Samples 1-Hr.	No. of Samples 4-Hr.
Hayden	Hayden Fire Station - rear of 640 Canyon Drive	JCC	Coul	116	4226	4224	1134	887	8452	N.A.
Hayden	Hayden Junction - Highway 177, in the vicinity of the Arizona Tank Lines maintenance yard.	JCC	Coul	58	2146	2111	360	318	8632	N.A.
Hayden	Montgomery Ranch - 2 mi. NW of Hayden	JCC	Coul	184	6491	6449	1576	1277	8204	N.A.
Hayden	Montgomery - Reese Ranch	State	Coul	134	5467	4425	1908	1246	8164	N.A.
Hayden	Old Town Hall, Canyon Drive	State	Coul	105	4483	3900	950	950	7756	N.A.
Hereford	11 mi. West of Bisbee	P.D.	Coul	6	812	545	192	140	8045	N.A.
Joseph City[d]	Laboratory	APS	Bubbler/ flame	2	51	51	25	25	5036	186
Joseph City	Leroux Substation, 9.5 mi. SE of Joseph City	APS	Bubbler	1	NA	NA	18	18	NA	206
Joseph City[d]	Woodruff Substation, 16 mi. SE of Joseph City	APS	Bubbler/ flame	1	60	59	26	25	6932	179
Katherine's Landing	Ranger Maint. Yard	Des Res	Bubbler	<13	NA	NA	< 13	< 13	NA	60
Kearney	Crescent Ranch - approx. 1 mi. E of Kearny on State Highway 177	JCC	Coul	32	1321	1297	231	205	8612	N.A.
Kearney	Kearney Station - rear of 304 Hartford	JCC	Coul	29	1043	962	195	195	8639	N.A.
Mammoth	Courthouse, 11.8 km N of smelter stacks	Magma	Coul	21	1616	1511	380	328	6964	N.A.
Mammoth	Mine site, 10.5 Km NW of smelter stacks	Magma	Coul	76	3425	3030	812	580	6809	N.A.
Maricopa[e]	Approx. 6.5 mi. N. 83°W of Maricopa	P.D.	Coul	1	54	28	15	13	1294	N.A.
Mescal	El Paso Natural Gas Co. Station, 9 mi. W of Benson	P.D.	Coul	4	379	215	156	54	8127	N.A.
Miami	Jones Ranch	State	Coul	51	8900	6875	2642	1548	8061	N.A.
Miami[f]	Lower Miami	State	Coul	28	4225	3737	1337	1240	6491	N.A.
Morenci	Stargo, Hwy. 666	State	Coul	210	7133	7073	2169	2098	8489	N.A.
Morenci	Cadillac Point - 5500, 2.75 mi. N51°W of Smelter stack	P.D.	Coul	244	8217	6349	2653	1944	7653	N.A.
Morenci	Clifton Fina, 1.75 mi. S69°E of Smelter Stack	P.D.	Coul	105	4040	3674	994	954	7517	N.A.
Morenci	East Plantsite, 2.5 mi. S35°E of Smelter Stack	P.D.	Coul	41	2513	1980	616	380	7744	N.A.
Morenci	Metcalf approx. 3.9 mi. N28°W from Smelter Stack	P.D.	Coul	193	5714	5186	1503	1468	7986	N.A.
Morenci	Oroville, approx. 2.75 mi. N48°E of Smelter Stack	P.D.	Coul	49	2401	1820	810	403	7468	N.A.
Morenci	Silver Basin, approx. 1.9 mi. S51°W from Smelter Stack	P.D.	Coul	216	5698	4795	1811	1650	8062	N.A.
Morenci	Stargo, 1.5 mi. N63°W of Smelter Stack	P.D.	Coul	219	7535	6860	2207	1472	8139	N.A.
Morenci	U.S. 666, 4.5 km. NW of Stack	State	Coul	237	9703	7360	2547	2315	7637	N.A.
Morenci	Eagle Creek Road, approx. 4.75 mi. S84 W of Smelter stk	P.D.	Coul	46	2271	1836	532	551	7953	N.A.
Oracle	New court house, 13.2 Km W of smelter stacks	Magma	Coul	21	2166	2165	457	443	6348	N.A.
Oracle Jct.	Near Oracle Junction, approx. 21 mi. North of Tucson	P.D.	Coul	11	955	750	225	213	7602	N.A.
Page	Airport	SRP	Bubbler	<1	NA	NA	16	11	NA	237
Page	Airport	SRP	Flame	NR	100	88	18	18	3641	N.A.
Page	Airport	SRP	Spec	1	138	128	24	24	4049	N.A.
Page	NW, 14.3 km from Navajo GS	SRP	Flame	NR	43	37	5	5	3608	N.A.
Page	W 5.8 km from Navajo GS	SRP	Flame	NR	69	67	15	15	3638	N.A.
Page	WSW, 3.2 km from Navajo GS	SRP	Flame	NR	176	170	36	36	3451	N.A.
Page	SW, 7.4 km from Navajo GS	SRP	Flame	NR	94	77	18	18	3552	N.A.

Nearest City or Town	Site Location	Operator	Method	Avg.	3-Hr. Avgs. Max.	3-Hr. Avgs. 2nd High	24-Hr. Avgs. Max.	24-Hr. Avgs. 2nd High.	No. of Samples 1-Hr.	No. of Samples 24-Hr.
Page	Airport	State	Bubbler	7	NA	NA	22	22	NA	47
Page	Airport	State	Coul	0	40	0	5	0	5070	N.A.
Petr. Forest[d]	National Park Visitor Center	APS	Bubbler/ flame	1	63	63	18	15	3719	174
Phoenix[g]	4732 S. Central	Maricopa	Coul	20	NR	NR	419	288	2433	N.A.
Phoenix	1845 E. Roosevelt	Maricopa	Coul	15	NR	NR	262	262	5664	N.A.
Phoenix	241 N. Central, Valley Bank Center, 29th Floor	P.D.	Coul	7	143	118	66	66	8082	N.A.
Phoenix	15 E. Monroe, Valley Bank Annex, 3rd Floor	P.D.	Coul	9	112	87	58	47	8115	N.A.
Phoenix	1845 East Roosevelt	State	Bubbler	9	NA	NA	21	20	NA	47
Redington	East of main ranch, 25.2 km SSE of smelter stacks	Magma	Coul	12	524	445	203	149	6941	N.A.
Riviera	Camera Site	Des Res	Bubbler	<13	NA	NA	<13	<13	NA	57
Riviera	Riverbend	Des Res	Bubbler	<13	NA	NA	<13	<13	NA	60
San Manuel	East Peppersauce Wash, 5.8 km ESE of smelter stacks	Magma	Coul	29	1589	1225	382	334	6888	N.A.
San Manuel	Golf Course, 3 km WNW of smelter stacks	Magma	Coul	107	5240	3720	1084	767	7317	N.A.
San Manuel	Upper Shopping Center, 2 km SSW of smelter stacks	Magma	Coul	74	4183	2742	858	784	7151	N.A.
San Manuel[h]	LDS Church	~~State~~	Coul	~~43~~	3517	1075	563	226	3880	N.A.
San Manuel[i]	Trailer Park	State	Coul	102	4758	3408	714	592	3787	N.A.
Tucson	32 N. Stone, Home Federal Tower, 6th Floor	P.D.	Coul	7	162	133	56	53	8219	N.A.
Tucson	151 West Congress Street	Pima	Flame	7	253	175	112	49	7450	N.A.
Tucson	Florence Hwy. & McGee Road	Pima	Coul	NR	437	348	119	24	2015	N.A.
Tucson	Saguaro Monument HQ	Pima	Coul	NR	192	183	52	47	3500	N.A.
Tucson[j]	1721 N. Tanque Verde Loop Road	Pima	Coul	NR	131	96	52	37	2628	N.A.
Tucson	22nd & Craycroft	Pima	Coul	3	157	105	49	43	7710	N.A.
Tucson	University of Arizona	State	Bubbler	11	NA	NA	25	24	NA	53
Twin Buttes[k]	Duval Sierrita Mine	State	Bubbler	11	NA	NA	22	21	NA	32
Vail	El Paso Natural Gas Co. Station	P.D.	Coul	4	1084	475	338	47	7336	N.A.
Winkelman	Meadows Station - approx ½ mi.S of the junction of Highway 77 and 177.	JCC	Coul	32	2462	2175	332	218	8411	N.A.
Winkelman	North of Winkelman School property, off of Highway 77 (north of Highway 77 and 177 junction, approx. ½ mi.)	JCC	Coul	39	2691	2604	364	338	8584	N.A.

a. Monitoring of sulfur dioxide data at the site from 06/75 through 11/75.
b. From 01/75 through 02/75
c. From 11/75 through 12/75.
d. Bubbler data was reported for annual and 24-hour averages and flame data was reported for 3-hour average.
e. From 11/75 through 12/75.
f. From 03/75 through 12/75.
g. From 05/13/75 through 12/31/75.
h. From 07/75 through 12/75.
i. From 01/75 through 06/75.
j. From 07/75 through 11/75.
k. From 03/75 through 12/75.

STANDARDS: Average (in ug/m^3)

	3-Hr	24-Hr	Annual
State	1,300	260	50
Federal Primary	----	365	80
Federal Secondary	1,300	---	---

3. DATA TRENDS

3. DATA TRENDS

This discussion of data trends, long-term and seasonal, is based on governmental agency data. Maricopa and Pima Counties were the main sources of data for Phoenix and Tucson, respectively. State data were used to determine trends in other areas of Arizona.

Long-term trends are discussed by considering variations in:

annual average concentrations;

annual maximum and second highest 1-hour and 8-hour concentrations;

number of violations of the 1-hour and 8-hour standards per year.

Annual average data should be the best indicator of long-term trends because annual averages are less affected by air quality measurement errors and by unusual meteorology and emissions. However, highest 1-hour and 8-hour data and number of violations should also be considered, especially for evaluating compliance or noncompliance with standards.

Seasonal trends are discussed by referring to the highest 1-hour and 8-hour concentrations since these data are significantly affected by meteorology.

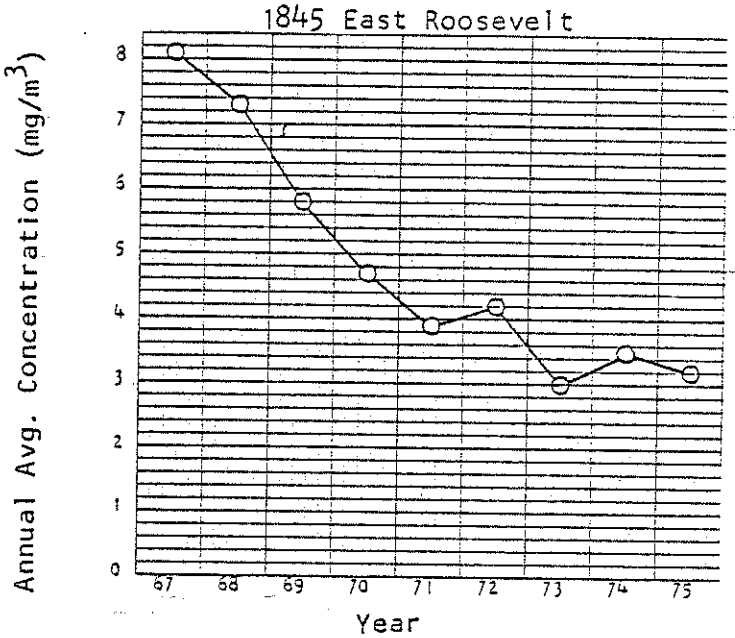
3.1 Carbon Monoxide

3.1.1 Phoenix

Long-term trends in CO concentrations are shown in Figure 3-1, a plot of annual average concentrations from 1967 through 1975 at 1845 East Roosevelt. A downward trend, from 8 milligrams per cubic meter (mg/m^3) in 1967 to 3 mg/m^3 in 1973, is evident. This is a decrease of 63%. The only exception to this trend was in 1972 when concentrations increased.

From 1973 through 1975 it appears that CO concentrations are leveling out.

Figure 3-1

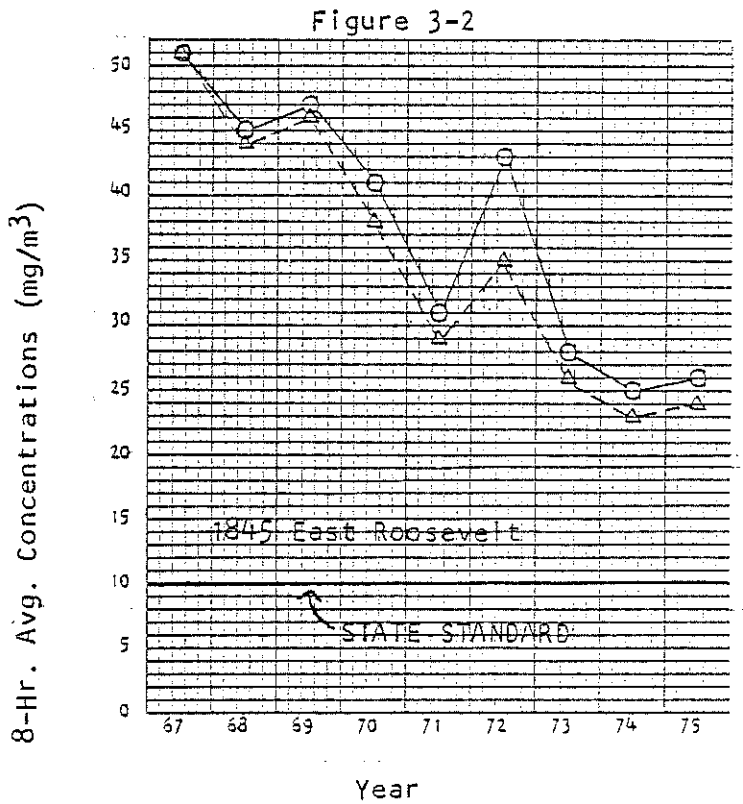


CO Annual Average concentrations, Phoenix, 1967-75

Similar downward and leveling out trends are noted in both the maximum and second highest 8-hour concentrations as shown in Fig. 3-2. In 1967, the maximum and second highest 8-hour concentrations were both 51 mg/m^3, whereas in 1975 they were 26 and 24 mg/m^3, respectively. This is a reduction of 49-53%. However, concentrations are still 14-16 mg/m^3 above the standard of 10 mg/m^3.

Exceptions to the downward trend were observed in 1969 and 1972.

Figure 3-2



CO 8-Hr. Concentrations, Phoenix, 1967-75

LEGEND:

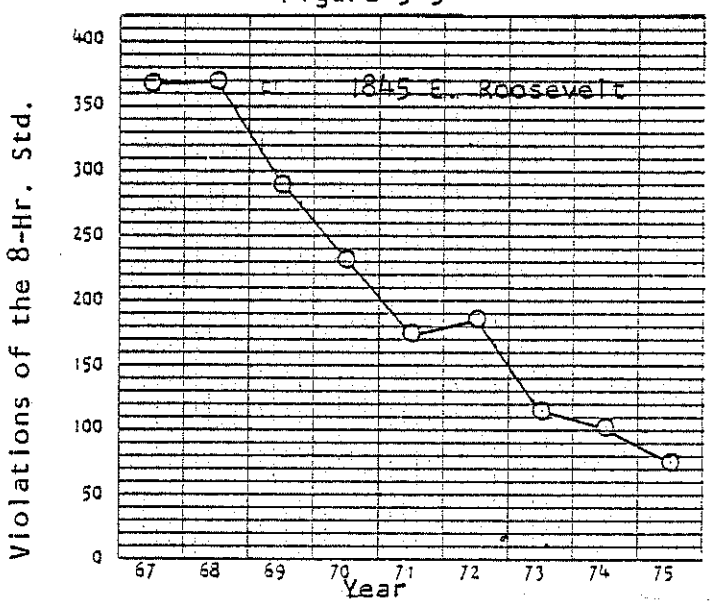
O—O = Max 8-Hr.

Δ- -Δ = 2nd Highest 8-Hr.

The numbers of violations of the 8-hour standard also reflect a downward trend, as shown in Fig. 3-3. In fact, the trend is much steeper and persists through 1975. An 80% decrease is noted in the number of violations--370 in 1967 to 75 in 1975.

Exceptions to the trend occurred in 1968 and 1972.

Figure 3-3

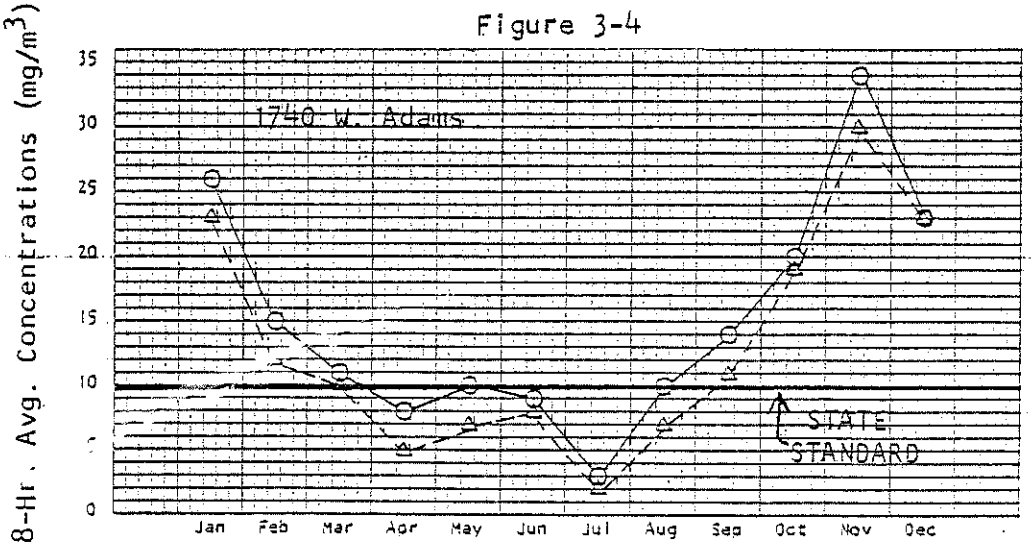


Violations of the CO 8-Hr. Standard, 1967-75.

Seasonal trends in CO concentrations in Phoenix are illustrated in Figure 3-4. The maximum and second highest 8-hour average concentrations at 1740 West Adams Street for each month are plotted in mg/m^3. The State standard of 10 mg/m^3 is noted on the graph.

Wintertime concentrations are much higher than summertime because inversions occur more frequently and last longer in winter.

Figure 3-4



CO 8-Hr. concentrations, Phoenix 1975

LEGEND:

O——O = Max. 8 hr.

Δ- - -Δ = 2nd Highest 8 hr.

3.1.2 Tucson

CO trend data for Tucson (151 West Congress Street) are listed below.

	1974	1975
Annual average (in mg/m^3)	2.1	1.8
Number of violations of the 8-hour standard	1	0
Maximum 8-hour average (in mg/m^3)	13	9
Second highest	10	9

In 1974-75, the trend in Tucson is similar to that for Phoenix; that is, no appreciable change in CO concentrations.

It should be noted that a new monitoring site was added in 1975 which recorded violations of the 8-hour standard. Data for this site, 22nd Street and Alvernon, are listed in the second section of this report.

3.2 Hydrocarbons

Long-term trend data for non-methane hydrocarbons are not currently available. Maricopa and Pima Counties did not monitor non-methane hydrocarbons extensively until 1975. Some indication of trends may be apparent at a later date.

3.3 Nitrogen Dioxide

3.3.1 Phoenix

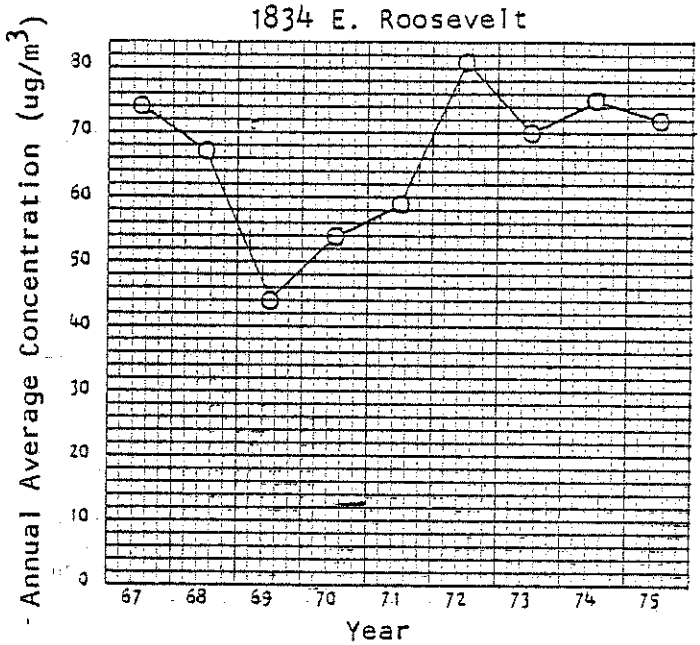
Trend data for NO_2 are shown in Figure 3-5, a plot of annual average concentrations from 1967 through 1975 at 1845 East Roosevelt. The State standard, 100 micrograms per cubic meter (ug/m^3), was not exceeded.

From 1967 through 1969, a downward trend appears; whereas in 1970 through 1974 an upward trend persists. In 1975, concentrations appear to be leveling. It is interesting to note certain similarities with CO trends. In 1972, both NO_2 and CO concentrations rose noticeably. For 1973 through 1975, the curves follow

the same pattern--lower in 1973 and then slightly higher in 1974 and slightly lower in 1975.

Figure 3-5

NO_2 Annual Average concentrations, Phoenix 1967 - 1975



3.3.2 Tucson

Annual average data for the 151 West Congress site are 56 and 58 ug/m^3 in 1974 and 1975, respectively, indicating no significant change.

These data suggest that NO_2 and CO concentrations in Tucson and Phoenix leveled out in the period 1973 through 1975.

3.4 Oxidants

3.4.1 Phoenix

Long-term trends in oxidants in Phoenix are difficult to determine because of the different methods used to monitor oxidants. From 1967 through 1973, the only method available was the colorimetric method which was subsequently found to be non-specific for ozone. An improved method, ultraviolet light absorption, which is specific for ozone, became available in 1974. The relationship between the colorimetric and U.V. methods was found to be inconsistent. Therefore, 1967 through 1973 data will not be considered in this discussion.

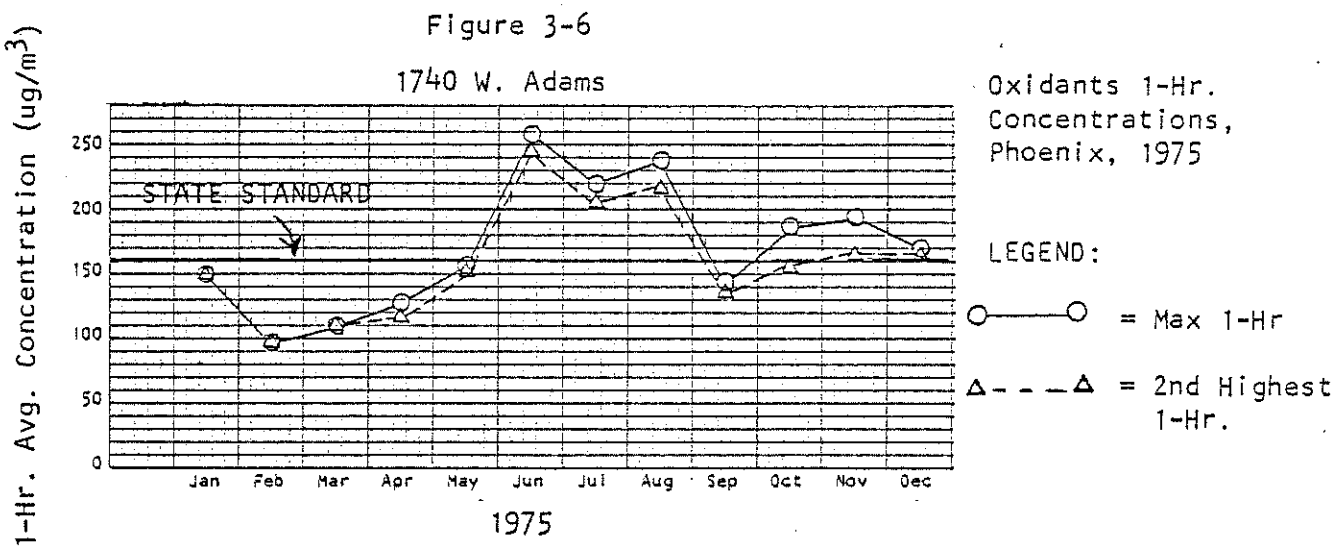
Oxidants data for 1974 through 1975 are rather puzzling. Annual average concentrations and numbers of violations indicate large decreases in oxidants concentrations in 1975 as compared to 1974. However, the maximum and second highest 1-hour concentrations do not reflect a significant change. Also, a significant change would not be expected in view of stable trends in CO and NO_2. The oxidants data are tabulated below.

MONITORING SITE: - 1845 E. Roosevelt	1974	1975
Annual average concentration (in ug/m^3)	52	24
Violations of the 1-hour standard (160 ug/m^3)	187	26
Maximum 1-hour standard (160 ug/m^3)	294	298
Second Highest	294	251

The seasonal pattern for oxidants is depicted in Figure 3-6, a plot of the monthly maximum and second highest 1-hour data in 1975.

Concentrations are higher in the summer months because of the greater amount of solar radiation and higher ambient temperatures.

Figure 3-6



3.4.2 Tucson

Oxidants data for 1974 through 1975 in Tucson at 151 W. Congress also reflect the anomalous trend noted in Phoenix--a sizable decrease in the annual average in 1975 with relatively constant highest 1-hour data. However, Tucson data differ in that the number of violations of the 1-hour standard changed very little, whereas

in Phoenix a large decrease was observed. The Tucson data are listed below.

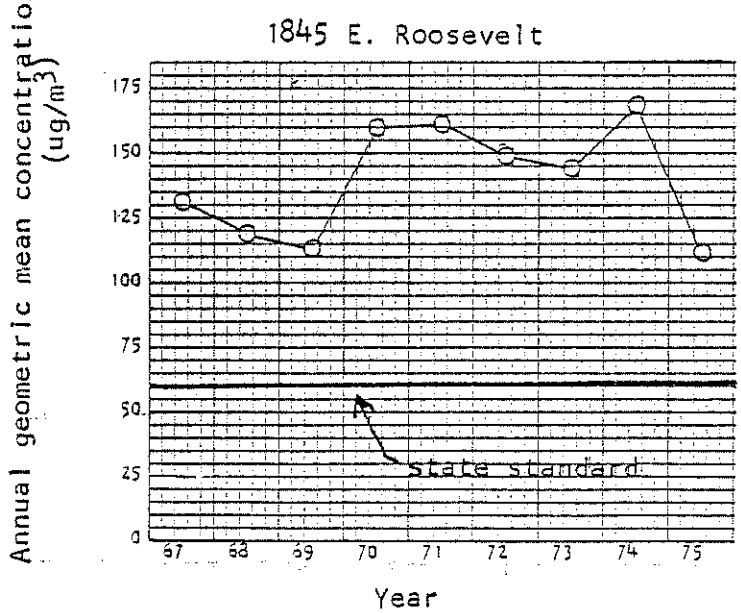
	1974	1975
Annual average concentration (in ug/m^3)	90	49
Violations of the 1-hour standard (160 ug/m^3)	7	9
Maximum 1-hour concentrations (in ug/m^3)	235	216
Second highest	215	196

3.5 Particulates

3.5.1 Phoenix

For 1967 through 1975, annual geometric mean concentrations in ug/m^3 are compared with the State standard, 60 ug/m^3, in figure 3-7. During this period, the highest and lowest mean concentrations were 168 and 112 ug/m^3 in 1974 and 1975, respectively. Overall, it seems that concentrations are fluctuating between these two extremes. Meteorology as well as fugitive emissions are undoubtedly affecting the data. However, the methods by which meteorology affects the data are not clearly understood. For example, annual rainfall data do not correlate with particulates data in the years 1970 through 1975.

Figure 3-7

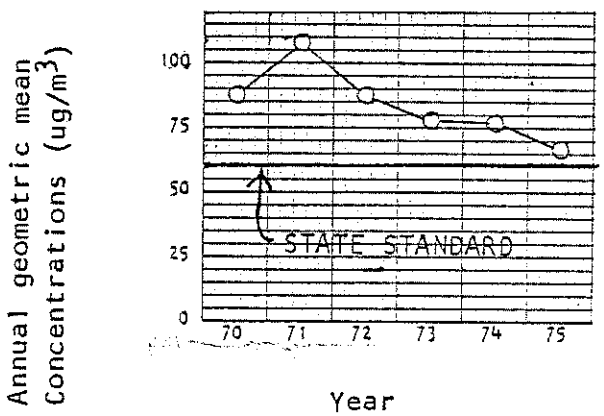


Particulates Annual Geometric Mean Concentration Phoenix, 1967-75.

3.5.2 Tucson

For 1970 through 1975, annual geometric mean data are compared with the state standard in Figure 3-8. Concentrations ranged from 107 ug/m^3 in 1971 to 67 ug/m^3 in 1975. The trend is downward except for 1971, when there was considerable construction activity near the monitoring site, 151 West Congress Street.

Figure 3-8
151 W. Congress



Particulates Annual Geometric Mean concentrations, Tucson, 1970-1975

3.5.3 Other Areas

The following table lists data for 1969 through 1975 in other areas of Arizona. A detailed discussion of each site would be too lengthy and beyond the scope of this report. Instead, a few general comments will be made regarding background data.

The two desert background sites--Montezuma Castle and Organ Pipe--have similar concentrations of particulates. The averages of the annual geometric means are 26 ug/m^3 for Montezuma Castle and 30 ug/m^3 for Organ Pipe. Considering geography and climate, Organ Pipe would be expected to have higher concentrations.

Davis Dam was a desert background site in 1969 and 1970. During these years, the average of the annual geometric means was 30 ug/m^3, the value obtained for Organ Pipe.

The third background site in operation now is Grand Canyon. The average of

of the last four annual geometric means is 15 ug/m^3.

Long-Term Trends in Particulates
1969 - 1975
(annual geometric means in ug/m^3)

Site	69	70	71	72	73	74	75
Ajo	87	83	75	70	71	59	83
Clarkdale	--	64	63	55	96	54	53
Davis Dam	29	31	33	36	32	30	37
Douglas (15th St. Park)	--	--	--	--	--	100	86
Douglas (NNE)	--	--	--	--	61	43	49
Flagstaff	--	74	50	42	73	53	67
Florence	149	153	124	124	120	85	180
Grand Canyon	15	21	40	12	18	17	14
Hayden	224	--	--	--	185	181	165
Kingman	--	--	--	--	--	58	57
Lake Havasu City	--	--	--	--	--	54	42
Montezuma Castle National Monument	--	--	21	26	28	27	27
Morenci	--	--	--	--	--	56	60
Organ Pipe Cactus National Monument	26	37	34	29	34	23	28
Page	17	9	--	31	52	48	44
Rillito (SE)	--	--	--	--	--	69	76
Show Low	--	--	--	--	--	49	48
Sierra Vista	--	--	--	--	--	61	54
Superior	139	204	144	99	101	84	84
Yuma	--	98	94	97	110	111	147

3.6 Sulfur Dioxide

Annual average data (in ug/m^3) for various areas are given in the following

table. The State standard of 50 ug/m^3 is noted for comparison.

The following observations are noted:

Ajo and Florence - No trend is apparent.

Davis Dam and Page - Concentrations increased in 1974 and then leveled out in 1975.

Douglas - A slight downward trend in the data is indicated.

Hayden - Concentrations decreased substantially in 1973 and 1974 and slightly in 1975.

ANNUAL AVERAGE CONCENTRATIONS (in ug/m^3)

Site	1972	1973	1974	1975
Ajo	47	37	55	39
Davis Dam	1	2	7	10
Douglas (NNW)	ND	142	130	116
Florence	ND	25	19	26
Hayden (Jail)	302	218	127	105
Page	1	1	8	7

State Standard - 50 ug/m^3

For Miami, Morenci, and San Manuel, trend data for the 1972-75 period are not available. The monitoring sites were moved several times and have only been at the present locations for about 1 - 2 years.

For Grand Canyon, a comparison of 1972-74 data with 1975 data is inadvisable because of a change in the sampling frequency.

ND - No data

Appendix A

G L O S S A R Y

Appendix A

GLOSSARY

annual average

The simple average of all observations for a given year. It is sometimes referred to as the arithmetic mean.

annual geometric mean

A more complex mean value obtained by use of the logarithms of all observations. The annual geometric mean is less affected by extreme values than the annual average. It is always smaller than the annual average for a given set of observations.

benzene soluble organics

The fraction of particulate matter that is soluble in benzene. Benzene soluble organics are produced by incomplete fuel combustion in motor vehicles and by wood and trash burning.

carbon monoxide

A colorless, odorless, toxic gas produced by incomplete fuel combustion, mainly emitted by motor vehicles.

hydrocarbons

Compounds containing carbon and hydrogen such as methane, ethylene, and benzene. Gasoline and other fuels are composed of hydrocarbons. Motor vehicles are the chief source of hydrocarbon emissions. Hydrocarbons react with nitrogen oxides in the atmosphere to form oxidants.

nitrogen dioxide

A reddish-brown, toxic, corrosive gas formed in the atmosphere from the products of high temperature fuel combustion. Motor vehicles and power plants are the primary sources of nitrogen dioxide.

oxidants

Oxygen-containing compounds that are formed by the reaction of hydrocarbons with nitrogen oxides in the atmosphere. Since sunlight promotes this reaction, it is referred to as the photochemical reaction and the compounds formed are referred to as photochemical oxidants or "smog". The principal oxidant is ozone, a colorless, pungent, toxic gas. Some oxidants are in the form of aerosols which reduce visibility. Other oxidants cause eye irritation and breathing difficulty.

particulates

Particles of solid and liquid matter dispersed in the atmosphere. Examples of particulates include dust, smoke, soot, mist, fumes, and fog. The smaller particles, commonly called aerosols, reduce visibility. Sources of particulates include fuel combustion, industrial processes, incineration, agriculture, and fugitive sources such as unpaved roads and vacant lots.

sulfates

The fraction of particulate matter composed of water-soluble sulfate compounds. Sulfates are formed by the oxidation of sulfur dioxide in the atmosphere.

sulfur dioxide

A heavy, pungent, colorless gas produced by combustion of sulfur-containing fuels, primarily in power plants and heating systems, by smelting of non-

ferrous metals, and by petroleum refining.