1979

AIR QUALITY DATA FOR ARIZONA

ARIZONA DEPARTMENT OF HEALTH SERVICES

dhs

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A I R Q U A L I T Y D A T A

F O R A R I Z O N A

Compiled: June, 1980

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Governor
State of Arizona

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1. INTRODUCTION

1. INTRODUCTION

The format and content of this report are similar to those of the 1978 report. 1979 data for criteria pollutants are listed in Section 2, long-range trends are discussed in Section 3 and data for chemical composition of particulates are tabulated in Section 4. The number of exceedances of the standards at each site has been added to Section 2.

In the appendix State and Federal ambient air quality standards are tabulated. A glossary of air pollutants and a description of air sampling techniques are also included.

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.

Figure 1-1, a highway map of Arizona, is included for reference purposes.

TABLE 1-1

Cities and Towns Monitored

City or Town	Carbon Monoxide	Hydrocarbons (Non-Methane)	Lead	Nitrogen Dioxide	Oxidants	Particulates	Sulfur Dioxide
Ajo			PD State			PD State	PD State
Apache Junction						P-G	
Boys Ranch			PD			PD	PD
Buckeye			PD		PD	PD	PD
Bullhead City				SCE		SCE	SCE
Casa Grande			State			State	
Clarkdale			State			State	
Clifton						Greenlee	Greenlee
Coolidge			PD	PD	PD	PD	PD
Corona de Tucson						Pima	
Davis Dam				SCE	SCE	SCE	SCE
Douglas			PD State			PD State	PD State
Dragoon				AEPCO		AEPCO	AEPCO
Eagar			State			State	
Flagstaff	State		State		State	State	
Florence			State			State	
Glendale	Maricopa		Maricopa		Maricopa	Maricopa	Maricopa
Grand Canyon			State	State		State	State
Green Valley			PD Pima			PD Pima	PD
Hayden			State			State	State JCC
Hereford			PD			PD	PD
Joseph City			State	APS State		APS State	APS State
Kansas Settlement				AEPCO		AEPCO	AEPCO
Kearney							JCC
Kingman			State			State	
Lake Havasu City			State			State	
Mammoth						P-G	Magma

TABLE 1-1 (Cont'd)

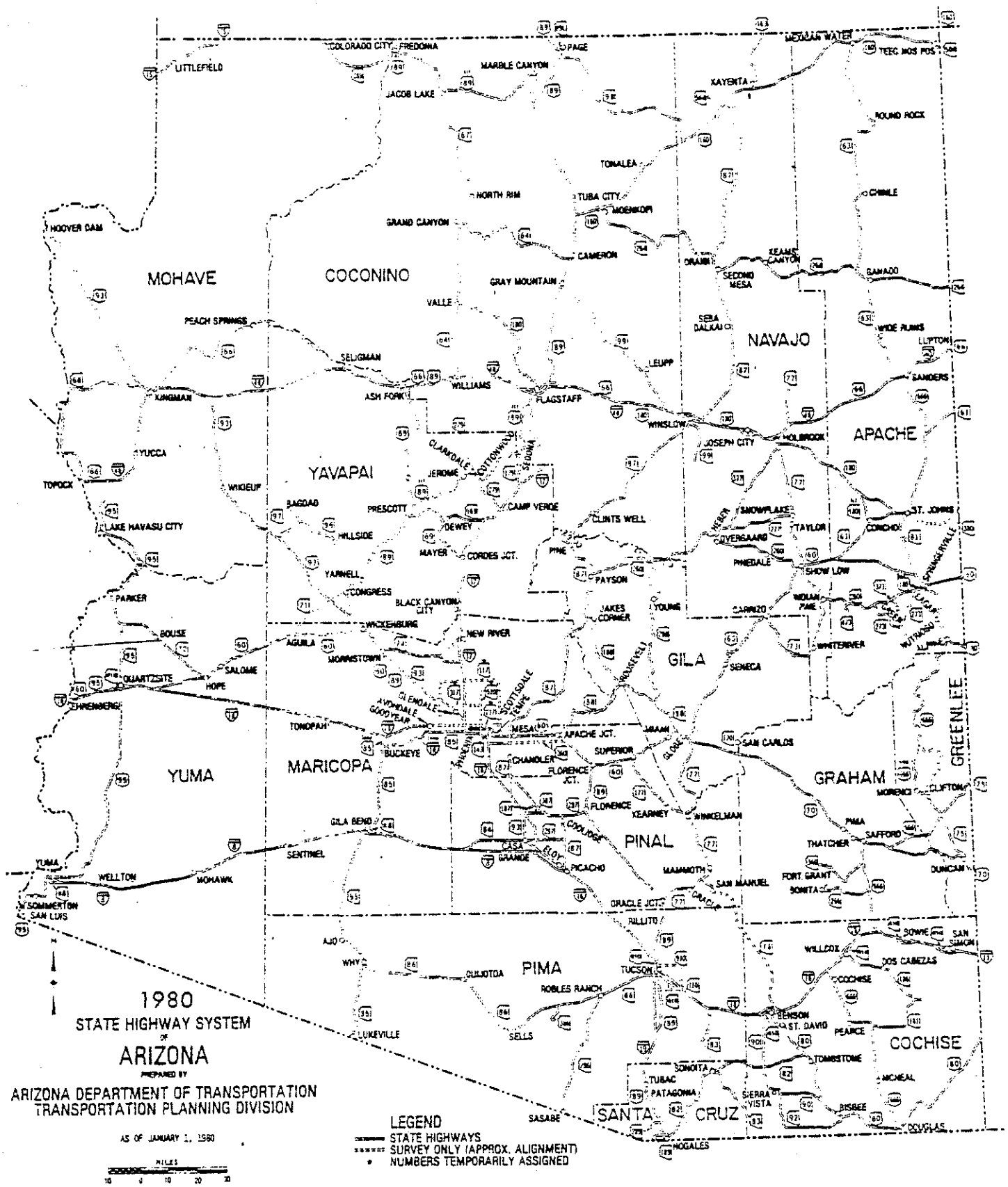
Cities and Towns Monitored

City or Town	Carbon Monoxide	Hydrocarbons (Non-Methane)	Lead	Nitrogen Dioxide	Oxidants	Particulates	Sulfur Dioxide
Marana						P-G	
McNeal							State
Maricopa	PD	PD	PD	PD	PD	PD	PD
Meadows							JCC
Mesa	Maricopa		Maricopa			Maricopa	
Mescal			PD			PD	
Miami			State			State	State
Montezuma Castle			State			State	
Morenci			PD State			PD State	PD State
Nelson			State			State	
Nogales			State			State	
Oracle							Magma
Oracle Junction			PD			PD	PD
Organ Pipe			State			State	
Page			State	SRP	SRP	SRP State	SRP
Parker			State			State	
Paul Spur			State			State	
Payson						P-G	
Petrified Forest				APS		APS	
Phoenix	Maricopa PD	PD	Maricopa PD	Maricopa PD	Maricopa PD	Maricopa PD	Maricopa PD
Prescott			State			State	
Redington							Magma
Rillito			State			State	
Riviera				SCE	SCE	SCE	SCE
Roosevelt						P-G	
Safford			State			State	
St. David				State			
St. Johns			State	SRP State	SRP	SRP	SRP State

TABLE 1-1 (Cont'd)

Cities and Towns Monitored

City or Town	Carbon Monoxide	Hydrocarbons (Non-Methane)	Lead	Nitrogen Dioxide	Oxidants	Particulates	Sulfur Dioxide
San Manuel			State			Magma State	Magma State
Scottsdale	Maricopa		Maricopa	Maricopa	Maricopa	Maricopa	Maricopa
Show Low			State			State	
Sierra Vista	State		State		State	State	
Stanfield						P-G	
Sunsites				AEPCO		AEPCO	AEPCO
Superior			State			State	
Tucson	PD Pima	PD Pima	PD Pima	PD Pima	PD Pima	PD Pima	PD Pima
Vail			PD			PD	PD
Willcox				AEPCO		AEPCO	AEPCO
Winkelman							JCC
Yuma	State		State		State	State	


1980
STATE HIGHWAY SYSTEM
OF
ARIZONA
PREPARED BY
ARIZONA DEPARTMENT OF TRANSPORTATION
TRANSPORTATION PLANNING DIVISION
AS OF JANUARY 1, 1980
MILES
LEGEND
STATE HIGHWAYS
SURVEY ONLY (APPROX. ALIGNMENT)
NUMBERS TEMPORARILY ASSIGNED
MOHAVE
COCONINO
NAVAJO
APACHE
YAVAPAI
GILA
GREENLEE
YUMA
MARICOPA
GRAHAM
PINAL
PIMA
COCHISE
SANTA CRUZ
LITTLEFIELD
COLORADO CITY
FREDONIA
PAGE
MARBLE CANYON
JACOB LAKE
KAYENTA
MEXICAN WATER
TEEC NOS POS
ROUND ROCK
TONALEA
NORTH RIM
TUBA CITY
MOENKOPI
CHINLE
HOOVER DAM
GRAND CANYON
CAMERON
KEAMS CANYON
GANADO
SECOND MESA
GRAY MOUNTAIN
VALLE
PEACH SPRINGS
SEBA DALKAI
WIDE RUINS
LUPTON
SELIGMAN
LEUPP
WILLIAMS
ASH FORK
FLAGSTAFF
SANDERS
KINGMAN
WINSLOW
JOSEPH CITY
HOLBROOK
YUCCA
CLARKDALE
COTTONWOOD
SEDONA
JEROME
TOPOCK
WIKIEUP
BAGDAD
PRESCOTT
CAMP VERDE
CLINTS WELL
SNOWFLAKE
TAYLOR
ST. JOHNS
CONCHO
LAKE HAVASU CITY
HILLSIDE
DEWEY
OVERGAARD
MAYER
CORDES JCT.
PINE
PINEDALE
SHOW LOW
YARNELL
PAYSON
PARKER
CONGRESS
BLACK CANYON CITY
JAKES CORNER
YOUNG
CARRIZO
INDIAN PINE
WHITERIVER
BOUSE
WICKENBURG
NEW RIVER
AGUILA
MORRISTOWN
SENECA
QUARTZSITE
SALOME
HOPE
CHEMBERS
GLENDALE
GOODYEAR
AVONDALE
SCOTTSDALE
TEMPE
TONOPAH
MESA
APACHE JCT.
JAKAM
SAN CARLOS
BUCKEYE
SUPERIOR
GLOBE
CHANDLER
FLORENCE JCT.
MORENCI
CLIFTON
FLORENCE
KEARNEY
WINKELMAN
GILA BEND
COOLIDGE
PIMA
SAFFORD
THATCHER
SENTINEL
CASA GRANDE
ELOY
PICACHO
MAMMOTH
SAN MANUEL
FORT GRANT
SONITA
DUNCAN
YUMA
WELLTON
MOHAWK
ORACLE JCT.
ORACLE
SOMMERTON
SAN LUIS
PILLITO
SOMERTON
SAN SIMON
AJO
WHY
OUIJOTOA
TUCSON
WILLCOX
DOS CABEZAS
ROBLES RANCH
COCHISE
BENSON
ST. DAVID
PEARCE
LUKEVILLE
SELLS
TOMBSTONE
SONOITA
TUBAC
PATAGONIA
MCNEAL
SIERRA VISTA
SASABE
BISBEE
DOUGLAS
NOGALES

2. 1979 DATA

Table 2-1

Abbreviations

GENERAL

NA	Not Applicable
NR	Not Reported

OPERATORS

JCC	Joint Control Center - A jointly owned system operated by ASARCO Incorporated and Kennecott Minerals Company
AEPCO	Arizona Electric Power Cooperative, Inc.
APS	Arizona Public Service Company
Greenlee	Greenlee County Air Pollution Control
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
SCE	Southern California Edison Company
State	Arizona Department of Health Services, Bureau of Air Quality Control

EQUIPMENT

Carbon Monoxide	
NDIR	Non-dispersive infrared
GC	Gas chromotograph
Hydrocarbons - Non-Methane	
GC	Gas chromotograph
Nitrogen Dioxide	
Color	Colorimetric
Chem	Chemiluminescent
Bubbler	Bubbler Sampler, 24-hour
Oxidants	
Coul	Coulometric
Chem	Chemiluminescent
UV	Ultraviolet absorption
Particulates	
Hi-vol	High volume air sampler, 24-hour
Sulfur Dioxide	
Coul	Coulometric
Flame	Flame photometric
Bubbler	Bubbler sampler, 24-hour
Flour	Flourescent

TABLE 2-2

1979 Carbon Monoxide Data Summary
(in mg/m^3)

Nearest City or Town	Site Location	Operator	Method	1-Hr. Average Max.	1-Hr. Average 2nd High	8-Hr. Average Max.	8-Hr. Average 2nd High	No. of Exeed-ances of 8-Hr. Std.	No. of Samples
Flagstaff	2501 North 4th Street	State	NDIR	32	21	11	10	1	3346
Glendale	6000 West Olive	Maricopa	NDIR	21	17	9	8	0	4105
Maricopa	Approximately 6.5 mi. N 83°W of Maricopa	PD	GC	3	2	1	1	0	3600
Mesa	Broadway & Brooks	Maricopa	NDIR	15	14	13	13	6	6089
Phoenix	3300 West Camelback	Maricopa	NDIR	31	30	19	17	37	5923
Phoenix	4732 South Central	Maricopa	NDIR	15	15	8	8	0	3260
Phoenix	8531 North 6th Street	Maricopa	NDIR	19	18	8	8	0	4411
Phoenix	1845 East Roosevelt	Maricopa	NDIR	27	24	18	17	28	6922
Phoenix	15 East Monroe, Valley Bank Annex	PD	GC	49	44	26	24	62	8018
Scottsdale	2857 North Miller	Maricopa	NDIR	19	15	10	9	0	4517
Scottsdale	13665 North Scottsdale Road	Maricopa	NDIR	8	7	3	3	0	.744
Sierra Vista	Highway 90 and Fry Boulevard	State	NDIR	27	25	7	6	0	2786
Tucson	151 West Congress St.	Pima	NDIR	12	11	7	6	0	7375
Tucson	22nd & Craycroft	Pima	NDIR	13	12	7	7	0	6483

TABLE 2-2 (Cont'd)

1979 Carbon Monoxide Data Summary
(in mg/m^3)

Nearest City or Town	Site Location	Operator	Method	1-Hr. Average Max.	1-Hr. Average 2nd High	8-Hr. Average Max.	8-Hr. Average 2nd High	No. of Exceedances of 8-Hr. Std.	No. of Samples
Tucson	22nd and Alvernon	Pima	NDIR	29	28	12	12	5	8152
Tucson	32 North Stone, Home Federal Savings Tower, 3rd Floor	PD	GC	19	17	8	8	0	7749
Yuma	201 South Second Avenue	State	NDIR	7	5	1	1	0	588
Yuma	1485 Second Ave.	State	NDIR	12	11	6	5	0	2098

STATE AND FEDERAL STANDARD: (Primary and Secondary)	1-Hr. Average	8-Hr. Average
	40 mg/m^3	10 mg/m^3

TABLE 2-3

1979 Hydrocarbons (Non-Methane) Data Summmary
(in ug/m^3)

Nearest City or Town	Site Location	Operator	Method	3-Hr. Averages (6-9 a.m.) Max.	2nd High	No. of Exceedances of 3-Hr. Standard	No. of 3-Hr. Samples
Maricopa	Approximately 6.5 miles N83°W of Maricopa	PD	GC	134	100	0	155
Phoenix	15 East Monroe, Valley Bank Annex	PD	GC	2958	2766	306	326
Tucson	32 North Stone, Home Federal Savings Tower, 3rd Floor	PD	GC	1094	1068	259	340
Tucson	151 West Congress Street	Pima	GC	545	525	103	210

STATE AND FEDERAL STANDARD: 3-Hr. Average (6-9 a.m.)
(Primary and Secondary) 160 ug/m^3

TABLE 2-4

1979 Lead Data Summary
High Volume Sampler (in ug/m^3)

Nearest City or Town	Site Location	Operator	Calendar Quarterly Average Maximum	Calendar Quarterly Average 2nd High	Number of Exceedances of Quarterly Standard	Number of Samples
Ajo	AZ DOT, Well Road	State	.25	.09	0	42
Ajo	Camelback Mountain	PD	Data not available at this time			
Ajo	Oxidation Pond	PD	Data not available at this time			
Ajo	South of Tailings Dam	PD	Data not available at this time			
Ajo	Town Square	PD	Data not available at this time			
Boys Ranch	General Motors Proving Ground	PD	.17	.16	0	54
Buckeye	Approximately 30 miles W of Phoenix	PD	.34	.17	0	40
Casa Grande	401 North Marshall Street	State	.45	.30	0	51
Clarkdale	High School Football Stadium	State	.10	.09	0	25
Coolidge	2 miles N of Coolidge	PD	.18	.14	0	54
Douglas	U.S. 666	State	.13	.08	0	49
Douglas	15th Street Park	State	.29	.22	0	15
Douglas	0.75 miles N15^{o}E of Smelter Stack	PD	Data not available at this time			
Douglas	1012 G Avenue (Mercantile)	PD	Data not available at this time			
Douglas	Pirtlesville	PD	Data not available at this time			
Douglas	Emission Control Center	PD	Data not available at this time			
Eagar	Town Hall	State	.43	.21	0	45
Flagstaff	County Courthouse, Birch & San Francisco	State	.15	.12	0	8
Florence	22nd Street and Willow	State	.21	.15	0	60

TABLE 2-4 (Cont'd)

1979 Lead Data Summary
High Volume Sampler (in ug/m^3)

Nearest City or Town	Site Location	Operator	Calendar Quarterly Average Maximum	Calendar Quarterly Average 2nd High	Number of Exceedances of Quarterly Standard	Number of Samples
Grand Canyon	Visitor's Center	State	.07	.04	0	11
Glendale	6000 West Olive	Maricopa	1.10	0.70	0	45
Green Valley	2 miles N of Townsite	PD	.19	.10	0	58
Hayden	Old Town Jail, Canyon Drive	State	.33	.29	0	47
Hayden	Montgomery-Reece Ranch	State	.37	.36	0	47
Hereford	11 miles W of Bisbee	PD	Data not available at this time			
Joseph City	3.25 miles SE of Joseph City	State	.08	.07	0	55
Kingman	305 West Beale Street	State	.26	.23	0	33
Lake Havasu	Lake Havasu Community Hos.	State	.06	.05	0	54
Maricopa	Approx. 6.5 miles N83^{o}W of Maricopa	PD	.11	.04	0	38
Mesa	Broadway & Brooks	Maricopa	.90	.60	0	52
Mescal	El Paso Natural Gas Company Station	PD	.10	.09	0	56
Miami	Miami Fire Department, 804 Sullivan Street	State	.65	.32	0	57
Miami	Jones Ranch	State	.27	.26	0	56
Morenci	U.S. 666, Stargo	State	.10	.08	0	58
Morenci	Cadillac Point - 5500	PD	Data not available at this time			
Morenci	Clifton Fina	PD	Data not available at this time			
Morenci	Fairbanks	PD	Data not available at this time			
Morenci	Mobile Monitor	PD	Data not available at this time			
Morenci	Morenci Mobile	PD	Data not available at this time			

TABLE 2-4 (Cont'd)

1979 Lead Data Summary
High Volume Sampler (in ug/m^3)

Nearest City or Town	Site Location	Operator	Calendar Quarterly Average Maximum	Calendar Quarterly Average 2nd High	Number of Exceedances of Quarterly Standard	Number of Samples
Morenci	Stargo	PD	Data not available at this time			
Montezuma Castle	Park Maintenance Building	State	.10	.07	0	46
Nelson	6 miles E of Peach Springs	State	.04	.03	0	27
Nogales	High School - Plum Street	State	.31	.25	0	10
Oracle Junction	Near Oracle Junction, Approx. 21 miles N of Tucson	PD	.24	.24	0	62
Organ Pipe	Visitor's Center	State	.06	.04	0	54
Page	Municipal Airport	State	.09	.07	0	52
Parker	914 Arizona Avenue	State	.35	.18	0	20
Paul Spur	Housing Area near Lime Plant	State	.36	.20	0	51
Phoenix	1845 East Roosevelt	Maricopa	2.6	1.8	2	40
Phoenix	4732 South Central	Maricopa	1.6	1.1	1	50
Phoenix	8531 North 6th Street	Maricopa	1.5	1.2	0	49
Phoenix	201 North Central, Valley Bank Center, Roof	PD	.51	.51	0	54
Phoenix	15 East Monroe, Valley Bank Annex, 3rd Floor	PD	1.23	1.20	0	52
Prescott	500 South Marina Street	State	.12	.11	0	57
Rillito	Miller's Market	State	.50	.36	0	53
Safford	523 10th Avenue	State	.31	.20	0	52
St. Johns	13.3 miles E31^{0}S of St. Johns	State	.05	.05	0	45
San Manuel	LDS Church	State	.07	.07	0	57

TABLE 2-4 (Cont'd)

1979 Lead Data Summary
High Volume Sampler (in ug/m^3)

Nearest City or Town	Site Location	Operator	Calendar Quarterly Average Maximum	Calendar Quarterly Average 2nd High	Number of Exceedances of Quarterly Standard	Number of Samples
Scottsdale	2857 North Miller Road	Maricopa	1.4	1.3	0	54
Scottsdale	13665 North Scottsdale Rd.	Maricopa	0.8	0.8	0	54
Show Low	City Hall Building, Deuce of Clubs Avenue	State	.37	.17	0	54
Sierra Vista	1st Street & Bartow Drive	State	.25	.19	0	57
Superior	AZ DOT, 951 Main Street	State	.25	.14	0	57
Tucson	Prince Road & Fairview	Pima	1.18	.95	0	57
Tucson	7200 East Tanque Verde (Magnetic Observatory)	Pima	.38	.20	0	60
Tucson	32 North Stone, Home Federal Savings Tower, Roof	PD	.44	.27	0	71
Vail	El Paso Natural Gas Co. Station	PD	.15	.10	0	61
Yuma	201 South Second Avenue	State	.35	.25	0	61

STATE AND FEDERAL STANDARD: Calendar Quarter Average
(Primary and Secondary) 1.5 ug/m^3

TABLE 2-5

1979 Nitrogen Dioxide Data Summary
(in ug/m3)

Nearest City or Town	Site Location	Operator	Method	Annual Average	Maximum 1-Hour	Maximum 24-Hour	Number of Samples 1-Hour	Number of Samples 24-Hour
Bullhead City	224 North Main Street	SCE	Chem	27[c]	193	59	5534	NA
Coolidge	2 miles N of Coolidge	PD	Chem	14	110	46	8614	NA
Davis Dam	Katherine's Landing	SCE	Chem	24[c]	116	38	5246	NA
Davis Dam	Dri. Mt. (1 mi. NE)	SCE	Chem	22	97	32	6994	NA
Dragoon	N. of Dragoon Mountains	AEPCO	Bubbler	13	NA	26	NA	302
Grand Canyon	Hopi Point	State	Bubbler	9[a]	NA	21	NA	17
Grand Canyon	Grand Canyon Village	State	Bubbler	19[a]	NA	42	NA	18
Holbrook	Petrified Forest Visitor Center	APS	Bubbler	1	NA	5	NA	286
Joseph City	3.25 miles SE of Joseph City	State	Bubbler	38[b]	NA	61	NA	3
Joseph City	Met. Tower, Cholla Power Plant	APS	Bubbler	1	NA	4	NA	291
Joseph City	Environmental Laboratory	APS	Bubbler	2	NA	23	NA	282
Joseph City	Leroux Substation	APS	Bubbler	2	NA	8	NA	286
Kansas Settlement	Kansas Settlement	AEPCO	Bubbler	10	NA	25	NA	285
Maricopa	Approximately 6.5 miles N83°W of Maricopa	PD	Chem	6[c]	41	13	3742	NA
Page	Water Tower	SRP	Bubbler	5	NA	16	NA	70
Phoenix	1845 East Roosevelt	Maricopa	Chem	76[c]	602	205	3393	NA
Phoenix	15 East Monroe, Valley Bank Annex	PD	Chem	77	391	243	8737	NA
Riveria	Fort Mohave (4 mi. S)	SCE	Chem	22[c]	97	26	3437	NA
St. David	1.8 miles SW of St. David	State	Bubbler	12[c]	NA	64	NA	32

TABLE 2-5 (Cont'd)
1979 Nitrogen Dioxide Data Summary
(in ug/m3)

Nearest City or Town	Site Location	Operator	Method	Annual Average	Maximum 1-Hour	Maximum 24-Hour	Number of Samples 1-Hour	Number of Samples 24-Hour
St. Johns	Mesa Parada	SRP	Bubbler	2	NA	26	NA	51
St. Johns	Airport	SRP	Bubbler	2[c]	NA	21	NA	31
St. Johns	Sewage Sump	SRP	Bubbler	3[c]	NA	12	NA	37
St. Johns	Mesa Parada	State	Bubbler	10[c]	NA	30	NA	25
Scottsdale	2857 N. Miller Rd.	Maricopa	Chem	72[c]	564	165	3268	NA
Sunsites	Horizon Corp. Storage Yard	AEPCO	Bubbler	8	NA	25	NA	295
Tucson	151 West Congress Street	Pima	Chem	46[c]	293	91	5670	NA
Tucson	22nd & Craycroft	Pima	Color	29[c]	132	71	4880	NA
Tucson	632 West Flores	PD	Chem	16[b]	30	24	4854	NA
Tucson	32 North Stone, Home Federal Savings Tower, 6th Floor	PD	Chem	NR	268	66	8712	NA
Willcox	Sulfur Springs Valley Elec. Co. Storage Yard - Willcox	AEPCO	Bubbler	21	NA	40	NA	295

STATE AND FEDERAL STANDARD (Primary and Secondary)	Annual Average
	100 ug/m^3

a- Annual average based on a limited number of samples due to relocation or installation of the monitoring site.
b- Annual average based on a limited number of samples due to termination of the site.
c- Annual average based on a limited number of samples.

TABLE 2-6

1979 Oxidants (Ozone) Data Summary
(in ug/m^3)

Nearest City or Town	Site Location	Operator	Method	1-Hour Average Max:	1-Hour Average 2nd High	No. of Exceedances of Std. in 1979*	Compliance Status Exceedances	No. of Samples
Buckeye	Approximately 30 mi. W of Phoenix	PD	Coul	147	147	0	0	6969
Coolidge	2 miles N of Coolidge	PD	Coul	131	131	0	0	8759
Davis Dam	Dri Mt. (1 mi. NE)	SCE	Chem	208	196	0	0	7617
Flagstaff	2501 North 4th St.	State	U.V.	129	124	0	0	3116
Flagstaff	Fort Valley	State	U.V.	99	87	0	0	920
Glendale	6000 West Olive	Maricopa	U.V.	251	241	3	2.0	4577
Maricopa	Approximately 6.5 mi. N83^{o}W of Maricopa	PD	Coul	141	139	0	0	3591
Page	Water Tower	SRP	Bubbler	52	52	0	0	63
Phoenix	8531 N. 6th St.	Maricopa	U.V.	310	277	1	.3	3048
Phoenix	15 East Monroe, Valley Bank Annex	PD	Coul	184	182	0	0	8730
Phoenix	1845 East Roosevelt	Maricopa	U.V.	259	251	5	4.0	8275
Phoenix	4237 South Central	Maricopa	U.V.	161	145	0	0	4477
Riveria	Fort Mohave (4 mi.S)	SCE	U.V.	168	158	0	0	5648
Scottsdale	2857 North Miller Rd.	Maricopa	U.V.	259	245	1	.3	4030
Sierra Vista	Hwy. 90 & Fry Blvd.	State	U.V.	166	160	0	0	4201

TABLE 2-6 (Cont'd)

1979 Oxidants (Ozone) Data Summary
(in ug/m^3)

Nearest City or Town	Site Location	Operator	Method	1-Hour Average Max.	1-Hour Average 2nd High	No. of Exceedances of Std. in 1979*	Compliance Status Exceedances	No. of Samples
Tucson	151 West Congress St.	Pima	U.V.	214	200	0	0	7914
Tucson	22nd & Craycroft	Pima	U.V.	202	202	0	0	7229
Tucson	Arthur Pack	Pima	U.V.	204	190	0	0	4792
Tucson	32 North Stone, Home Federal Savings Tower 6th Floor	PD	U.V.	196	196	0	0	3482
St. Johns	Mesa Parada	SRP	U.V	143	141	0	0	4353
Yuma	201 South Second Ave.	State	U.V.	149	149	0	0	559
Yuma	1485 - Second Ave.	State	U.V.	225	220	0	0	2964

STANDARD: The state and federal primary and secondary standard is .12 ppm (235 ug/m^3) for the maximum daily 1-hour concentration. Compliance status is determined by computing the average number of days that the one-hour maximum specified average has been exceeded per year for the past three years. No more than 1.0 exceedances per year averaged over the last three years is allowed.

* The number of exceedances of the Standard at each site include exceedances which may or may not have occurred concurrently at other sites.

TABLE 2-7

1979 Particulates Data Summary
High Volume Sampler (in ug/m^3)

Nearest City or Town	Site Location	Operator	Annual Geometric Mean	24-Hour Average Max.	24-Hour Average 2nd High	No. of Exceedances of 24-Hr. Standards State and Federal Primary	No. of Exceedances of 24-Hr. Standards State and Federal Secondary	Number of Samples
Ajo	Camelback Mountain	PD	28	193	115	0	1	257
Ajo	Oxidation Pond	PD	78	4875	4310	16	40	261
Ajo	South Tailings Dam	PD	65	4310	579	10	29	258
Ajo	Town Square	PD	76	315	271	3	23	260
Ajo	AZ DOT, Well Road	State	67[c]	245	183	0	3	42
Boys Ranch	General Motors Proving Grounds	PD	74	282	260	1	14	139
Buckeye	¼ mi. N of Hwy 80 on 4th	PD	150	1854	597	19	50	109
Bullhead City	Bullhead City	SCE	75	374	224	1	2	55
Case Grande	401 North Marshall Rd.	State	100	372	304	4	11	51
Clarkdale	High School Football Stadium	State	100[c]	647	437	3	5	25
Clifton	County Courthouse Roof	Greenlee	38[a]	98	90	0	0	31
Coolidge	2 miles N of Coolidge	PD	77	277	276	2	22	142
Corona de Tucson	21 miles SE of Tucson	Pima	28	137	88	0	0	58
Davis Dam	Dri Mt. (1mi. NE)	SCE	23	92	63	0	0	51
Davis Dam	Katherine Landing	SCE	25	95	86	0	0	58
Douglas	U.S. 666	State	48	140	137	0	0	49
Douglas	North	PD	57	288	268	2	12	249
Douglas	1012 G Avenue	PD	99	300	292	2	50	236
Douglas	Pirtleville	PD	61	325	297	4	22	247

TABLE 2-7 (Cont'd)

1979 Particulates Data Summary
High Volume Sampler (in ug/m^3)

Nearest City or Town	Site Location	Operator	Annual Geometric Mean	24-Hour Average Max.	24-Hour Average 2nd High	No. of Exceedances of 24-Hr. Standards State and Federal Primary	No. of Exceedances of 24-Hr. Standards State and Federal Secondary	Number of Samples
Douglas	Emission Control Center	PD	53	1053	854	9	18	163
Douglas	15th Street Park	State	121	490	359	3	22	57
Dragoon	N. Dragoon Mt.	AEPCO	28	133	102	0	0	144
Eagar	Town Hall	State	114	383	231	1	14	45
Flagstaff	Birch & San Francisco	State	68[a]	114	114	0	0	8
Flagstaff	218 N. Leroux St.	State	82[a]	199	171	0	2	31
Florence	22nd St. and Willow	State	88	218	170	0	6	60
Glendale	6000 West Olive Avenue	Maricopa	105	229	215	0	7	45
Grand Canyon	Grand Canyon Village	State	20[a]	119	118	0	0	25
Grand Canyon	Hopi Point	State	22[a]	24	23	0	0	22
Green Valley	245 West Esperanza	Pima	54	369	153	1	2	60
Green Valley	2 miles N of townsite	PD	54	205	177	0	2	134
Hayden	Old Town Jail, Canyon Drive	State	172	426	369	11	33	47
Hayden	Montgomery-Reece Ranch	State	53	187	137	0	1	47
Hereford	Phelps Dodge Experimental Farm	PD	30	202	133	0	1	256

TABLE 2-7 (Cont'd)

1979 Particulates Data Summary
High Volume Sampler (in ug/m3)

Nearest City or Town	Site Location	Operator	Annual Geometric Mean	24-Hour Average Max.	24-Hour Average 2nd High	No. of Exceedances of 24-Hr. Standards State and Federal Primary	No. of Exceedances of 24-Hr. Standards State and Federal Secondary	Number of Samples
Holbrook	Petr. Forest Visitor Ctr.	APS	17	100	71	0	0	283
Joseph City	3.25 miles SE of Joseph City	State	31	152	120	0	1	55
Joseph City	Environmental Laboratory	APS	40	645	407	4	7	281
Joseph City	Leroux Substation, 9.5 miles SE of Joseph City	APS	26	126	122	0	0	279
Joseph City	Met Tower, Cholla Power Plant	APS	17	143	119	0	0	286
Kansas Settlement	1 mi. W of Cotton Gin	AEPCO	38	113	112	0	0	129
Kingman	305 West Beale Street	State	83[cd]	456	287	2	6	33
Lake Havasu	Lake Havasu Community Hospital	State	7[d]	69	68	0	0	54
Maricopa	Approximately 6.5 miles N83°W of Maricopa	PD	41	270	122	1	1	88
Mesa	Broadway & Brooks	MCHD	87	228	199	0	5	52
Mescal	El Paso Natural Gas Co. Station	PD	75	370	292	5	30	124
Miami	Miami Fire Dept., 804 Sullivan St.	State	118	266	208	1	17	57

TABLE 2-7 (Cont'd)

1979 Particulates Data Summary
High Volume Sampler (in ug/m^3)

Nearest City or Town	Site Location	Operator	Annual Geometric Mean	24-Hour Average Max.	24-Hour Average 2nd High	No. of Exceedances of 24-Hr. Standards State and Federal Primary	No. of Exceedances of 24-Hr. Standards State and Federal Secondary	Number of Samples
Miami	Jones Ranch	State	30	241	167	0	2	56
Montezuma Castle	Park Maintenance Building	State	33	66	66	0	0	46
Morenci	Cadillac Point	PD	37	153	146	0	1	248
Morenci	Clifton Fina	PD	64	193	179	0	4	254
Morenci	Fairbanks	PD	66	972	516	5	28	247
Morenci	Stargo	PD	53	255	162	0	2	249
Morenci	Stargo, Highway 666	State	55	195	129	0	1	58
Morenci	Standpipe	PD	30	184	118	0	1	236
Nelson	6 miles E of Peach Springs	State	12[c]	165	114	0	1	27
Nogales	Nogales High School, Plum Street	State	68[c]	324	154	1	3	10
Oracle Junct.	Junction of Hwy.89 & 77	PD	34	94	87	0	0	134
Organ Pipe	Visitor's Center	State	31	104	86	0	0	54
Page	Water Tower	SRP	34	83	75	0	0	81
Page	Airport	State	34	191	131	0	1	52

TABLE 2-7 (Cont'd)

1979 Particulates Data Summary
High Volume Sampler (in ug/m3)

Nearest City or Town	Site Location	Operator	Annual Geometric Mean	24-Hour Average Max.	24-Hour Average 2nd High	No. of Exceedances of 24-Hr. Standards State and Federal Primary	No. of Exceedances of 24-Hr. Standards State and Federal Secondary	Number of Samples
Paul Spur	Housing Area near Lime Plant	State	395	1853	1652	39	44	51
Parker	914 Arizona Avenue	State	44[cd]	258	247	0	3	20
Phoenix	4732 South Central	Maricopa	171	404	366	6	37	50
Phoenix	8531 North 6th St.	Maricopa	117	184	182	0	17	50
Phoenix	201 North Central, Valley Bank Center, Roof	PD	74	190	187	0	8	264
Phoenix	15 East Monroe, Valley Bank Annex, 3rd Floor	PD	107	301	256	1	52	261
Phoenix	1845 East Roosevelt	MCHD	121[c]	243	209	0	13	40
Prescott	500 South Marina St.	State	41	308	277	1	3	57
Rillito	Miller's Market	State	132	475	311	5	22	53
Riveria	Camera Site	SCE	35	178	122	0	1	60
Riveria	Fort Mohave (4 mi. S)	SCE	41	191	113	0	1	55
Riveria	Hancock (1 mi. E)	SCE	46	289	144	1	1	57
Safford	523 10th Avenue	State	159	481	369	8	31	52
St. Johns	Airport	SRP	19	61	35	0	0	48
St. Johns	Mesa Parada	SRP	10	45	27	0	0	60
St. Johns	Mesa Parada	State	12	57	52	0	0	45
San Manuel	Townsite	Magma	45	114	101	0	0	57
San Manuel	3-C Ranch	Magma	33[c]	71	58	0	0	38

TABLE 2-7 (Cont'd)

1979 Particulates Data Summary
High Volume Sampler (in ug/m^3)

Nearest City or Town	Site Location	Operator	Annual Geometric Mean	24-Hour Average Max.	24-Hour Average 2nd High	No. of Exceedances of 24-Hr. Standards State and Federal Primary	No. of Exceedances of 24-Hr. Standards State and Federal Secondary	Number of Samples
San Manuel	Golf Course	Magma	36	86	70	0	0	57
San Manuel	East Peppersauce Wash	Magma	48[a]	116	109	0	0	33
San Manuel	Dormsite	Magma	46	128	126	0	0	55
San Manuel	LDS Church	State	30	111	107	0	0	57
Scottsdale	2857 North Miller Road	MCHD	99	210	192	0	3	54
Scottsdale	13665 North Scottsdale Road	MCHD	147	471	346	6	33	54
Show Low	City Hall, Deuce of Clubs Avenue	State	93[d]	408	370	6	11	56
Sierra Vista	1st Street & Bartow Dr.	State	65	275	171	1	2	57
Sunsites	Horizon Corp. Storage Yard	AEPCO	51	149	140	0	0	142
Superior	AZ DOT, 951 Main Street	State	76	164	150	0	1	57
Tucson	151 West Congress	Pima	70	363	152	1	2	172
Tucson	Alvernon & Ft. Lowell	Pima	120	265	258	1	17	54
Tucson	1970 W. Ajo Way & Mission Road	Pima	69	198	140	0	1	60
Tucson	Davis-Monthan Air Force Base	Pima	69	147	129	0	0	59
Tucson	Oracle Road & Magee	Pima	60	208	122	0	1	58
Tucson	Golf Links Rd & Harrison	Pima	65	151	124	0	1	45
Tucson	Hughes Access & Nogales Highway	Pima	54	206	116	0	1	61

TABLE 2-7 (Cont'd)

1979 Particulates Data Summary
High Volume Sampler (in ug/m^3)

Nearest City or Town	Site Location	Operator	Annual Geometric Mean	24-Hour Average Max.	24-Hour Average 2nd High	No. of Exceedances of 24-Hr. Standards State and Federal Primary	No. of Exceedances of 24-Hr. Standards State and Federal Secondary	Number of Samples
Tucson	7920 East Tanque Verde Road	Pima	61	159	154	0	2	61
Tucson	Prince Road & Fairview	Pima	129	284	280	2	17	59
Tucson	Pima College West	Pima	47	109	104	0	0	56
Tucson	Orange Grove & El Camina de Terra	Pima	109	287	240	1	17	60
Tucson	1810 South 6th Avenue	Pima	101	234	223	0	4	60
Tucson	32 North Stone, Home Federal Savings Tower, Roof	PD	50	145	135	0	0	253
Tucson	University of Arizona	State	89	204	197	0	7	54
Yuma	201 South Second Avenue	State	139	598	534	2	29	61
Vail	El Paso Natural Gas Co. Station	PD	35	141	105	0	0	138
Willcox	Sul. Springs Valley Elec. Co. Storage Yard	AEPCO	44	166	164	0	2	141

a- Annual mean based on a limited number of samples due to relocation or installation of the monitoring site.
c- Annual mean based on a limited number of samples.
d- Annual mean is unexplicably different from annual means determined in previous years.

STANDARDS:	Annual Geometric Mean	24-Hour Average
State and Federal Primary	75 ug/m^3	260 ug/m^3
State and Federal Secondary	60 ug/m^3	150 ug/m^3

TABLE 2-8

1979 Sulfur Dioxide Data Summary
(in ug/m^3)

Site	Location	Operator	Method	Annual Average	Max. Averages 3-Hr.	Max. Averages 24-Hr.	Number of Exceedances of Standards 3-Hr.	Number of Exceedances of Standards 24-Hr.	No. of Samples 1-Hr.	No. of Samples 24-Hr.
Ajo	Town Square	PD	Coul	22	961	160	0	0	8652	NA
Ajo	Oxidation	PD	Coul	51	1074	377	0	1	8659	NA
Ajo	S. of Tailings Dam	PD	Coul	13	883	165	0	0	8681	NA
Ajo	Camelback Mtn.	PD	Coul	24	1250	228	0	0	8683	NA
Ajo	Gibson	PD	Coul	18	1119	296	0	0	8686	NA
Ajo	Shelton	PD	Coul	18	1082	155	0	0	8676	NA
Ajo	Miller	PD	Coul	11	673	94	0	0	8688	NA
Ajo	Hotshot	PD	Coul	8	542	105	0	0	8677	NA
Ajo	AZ DOT, Well Road	State	Fluor.	18	1231	401	0	1	6739	NA
Boys Ranch	General Motors Proving Grounds	PD	Coul	7	68	45	0	0	8147	NA
Buckeye	¼ mi. N of Hwy. 80 on N. 4th	PD	Coul	3	107	27	0	0	6848	NA
Bullhead City	Bullhead City	SCE	Flame	23	173	103	0	0	7195	NA
Clifton	Courthouse	Greenlee	Cond,	8	529	191	0	0	7056	NA
Coolidge	2 mi. N of Coolidge	PD	Coul	4	167	60	0	0	8342	NA

TABLE 2-8 (Cont'd)

1979 Sulfur Dioxide Data Summary
(in ug/m^3)

Site	Location	Operator	Method	Annual Average	Max. Averages 3-Hr.	Max. Averages 24-Hr.	Number of Exceedanes of Standards 3-Hr.	Number of Exceedanes of Standards 24-Hr.	No. of Samples 1-Hr.	No. of Samples 24-Hr.
Douglas	North	PD	Coul	48	1920	270	1	0	8703	NA
Douglas	Curtis	PD	Coul	39	1816	521	2	1	8718	NA
Douglas	Fir	PD	Coul	24	812	204	0	0	8691	NA
Douglas	1012 G Avenue	PD	Coul	37	1423	244	2	0	8704	NA
Douglas	Mobile II	PD	Coul	44	1239	299	0	0	8610	NA
Douglas	Queen	PD	Coul	29	1082	236	0	0	8678	NA
Douglas	Mobil III	PD	Coul	94[a]	935	136	0	0	108	NA
Douglas	McNeal	PD	Coul	9	1300	197	0	0	6825	NA
Douglas	NW	PD	Coul	67	1441	367	3	1	8704	NA
Douglas	Pirtleville	PD	Coul	45	1302	396	1	1	8705	NA
Douglas	2 km NNW of Smelter	State	Coul/ Fluor	43	1785	471	3	3	6912	NA
Douglas	U.S. 666	State	Coul/ Fluor	42[c]	1276	392	0	1	6517	NA
Dragoon Mts.	N Dragoon Mts.	AEPCO	Bubbler	10	NA	57	NA	0	NA	296
Dri Mt.	Davis Dam	SCE	Flame	28	124	33	0	0	7426	NA
Grand Canyon	Grand Canyon Village	State	Bubbler	5[b]	NA	14	NA	0	NA	20
Fort Mohave	Riveria	SCE	Flame	28	126	38	0	0	7304	NA

TABLE 2-8 (Cont'd)

1979 Sulfur Dioxide Data Summary
(in ug/m^3)

Site	Location	Operator	Method	Annual Average	Max. Averages 3-Hr.	Max. Averages 24-Hr.	Number of Exceedances of Standards 3-Hr.	Number of Exceedances of Standards 24-Hr.	No. of Samples 1-Hr.	No. of Samples 24-Hr.
Grand Canyon	Hopi Point	State	Bubbler	5[a]	NA	18	NA	0	NA	18
Green Valley	2 mi. N of townsite	PD	Coul	0	19	3	0	0	7946	NA
Hancock	Riveria	SCE	Flame	28	163	88	0	0	7790	NA
Hayden	Hayden Fire Station	JCC	Coul	95	4025	867	7	2	8550	NA
Hayden	Hayden Junction Highway 177	JCC	Coul	43	1751	244	1	0	8676	NA
Hayden	Montgomery Ranch	JCC	Coul	158	9287	1383	13	9	8648	NA
Hayden	Town Hall	JCC	Coul	NR	999	365	0	0	3701	NA
Hayden	Montgomery Ranch	State	Coul/ Fluor	137	11876	1673	24	16	8068	NA
Hayden	Old Town Jail	State	Fluor	71	4606	1143	10	3	8311	NA
Hereford	Phelps Dodge Experimental	PD	Coul	1	262	60	0	0	8603	NA
Joseph City	Environmental Laboratory	APS	Bubbler/ Flame	0	26	0	0	0	3695	291
Joseph City	Leroux Substation	APS	Bubbler/ Flame	0	28	10	0	0	7092	291

TABLE 2-8 (Cont'd)

1979 Sulfur Dioxide Data Summary
(in ug/m^3)

Site	Location	Operator	Method	Annual Average	Max. Averages 3-Hr.	Max. Averages 24-Hr.	Number of Exceedances of Standards 3-Hr.	Number of Exceedances of Standards 24-Hr.	No. of Samples 1-Hr.	No. of Samples 24-Hr.
Joseph City	3.25 mi. SE of Joseph City	State	Bubbler	56	NA	16	NA	0	NA	4
Kansas Settlement	1 mi. W of Cotton Gin	AEPCO	Bubbler	11	NA	44	NA	0	NA	279
Katherine Landing	Davis Dam	SCE	Flame	28	171	46	0	0	7337	NA
Kearny	Cresent Ranch, Hwy. 177	JCC	Coul	32	854	177	0	0	8699	NA
Kearny	Rear of 304 Hartford	JCC	Coul	NR	1083	153	0	0	4302	NA
McNeal	2.5 mi. W., .25 mi. S of McNeal	State	Coul/ Fluor	2[e]	293	37	0	0	3686	NA
Mammoth	Courthouse	Magma	Coul	4	600	118	0	0	8479	NA
Mammoth	Mercer Ranch (Mobile Unit)	Magma	Coul	NR	472	107	0	0	2821	NA
Maricopa	Approx. 6.5 mi. N83^{o}W of Maricopa	PD	Coul	1[c]	68	11	0	0	3551	NA
Mescal	El Paso Natural Gas Co.	PD	Coul	1	135	35	0	0	7931	NA
Met. Tower	Cholla Power Plant	APS	Bubbler/ Flame	0	111	1	0	0	7125	293
Miami	Cities Service Building	State	Fluor	42[c]	1956	403	5	1	6440	NA
Miami	Jones Ranch	State	Fluor	79	7394	1501	46	17	8596	NA

TABLE 2-8 (Cont'd)

1979 Sulfur Dioxide Data Summary
(in ug/m^3)

Site	Location	Operator	Method	Annual Average	Max. Averages 3-Hr.	Max. Averages 24-Hr.	Number of Exceedances of Standards 3-Hr.	Number of Exceedances of Standards 24-Hr.	No. of Samples 1-Hr.	No. of Samples 24-Hr.
Miami	Lower Miami School	State	Coul/ Fluor	26	1254	316	0	0	7821	NA
Miami	County Landfill (Little Acres)	State	Fluor.	30	3176	660	5	3	6985	NA
Morenci	Cadillac Point	PD	Coul	72	2096	341	12	0	8718	NA
Morenci	Clifton Fina	PD	Coul	49	1302	424	1	1	8750	NA
Morenci	Metcalf	PD	Coul	52	2062	459	1	1	8662	NA
Morenci	Oroville	PD	Coul	18	988	189	0	0	8746	NA
Morenci	Mobile-Center Market	PD	Coul	54[a]	1721	679	1	1	4081	NA
Morenci	Mobile, Standpipe	PD	Coul	36	1624	348	3	0	8571	NA
Morenci	Stargo	PD	Coul	75	2182	356	6	0	8724	NA
Morenci	Eagle Creek	PD	Coul	13[b]	689	178	0	0	4504	NA
Morenci	Fairbanks	PD	Coul	20	778	134	0	0	8868	NA
Morenci	Stargo, Highway 666	State	Coul/ Fluor.	75	2208	389	6	2	7871	NA
Morenci	U.S. 666, 4.5 km NW of Smelter	State	Fluor.	59	1953	292	10	0	7855	NA

TABLE 2-8 (Cont'd)

1979 Sulfur Dioxide Data Summary
(in ug/m^3)

Site	Location	Operator	Method	Annual Average	Max. Averages 3-Hr.	Max. Averages 24-Hr.	Number of Exceedances of Standards 3-Hr.	Number of Exceedances of Standards 24-Hr.	No. of Samples 1-Hr.	No. of Samples 24-Hr.
Oracle	New Courthouse	Magma	Coul	11	719	124	0	0	8431	NA
Oracle	Holy Cross Canyon (Mobile Unit)	Magma	Coul	NR	768	160	0	0	2176	NA
Oracle Junction	Junction of Hwys. 89 & 177	PD	Coul	6	338	63	0	0	7356	NA
Page	Water Tower	SRP	Bubbler	1	NA	16	0	0	NA	69
Page	Water Tower	SRP	Flame	NR	NR	33	0	0	NR	NA
Page	Copper Mine	SRP	Flame	NR	NR	41	0	0	NR	NA
Page	Highway 98	SRP	Flame	NR	NR	44	0	0	NR	NA
Page	Airport	SRP	Flame	NR	NR	20	0	0	NR	NA
Page	Wahweap	SRP	Flame	NR	NR	20	0	0	NR	NA
Pet. Forest	National Park Visitor	APS	Bubbler/ Flame	0	33	3	0	0	7137	288
Phoenix	201 N. Central, Valley Bank Center, 29th Fl.	PD	Coul	8	147	51	0	0	8225	NA
Phoenix	15 East Monroe, Valley Bank Annex 3rd Floor	PD	Coul	7	80	31	0	0	8241	NA

TABLE 2-8 (Cont'd)

1979 Sulfur Dioxide Data Summary
(in ug/m^3)

Site	Location	Operator	Method	Annual Average	Max. Averages 3-Hr.	Max. Averages 24-Hr.	Number of Exceedances of Standards 3-Hr.	Number of Exceedances of Standards 24-Hr.	No. of Samples 1-Hr.	No. of Samples 24-Hr.
Redington	E of main ranch	Magma	Coul	16	543	201	0	0	8510	NA
St. Johns	Mesa Parada	SRP	Fluor.	0[c]	35	4	0	0	4648	NA
St. Johns	Mesa Parada	State	Bubbler	6[c]	NA	24	NA	0	NA	32
San Manuel	Townsite	Magma	Coul	73	3014	611	4	2	8554	NA
San Manuel	Golf Course	Magma	Coul/ Fluor	65	2753	497	3	1	8541	NA
San Manuel	Dormsite	Magma	Coul	74	1869	412	4	1	8521	NA
San Manuel	LDS Church	State	Fluor.	58	2024	524	5	1	7403	NA
San Manuel	Mine Site	Magma	Coul	65	3023	432	5	2	8558	NA
Sunsites	Horizon Corp. Storage Yard	AEPCO	Bubbler	9	NA	49	NA	0	NA	289
Tucson	32 North Stone, Home Federal Tower, 6th Fl.	PD	Coul	3	142	39	0	0	8618	NA
Tucson	151 West Congress	Pima	Flame	4	114	31	0	0	7005	NA
Tucson	1721 North Tanque Verde Loop Rd.	Pima	Coul	1	97	29	0	0	8407	NA
Tucson	22nd & Craycroft	Pima	Coul	5	210	52	0	0	8531	NA

TABLE 2-8 (Cont'd)

1979 Sulfur Dioxide Data Summary
(in ug/m3)

Site	Location	Operator	Method	Annual Average	Max. Averages 3-Hr.	Max. Averages 24-Hr.	Number of Exceedances of Standards 3-Hr.	Number of Exceedances of Standards 24-Hr.	No. of Samples 1-Hr.	No. of Samples 24-Hr.
Vail	El Paso Natural Gas Co. Station	PD	Coul	3	134	32	0	0	7400	NA
Willcox	Sulphur Springs Valley Elec. Co. Storage Yd.	AEPCO	Bubbler	16	NA	42	NA	0	NA	289
Winkel-man	N of Winkelman School off Hwy 77	JCC	Coul	20	1261	294	0	0	8691	NA
Winkel-man	1 mi. N of Hwy 77 and Junction 177	JCC	Coul	113	1647	349	3	0	8667	NA
Winkel-man	1 mi. S of Hwy 77 and Junction 177	JCC	Coul	24	949	170	0	0	8664	NA

a - Annual average based on a limited number of samples due to relocation or installation of the monitoring site.
b- Annual average based on a limited number of samples due to termination of the monitoring site.
c- Annual average based on a limited number of samples.
e- Annual mean is based on a limited number of samples because the site is operated on a seasonal schedule.

STANDARDS:

	Annual Average	3-Hour Average	24-Hour Average
State and Federal Primary	80 ug/m^3	----	365 ug/m^3
State and Federal Secondary	-----	1300 ug/m^3	----

3. DATA TRENDS

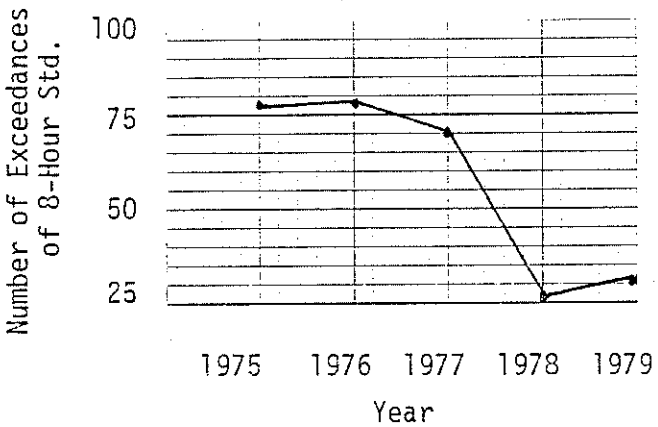
3.1 Carbon monoxide

3.1.1 Phoenix

In 1979, no significant changes in the number of exceedances of the standard (8-Hr.) or in the highest concentrations (8-Hr.) occurred. The data in Figure 3-1 below and Figure 3-2 illustrate these trends.

FIGURE 3-1

Number of Exceedances of CO Standards in Phoenix

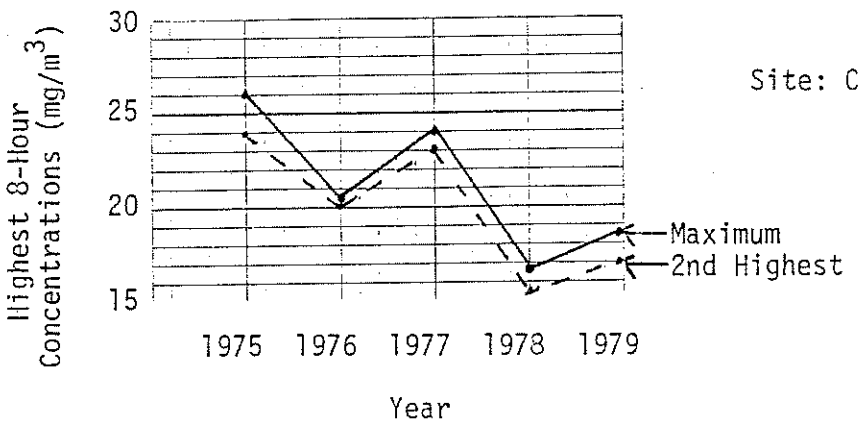


Site: Central Phoenix (1845 E. Roosevelt Street)

8-Hr. Standard: 10 mg/m^3

FIGURE 3-2

Highest Concentrations of CO in Phoenix



Site: Central Phoenix

It should be noted that the data represent the Central Phoenix site only. Data from the other monitoring sites could not be included in this review for the following reasons:

South Phoenix, North Phoenix Glendale and Scottsdale	These sites were not operating during the last few months of 1979.
West Phoenix	This site was not installed until February, 1977.
Mesa	This site was relocated in 1978.

The trend for other sites in the network should be the same as for the Central Phoenix site. Data for the years 1975 through 1978 substantiate that conclusion (Refer to Figure 3-1 in "1978 Air Quality Data for Arizona", Arizona Department of Health Services, September, 1979.)

Even though exceedance data are a better indicator of trends, highest concentrations are included for information.

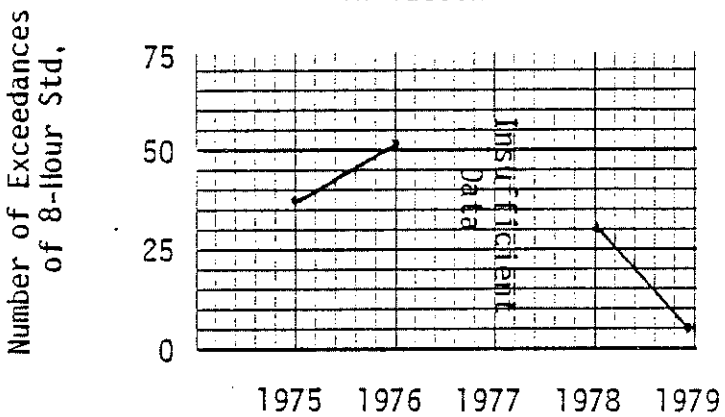
3.1.2 Tucson

A large decrease in the number of exceedances of the standard (8-Hr.), 84%, in 1979 relative to 1978 was recorded. Meanwhile, moderate reductions, 18-20%, in the highest concentrations (8-Hr.) were observed.

Refer to Figure 3-3 and 3-4 below for the applicable data.

FIGURE 3-3

Number of Exceedances of CO Standard in Tucson

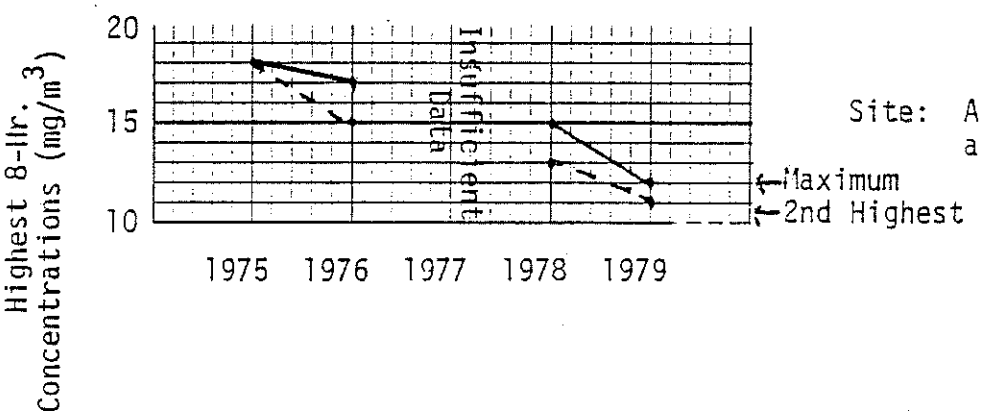


Sites: 151 W. Congress
Alvernon Way and 22nd Street
Craycroft and 22nd Street

8-Hour Std: 10 mg/m^3

FIGURE 3-4

Highest Concentrations of CO in Tucson



Site: Alvernon Way and 22nd Street

3.1.3 Other areas

No violations of the standards have ever been measured since monitoring sites were established in 1975. However, in 1979 an exceedance of the 8-Hour standard was detected in Flagstaff for the first time. Highest concentration data in Table 3-1 below illustrate the general level of readings obtained in Flagstaff, Sierra Vista and Yuma.

TABLE 3-1

CO for Flagstaff, Sierra Vista and Yuma

City	Year	8-Hr. Concentration (mg/m^3) Maximum	2nd High
Flagstaff	1975	8	7
	1976	6	6
	1977	5	5
	1978	10	10
	1979	11	10
Sierra Vista	1977	7	7
	1978	7	6
	1979	7	6
Yuma	1975	4	4
	1976	5	4
	1977	7	7
	1978	-	-
	1979	6	5

At Sierra Vista, concentrations have remained fairly steady for the past three years. However, no long-term trends can be discerned in Yuma or Flagstaff because only one and two years of data, respectively, are available for the current sites.

In Flagstaff, concentrations appear to be higher at the current site (2501 N. 4th Street). On the other hand, in Yuma no significant difference between the new site (201 S. 2nd Avenue) and the old site (1485 2nd Avenue) is evident at this time.

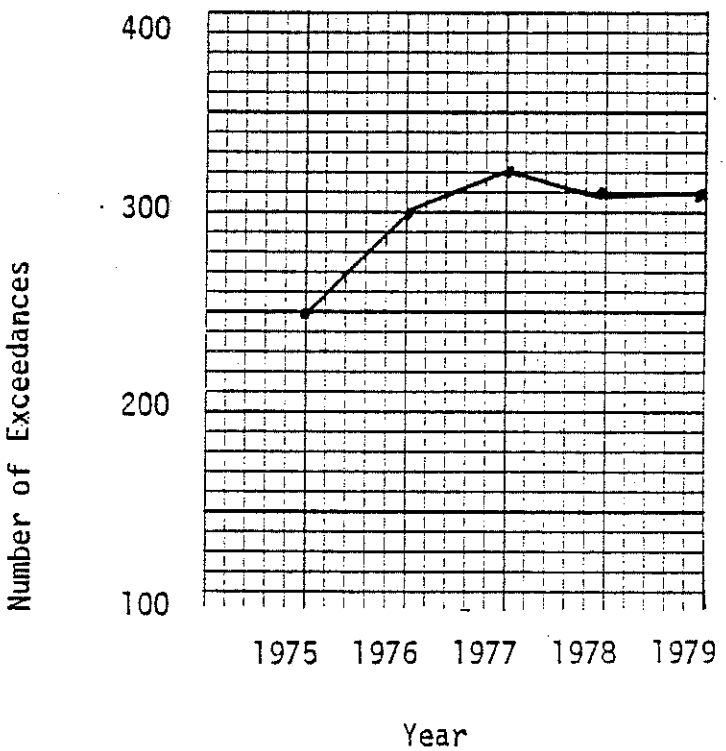
3.2 Hydrocarbons

3.2.1 Phoenix

The number of exceedances of the 3-Hr. standard for hydrocarbons in 1979 was virtually the same as in 1978. In fact, there has been no significant change since 1976 when exceedances rose 19% from 250 in 1975 to 297 in 1976. Figure 3-5 below illustrate these data.

FIGURE 3-5

Number of Exceedances of Hydrocarbons Standard in Phoenix



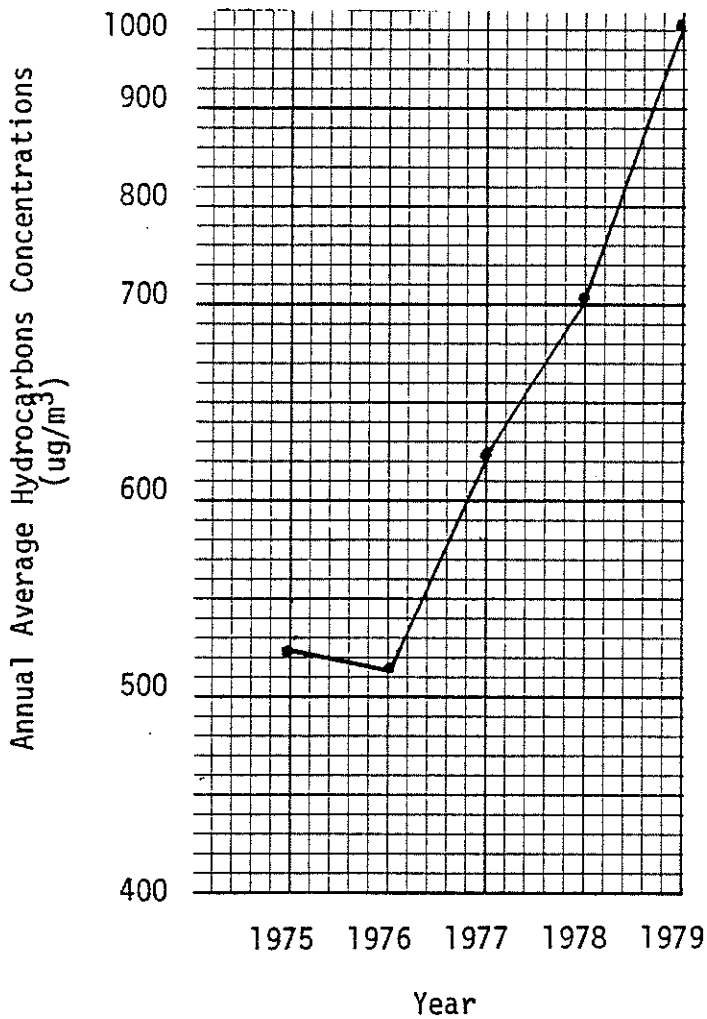
Site: 15 East Monroe by Phelps Dodge Corp.

Standard: 160 ug/m^3 3-Hour Average (6-9 a.m.

Average concentrations have followed a different pattern, one of sharply rising concentrations in recent years, both for the annual and seasonal values. In Figure 3-6 this trend is illustrated using annual data for the past five years.

FIGURE 3-6

Annual Average Concentrations of Hydrocarbons in Phoenix



Site: 15 East Monroe operated by Phelps Dodge Corporation

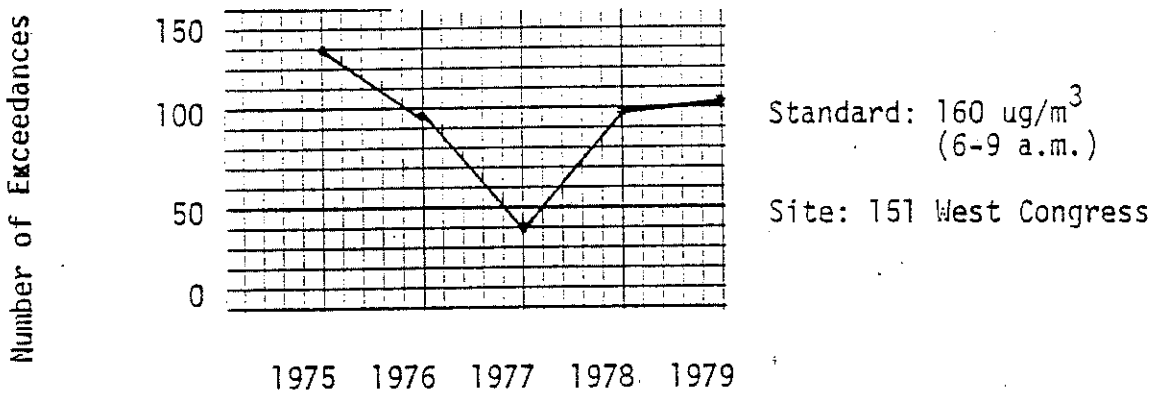
It would appear that the number of exceedances is not a good trend indicator for Phoenix data. The reason is that concentrations of hydrocarbons are higher than the 3-Hour standard on practically every day.

3.2.2 Tucson

As in Phoenix, the number of exceedances of the standard did not change appreciably in 1979 in Tucson. A total of 103 were detected in 1979, 5% greater than in 1978. Refer to Figure 3-7 for the applicable data.

FIGURE 3-7

Number of Exceedances of Hydrocarbons Standard in Tucson

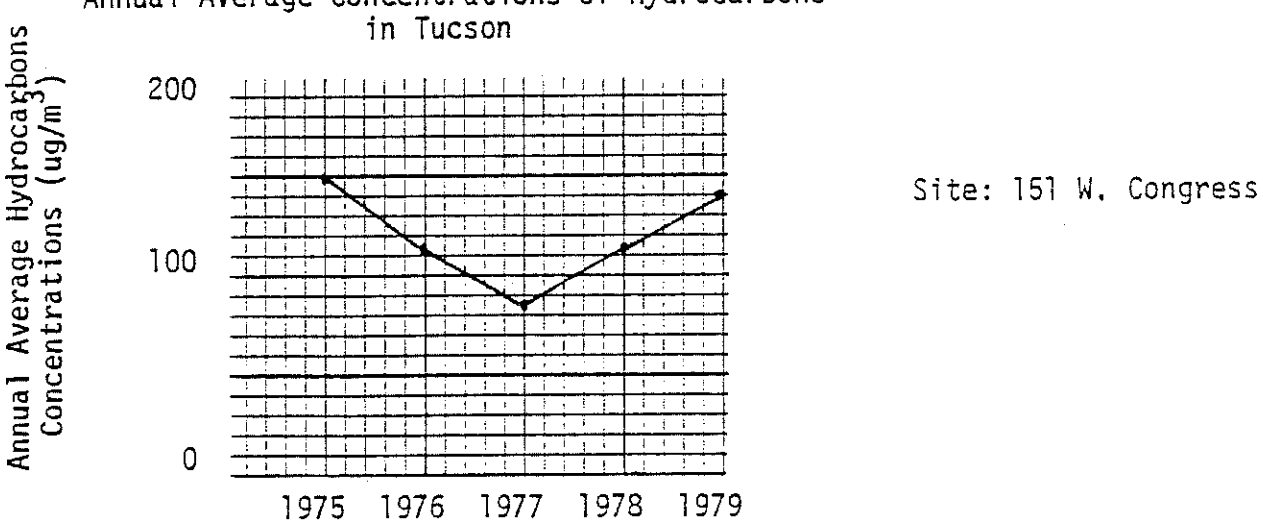


Again, similar to the Phoenix trend, the annual average concentration increased in 1979 at a greater rate than the number of exceedances. The annual average concentration was 138 ug/m^3, up 18% from 1978.

These results are illustrated in Figure 3-8 below.

FIGURE 3-8

Annual Average Concentrations of Hydrocarbons in Tucson



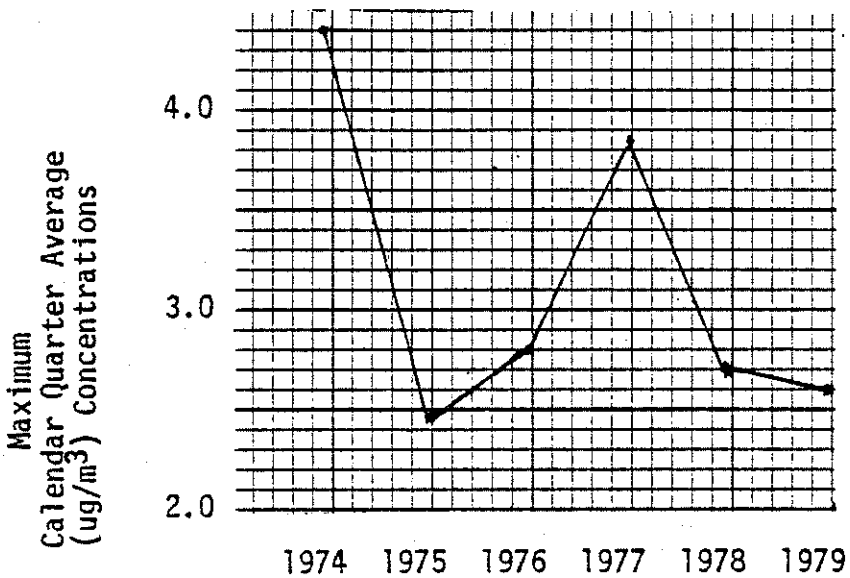
3.3 Lead

3.3.1 Phoenix

Phoenix data are illustrated in Figures 3-9 and 3-10 below. Lead concentrations continued the general decline which had started in 1977. The lead standard was exceeded at only two out of seven sites, 1845 E. Roosevelt and 4732 S. Central, in 1979.

FIGURE 3-9

Highest Lead Concentrations in Phoenix

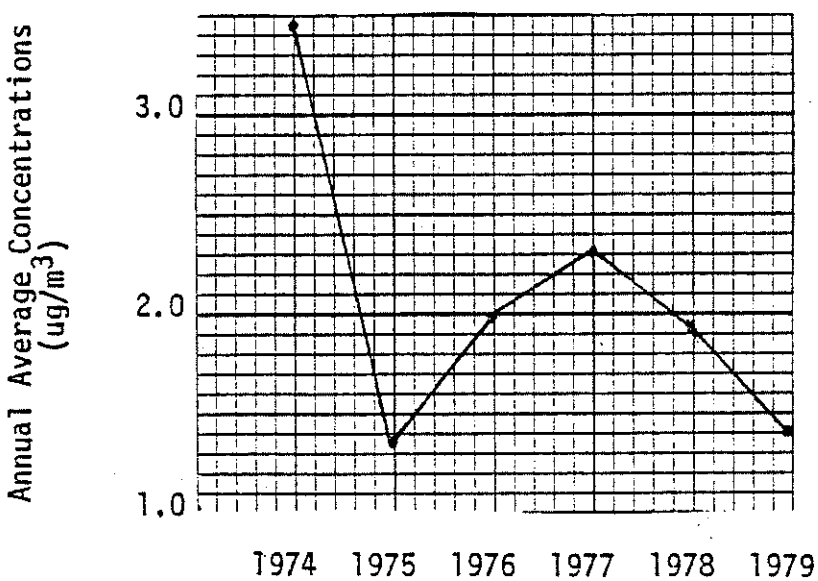


Site: 1845 E. Roosevelt Street

Standard: 1.5 ug/m^3 calendar quarter averag

FIGURE 3-10

Average Lead Concentrations in Phoenix



Site: 1845 E. Roosevelt Street

3.3.2 Tucson

No exceedances of the standard have been detected in Tucson in the past two years. The highest quarterly average concentrations were 1.29 in 1978 and 1.18 ug/m^3 in 1979 at the 1016 West Prince Road site.

3.3.3 Other areas

Concentrations in 1979 were about the same as in 1978 except at Casa Grande and Miami where 73% and 75% increases in the maximum quarterly averages were noted. The highest quarterly concentrations were 0.65 ug/m^3 in Miami, 0.50 ug/m^3 in Rillito and 0.45 ug/m^3 in Casa Grande. Two years of complete lead data are now available from state samplers in non-urban areas of the state.

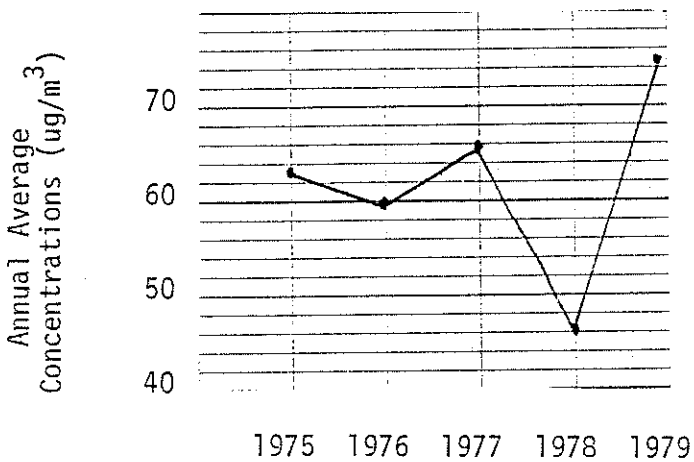
3.4 Nitrogen Dioxide

3.4.1 Phoenix

The annual average concentration was considerably elevated in 1979, up to 77 ug/m^3 from 44 ug/m^3 in 1978. This is a complete reversal of the trend in 1978 when a large drop in the average concentration occurred. These data, which are plotted in Figure 3-11, were obtained from Maricopa County's 1845 East Roosevelt site. It should be noted that similar trends and concentrations have been observed in data from Phelps Dodge's 15 East Monroe site.

FIGURE 3-11

Concentrations of Nitrogen Dioxide
in Phoenix



Site: 1845 E. Roosevelt

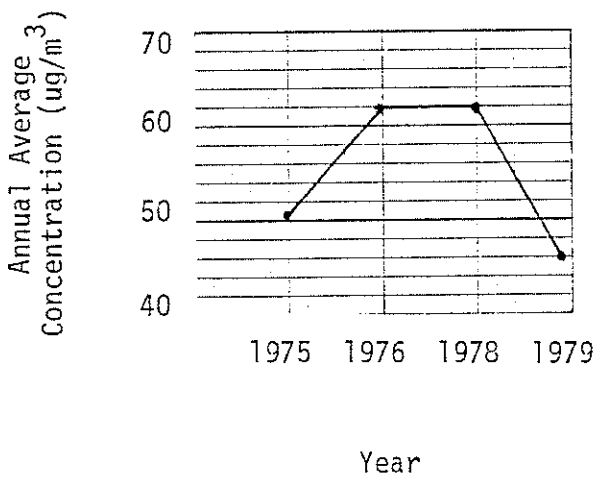
Standard: 100 ug/m^3

3.4.2 Tucson

A 25% decline in the average concentration at the 151 West Congress station was recorded in 1979. A similar decrease at the 22nd and Craycroft site, 28%, was detected. However, the analyzer at 151 West Congress is an EPA-approved instrument; whereas, the 22nd and Craycroft instrument is not. Therefore, the 151 West Congress data are used to depict trends in Figure 3-12.

FIGURE 3-12

Concentrations of Nitrogen Dioxide
in Tucson



Site: 151 West Congress

Standard: 100 ug/m^3,
annual average

3.5 Oxidants (Ozone)

3.5.1 Phoenix

A 33% increase in compliance status exceedances was observed in 1979. On the other hand, no appreciable change in the maximum and second highest 1-Hour concentrations was noted during the past year.

These patterns in oxidants measurements are indicated in Table 3-2 below. Compliance status exceedances are based on data from the Central Phoenix (1845 E. Roosevelt) site because the greatest number of exceedances occur at this site. Thus, the Central Phoenix site is the controlling site for compliance determination.

TABLE 3-2

PHOENIX O_x DATA TRENDS - 1975/1979

Year	Compliance Status Exceedances	Highest 1-Hour Averages (ug/m^3)			
		Maximum	Site	2nd High	Site
1975	1.0*	298	Central	251	Central
1976	1.5*	259	Central	243	Glendale
1977	2.0	310	Central	300	Central
1978	3.0	310	Central	300	Glendale
1979	4.0	310	North	277	North

Sites: Central, North and South Phoenix, Glendale and Scottsdale

Standard: 235 ug/m^3 (.12 ppm), daily maximum 1-Hour average. Compliance status is determined by computing the average number of days that the one-hour standard has been exceeded per year for the past three years. No more than 1.0 exceedances per year averaged over the last three years is allowed.

*For 1975 and 1976 the number of compliance status exceedances are based on only one and two years of data, respectively.

3.5.2 Tucson

The maximum and second highest 1-Hour concentrations remain virtually the same in 1979 as in 1978. As in previous years, no exceedances of the 235 ug/m3 standard was detected in 1979. Reference data are tabulated below.

TABLE 3-3

TUCSON O_x DATA TRENDS - 1976/1979

Year	Maximum	Highest 1-Hour Averages (ug/m3) Site	2nd High	Site
1976	196	Congress	196	Congress
1977	196	Craycroft	196	Congress
1978	210	Craycroft	202	Congress
1979	214	Congress	204	Craycroft

Sites: 151 West Congress and Craycroft and 22nd Street with September data deleted.

*Standard: 235 ug/m^3 (.12 ppm), daily maximum 1-Hour average.

3.5.3 Non-Urban Areas

In Flagstaff, a downward trend for the past three years can be discerned in Table 3-4. The highest 1-hour concentration was 129 ug/m^3 in 1979, 20% less than the corresponding figure for 1978.

In Sierra Vista, concentrations were higher in 1979 than in 1978. The maximum 1-hour reading, 166 ug/m^3, was 10% higher than the 1978 maximum value.

In Yuma, 225 ug/m^3 was the highest 1-hour concentration which is virtually the same as the peak reading in 1978.

TABLE 3-4

O_x DATA FOR FLAGSTAFF, SIERRA VISTA AND YUMA

City	Year	Highest 1-Hour Concentration (ug/m^3) Maximum	2nd High
Flagstaff	1977	174	174
	1978	162	156
	1979	129	124
Sierra Vista	1978	151	148
	1979	166	160
Yuma	1978	228	224
	1979	225	220

Standard: 235 ug/m^3(.12 ppm), daily maximum 1-Hour average.

3.6 Particulates

3.6.1 Phoenix

Except for the South Phoenix site, concentrations in 1979 were higher than in 1978, but about the same as in 1975-1977. It should be noted that 1978 was a year of reduced particulates concentrations in most areas of Arizona, presumably due to unusual meteorology.

At the South Phoenix site, concentrations were actually less in 1979 than in 1978 with a 22% drop in the annual geometric mean. The completion of construction activity near the site probably accounts for this trend. No significant change in particulates concentrations in the Phoenix area during the past five years is evident. At all sites, concentrations remain above the annual standard, 75 ug/m^3.

Phoenix area particulates data are summarized in Table 3-5 which follows:

TABLE 3-5

Concentrations of Particulates in the Phoenix Area

	Annual Geometric Mean Concentration (ug/m^3)				
Site	1975	1976	1977	1978	1979
Glendale-6000 W. Olive	101	101	112	97	105
Mesa-Broadway & Brooks	-	-	-	86	87
Scottsdale-2857 N. Miller	115	124	118	92	99
N. Scottsdale-13665 N. Scottsdale	148	118	179	128	147
Phoenix-1845 E. Roosevelt	112	121	144	120	121
Phoenix-4732 S. Central	143	120	155	218	171
Phoenix-8531 N. 6th St.	121	127	109	106	117

Standard: 75 ug/m^3, annual geometric mean.

3.6.2 Tucson

In Tucson concentrations were also generally higher in 1979 than in 1978 as a result of 1978 being an atypical year for particulates concentrations. Seven locations exhibited higher levels, five sites indicated no appreciable change and one site showed a decrease. The largest rise in concentrations, 46% at the University, has been attributed to construction work near the sampler.

Over the last five years no pattern in Tucson data is reflected except a declining trend at the Alvernon and Fort Lowell site. However, this site and three others still exceed the annual standard, 75 ug/m3.

Table 3-6 includes a summary of these data.

TABLE 3-6

Concentrations of Particulates in Tucson

Site	Annual Geometric Mean Concentration (ug/m^3)				
	1975	1976	1977	1978	1979
151 W. Congress Street	67	71	68	56	70
Alvernon & Ft. Lowell Rd.	174	168	155	126	120
1970 W. Ajo Way	79	76	72	66	69
Davis - Monthan AFB	73	72	76	69	69
Oracle Road and Magee	66	54	73	50	60
Golf Links Road & Harrison	62	57	63	55	65
Hughes Access & Nogales Hwy.	54	51	50	43	54
7920 E. Tanque Verde	60	59	67	56	61
Orange Grove & El Camino del Terra	87	85	85	87	109
Pima College	-	-	50	42	47
Prince Road and Fairview	-	-	122	110	129
1810 S. 6th Avenue	96	118	119	117	101
University of Arizona	71	73	71	61	89

Standard: 75 ug/m^3, annual geometric mean

3.6.3 Non-Urban Areas

Particulates data for non-urban areas exhibited the same tendency as urban data, that is, values in 1979 were greater than in 1978, but were about the same as pre-1978. In addition, there are a few interesting, site-specific trends which should be noted.

At Hayden the annual geometric mean has risen steadily in the past two years. The increase in 1978 occurred despite the fact that 1978 was a year of lower concentrations. Industrial traffic on an unpaved road close to the sampling station is the suspected cause of these increases.

Conversely, at Ajo, Casa Grande, Joseph City, Miami (Jones Ranch), San Manuel and Superior a declining trend has developed for reasons unknown. Refer to Table 3-7 for the annual geometric mean data.

TABLE 3-7

Concentrations of Particulates in Non-Urban Areas of Arizona

	Annual Geometric Mean Concentration (ug/m^3)				
Site	1975	1976	1977	1978	1979
Ajo	83	92	72	69	67
Casa Grande	147	122	118	98	100
Douglas (U.S. 666)	49	43	46	NA	48
Flagstaff	67	79	79	NA	82
Florence	-	107	93	67	88
Hayden	165	119	92	134	172
Hayden NW	-	-	57	46	53
Joseph City	-	46	54	31	31
Miami (Jones Ranch)	44	38	43	20	30
Miami (Fire Station)	-	-	99	85	118
Montezuma Castle National Monument	27	30	30	24	33
Morenci	60	50	47	37	55
Organ Pipe Cactus National Monument	28	33	33	28	31
Page	44	41	37	25	34
Prescott	48	50	47	38	41
Rillito	NA	112	143	100	132
Safford	133	158	143	123	159
San Manuel	NA	43	50	26	30
Sierra Vista	54	59	63	53	65
Superior	84	101	96	69	76
Yuma	147	142	133	112	139

Standard: 75 ug/m^3, annual geometric mean

3.7 Sulfur Dioxide

3.7.1 Copper Smelter Areas

In all areas annual average concentrations were higher in 1979 except at Morenci. The increases in the annual averages were on the order of 20% at Ajo, Douglas, Hayden and Miami. At San Manuel, the increase was only 5%; whereas, a 4% decrease was observed for Morenci.

All areas continued to meet the annual air quality standard except Hayden, as shown by the data in Table 3-8.

TABLE 3-8

Concentrations of Sulfur Dioxide in Smelter Areas of Arizona

	Annual Average Concentrations (ug/m^3)				
Site	1975	1976	1977	1978	1979
Ajo (Oxidation Pond)	72	33	24	43	51
Douglas (County Hospital)	146	51	48	55	67
Hayden (Montgomery Ranch)	184	183	180	133	158
Miami (Jones Ranch)	51	56	84	64	79
Morenci (Stargo)	219	109	77	78	75
San Manuel (Golf Course)	107	75	79	62	65

Standard: 80 ug/m^3, annual average

4. NON-CRITERIA POLLUTANTS

TABLE 4-1

1979 Benzene Soluble Organics Data Summary
High Volume Sampler (in ug/m3)

Nearest City or Town	Site Location	Operator	Annual Average	Maximum 24-Hour Average	Number of Samples
Ajo	Camelback Mountain	PD[a]	1.9	NR	78
Ajo	Oxidation Pond	PD[a]	2.1	NR	82
Ajo	South Tailings Dam	PD[a]	2.3	NR	80
Ajo	Town Square	PD[a]	2.7	NR	78
Ajo	AZ DOT, Well Road	State	2.0[d]	7.1	42
Boys Ranch	General Motors Proving Ground	PD[a]	1.7	NR	83
Buckeye	¼N on Hwy 80 on N 4th	PD[a]	2.1	NR	67
Case Grande	401 North Marshall Road	State	2.9	8.5	51
Clarkdale	High School Football Stadium	State	1.4[d]	3.6	25
Coolidge	2 mi. N of Coolidge	PD[a]	1.5	NR	84
Douglas	U.S. 666	State	1.3	3.1	49
Douglas	15th Street Park	State	2.1[d]	4.2	15
Douglas	0.75 mi. N15^{o}E of Smelter	PD[a]	1.7	NR	79
Douglas	1012 G Avenue-Mercantile	PD[a]	3.1	NR	75
Douglas	Pirtleville	PD[a]	1.8	NR	79
Douglas	Emission Control Center	PD[a]	2.1[c]	NR	33
Eagar	Town Hall	State	12.5	57.2	45

TABLE 4-1 (Cont'd)

1979 Benzene Soluble Organics Data Summary
High Volume Sampler (in ug/m^3)

Nearest City or Town	Site Location	Operator	Annual Average	Maximum 24-Hour Average	Number of Samples
Flagstaff	Birch & San Francisco	State	4.3[b]	16.6	8
Flagstaff	218 North Leroux	State	8.1[b]	30.4	31
Florence	22nd Street & Willow	State	2.0	5.3	60
Glendale	6000 West Olive Avenue	Maricopa	5.8[d]	22.6	43
Grand Canyon	Grand Canyon Village	State	0.6[b]	1.3	11
Green Valley	2 mi. N of townsite	PD[a]	1.5	NR	77
Hayden	Old Town Jail, Canyon Drive	State	4.3	12.7	47
Hayden	Montgomery-Reece Ranch	State	1.3	4.8	47
Hereford	Phelps Dodge Experimental Farm	PD[a]	1.5	NR	81
Joseph City	3.25 mi. SE of Joseph City	State	1.0	2.6	55
Kingman	305 West Beale Street	State	2.9[d]	10.5	33
Lake Havasu	Lake Havasu Community Hospital	State	0.7	1.7	54
Maricopa	Approx. 6.5 mi. N83^{o}W of Maricopa	PD[a]	1.2	NR	48
Mesa	Broadway and Brooks	Maricopa	4.3	18.4	52
Mescal	El Paso Natural Gas Company Station	PD[a]	4.0	NR	69
Miami	Miami Fire Department, 804 Sullivan Street	State	2.5	8.0	57
Miami	Jones Ranch	State	1.0	2.4	56

TABLE 4-1 (Cont'd)

1979 Benzene Soluble Organics Data Summary
High Volume Sampler (in ug/m^3)

Nearest City or Town	Site Location	Operator	Annual Average	Maximum 24-Hour Average	Number of Samples
Montezuma Castle	Park Maintenance Building	State	2.8	12.0	46
Morenci	Stargo, Highway 666	State	1.7	10.7	58
Morenci	Cadillac Point	PD[a]	1.6	NR	76
Morenci	Clifton Fina	PD[a]	1.8	NR	81
Morenci	Standpipe	PD[a]	1.3	NR	74
Morenci	Fairbanks	PD[a]	1.6	NR	79
Morenci	Stargo	PD[a]	1.6	NR	78
Nelson	6 mi. E of Peach Springs	State	0.6[d]	2.6	27
Nogales	Nogales High School - Plum Street	State	2.5[d]	5.5	10
Oracle Junction	Near Oracle Junction, of Hwys 89 & 77	PD[a]	1.9	NR	79
Organ Pipe Cactus National Monument	Visitor's Center	State	0.9	2.9	54
Page	Airport	State	1.9	12.9	52
Parker	914 Arizona Avenue	State	1.8[d]	5.5	20
Paul Spur	Housing Area near Lime Plant	State	1.2	3.1	51
Phoenix	201 North Central, Valley Bank Center, Roof	PD[a]	2.8	NR	104
Phoenix	15 East Monroe, Valley Bank Annex, 3rd Floor	PD[a]	4.8	NR	83

TABLE 4-1

1979 Benzene Soluble Organics Data Summary
High Volume Sampler (in ug/m^3)

Nearest City or Town	Site Location	Operator	Annual Average	Maximum 24-Hour Average	Number of Samples
Phoenix	1845 East Roosevelt	Maricopa	8.4[d]	26.6	40
Phoenix	4732 South Central	Maricopa	7.6	20.2	49
Phoenix	8531 North 6th Street	Maricopa	6.6	18.9	50
Prescott	500 South Marina Street	State	1.5	11.2	57
Rillito	Miller's Market	State	2.2	5.8	53
Safford	523 10th Avenue	State	2.3	6.9	52
St. Johns	Mesa Parada	State	0.9	2.7	45
San Manuel	LDS Church	State	1.2	22.2	57
Scottsdale	2857 North Miller Road	Maricopa	6.2	19.3	54
Scottsdale	13665 North Scottsdale Road	Maricopa	3.5	10.5	54
Show Low	City Hall, Deuce of Clubs Avenue	State	5.4	74.4	56
Sierra Vista	1st Street & Bartow Drive	State	1.9	7.7	57
Superior	AZ DOT, 951 Main Street	State	1.6	4.3	57
Tucson	32 North Stone, Home Federal Savings Tower, Roof	PD[a]	2.4	NR	136
Vail	El Paso Natural Gas Company Station	PD[a]	1.9	NR	82
Yuma	201 South Second Avenue	State	3.2	13.7	61

a- Phelps Dodge uses Cyclohexane Extraction process
b- Annual average based on a limited number of samples due to relocation or installation of the monitoring site.
c- Annual average based on a limited number of samples due to termination of the monitoring site.
d- Annual average based on a limited number of samples.

TABLE 4-2

1979 Nitrates Data Summary
High Volume Sampler (in ug/m3)

Nearest City or Town	Site Location	Operator	Annual Average	Maximum 24-Hour Average	Number of Samples
Ajo	AZ DOT, Well Road	State	2.8[c]	5.8	42
Casa Grande	401 North Marshall Road	State	4.1	17.1	51
Clarkdale	High School Football Stadium	State	6.4[c]	52.9	25
Douglas	U.S. 666	State	2.1	5.0	49
Douglas	15th Street Park	State	2.4[c]	5.4	15
Eagar	Town Hall	State	3.3	10.0	45
Flagstaff	Birch & San Francisco	State	1.1[a]	4.1	8
Flagstaff	218 N. Leroux	State	3.3[a]	7.9	31
Florence	22nd Street & Willow	State	4.2	12.5	60
Glendale	6000 West Olive Avenue	Maricopa	1.2[c]	4.4	42
Grand Canyon	Grand Canyon Village	State	1.1[a]	2.7	11
Hayden	Old Town Jail, Canyon Drive	State	2.4	5.6	47
Hayden	Montgomery-Reece Ranch	State	3.1	7.5	47
Joseph City	3.25 mi. SE of Joseph City	State	1.6	6.4	55
Kingman	305 West Beale Street	State	3.4[c]	7.0	33
Lake Havasu	Lake Havasu Community Hospital	State	0.8	5.6	54
Mesa	Broadway & Brooks	Maricopa	0.9	5.4	47

TABLE 4-2 (Cont'd)

1979 Nitrates Data Summary
High Volume Sampler (in ug/m^3)

Nearest City or Town	Site Location	Operator	Annual Average	Maximum 24-Hour Average	Number of Samples
Miami	Miami Fire Department, 804 Sullivan Street	State	3.5	11.0	57
Miami	Jones Ranch	State	2.8	8.8	56
Montezuma Castle National Monument	Park Maintenance Building	State	3.3	6.6	46
Morenci	Stargo, Highway 666	State	2.6	7.2	58
Nelson	6 mi. E of Peach Springs	State	1.6[c]	5.9	27
Nogales	Nogales High School, Plum Street	State	2.3[c]	5.9	10
Organ Pipe National Monument	Visitor's Center	State	2.3	8.0	54
Page	Airport	State	3.1	8.3	52
Parker	914 Arizona Avenue	State	3.0[c]	12.6	20
Paul Spur	Housing Area near Lime Plant	State	6.0	30.3	51
Phoenix	1845 East Roosevelt	Maricopa	1.0[c]	8.1	38
Phoenix	4732 South Central	Maricopa	0.6	3.8	47
Phoenix	8531 North 6th Street	Maricopa	0.8	5.1	47
Prescott	500 South Marina Street	State	2.0	5.8	57
Rillito	Miller's Market	State	3.9	8.0	53
Safford	523 10th Avenue	State	2.8	9.1	52

TABLE 4-2 (Cont'd)

1979 Nitrates Data Summary
High Volume Sampler (in ug/m^3)

Nearest City or Town	Site Location	Operator	Annual Average	Maximum 24-Hour Average	Number of Samples
St. Johns	Mesa Parada	State	1.3	4.9	45
San Manuel	LDS Church	State	1.9	6.0	57
Scottsdale	2857 North Miller Road	Maricopa	0.8	4.9	51
Scottsdale	13665 North Scottsdale Road	Maricopa	0.7	6.1	50
Show Low	City Hall, Deuce of Clubs Avenue	State	1.9	5.6	56
Sierra Vista	1st Street & Bartow Drive	State	2.5	9.2	57
Superior	AZ DOT, 951 Main Street	State	3.6	9.8	57
Yuma	201 South Second Avenue	State	4.7	16.1	61

a- Annual average based on a limited number of samples due to relocation or installation of the monitoring site.
b- Annual average based on a limited number of samples due to termination of the monitoring site.
c- Annual average based on a limited number of samples.

TABLE 4-3

1979 Sulfates Data Summary
High Volume Sampler (in ug/m^3)

Nearest City or Town	Site Location	Operator	Annual Average	Maximum 24-Hour Average	Number of Samples
Ajo	AZ DOT, Well Road	State	8.3[c]	15.2	42
Casa Grande	401 North Marshall Road	State	7.1	24.7	51
Clarkdale	High School Football Stadium	State	10.7[c]	50.5	25
Douglas	U.S. 666	State	9.1	20.6	49
Douglas	15th Street Park	State	9.6[c]	14.0	15
Eagar	Town Hall	State	6.2	13.2	45
Flagstaff	Birch & San Francisco	State	3.7[a]	6.0	8
Flagstaff	218 N. Leroux	State	6.3[a]	10.6	31
Florence	22nd Street & Willow	State	7.8	18.4	60
Glendale	6000 West Olive Avenue	Maricopa	5.8	21.0	44
Grand Canyon	Grand Canyon Village	State	3.5[a]	7.7	11
Green Valley	245 West Esperanza	Pima	4.0[c]	7.4	24
Hayden	Old Town Jail, Canyon Drive	State	12.2	26.6	47
Hayden	Montgomery-Reece Ranch	State	16.3	32.2	47
Joseph City	3.25 Mi. SE of Joseph City	State	7.5	17.2	55
Kingman	305 West Beale Street	State	5.8[c]	16.1	33
Lake Havasu	Lake Havasu Community Hospital	State	2.1	15.2	54

TABLE 4-3 (Cont'd)

1979 Sulfates Data Summary
High Volume Sampler (in ug/m^3)

Nearest City or Town	Site Location	Operator	Annual Average	Maximum 24-Hour Average	Number of Samples
Mesa	Broadway & Brooks	Maricopa	4.6	21.3	51
Miami	Jones Ranch	State	11.3	74.9	56
Miami	Miami Fire Department, 804 Sullivan Street	State	16.9	60.1	57
Montezuma Castle	Park Maintenance Building	State	7.3	20.6	46
Morenci	Stargo, Highway 666	State	13.5	27.9	58
Nelson	6 mi. E of Peach Springs	State	2.5[c]	8.4	27
Nogales	Nogales High School, Plum Street	State	6.0[c]	11.2	10
Organ Pipe	Visitor's Center	State	4.3	8.8	54
Page	Airport	State	6.4	12.6	52
Parker	914 Arizona Avenue	State	4.4[c]	8.6	20
Paul Spur	Housing Area near Lime Plant	State	16.0	47.4	51
Phoenix	1845 East Roosevelt	Maricopa	5.9	14.2	40
Phoenix	4732 South Central	Maricopa	5.3	13.9	49
Phoenix	8531 North 6th Street	Maricopa	4.7	19.1	50
Prescott	500 South Marina Street	State	3.7	6.7	57
Rillito	Miller's Market	State	7.7	16.9	53

TABLE 4-3 (Cont'd)

1979 Sulfates Data Summary
High Volume Sampler (in ug/m^3)

Nearest City or Town	Site Location	Operator	Annual Average	Maximum 24-Hour Average	Number of Samples
Safford	523 10th Avenue	State	8.7	25.4	52
St. Johns	Mesa Parada	State	4.4	13.2	45
San Manuel	LDS Church	State	10.9	37.0	57
Show Low	City Hall, Deuce of Clubs Avenue	State	5.2	12.7	56
Sierra Vista	1st Street & Bartow Drive	State	7.1	41.5	57
Superior	AZ DOT, 951 Main Street	State	8.5	23.2	57
Scottsdale	2857 North Miller Road	Maricopa	4.8	20.8	54
Scottsdale	13665 North Scottsdale Road	Maricopa	4.6	16.5	52
Tucson	32 North Stone, Home Federal Savings Tower, 6th Floor	PD	3.7	9.1	108
Tucson	Alvernon & Ft. Lowell	Pima	4.0[c]	7.6	23
Tucson	151 West Congress Street	Pima	4.2[c]	7.0	24
Tucson	Davis-Montham Air Force Base	Pima	4.0[c]	5.9	23
Tucson	1810 South 6th Avenue	Pima	4.4[c]	6.8	24
Tucson	Orange Grove & El Camino del Terra	Pima	5.1[c]	10.0	24
Tucson	South Tucson	Pima	5.4[c]	11.0	24
Tucson	Prince Road & Fairview	Pima	4.6[c]	6.8	24
Yuma	201 South Second Avenue	State	6.4	13.5	61

a- annual average based on a limited number of samples due to relocation or installation of the monitoring site.
c- annual average based on a limited number of samples.

APPENDICES

AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Time	State and Federal Standards Primary	Secondary
Carbon Monoxide	1-hour	40	40
	8-hour	10	10
Hydrocarbons	3-hour (6-9 a.m.)	160	160
Nitrogen dioxide	Annual	100	100
Ozone	1-hour (daily max.)	235	235
Particulates	24-hour	260	150
	Annual (Geom. Mean)	75	60
Sulfur dioxide	3-hour	---	1300
	24-hour	365	---
	Annual	80	---
Lead	Calendar Quarter	1.5	1.5

NOTE: Units are ug/m^3 except for carbon monoxide which has units of mg/m^3. Reference conditions are 25^oC and 760 mm Hg.

Standards: Not to be exceeded more than once per year except:

1. In the case of ozone, the number of exceedance days is not to be more than 1.0 per year based on a 3-year running average.
2. In the case of lead, never to be exceeded.

Glossary of Pollutants Found In The Ambient Air

Benzene Soluble Organics

"Benzene soluble organics" is a term referring to that fraction of particulate matter which is soluble in benzene. Organic compounds which are formed during incomplete of fuels comprise the majority of benzene soluble organics. In Arizona the prime sources of these compounds are motor vehicle operation and wood burning.

Carbon Monoxide

Carbon monoxide is a colorless, odorless gas formed by incomplete combustion of fuels. The major source of carbon monoxide in the urban air is motor vehicle operation.

Hydrocarbons

Hydrocarbons, which are a group of compounds composed of carbon and hydrogen, are the constituents of gaseous and liquid fuels. As a result, motor vehicles, service stations and bulk fuel storage tanks are the chief origins of hydrocarbon emissions.

Lead

In Arizona lead originates primarily from motor vehicle operation due to the use of lead anti-knock compounds in gasoline. Lead concentrations are expected to drop to acceptable levels in the Phoenix area in the near future due to increased usage of unleaded gasoline instead of leaded gasoline.

Nitrates

"Nitrates" is a term referring to nitric acid and salts of nitric acid which are formed in the atmosphere by various complex reactions of nitrogen oxides with other substances. Nitrates occur as finely divided particulates which inhibit visibility.

Nitrogen Dioxide

Nitrogen dioxide is a reddish-brown corrosive gas produced during high temperature fuel combustion. Power plants and motor vehicles generate the bulk of nitrogen dioxide in the atmosphere.

Nitrogen Oxides

In air pollution terminology, nitrogen oxides include nitrogen dioxide and nitric oxide only. Both of these gases are emitted by the same major sources, namely, motor vehicles and power plants, as a result of high temperature fuel combustion. Nitrogen oxides react with hydrocarbons in the atmosphere to produce oxidants or ozone.

Oxidants (Ozone)

Oxidants are oxygen-containing gases or vapors that are formed in the atmosphere by the reaction of hydrocarbons with nitrogen oxides. Since sunlight

accelerates this reaction, it is referred to as the photochemical reaction and the products formed are sometimes referred to as photochemical oxidants. The principal oxidant is ozone, a pungent, bluish gas which is a triatomic form of oxygen.

Particulates

These are small solid particles or liquid droplets which are suspended in the atmosphere. Examples of particulates include dust, smoke, mist and fog. Particulates reduce visibility in the atmosphere due to their ability to scatter light. Major sources of particulates in Arizona are motor vehicle traffic on paved and unpaved roads and streets, construction activity, agriculture, wood burning, industrial and power generating plants and windblown desert lands.

Sulfates

Sulfates are a group of compounds including sulfuric acid and salts of sulfuric acid which are produced by the conversion of sulfur dioxide to sulfuric acid and salts of sulfuric acid. Sulfates occur as small particles which cause visibility reduction.

Sulfur Dioxide

Sulfur dioxide is a heavy, acrid, colorless gas generated by combustion of sulfur-containing fuels in power generating and industrial plants. Another important source in Arizona is the smelting of sulfide ore in the copper industry.

AIR SAMPLING TECHNIQUES

Benzene Soluble Organics

Concentrations of benzene soluble organics are measured by subjecting particulate samples to a hot benzene extraction and determining the amount of particulates which dissolve in the benzene.

Carbon Monoxide

Carbon monoxide concentrations are monitoring by two methods, infrared absorption or gas chromotography. The infrared absorption method is based on the fact that carbon monoxide absorbs infrared radiation at a wavelength at which other gases do not absorb infrared radiation.

The gas chromotographic technique utilizes a chromotographic column which separates carbon monoxide from other gases. Carbon monoxide is extracted from the column and converted to methane and the resulting methane is measured in a flame ionization detector.

Hydrocarbons (Non-methane)

Hydrocarbons (non-methane) are monitored by a gas chromotograph using a flame ionization detector. Ambient air is drawn into the chromotograph and divided into two air streams. One stream is passed directly into the flame ionization detector so that total hydrocarbons are measured. The other stream is passed through a chromotographic column in which methane is separated from other gases. Methane is then extracted from the column and measured in the flame ionization detector. Non-methane hydrocarbon concentrations are calculated by subtracting methane concentrations from total hydrocarbon concentrations. The reason for removing methane from consideration is that it is photochemically non-reactive. That is, it does not contribute to the formation of ozone and other oxidants.

Lead

Concentrations of lead are determined by means of nitric acid extraction of particulate samples followed by atomic absorption analysis of the nitric acid extract.

Nitrates

Nitrates analysis is performed through water extraction of particulate samples and colorimetric analysis of the water extract.

Nitrogen Dioxide

Three methods, bubbler, chemiluminescent and colorimetric, are utilized for nitrogen dioxide sampling. The bubbler method is a manual, non-continuous procedure whereas the other two methods are automated and continuous. In the bubbler method the air sample is bubbled through an impinger tube filled with an aqueous solution of sodium arsenite and sodium hydroxide for 24 hours. The impinger tube is delivered to the laboratory and the absorbing solution is analyzed colorimetrically.

The chemiluminescent technique is based on the catalytic conversion of nitrogen dioxide in the air sample to nitric oxide followed by chemiluminescent analysis of the effluent from the converter for nitric oxide. This measurement represents the concentration of nitrogen dioxide plus nitric oxide in the sample. It is necessary to concurrently monitor the concentration of nitric oxide only by chemiluminescent analysis of that part of the air sample which bypasses the catalytic converter. The nitric oxide concentration is subtracted from the concentration of nitrogen dioxide plus nitric oxide to give the nitrogen dioxide concentration.

Oxidants (Ozone)

There are two acceptable methods for oxidants or ozone monitoring, ultraviolet (UV) absorption, photometry and chemimluminescence. In the UV analyzer concentrations are determined by measuring the quantity of UV radiation absorbed by ozone in the air sample.

The chemiluminescent analyzer monitors ozone by detecting the amount of light emitted due to the reaction of ozone with ethylene.

Particulates

Particulate concentrations are measured by passing a metered flow of air for 24 hours through a pre-weighed 8 x 10 inch glass fiber filter. Particulates in the air sample are trapped on the filter which is delivered to the laboratory for reweighing. The gain in weight of the filter during sampling represents the quantity of particulates collected. The concentration is calculated by dividing the weight of particulates by the volume of air passed through the filter.

The filter is then divided into sections for chemical analysis for benzene soluble organics, sulfates, nitrates, lead and other metals.

Sulfates

Concentrations of sulfates are determined by water extraction of particulate samples followed by turbidimetric analysis of the water extract.

Sulfur Dioxide

In Arizona four methods of sampling are used. The methods are the bubbler, coulometric, fluorescent and flame photometric methods. The bubbler method is a manual, non-continuous technique. The three other methods are continuous and automated. In the bubbler the sample is bubbled through an impinger tube filled with an aqueous solution of potassium chloride and mercuric chloride for 24 hours. After sampling the solution is analyzed colorimetrically.

The coulometric method consists of scrubbing sample air in an aqeous solution of potassium bromide, bromine and sulfuric acid. Sulfur dioxide in the air sample reacts with bromine, causing a change in electrical potential at the anode. This voltage change is proportional to the amount of bromine which has reacted with sulfur dioxide. Thus, the voltage change is a direct indication of the sulfur dioxide concentration in the air sample.

In the fluorescent analyzer, sample air is drawn into a chamber and irradiated with ultraviolet light. Any sulfur dioxide in the air stream is excited to a

higher energy state. The excited sulfur dioxide then reverts to a lower energy state by emitting radiation which is measured by a photomultiplier tube.

The flame photometer technique is similar to the fluorescent in that emitted radiation is proportional to the sulfur dioxide concentration. In the flame photometer, however, the radiation is emitted by excited sulfur molecules rather than sulfur dioxide molecules. Sulfur molecules are produced by passing sample air into a hydrogen flame where sulfur dioxide is converted to elemental sulfur. Sulfides must be removed by a scrubber before the air sample is passed into the hydrogen flame because they will also convert to elemental sulfur.