1980

AIR QUALITY DATA FOR ARIZONA

ARIZONA DEPARTMENT OF HEALTH SERVICES

dhs

1 9 8 0

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: May, 1981

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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 1979 report. 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. 1980 data for criteria pollutants are listed in Section 2, long-range trends are discussed in Section 3 and data regarding chemical composition of particulates are tabulated in Section 4. In the appendix State and Federal ambient air quality standards, a glossary of air pollutants and a description of air sampling techniques are included.

A few changes and additions in Section 2 have been made, including the following:

Within each pollutant summary table, the cities and towns are listed under the appropriate county.

The number of exceedance days for short-term standards has been added.

Average concentrations for lead for each calendar quarter are provided.

A footnote indicating whether or not each site meets federal monitoring criteria has been added.

TABLE 1-1

Counties and Towns Monitored

COUNTY AND TOWN	CARBON MONOXIDE	HYDROCARBONS (NON-METHANE)	LEAD	NITROGEN DIOXIDE	OZONE	PARTICULATES	SULFUR DIOXIDE
APACHE:							
Eagar			State			State	
Petrified Forest(N.P.)				APS		APS	
St. Johns			State	SRP State	SRP	SRP State	SRP State
COCHISE:							
Bisbee			State			State	
Douglas			PD State			PD State	PD State
Dragoon				AEPCO		AEPCO	AEPCO
Hereford			PD			PD	PD
Kansas Settlement				AEPCO		AEPCO	AEPCO
McNeal							State
Paul Spur			State			State	
St. David				State			
Sierra Vista	State		State		State	State	
Sunsites				AEPCO		AEPCO	AEPCO
Willcox				AEPCO		AEPCO	AEPCO
COCONINO:							
Flagstaff	State		State		State	State	
Grand Canyon(N.P.)			State	State		State	State
Lees Ferry				SRP			SRP
Page			State	SRP	SRP	SRP State	SRP

TABLE 1-1 (Cont'd)

Counties and Towns Monitored

COUNTY AND TOWN	CARBON MONOXIDE	HYDROCARBONS (NON-METHANE)	LEAD	NITROGEN DIOXIDE	OZONE	PARTICULATES	SULFUR DIOXIDE
GILA:							
Hayden			State			State	JCC State
Miami			State			State	State
Payson						P-G	
Roosevelt						P-G	
Winkelman							JCC
Graham:							
Safford			State			State	
GREENLEE:							
Clifton						Greenlee	Greenlee
Morenci			PD State			PD State	PD State
MARICOPA:							
Boys Ranch			PD			PD	PD
Buckeye			PD		PD	PD	PD
Glendale	Maricopa		Maricopa		Maricopa	Maricopa	
Mesa	Maricopa		Maricopa		Maricopa	Maricopa	
Phoenix	Maricopa PD	PD	Maricopa PD	Maricopa PD	Maricopa PD	Maricopa PD	Maricopa PD
Scottsdale	Maricopa		Maricopa		Maricopa	Maricopa	
MOHAVE:							
Bullhead City				SCE		SCE	SCE
Davis Dam				SCE	SCE	SCE	SCE
Kingman			State			State	

TABLE 1-1 (Cont'd)

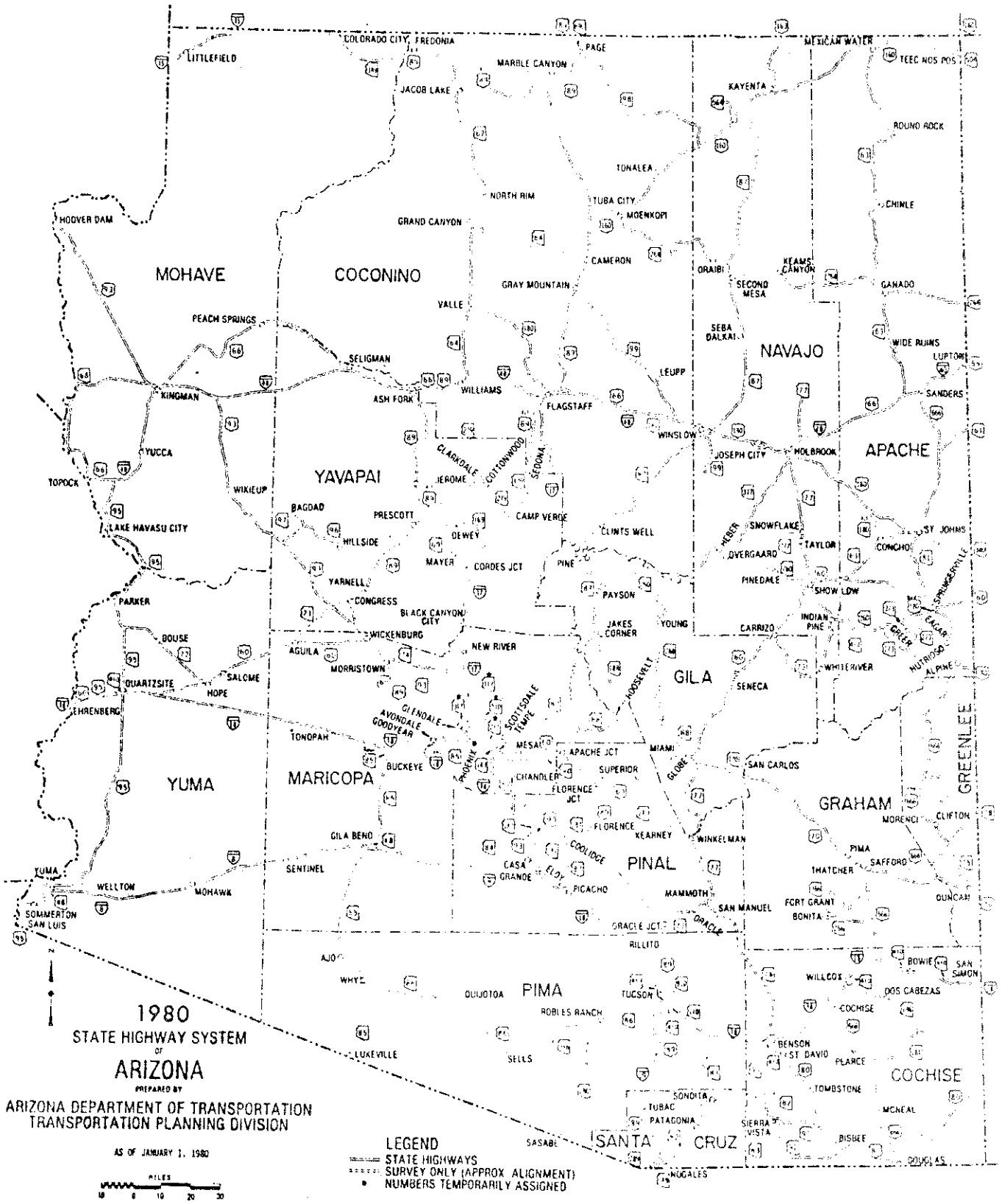
Counties and Towns Monitored

COUNTY AND TOWN	CARBON MONOXIDE	HYDROCARBONS (NON-METHANE)	LEAD	NITROGEN DIOXIDE	OZONE	PARTICULATES	SULFUR DIOXIDE
Lake Havasu City			State			State	
Riviera					SCE	SCE	SCE
NAVAJO:							
Joseph City			State	APS		APS State	APS
Show Low			State			State	
PIMA:							
Ajo			PD State			PD State	PD State
Corona de Tucson						Pima	
Green Valley			PD			PD Pima	PD
Mescal						PD	
Organ Pipe (N.M.)			State			State	
Redington							Magma
Rillito			State			State	
Tucson	PD Pima	PD Pima	PD Pima	PD Pima	PD Pima	PD Pima	PD Pima
Vail			PD			PD	PD
PINAL:							
Apache Junction						PG	
Casa Grande			State			State	
Coolidge			PD	PD	PD	PD	PD

TABLE 1-1 (Cont'd)

Counties and Towns Monitored

COUNTY AND TOWN	CARBON MONOXIDE	HYDROCARBONS (NON-METHANE)	LEAD	NITROGEN DIOXIDE	OZONE	PARTICULATES	SULFUR DIOXIDE
Florence			State			State	
Kearney							JCC Magma
Mammoth						P-G	
Marana						P-G	
Maricopa	PD	PD	PD	PD	PD	PD	
Oracle							Magma
Oracle Junction			PD			PD	PD
San Manuel			State			Magma State	Magma State
Stanfield						P-G	
Superior			State			State	
SANTA CRUZ:							
Nogales			State			State	
YAVAPAI:							
Clarkdale			State			State	
Montezuma Castle (N.M.)			State			State	
Nelson			State			State	
Prescott	State		State			State	
YUMA:							
Parker			State			State	
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
GRAHAM
YUMA
MARICOPA
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
ORAIBI
KEAMS CANYON
SECOND MESA
GANADO
GRAY MOUNTAIN
VALLE
PEACH SPRINGS
SEBA DALKAI
WIDE RUINS
LUPTON
SELIGMAN
LEUPP
KINGMAN
ASH FORK
WILLIAMS
FLAGSTAFF
SANDERS
WINSLOW
JOSEPH CITY
HOLBROOK
YUCCA
CLARKDALE
COTTONWOOD
SEDONA
TOPOCK
WIKIEUP
JEROME
BAGDAD
PRESCOTT
CAMP VERDE
LAKE HAVASU CITY
HILLSIDE
DEWEY
CLINTS WELL
HEBER
SNOWFLAKE
TAYLOR
ST JOHNS
CONCHO
OVERGAARD
MAYER
CORDES JCT
PINE
PINEDALE
SHOW LOW
YARNELL
PAYSON
PARKER
CONGRESS
BLACK CANYON CITY
JAKES CORNER
YOUNG
CARRIZO
INDIAN PINE
SPRINGERVILLE
EAGAR
GREER
BOUSE
WICKENBURG
NEW RIVER
AGUILA
MORRISTOWN
WHITERIVER
HUTRIDGE
ALPINE
QUARTZSITE
SALOME
HOPE
HOOSEVELT
SENECA
EHRENBERG
GLENDALE
AVONDALE
GOODYEAR
SCOTTSDALE
TEMPE
TONOPAH
MESA
APACHE JCT
MIAMI
BUCKEYE
PHOENIX
SUPERIOR
GLOBE
SAN CARLOS
CHANDLER
FLORENCE JCT
MORENCI
CLIFTON
GILA BEND
FLORENCE
KEARNEY
WINKELMAN
PIMA
SAFFORD
THATCHER
COOLIDGE
CASA GRANDE
ELOY
SENTINEL
YUMA
WELLTON
MOHAWK
PICACHO
MAMMOTH
SAN MANUEL
FORT GRANT
BONITA
DUNCAN
SOMMERTON
SAN LUIS
ORACLE JCT
ORACLE
RILLITO
AJO
WHY
QUIJOTOA
TUCSON
WILLCOX
BOWIE
SAN SIMON
DOS CABEZAS
ROBLES RANCH
COCHISE
LUKEVILLE
SELLS
BENSON
ST DAVID
PEARCE
TOMBSTONE
SONOITA
TUBAC
PATAGONIA
MCNEAL
SIERRA VISTA
SASABE
BISBEE
DOUGLAS
NOGALES

2. 1980 DATA

Table 2-1

Abbreviations and Footnotes

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 District
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 chromatograph
Hydrocarbons - Non-Methane	
GC	Gas chromatograph
Nitrogen Dioxide	
Color	Colorimetric
Chem	Chemiluminescent
Bubbler	Bubbler Sampler, 24-hour
Oxidants	
Coul	Coulometric
Chem	Chemiluminescent
UV	Ultraviolet absorption

Table 2-1 (Cont'd)

Particulates	
Hi-vol	High volume air sampler, 24-hour
Sulfur Dioxide	
Coul	Coulometric
Flame	Flame photometric
Bubbler	Bubbler sampler, 24-hour
Fluor	Fluorescent

Footnotes:

a. All monitoring sites conform with federal monitoring criteria except the analyzer auditing criterion.

b. New Site.

c. Site terminated.

d. Annual mean based on a limited number of samples.

e. Site operated on a seasonal schedule.

f. Phelps Dodge used cyclohexane rather than benzene to extract organics from monthly composite samples.

TABLE 2-2

1980 Carbon Monoxide Data Summary [a]
(in mg/m^3)

COUNTY AND CITY	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. STANDARD DAYS	NO. OF EXCEEDANCES OF 8-HR. STANDARD TIMES	NO. OF SAMPLES
APACHE:										
None										
COCHISE:										
Sierra Vista[e]	Fry Blvd.	State	NDIR	20	17	5	5	0	0	2644
COCONINO:										
Flagstaff	2501 N. 4th St.	State	NDIR	18	17	10	8	0	0	3326
GILA:										
None										
GRAHAM:										
None										
GREENLEE:										
None										
MARICOPA:										
Glendale	6000 W. Olive	Maricopa	NDIR	16	16	7	6	0	0	3462
Mesa	Broadway & Brooks	Maricopa	NDIR	18	15	11	8	1	1	6996

TABLE 2-2 (Cont'd)

1980 Carbon Monoxide Data Summary [a]
(in mg/m^3)

COUNTY AND CITY	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. STANDARD DAYS	NO. OF EXCEEDANCES OF 8-HR. STANDARD TIMES	NO. OF SAMPLES
MARICOPA:										
Phoenix	3300 W. Camelback	Maricopa	NDIR	22	21	17	15	20	22	7998
Phoenix	4732 S. Central	Maricopa	NDIR	16	15	9	9	0	0	5319
Phoenix	8531 N. 6th St.	Maricopa	NDIR	21	19	14	8	1	1	5724
Phoenix	1845 E. Roosevelt	Maricopa	NDIR	27	24	19	18	18	20	8366
Phoenix	15 E. Monroe	PD	GC	33	31	18	16	7	8	8206
Scottsdale	2857 N. Miller	Maricopa	NDIR	17	15	11	11	3	3	6631
MOHAVE:										
None										
NAVAJO:										
None										
PIMA:										
Tucson	151 W. Congress St.	Pima	NDIR	16	13	8	7	0	0	3670
Tucson	22nd & Craycroft	Pima	NDIR	19	18	8	7	0	0	8633
Tucson	22nd & Alvernon	Pima	NDIR	31	24	14	13	3	3	8635
Tucson	32 N. Stone	PD	GC	20	20	9	9	0	0	5651
PINAL:										
Maricopa	6.5 mi. NW of Town	PD	GC	6	3	1	1	0	0	2703
SANTZ CRUZ:										
None										

TABLE 2-2 (Cont'd)

1980 Carbon Monoxide Data Summary [a]
(in mg/m^3).

COUNTY AND CITY	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. STANDARD DAYS	NO. OF EXCEEDANCES OF 8-HR. STANDARD TIMES	NO. OF SAMPLES
YAVAPAI:										
Prescott[b]	Co. Maint. Yard	State	NDIR	26	19	11	6	1	1	561
YUMA:										
Yuma[e]	1485 Second Ave.	State	NDIR	18	17	8	7	0	0	3430

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

TABLE 2-3

1980 Hydrocarbons (Non-Methane) Data Summary [a]
(in ug/m^3)

COUNTY AND CITY	SITE LOCATION	OPERATOR	METHOD	3-HR. AVERAGE (6-9 A.M.) MAX.	3-HR. AVERAGE (6-9 A.M.) 2ND HIGH	NO. OF EXCEEDANCES OF 3-HR. STANDARD	NO. OF 3-HR. (6-9 A.M.) SAMPLES
APACHE:							
None							
COCHISE:							
None							
COCONINO:							
None							
GILA:							
None							
GRAHAM:							
None							
GREENLEE:							
None							
MARICOPA:							
Phoenix	15 E. Monroe	PD	GC	3803	3663	201	312
MOHAVE:							
None							

TABLE 2-3 (Cont'd)

1980 Hydrocarbons (Non-Methane) Data Summary [a]
(in ug/m^3)

COUNTY AND CITY	SITE LOCATION	OPERATOR	METHOD	3-HR. AVERAGE (6-9 A.M.) MAX.	3-HR. AVERAGE (6-9 A.M.) 2ND HIGH	NO. OF EXCEEDANCES OF 3-HR. STANDARD	NO. OF 3-HR. (6-9 A.M.) SAMPLES
NAVAJO:							
None							
PIMA:							
Tucson	32 N. Stone	PD	GC	1179	766	85	329
Tucson	151 W. Congress St.	Pima	GC	406	346	36	266
PINAL:							
Maricopa	6.5 mi. NW of Town	PD	GC	1253	543	39	143
SANTA CRUZ:							
None							
YAVAPAI:							
None							
YUMA:							
None							

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

TABLE 2-4

1980 Lead Data Summary
High Volume Sampler (in ug/m^3)

CITY AND COUNTY	SITE LOCATION	OPERATOR	QUARTERLY AVERAGE 1	2	3	4	NO. OF SAMPLES 1	2	3	4
APACHE:										
Eagar	Town Hall	State	.11	.07	.21	.22	15	15	11	11
St. Johns	Mesa Parada	State	.02	.00	.02		14	15	5	0
COCHISE:										
Bisbee	Warren-City Hall	State			.12	.09	0	0	2	14
Douglas	1.2 mi. N. of Smelter	State	.12	.10	.12	.18	13	9	4	13
Douglas	0.8 mi. N. of Smelter	PD	.11	.18	.08	.27	15	15	15	10
Douglas	1012 G. Avenue	PD	.34	.28	.25	.46	13	14	13	15
Douglas	Pirtleville	PD	.13	.18	.16	.28	15	15	16	10
Douglas	City Park	State		.09	.11	.35	0	4	6	7
Hereford	PD Exper. Farm	PD	.03	.03	.03	.07	15	15	10	10
Paul Spur	Housing Area	State	.30	.02	.16	.11	15	9	12	13
Sierra Vista	Bartow Drive	State	.10	.06	.15	.17	8	9	12	12
COCONINO:										
Flagstaff	218 N. Leroux	State	.17	.10		.22	15	2	0	14
Grand Canyon	Visitors Center	State		.01	.07	.03	0	11	14	14
Page	Airport	State	.05	.01	.10	.11	14	13	14	14
GILA:										
Hayden	Jail	State	.13	.10	.09	.23	12	5	11	11
Hayden	M-R Ranch	State	.19	.18	.05	.17	12	13	11	10
Miami	Fire Station	State	.18	.17	.14	.28	15	15	10	13
Miami	Jones Ranch	State	.02	.01	.02	.05	12	11	4	12

TABLE 2-4 (Cont'd)

1980 Lead Data Summary
High Volume Sampler (in ug/m^3)

CITY AND COUNTY	SITE LOCATION	OPERATOR	QUARTERLY AVERAGE 1	2	3	4	NO. OF SAMPLES 1	2	3	4
GRAHAM:										
Safford	523 10th Avenue	State	.21	.06	.15	.18	14	14	13	15
GREENLEE:										
Morenci	Cadillac Point	PD	.09	.05	.03	.12	14	15	11	14
Morenci	Fina Station	PD	.22	.17	.09	.28	14	15	10	14
Morenci	Fairbanks	PD	.10	.06	.13	.09	14	15	11	13
Morenci	Standpipe	PD	.04	.07	.02	.08	13	15	10	11
Morenci	Stargo	PD	.11				8	0	0	0
Morenci	Stargo	State	.06	.01	.05	.10	15	15	15	11
MARICOPA:										
Boys Ranch	GM Prov. Ground	PD	.07	.06	.07	.11	15	15	13	15
Buckeye	North 4th Street	PD	.21	.10	.13	.29	15	15	15	14
Glendale	6000 W. Olive	Maricopa	.6	.3	.3	.7	14	14	15	4
Mesa	Broadway	Maricopa	.4	.3	.3	.7	15	15	16	15
Phoenix	15 E. Monroe	PD	.81	.46	.45	1.02	14	15	15	16
Phoenix	1845 E. Roosevelt	Maricopa	1.3	.7	.7	1.6	13	10	14	14
Phoenix	201 N. Central	PD	.40	.19	.25	.41	15	14	14	15
Phoenix	8531 N. 6th Street	Maricopa	.8	.5	.4	1.0	15	12	15	14
Phoenix	4732 S. Central	Maricopa	.8	.5	.5	1.1	12	15	15	14
Scottsdale	2857 N. Miller Road	Maricopa	.8	.5	.5	1.1	15	15	16	15
Scottsdale	13665 N. Scottsdale Rd.	Maricopa	.4	.3	.3	.4	14	15	14	12
MOHAVE:										
Kingman	305 W. Beale Street	State	.11	.08	.20	.21	12	10	4	7
Lake Havasu City	Community Hospital	State	.02	.06	.10	.13	14	12	16	11

TABLE 2-4 (Cont'd)

1980 Lead Data Summary
High Volume Sampler (in ug/m^3)

CITY AND COUNTY	SITE LOCATION	OPERATOR	QUARTERLY AVERAGE 1	2	3	4	NO. OF SAMPLES 1	2	3	4
NAVAJO:										
Joseph City	S.E. Joseph City	State	.04	.03	.05	.07	4	12	6	8
Show Low	Deuce of Clubs Avenue	State	.14	.04	.15	.25	12	15	10	12
PIMA:										
Ajo	Well Road	State	.10	.04	.08	.15	15	13	5	14
Ajo	Camelback Mountain	PD	.04	.03	.03	.05	14	15	11	16
Ajo	Oxidation Pond	PD	.09	.12	.02	.22	14	15	11	16
Ajo	South of Tailings Dam	PD	.03	.03	.02	.05	14	15	11	16
Ajo	Town Square	PD	.15	.13	.08	.16	13	15	10	16
Green Valley	2 mi. N. of Townsite	PD	.05	.05	.14	.09	14	14	15	16
Organ Pipe	Visitors Center	State	.03	.00	.03	.02	11	13	10	9
Rillito	Miller's Market	State	.23	.12	.32	.41	15	12	15	12
Tucson	East Tanque Verde Road	Pima	.22	.12	.17	.23	15	15	14	15
Tucson	32 North Stone	PD	.24	.14	.20	.22	15	14	12	16
Tucson	Prince Road	Pima	.71	.35	.47	.82	15	15	13	15
Vail	El Paso Natural Gas. Co. Sta.	PD	.05	.09	.09	.06	12	12	14	16
PINAL:										
Casa Grande	401 N. Marshall Road	State	.22	.12	.17	.29	15	14	13	15
Coolidge	2 mi. North	PD	.08	.05	.06	.12	15	15	15	16
Florence	22nd St. & Willow	State		.02	.09	.14	0	8	16	15
Maricopa	6.5 mi. N.W. of Town	PD	.05	.03	.10	.09	15	14	13	15
Oracle Junction	Highways 89 & 77	PD	.16	.14	.15	.14	15	14	15	10
San Manuel	LDS Church	State	.04	.02	.04	.04	15	15	8	12
Superior	951 Main Street	State	.06	.05	.12	.11	6	14	13	9
SANTA CRUZ:										
Nogales	U.S. Post Office	State			.84	1.10	0	0	12	14

TABLE 2-4 (Cont'd)

1980 Lead Data Summary
High Volume Sampler (in ug/m^3)

CITY AND COUNTY	SITE LOCATION	OPERATOR	QUARTERLY AVERAGE 1	2	3	4	NO. OF SAMPLES 1	2	3	4
YAVAPAI:										
Clarkdale	Football Stadium	State			.04	.03	0	0	12	12
Montezuma Castle	Maint. Building	State	.04	.01	.04	.04	15	9	10	10
Nelson	1 mi. N. of Lime Plant	State	.01	.01	.03	.00	9	10	9	8
Prescott[c]	500 S. Marina Street	State	.06	.01	.09	.17	11	15	16	3
Prescott[b]	Co. Maint. Yard	State				.54	0	0	0	4
YUMA:										
Parker	914 Arizona Avenue	State	.16	.15	.18	.27	11	15	4	11
Yuma	201 S. 2nd Avenue	State	.23	.15	.19	.24	15	9	15	15

STATE AND FEDERAL STANDARD (ug/m^3):
(Primary and Secondary)

Calendar Quarter Average

1.5

TABLE 2-5

1980 Nitrogen Dioxide Data Summary
(in ug/m^3)

COUNTY AND CITY	SITE LOCATION	OPERATOR	METHOD	AVERAGE	MAXIMUM 1-HOUR	MAXIMUM 24-HOUR	NO. OF SAMPLES 1-HOUR	NO. OF SAMPLES 24-HOUR
APACHE:								
Petrified Forest	Visitors Center	APS	Bubbler	4	NA	15	NA	293
St. Johns	Airport	SRP	Bubbler	3	NA	22	NA	58
St. Johns	Sewage Sump	SRP	Bubbler	3	NA	7	NA	49
St. Johns	Mesa Parada	SRP	Bubbler	3	NA	7	NA	55
St. Johns[c]	Mesa Parada	State	Bubbler	4[d]	NA	20	NA	14
COCHISE:								
Dragoon	N. Dragoon Mts.	AEPCO	Bubbler	10	NA	17	NA	180
Kansas Settlement	W. of Cotton Gin	AEPCO	Bubbler	8	NA	15	NA	184
St. David	1.8 mi. S.W. Town	State	Bubbler	10	NA	66	NA	46
Sunsites	Horizon Corp.	AEPCO	Bubbler	8	NA	20	NA	184
Willcox	Sulfur Spr. V. Elec.	AEPCO	Bubbler	18	NA	27	NA	184
COCONINO:								
Grand Canyon	Hopi Point	State	Bubbler	11[d]	NA	100	NA	36
Lees Ferry[b]	Vermillion Cliffs	SRP	Chem.	4[d]	48	24	2090	NA
Page	Water Tower	SRP	Chem.	24[d]	162	41	1593	NA
GILA:								
None								
GRAHAM:								
None								
GREENLEE:								
None								

TABLE 2-5 (Cont'd)

1980 Nitrogen Dioxide Data Summary
(in ug/m^3)

COUNTY AND CITY	SITE LOCATION	OPERATOR	METHOD	AVERAGE	MAXIMUM 1-HOUR	MAXIMUM 24-HOUR	NO. OF SAMPLES 1-HOUR	NO. OF SAMPLES 24-HOUR
MARICOPA:								
Phoenix	1845 E. Roosevelt	Maricopa	Chem.	14[d]	132	67	5209	NA
Phoenix	15 E. Monroe	PD	Chem.	75	846	324	8014	NA
MOHAVE:								
Bullhead City	224 N. Main St.	SCE	Chem.	32	150	60	5217	NA
Davis Dam[b]	Dri. Mt. (1 mi. NE)	SCE	Chem.	NR	56	24	1294	NA
Davis Dam	Katherine's Landing	SCE	Chem.	23	137	38	6852	NA
NAVAJO:								
Joseph City	Environmental Lab	APS	Bubbler	7	NA	33	NA	287
Joseph City	Leroux Substation	APS	Bubbler	8	NA	31	NA	287
Joseph City	Cholla Power Plant	APS	Bubbler	4	NA	27	NA	286
PIMA:								
Tucson	22nd & Craycroft	Pima	Color/Chem.	43[d]	319	111	6242	NA
Tucson	151 W. Congress	Pima	Chem.	68	413	241	7380	NA
Tucson	32 N. Stone	PD	Chem.	49[d]	363	179	6304	NA
PINAL:								
Coolidge	2 mi. N. of Town	PD	Chem.	10[d]	86	27	3665	NA
Maricopa	6.5 mi. N. W. of Town	PD	Chem.	10[d]	94	25	5029	NA
Santa Cruz:								
None								

TABLE 2-5 (Cont'd)

1980 Nitrogen Dioxide Data Summary
(in ug/m^3)

COUNTY AND CITY	SITE LOCATION	OPERATOR	METHOD	AVERAGE	MAXIMUM 1-HOUR	MAXIMUM 24-HOUR	NO. OF SAMPLES 1-HOUR	NO. OF SAMPLES 24-HOUR
YAVAPAI:								
None								
YUMA:								
None								

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

TABLE 2-6

1980 Ozone Data Summary
(in ppm)

COUNTY AND CITY	SITE LOCATION	OPERATOR	METHOD	1-HOUR AVERAGE MAX.	1-HOUR AVERAGE 2ND HIGH	NO. OF EXCEEDANCES OF STD. IN 1980	COMPLIANCE STATUS EXCEEDANCES	NO. OF SAMPLES
APACHE:								
St. Johns	Mesa Parada	SRP	U.V.	.05	.05	0	0	2402
COCHISE:								
Sierra Vista	Fry Boulevard	State	U.V.	.10	.09	0	0	2339
COCONINO:								
Flagstaff	2501 N. 4th St.	State	U.V.	.08	.07	0	0	3195
Page	Water Tower	SRP	U.V.	.07	.07	0	0	7280
GILA:								
None								
GRAHAM:								
None								
GREENLEE:								
None								
MARICOPA:								
Buckeye[c]	North 4th St.	PD	Coul	.06	.06	0	0	3850
Glendale	6000 W. Olive	Maricopa	U.V.	.15	.14	3	2.0	5872
Mesa[b]	Broadway & Brooks	Maricopa	U.V.	.11	.09	0	0	3290
Phoenix	15 E. Monroe	PD	Coul/U.V.	.11	.08	0	0	8683

TABLE 2-6 (Cont'd)

1980 Ozone Data Summary
(in ppm)

COUNTY AND CITY	SITE LOCATION	OPERATOR	METHOD	1-HOUR AVERAGE MAX.	1-HOUR AVERAGE 2ND HIGH	NO. OF EXCEEDANCES OF STD. IN 1980	COMPLIANCE STATUS EXCEEDANCES	NO. OF SAMPLES
MARICOPA:								
Phoenix	1845 E. Roosevelt	Maricopa	U.V.	.17	.15	3	3.7	8276
Phoenix	8531 N. 6th St.	Maricopa	U.V.	.15	.14	10	3.7	6829
Phoenix	4732 S. Central	Maricopa	U.V.	.12	.12	0	0	5293
Phoenix	3300 W. Camelback	Maricopa	U.V.	.12	.12	0	0	5314
Scottsdale	2857 N. Miller Rd.	Maricopa	U.V.	.15	.15	3	1.3	6392
MOHAVE:								
Davis Dam	Dri Mt. (1 mi. NE)	SCE	Chem.	.07	.06	0	0	1288
Davis Dam[b]	Katherine Landing	SCE	U.V.	.10	.10	0	0	6122
Riviera	Ft. Mohave	SCE	U.V.	.08	.08	0	0	5297
NAVAJO:								
None								
Pima:								
Tucson	151 W. Congress	Pima	U.V.	.12	.11	0	0	8684
Tucson	22nd & Craycroft	Pima	U.V.	.11	.10	0	0	7920
Tucson	9101 N. Thornydale	Pima	U.V.	.09	.09	0	0	6956
Tucson	4591 N. Pomona[b]	Pima	U.V.	.11	.11	0	0	6490
Tucson	32 N. Stone	PD	U.V.	.10	.10	0	0	7144
PINAL:								
Coolidge[c]	2 mi. N. of Town	PD	Coul	.07	.05	0	0	3432
Maricopa	6.5 mi N.W. of Town	PD	Coul/Chem.	.05	.05	0	0	6736

TABLE 2-6 (Cont'd)

1980 Ozone Data Summary
(in ppm)

COUNTY AND CITY	SITE LOCATION	OPERATOR	METHOD	1-HOUR AVERAGE MAX.	1-HOUR AVERAGE 2ND HIGH	NO. OF EXCEEDANCES OF STD. IN 1980	COMPLIANCE STATUS EXCEEDANCES	NO. OF SAMPLES
SANTA CRUZ:								
None								
YAVAPAI:								
None								
YUMA:								
Yuma	1485 2nd Avenue	State	U.V.	.08	.08	0	0	2862

STATE AND FEDERAL STANDARD:
(Primary and Secondary)

The 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 1-hour standard has been exceeded per year for the past three years. No more than 1.0 exceedances per year over the last three years is permitted.

TABLE 2-7

1980 Particulates Data Summary
High Volume Sampler (in ug/m^3)

COUNTY AND CITY	SITE LOCATION	OPERATOR	ANNUAL GEOMETRIC MEAN	24-HR. AVERAGE MAX.	24-HR. 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	NO. OF SAMPLES
APACHE:								
Eagar	Town Hall	State	83	180	179	0	5	52
Petrified Forest	Vistors Center	APS	15	77	72	0	0	235
St. Johns	Airport	SRP	24	87	58	0	0	58
St. Johns	Mesa Parada	SRP	11	26	24	0	0	56
St. Johns[c]	Mesa Parada	State	17[d]	39	37	0	0	34
COCHISE:								
Bisbee[b]	Warren-City Hall	State	42[d]	79	60	0	0	16
Douglas	1.2 mi. N. of Smelter	State	57	150	144	0	0	49
Douglas	0.8 m. N. of Smelter	PD	63	300	227	1	7	138
Douglas	1012 G Avenue	PD	100	310	252	1	23	139
Douglas	Pirtleville	PD	97	357	322	6	33	136
Douglas	City Park	State	136	505	462	7	22	53
Dragoon	N. Dragoon Mts.	AEPCO	27	132	72	0	0	209
Hereford	Phelps Dodge Exper. Farm	PD	38	1407	308	2	3	61
Kansas Settlement	W.of Cotton Gin	AEPCO	41	164	144	0	1	221
Paul Spur	Housing Area	State	381	2483	2193	33	43	49
Sierra Vista	Bartow Drive	State	52[d]	106	96	0	0	41
Sunsites	Horizon Corp.	AEPCO	52	192	166	0	2	221
Willcox	SSVEC Yard	AEPCO	44	160	139	0	0	220
COCONINO:								
Flagstaff	218 N. Leroux Street	State	81[d]	249	205	0	3	31
Grand Canyon	Hopi Point	State	11[d]	57	43	0	0	43

TABLE 2-7 (Cont'd)

1980 Particulates Data Summary
High Volume Sampler (in ug/m^3)

COUNTY AND CITY	SITE LOCATION	OPERATOR	ANNUAL GEOMETRIC MEAN	24-HR. AVERAGE MAX.	24-HR. 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	NO. OF SAMPLES
COCONINO:								
Grand Canyon[b]	Visitors Center	State	21[d]	52	47	0	0	39
Page	Water Tower	SRP	37	97	83	0	0	123
Page	Airport	State	36	120	99	0	0	5
GILA:								
Hayden	Jail	State	152[d]	630	620	12	19	39
Hayden	Montgomery Ranch	State	50	196	111	0	1	46
Miami	Fire Station	State	86	332	158	1	3	53
Miami	Jones Ranch	State	17[d]	75	73	0	0	40
Payson[c]	Ranger Station	P-G	52[d]	113	95	0	0	11
Payson[b]	Courthouse	P-G	43[d]	245	189	0	2	12
Roosevelt	Ranger Station	P-G	36[d]	85	58	0	0	20
GRAHAM:								
Safford	523 - 10th Avenue	State	122	398	324	2	20	56
GREENLEE:								
Clifton	Courthouse	Greenlee	31	85	83	0	0	55
Morenci	Cadillac Point	PD	34	164	115	0	1	138
Morenci	Fina Station	PD	36	151	148	0	0	136
Morenci	Fairbanks	PD	64	610	319	2	6	137
Morenci	Stargo	PD	27	161	104	0	1	99
Morenci	Standpipe	PD	21	426	102	1	1	132
Morenci	Stargo	State	50	111	106	0	0	56

TABLE 2-7 (Cont'd)

1980 Particulates Data Summary
High Volume Sampler (in ug/m^3)

COUNTY AND CITY	SITE LOCATION	OPERATOR	ANNUAL GEOMETRIC MEAN	24-HR. AVERAGE MAX.	24-HR. 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	NO. OF SAMPLES
MARICOPA:								
Boys Ranch	G. M. Proving Grounds	PD	70	245	228	0	5	59
Buckeye	N. 4th Street	PD	127	600	534	10	18	58
Glendale	6000 W. Olive Avenue	Maricopa	88	257	175	0	6	47
Mesa	Broadway & Brooks	Maricopa	86	200	197	0	7	61
Phoenix	15 E. Monroe Street	PD	107	308	277	2	15	60
Phoenix	1845 E. Roosevelt	Maricopa	120	249	229	0	14	51
Phoenix	201 N. Central	Maricopa	74	244	207	0	2	60
Phoenix	8531 N. 6th Street	Maricopa	100	220	208	0	11	57
Phoenix	4732 S. Central	Maricopa	182	354	339	9	40	56
Scottsdale	2857 N. Miller Rd.	Maricopa	87	205	171	0	5	61
Scottsdale	13665 N. Scottsdale Rd.	Maricopa	115	311	277	2	19	55
MOHAVE:								
Bullhead City	224 N. Main Street	SCE	66	170	150	0	2	55
Davis Dam	Dri. Mt. (1 mi. NE)	SCE	22	79	69	0	0	46
Davis Dam	Katherine Landing	SCE	25	75	64	0	0	58
Kingman	305 W. Beale Street	State	43[d]	201	95	0	1	33
Lake Havasu City	Community Hospital	State	27	109	101	0	0	53
Riviera	Camera Site	SCE	35	368	320	2	2	55
Riviera	Ft. Mohave	SCE	40	113	103	0	0	62
Riviera	Hancock	SCE	51	114	106	0	0	61
NAVAJO:								
Joseph City	3.25 mi. S.E. of Town	State	50[d]	227	106	0	1	30
Joseph City	Environmental Laboratory	APS	37	599	270	2	7	288
Joseph City	Leroux Substation	APS	22	192	155	0	1	290

TABLE 2-7 (Cont'd)

1980 Particulates Data Summary
High Volume Sampler (in ug/m^3)

COUNTY AND CITY	SITE LOCATION	OPERATOR	ANNUAL GEOMETRIC MEAN	24-HR. AVERAGE MAX.	24-HR. 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	NO. OF SAMPLES
NAVAJO:								
Joseph City	Cholla Plant	APS	18	137	136	0	0	287
Show Low	Deuce of Clubs Avenue	State	62	166	164	0	2	49
PIMA:								
Ajo	Well Road	State	85	201	199	0	9	47
Ajo	Camelback Mountain	PD	32	181	176	0	2	142
Ajo	Oxidation Pond	PD	83	4366	2865	11	21	142
Ajo	South Tailings Dam	PD	58	4405	378	2	12	142
Ajo	Town Square	PD	80	749	308	8	22	140
Corona de Tucson	21 mi. S.E. of Tucson	Pima	22	57	52	0	0	49
Green Valley	2 mi. N. of Townsite	PD	49	150	110	0	0	60
Green Valley	245 W. Esperanza	Pima	39	93	70	0	0	60
Organ Pipe	Visitors Center	State	36[d]	72	63	0	0	43
Rillito	Miller's Market	State	114	250	236	0	14	58
Tucson	Ft. Lowell Road	Pima	101	224	185	0	5	59
Tucson	Davis-Monthan A. F. B.	Pima	67	236	208	0	4	56
Tucson	7920 E. Tanque Verde Rd.	Pima	55	148	130	0	0	58
Tucson	Golf Links Road	Pima	59	114	111	0	0	59
Tucson	Hughes Access	Pima	54	141	109	0	0	57
Tucson	32 N. Stone	PD	50	196	134	0	1	227
Tucson	Orange Grove	Pima	108	389	322	2	15	57
Tucson	Pima College West	Pima	43	81	77	0	0	59
Tucson	Prince Road	Pima	117	218	209	0	15	59
Tucson	1810 S. 6th Avenue	Pima	97	368	192	1	7	58
Tucson	University	Pima	75	209	198	0	2	56
Tucson	1970 W. Ajo Way	Pima	61	161	135	0	1	59
Tucson	151 W. Congress	Pima	61	188	184	0	3	163
Vail	El Paso Natural Gas Co, Sta.	PD	31	118	87	0	0	55

TABLE 2-7 (Cont'd)

1980 Particulates Data Summary
High Volume Sampler (in ug/m^3)

COUNTY AND CITY	SITE LOCATION	OPERATOR	ANNUAL GEOMETRIC MEAN	24-HR. AVERAGE MAX.	24-HR. 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	NO. OF SAMPLES
PINAL:								
Apache Junction	County Yard	P-G	78[d]	183	164	0	3	22
Casa Grande	401 N. Marshall Road	State	105	282	256	1	11	57
Coolidge	2 mi. N. of Town	PD	87	220	206	0	10	60
Florence	22nd St. & Willow	State	106[d]	212	205	0	6	39
Marana	Marana Air Park	P-G	43[d]	106	104	0	0	26
Maricopa	6.5 mi. N.W. of Town	PD	55	219	153	0	2	59
Oracle Junction	Highways 89 & 77	PD	31	141	82	0	0	59
San Manuel	3-C Ranch SW	Magma	NR	95	40	0	0	18
San Manuel	3-C Ranch WSW	Magma	NR	40	31	0	0	15
San Manuel	Dormsite	Magma	35	87	74	0	0	61
San Manuel	E. Peppersauce Wash	Magma	33	115	91	0	0	61
San Manuel	Golf Course	Magma	32	70	66	0	0	60
San Manuel	LDS Church	State	29	80	79	0	0	50
San Manuel	Townsite	Magma	35	75	71	0	0	58
Stanfield	County Courthouse	P-G	65[d]	212	192	0	4	28
Superior	951 Main Street	State	62[d]	165	164	0	2	42
SANTA CRUZ:								
Nogales[b]	U. S. Post Office	State	147[d]	381	348	5	13	26
YAVAPAI:								
Clarkdale	Football Stadium	State	71[d]	144	114	0	0	24
Montezuma Castle	Maint. Building	State	27[d]	82	67	0	0	44
Nelson	1 mi. N. of Lima Plant	State	37[d]	273	166	1	2	36
Prescott[c]	500 S. Marina Street	State	39[d]	97	88	0	0	45
Prescott[b]	Co. Maint. Yard	State	142[d]	164	143	0	1	4

TABLE 2-7 (Cont'd)

1980 Particulates Data Summary
High Volume Sampler (in ug/m^3)

COUNTY AND CITY	SITE LOCATION	OPERATOR	ANNUAL GEOMETRIC MEAN	24-HR. AVERAGE MAX.	24-HR. 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	NO. OF SAMPLES
YUMA:								
Parker	914 Arizona Avenue	State	82[d]	332	254	1	6	31
Yuma	201 S. 2nd Avenue	State	126	787	276	3	14	54

STATE AND FEDERAL STANDARDS (ug/m^3):	Annual Geometric Mean	24-Hr. Average
Primary	75	260
Secondary	60	150

TABLE 2-8

1980 Sulfur Dioxide Data Summary
(in ug/m^3)

COUNTY AND CITY	SITE LOCATION	OPERATOR	METHOD	ANNUAL AVERAGE	MAX. AVERAGE 3-HR.	MAX. AVERAGE 24-HR.	NO. OF EXCEEDANCES OF STANDARDS 3-HR. DAYS	3-HR. TIMES	24-HR. Times	NO. OF SAMPLES 1-HR.	NO. OF SAMPLES 24-HR.
APACHE:											
Petrified Forest	Visitors Center	APS	Bubbler/Flame	0	27	5	0	0	0	7098	97
St. Johns	Mesa Parada	SRP	Bubbler/Fluor.	17	32	24	0	0	0	4854	59
St. Johns[c]	Mesa Parada	State	Bubbler	7[d]	NA	20	NA	NA	0	NA	34
COCHISE:											
Douglas	0.8 mi. N. of Smelter	PD	Coul	45	1511	283	1	1	0	8724	NA
Douglas	Curtis	PD	Coul	24	1554	237	1	1	0	8720	NA
Douglas	Fir	PD	Coul	18	926	204	0	0	0	8686	NA
Douglas	1012 G Street	PD	Coul	29	1520	259	1	1	0	8726	NA
Douglas	Queen	PD	Coul	30	1292	283	0	0	0	8680	NA
Douglas	Mobile III	PD	Coul	22	1423	257	2	2	0	8721	NA
Douglas	County Hospital	PD	Coul	45	1729	309	1	1	0	8742	NA
Douglas	Pirtleville	PD	Coul	40	1677	280	2	2	0	8709	NA
Douglas	1.2 mi. N. of Smelter	State	Coul/Fluor.	38	1479	307	2	3	0	7420	NA
Douglas	County Hospital	State	Coul/Fluor.	33	1696	280	1	2	0	7909	NA
Dragoon	N. Dragoon Mts.	AEPCO	Bubbler	7	NA	24	NA	NA	0	NA	281
Hereford	PD Exper. Farm	PD	Coul	0	244	21	0	0	0	8304	NA
Kansas Settlement	W. of Cotton Gin	AEPCO	Bubbler	6	NA	14	NA	NA	0	NA	280
McNeal[e]	Mitchell Ranch	State	Coul/Fluor.	1[d]	244	31	0	0	0	3370	NA
McNeal[e]	Pinedo Farm	PD	Coul	4[d]	283	71	0	0	0	5236	NA
Sunsites	Horizon Corp.	AEPCO	Bubbler	7	NA	15	NA	NA	0	NA	281
Willcox	Sulfur Spr. V. Elec.	AEPCO	Bubbler	13	NA	24	NA	NA	0	NA	281
COCONINO:											
Grand Canyon	Hopi Point	State	Bubbler	7	NA	34	NA	NA	0	NA	35
Lees Ferry[b]	Vermilion Cliffs	SRP	Fluor.	9	157	51	0	0	0	2148	NA

TABLE 2-8 (Cont'd)

1980 Sulfur Dioxide Data Summary
(in ug/m^3)

COUNTY AND CITY	SITE LOCATION	OPERATOR	METHOD	ANNUAL AVERAGE	MAX. AVERAGE 3-HR.	MAX. AVERAGE 24-HR.	NO. OF EXCEEDANCES OF STANDARDS 3-HR. DAYS	3-HR. TIMES	24-HR. TIMES	NO. OF SAMPLES 1-HR.	NO. OF SAMPLES 24-HR.
COCONINO:											
Page	Water Tower	SRP	Flame	3	140	50	0	0	0	7106	NA
Page	Coppermine Rd.	SRP	Flame	3[d]	116	48	0	0	0	6094	NA
Page	Highway 98	SRP	Flame	2[d]	201	68	0	0	0	6302	NA
Page	Airport	SRP	Flame	2[d]	121	42	0	0	0	5905	NA
Page	Wahweap	SRP	Flame	1[d]	156	34	0	0	0	5563	NA
GILA:											
Hayden	Garfield Ave.	JCC	Coul	35	975	214	0	0	0	8322	NA
Hayden	Fire Station	JCC	Coul	60	1229	364	0	0	0	8192	NA
Hayden	Hayden Junction	JCC	Coul	22	1132	214	0	0	0	8596	NA
Hayden	Montgomery Ranch	JCC	Coul	93	3781	742	7	9	5	8602	NA
Hayden	Montgomery Ranch	State	Coul/Fluor.	86	4019	751	9	13	5	7841	NA
Hayden	Jail	State	Coul/Fluor.	45	1410	418	3	3	1	7922	NA
Miami	Cities Serv. Bldg.	State	Fluor.	18	908	206	0	0	0	8600	NA
Miami	Jones Ranch	State	Fluor.	30	3993	563	9	11	5	8584	NA
Miami	Lower Miami School	State	Coul/Fluor.	8	1761	290	2	2	0	7748	NA
Miami	Landfill	State	Fluor.	14	1295	306	0	0	0	8320	NA
Winkelman	School	JCC	Coul	20	1113	138	0	0	0	8469	NA
Winkelman	1 mi. N Jct. 77&177	JCC	Coul	55	1254	314	0	0	0	8651	NA
Winkelman	1 mi. S Jct. 77&177	JCC	Coul	20	1075	164	0	0	0	8100	NA
GRAHAM:											
None											
GREENLEE:											
Morenci	Cadillac Point	PD	Coul	69	2463	677	15	15	5	8743	NA
Morenci	Fina Station	PD	Coul	40	1171	351	0	0	0	8707	NA

TABLE 2-8 (Cont'd)

1980 Sulfur Dioxide Data Summary
(in ug/m3)

COUNTY AND CITY	SITE LOCATION	OPERATOR	METHOD	ANNUAL AVERAGE	MAX. AVERAGE 3-HR.	MAX. AVERAGE 24-HR.	NO. OF EXCEEDANCES OF STANDARDS 3-HR. DAYS	NO. OF EXCEEDANCES OF STANDARDS 3-HR. TIMES	NO. OF EXCEEDANCES OF STANDARDS 24-HR. TIMES	NO. OF SAMPLES 1-HR.	NO. OF SAMPLES 24-HR.
GREENLEE:											
Morenci	Metcalf	PD	Coul	59	1538	493	5	5	2	8516	NA
Morenci	Oroville	PD	Coul	15	1030	134	0	0	0	8738	NA
Morenci[c]	Mobile-Cntr. Market	PD	Coul	50[d]	1014	259	0	0	0	2004	NA
Morenci	Standpipe	PD	Coul	50	2681	414	3	3	1	8737	NA
Morenci	Stargo	PD	Coul	79	2410	440	18	18	9	8775	NA
Morenci	Fairbanks	PD	Coul	12	838	116	0	0	0	8769	NA
Morenci[b]	Mobile-Newtown	PD	Coul	73[d]	2096	633	9	10	2	5872	NA
Morenci	Stargo	State	Coul/Fluor.	98	2760	555	22	25	12	7907	NA
Morenci	Cadillac Point	State	Fluor.	75	3089	790	20	23	9	8649	NA
MARICOPA:											
Boys Ranch	GM Prov. Grounds	PD	Coul	8	80	26	0	0	0	7965	NA
Buckeye	N. 4th Street	PD	Coul	3	34	16	0	0	0	7847	NA
Phoenix	201 N. Central	PD	Coul	7	115	52	0	0	0	8341	NA
Phoenix	15 E. Monroe	PD	Coul	7	84	42	0	0	0	8320	NA
Phoenix	1845 E. Roosevelt	Maricopa	Coul	15[d]	NR	92	NR	NR	0	4423	NA
MOHAVE:											
Bullhead City	224 N. Main St.	SCE	Flame	1	149	45	0	0	0	8081	NA
Davis Dam[c]	Dri. Mt.	SCE	Flame	NR	37	29	0	0	0	1054	NA
Davis Dam	Katherine Landing	SCE	Flame	1[d]	175	50	0	0	0	6061	NA
Riviera	Ft. Mohave	SCE	Flame	1	162	58	0	0	0	6939	NA
Riviera	Hancock	SCE	Flame	1	131	47	0	0	0	7291	NA

TABLE 2-8 (Cont'd)

1980 Sulfur Dioxide Data Summary
(in ug/m^3)

COUNTY AND CITY	SITE LOCATION	OPERATOR	METHOD	ANNUAL AVERAGE	MAX. AVERAGE 3-HR.	MAX. AVERAGE 24-HR.	NO. OF EXCEEDANCES OF STANDARDS 3-HR. DAYS	3-HR. TIMES	24-HR. TIMES	NO. OF SAMPLES 1-HR.	NO. OF SAMPLES 24-HR.
NAVAJO:											
Joseph City	Environ. Lab.	APS	Bubbler/Flame	0	28	3	0	0	0	6153	97
Joseph City	Leroux Substation	APS	Bubbler/Flame	0	29	6	0	0	0	6062	97
Joseph City	Cholla Plant	APS	Bubbler/Flame	0	38	3	0	0	0	7300	97
PIMA:											
Ajo	Town Square	PD	Coul	21	1669	301	2	2	0	8715	NA
Ajo	Oxidation Pond	PD	Coul	42	1145	348	0	0	0	8691	NA
Ajo	S. Tailings Dam	PD	Coul	13	1292	257	0	0	0	8694	NA
Ajo	Camelback Mt.	PD	Coul	13	2148	283	2	2	0	8660	NA
Ajo	Gibson	PD	Coul	10	1281	178	0	0	0	8718	NA
Ajo	Shelton	PD	Coul	10	1118	160	0	0	0	8690	NA
Ajo	Miller	PD	Coul	7	270	76	0	0	0	8724	NA
Ajo	Hotshot	PD	Coul	6	820	155	0	0	0	8605	NA
Ajo	Well Road	State	Fluor.	22	1566	456	4	5	2	8660	NA
Green Valley	2 mi. N. of Townsite	PD	Coul	1	160	34	0	0	0	8330	NA
Redington	E. of Main Ranch	Magma	Fluor.	6	521	119	0	0	0	8625	NA
Tucson	32 N. Stone	PD	Coul	1	63	18	0	0	0	8154	NA
Tucson[b]	Pomona Road	PD	Coul	2	58	21	0	0	0	8244	NA
Tucson	151 W. Congress	Pima	Flame	2	105	25	0	0	0	7239	NA
Tucson	1721 N. Tanque Verde	Pima	Fluor.	4[d]	157	55	0	0	0	4495	NA
Tucson	22nd & Craycroft	Pima	Fluor.	2[d]	79	33	0	0	0	7077	NA
Vail	El Paso Natural Gas Co. Station	PD	Coul	0[d]	55	16	0	0	0	6310	NA
PINAL:											
Coolidge	2 mi. N. of Town	PD	Coul	1	142	22	0	0	0	8414	NA
Kearny	Crescent Ranch	JCC	Coul	20	755	165	0	0	0	8738	NA

TABLE 2-8 (Cont'd)

1980 Sulfur Dioxide Data Summary
(in ug/m^3)

COUNTY AND CITY	SITE LOCATION	OPERATOR	METHOD	ANNUAL AVERAGE	MAX. AVERAGE 3-HR.	MAX. AVERAGE 24-HR.	NO. OF EXCEEDANCES OF STANDARDS 3-HR. DAYS	3-HR. TIMES	24-HR. TIMES	NO. OF SAMPLES 1-HR.	NO. OF SAMPLES 24-HR.
PINAL:											
Mammoth	Courthouse	Magma	Fluor.	6	499	107	0	0	0	8692	NA
Mammoth[b]	Aravaipa Canyon	Magma	Fluor.	NR	137	67	0	0	0	5912	NA
Mammoth	Mercer Ranch	Magma	Fluor.	NR	392	136	0	0	0	2330	NA
Oracle	New Courthouse	Magma	Fluor.	9	680	125	0	0	0	8602	NA
Oracle Junction	Junction 89 & 77	PD	Coul	4	356	100	0	0	0	8146	NA
San Manuel	Townsite	Magma	Fluor.	32	1283	273	0	0	0	8677	NA
San Manuel	Golf Course	Magma	Fluor.	36	1467	296	1	1	0	8697	NA
San Manuel	Dormsite	Magma	Fluor.	58	2415	340	4	4	0	8534	NA
San Manuel	Minesite	Magma	Fluor.	32	1156	235	0	0	0	8649	NA
San Manuel	LDS Church	State	Fluor.	32	1953	295	2	2	0	8227	NA
SANTA CRUZ:											
None											
YAVAPAI:											
None											
Yuma:											
None											

STATE AND FEDERAL STANDARDS (ug/m^3):	Annual Average	24-Hr. Average	3-Hr. Average
Primary	80	365	-
Secondary	-	-	1300

3. DATA TRENDS

3.1 Carbon Monoxide

3.1.1 Phoenix

In 1980 there was 20 exceedances of the 8-hr. standard at the Roosevelt Street site, representing a 29% decrease from 1979. On the other hand, the maximum and second highest 8-Hr. concentrations did not change significantly at this site. These trends are illustrated in Figures 3-1 and 3-2 below.

Figure 3-1

CO Exceedances in Phoenix

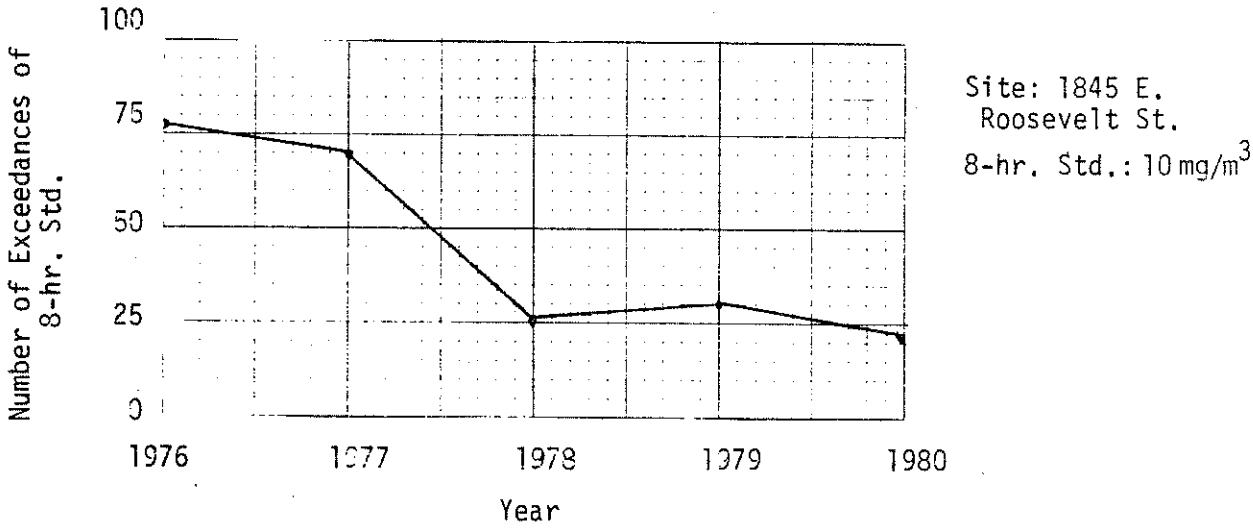
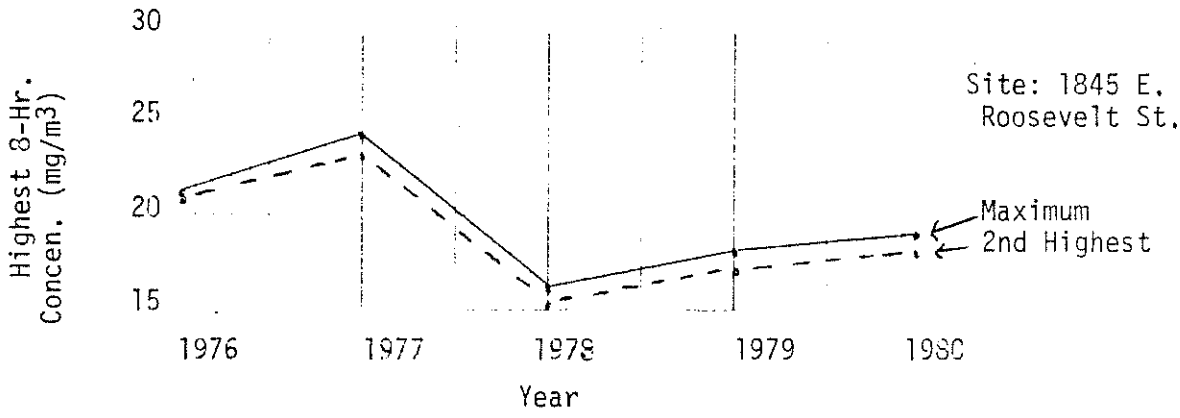


Figure 3-2

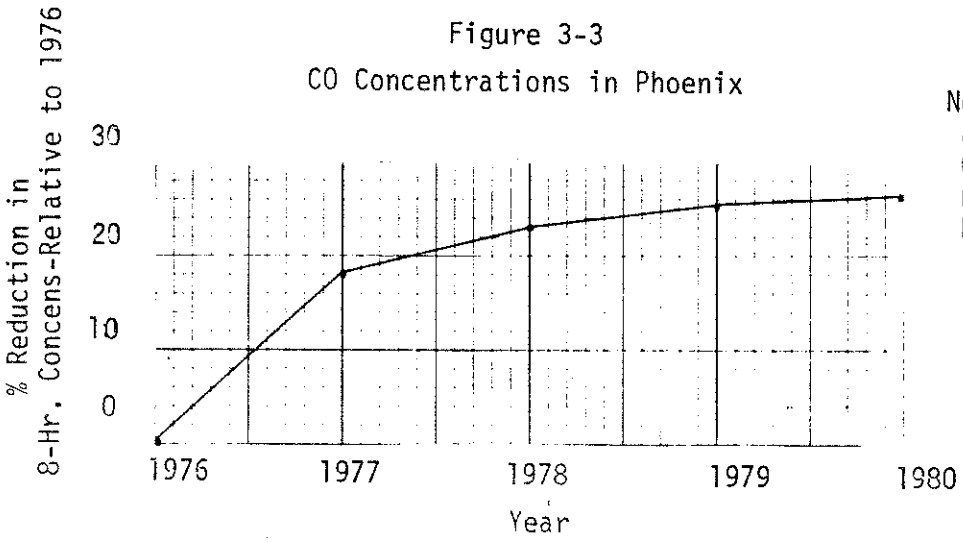
Highest CO Concentrations in Phoenix



In order to determine how much CO emissions are actually being reduced, it is necessary to factor out the effects of meteorology. Therefore, a meteorological index was developed which can be used to adjust ambient CO data to common meteorological conditions. Application of this index to data for 1976-1980 produced the graph below, Figure 3-3. It can be seen that most of the CO emission reduction occurred in 1977 after which it leveled off at about 25-26%. This is far short of 60% emission reduction which is required to meet the 8-hour standard.

Figure 3-3

CO Concentrations in Phoenix



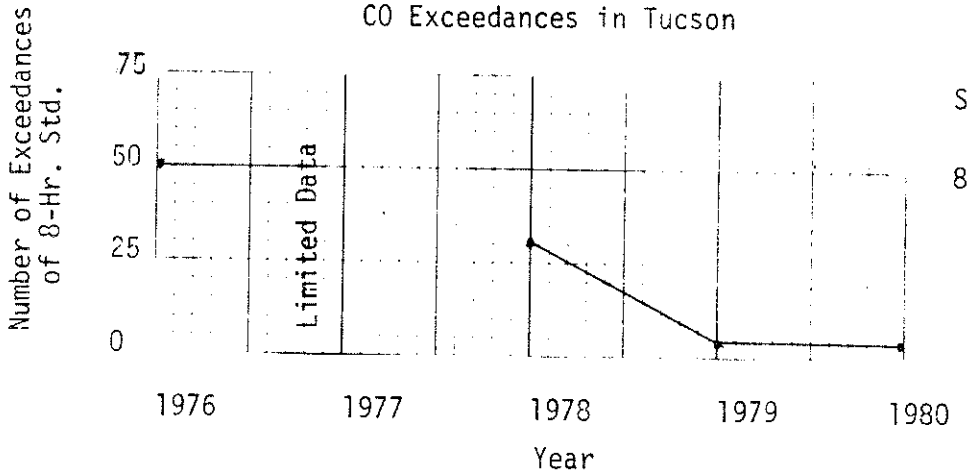
Note: Reductions refer to average daily max. 8-hr. Concentrations for the network for November and December.

3.1.2 Tucson

Tucson data exhibited a similar trend, that is, no appreciable change as shown in Figures 3-4 and 3-5 below.

Figure 3-4

CO Exceedances in Tucson

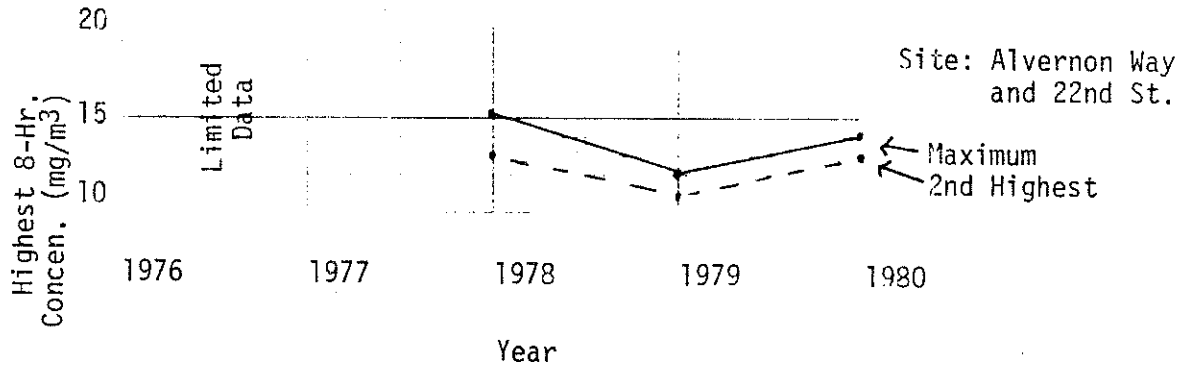


Site: Alvernon Way and 22nd St.

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

Figure 3-5

Highest CO Concentrations in Tucson



3.1.3 Other areas

In Flagstaff and Sierra Vista the maximum and second highest 8-Hr. concentrations declined 9 to 29%. On the other hand, concentrations increased 29 to 33% in Yuma. However, no exceedances of the 8-Hr. standard were detected in these cities.

One exceedance, an 11 mg/m^3 value, was recorded in Prescott where monitoring began in 1980. Reference data are given in Table 3-1 below for Prescott as well as Flagstaff, Sierra Vista, and Yuma.

TABLE 3-1

CO concentrations in Flagstaff, Prescott, Sierra Vista and Yuma

City	Year	8-Hr. Concentration (mg/m^3) Maximum	2nd High
Flagstaff	1976	6	6
	1977	5	5
	1978	10	10
	1979	11	10
	1980	10	8
Prescott	1980	11	6
Sierra Vista	1977	7	7
	1978	7	6
	1979	7	6
	1980	5	5
Yuma	1976	5	4
	1977	7	7
	1978	-	-
	1979	6	5
	1980	8	7

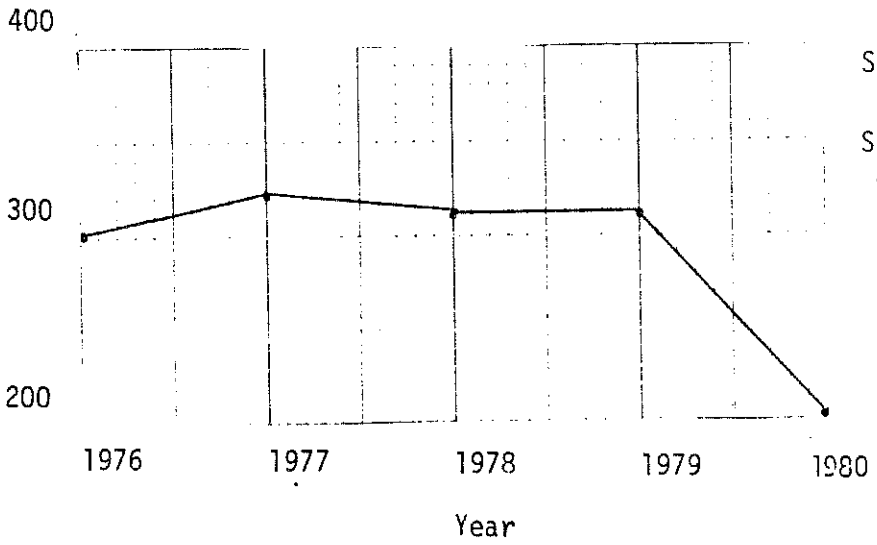
3.2 Hydrocarbons

3.2.1 Phoenix

Both trend indicators that were reviewed, the annual average concentration and the number of exceedances of the standard, reflect a downward shift in hydrocarbon levels in 1980. However, over the last five years, these indicators have moved in different directions from year-to-year and overall. The number of exceedances declined whereas the annual average concentration increased over the five year span. Refer to Figure 3-6 and Figure 3-7 for the appropriate curves.

Figure 3-6

Hydrocarbons Exceedances in Phoenix

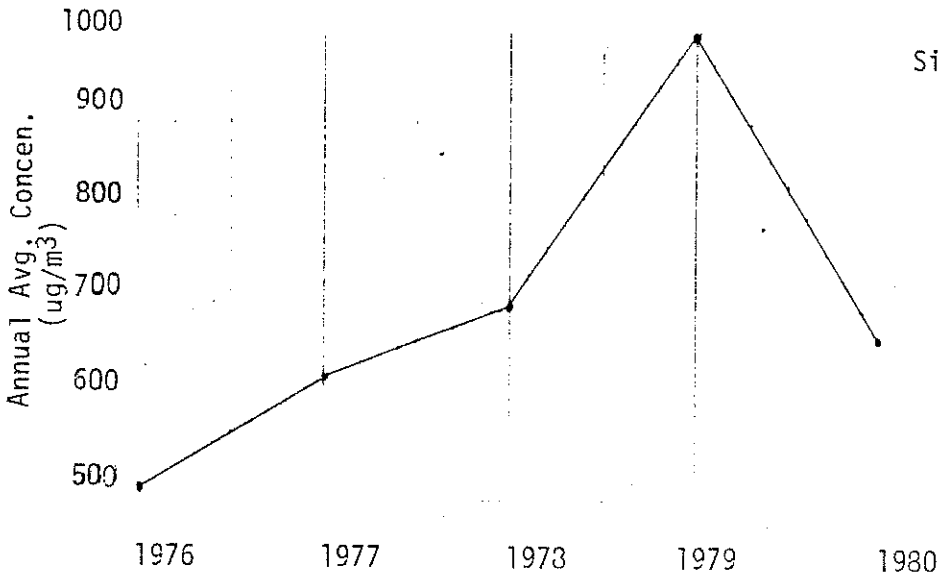


Site: 15 E. Monroe
(Phelps Dodge Corp.)

Standard: 160 ug/m^3,
3-Hr. avg. 6-9 a.m.

Figure 3-7

Hydrocarbons Concentrations in Phoenix



Site: 15 E, Monroe
(Phelps Dodge Corp.)

3.2.2 Tucson

Reduced hydrocarbon concentrations in 1980 were also observed in Tucson at two sampling sites. Figures 3-8 and 3-9 below display this trend. These graphs also reflect an overall downward trend over the past five years. Furthermore, it is interesting to note that both exceedances and average concentrations declined significantly in 1977 at both sites and then increased through 1979. The one exception to this pattern was the average concentration at 32 N. Stone Avenue, which declined in 1979.

Figure 3-8

Hydrocarbons Exceedances in Tucson

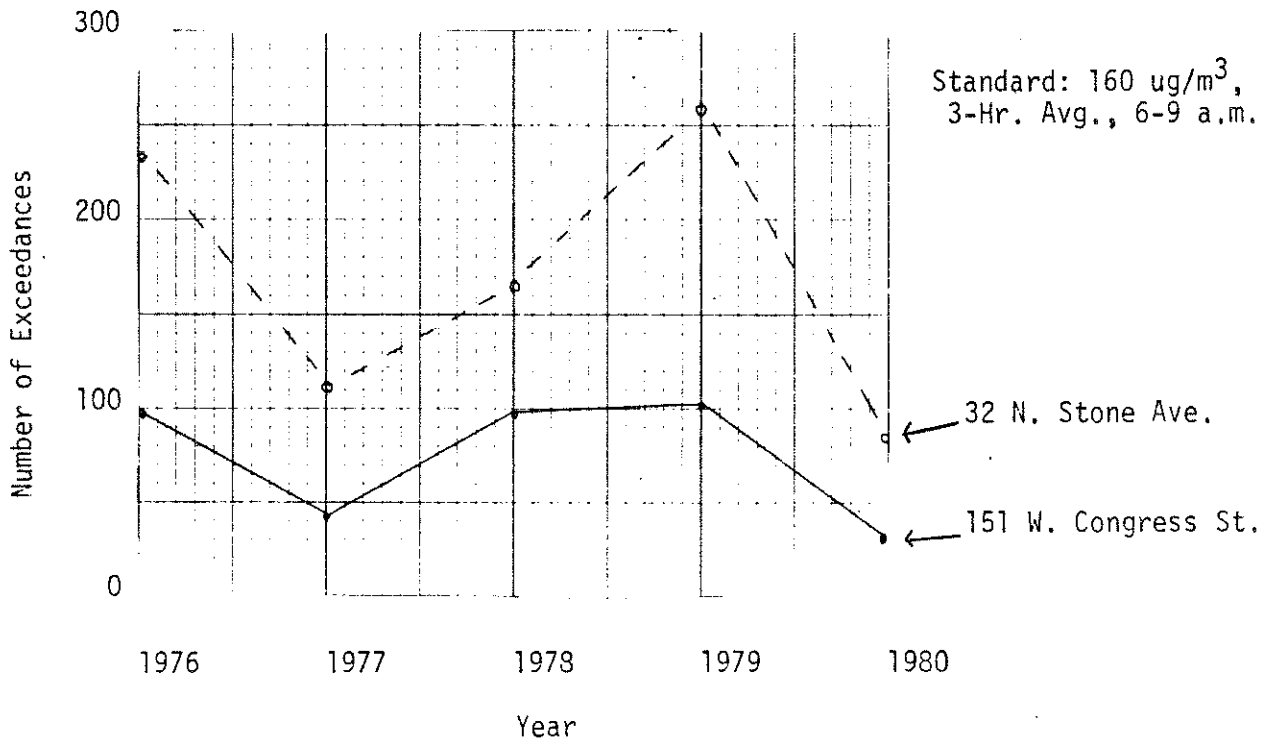
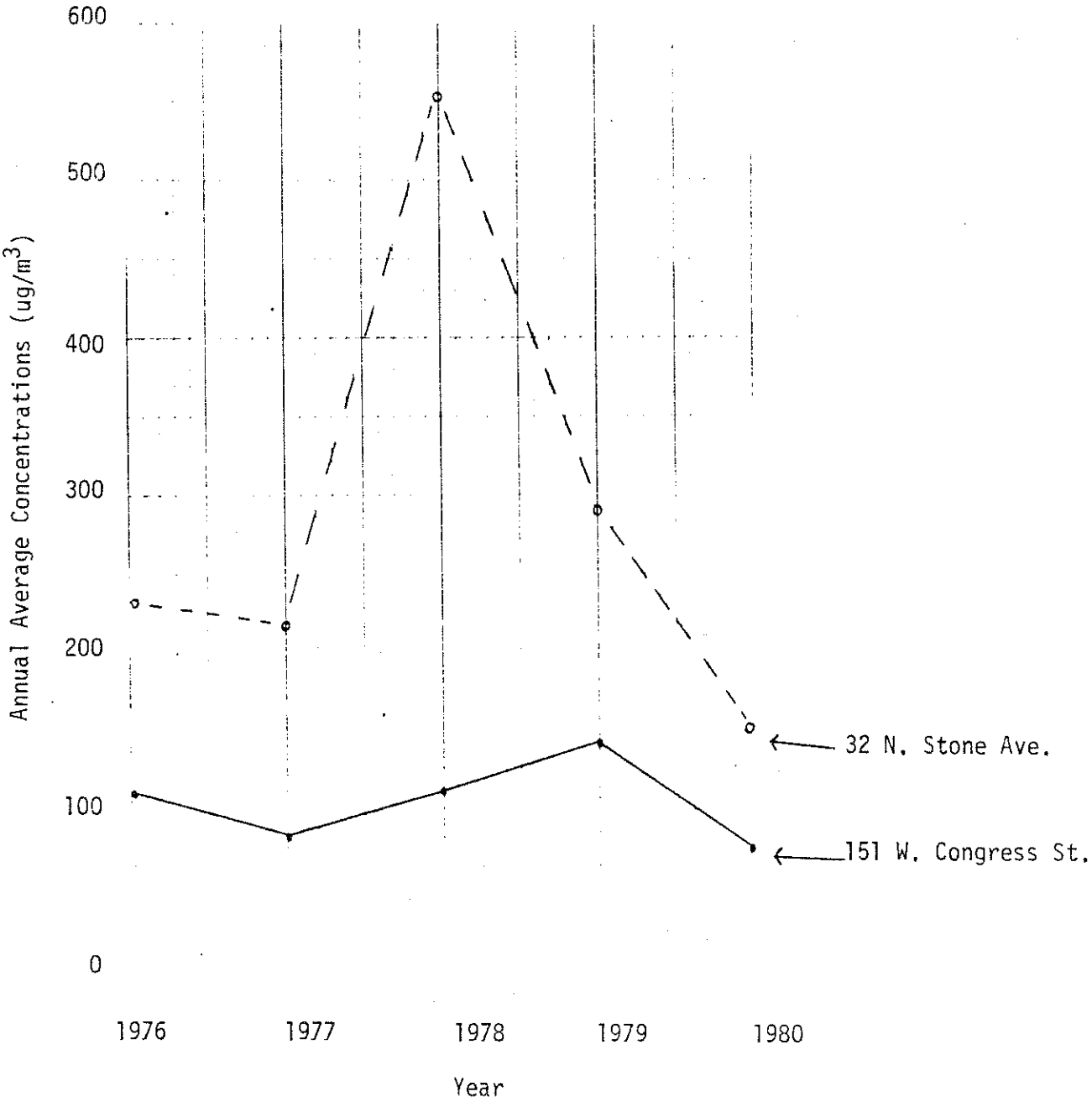


Figure 3-9

Hydrocarbons Concentrations in Tucson



3.3 Lead

3.3.1 Phoenix

In 1980 lead concentrations continued the downward trend which developed in 1978, as reflected by plots of the highest and average concentrations in Figure 3-10 and 3-11 below. Another indication of lower concentrations is the fact that the lead standard was exceeded at only one site contrasted with two sites in 1979. Lower lead concentrations are most likely due to reduced usage of leaded gasoline.

Figure 3-10

Highest Lead Concentration in Phoenix

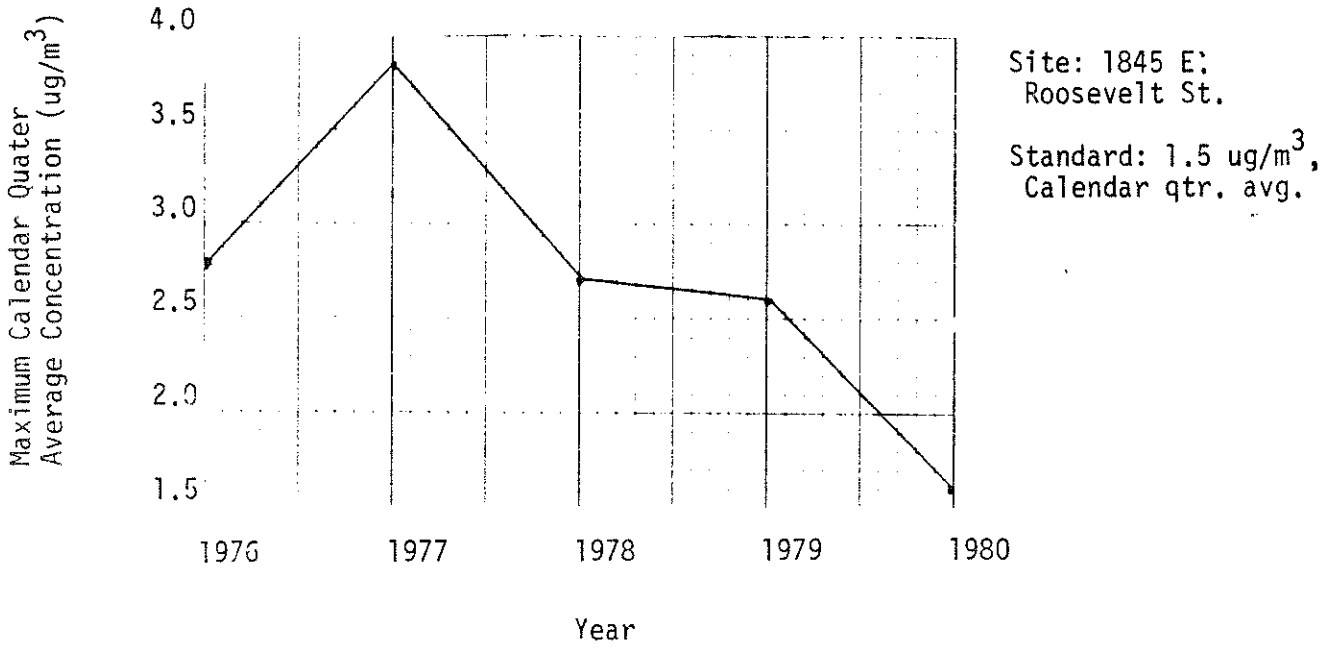
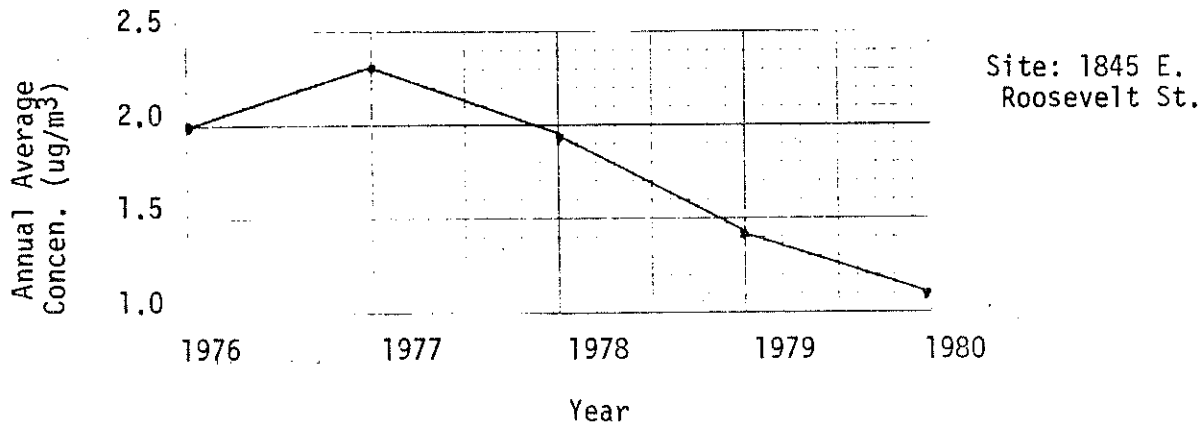


Figure 3-11

Average Lead Concentrations in Phoenix



3.3.2 Tucson

As in Phoenix a decreasing trend in lead concentrations is apparent. Also, it should be noted in Table 3-2 below that no exceedance has been detected in Tucson.

TABLE 3-2

Lead Concentrations in Tucson

Year	Maximum Quarterly Avg. (ug/m^3)
1978	1.17
1979	1.18
1980	0.82

Monitoring Site: 1016 W. Prince Road

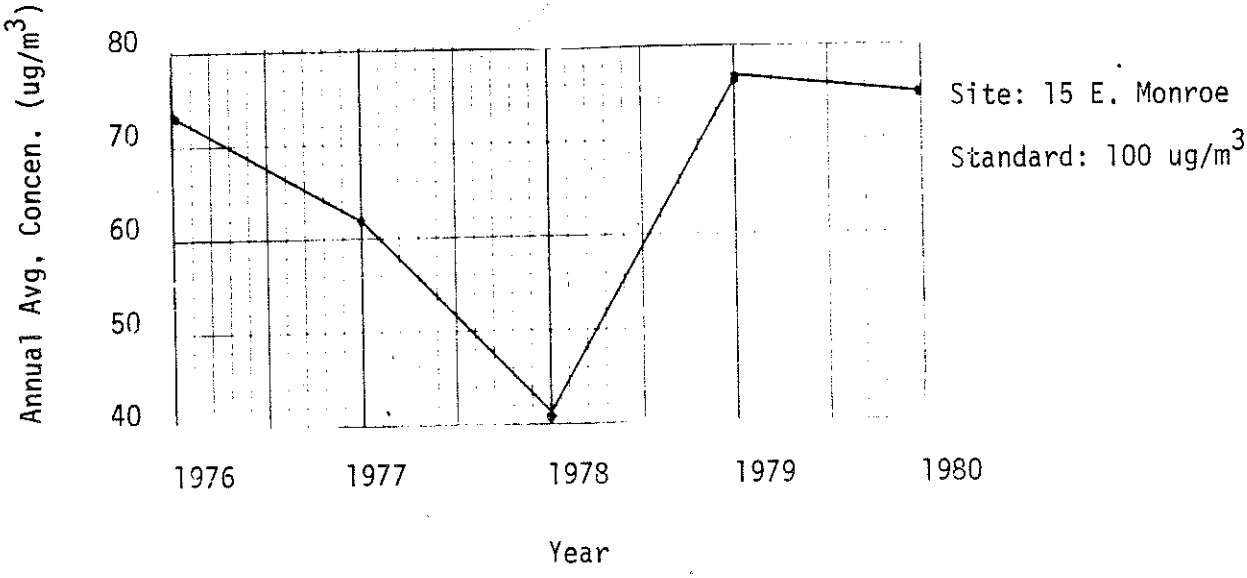
3.4 Nitrogen Dioxide

3.4.1 Phoenix

The annual average concentration decreased very little in 1980, from 77 ug/m^3 in 1979 to 75 ug/m^3 at the 15 E. Monroe site operated by Phelps Dodge Corporation. One very unusual feature of nitrogen dioxide data for the past five years is the large drop in the annual average in 1978. Otherwise concentrations appear to run about 75 ug/m^3.

Figure 3-12

Nitrogen Dioxide Concentrations in Phoenix

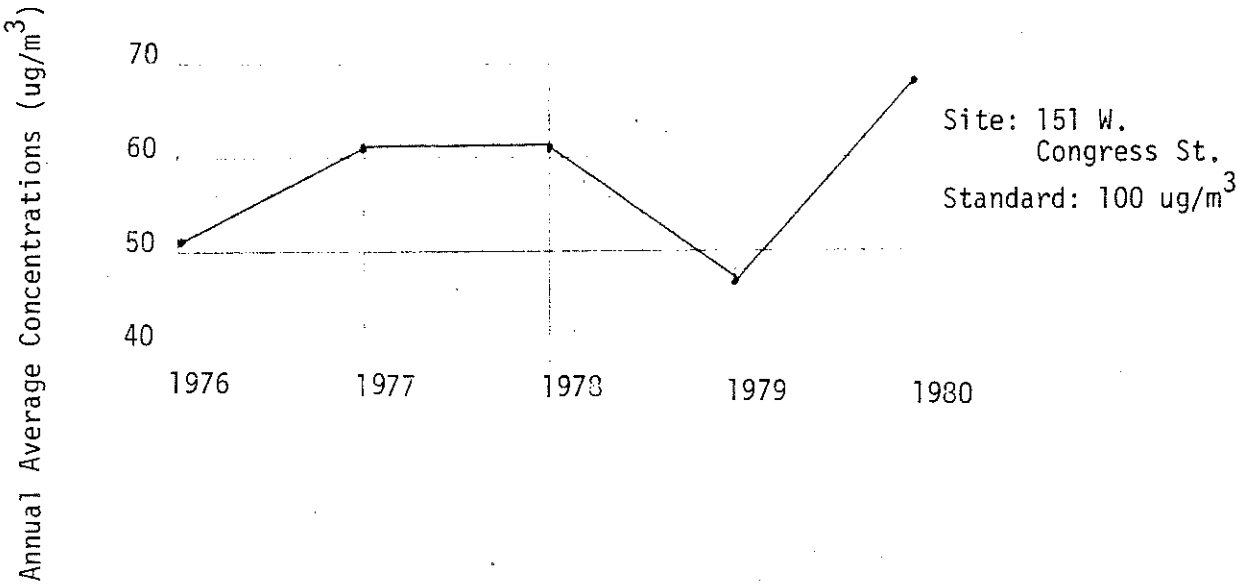


3.4.2 Tucson

Nitrogen dioxide concentrations increased 45% in 1980, from 47 ug/m^3 in 1979 to 68 ug/m^3 in 1980. In fact these values are the lower and upper limits for annual average concentrations for the past five years. During this period it appears that concentrations are increasing. Refer to Figure 3-13 for the applicable data.

Figure 3-13

Nitrogen Dioxide Concentrations in Tucson



3.5 Ozone

3.5.1 Phoenix

At the 1845 E. Roosevelt St. site, no appreciable variations in 1980 relative to 1979 were seen. However, at three other sites, two out of three trend indicators rose sharply. Specifically, the number of exceedances of the standard and the number of compliance status exceedances (3-year running average number of exceedances) were much greater in 1980 at the North 6th St., Miller Road (Scottsdale), and W. Olive (Glendale) sites. On the basis of these facts, it appears that ozone concentrations are increasing.

Tables 3-3 and 3-4 present data for the above mentioned trend indicators. The few sites listed are the only ones included because they are the sites at which exceedances were detected for the years 1976-1980.

TABLE 3-3

Number of Exceedances of Ozone Standard in Phoenix

Site	1976	1977	1978	1979	1980
1845 E. Roosevelt St.	1	4	4	4	3
8531 N. 6th St.	0	0	0	1	10
2857 N. Miller Rd. (Scottsdale)	0	0	0	1	3
6000 W. Olive Ave. (Glendale)	0	0	2	1	3

Standard: .12 ppm, daily maximum 1-hr. average, not to be exceeded more than 1.0 times per year, based on a 3-year running average.

TABLE 3-4

Ozone Compliance Status Exceedances in Phoenix
(3 - Year Running Avg. No. of Exceedances)

Site	1976*	1977	1978	1979	1980
1845 E. Roosevelt St.	1.0	2.0	3.0	4.0	3.7
8531 N. 6th St.	0	0	0	.3	3.7
2857 N. Miller Rd. (Scottsdale)	0	0	0	.3	1.3
6000 W. Olive Ave. (Glendale)	0	0	.7	1.0	2.0

* - Based on 1975 and 1976 data

Prior to 1980 the Roosevelt St. site was the controlling site for compliance determination, but during 1980 the 6th St. site recorded 10 exceedances, resulting in a 3-year average of 3.7 exceedances per year, the same as for the Roosevelt St. site.

A third set of variables, highest concentrations, did not change substantially in 1980. Refer to Table 3-5 below for these data. It should be noted that the Papago Park site, a new site installed in 1980, recorded the maximum 1-hr. concentration, .17 ppm (also recorded at the Roosevelt St. site) in 1980. This site also detected a relatively large number of exceedances of the standard in 1980, 7 to be exact.

TABLE 3-5

Highest Ozone Concentrations in Phoenix

Year	Max. 1-Hr. Avg. (ppm)	Site	2nd Highest 1-Hr. Avg. (ppm)	Site
1976	.13	Roosevelt St.	.12	W. Olive (Glendale)
1977	.16	Roosevelt St.	.15	Roosevelt St.
1978	.16	Roosevelt St.	.15	W. Olive (Glendale)
1979	.16	N. 6th St.	.14	N. 6th St.
1980	.17	Papago Park and Roosevelt St.	.15	Roosevelt St., Miller Rd. (Scottsdale), W. Olive (Glendale) and N. 6th St.

3.5.2 Tucson

Ozone concentrations tended to increase slightly, particularly at the downtown station (151 W. Congress) where the maximum 1-hr. value was .12ppm, 9% higher than in 1979. This marked the first time that the standard had been equaled in Tucson. The previous maximum concentration was .11ppm in 1979, also recorded at the downtown site. During the last five years ozone levels have risen 10-20% downtown.

TABLE 3-6

Highest Ozone Concentrations in Tucson

Year	Max. 1-Hr. Avg. (ppm)	Site	2nd Highest 1-Hr. Avg. (ppm)	Site
1976	.10	Downtown	.10	Downtown
1977	.10	Downtown and 22nd & Craycroft	.10	22nd & Craycroft
1978	.11	22nd & Craycroft	.11	22nd & Craycroft
1979	.11	Downtown	.10	Downtown, 22nd & Craycroft, and Arthur Pack G.C.
1980	.12	Downtown	.11	Downtown, 22nd & Craycroft, and Pomona Ave.

Standard: .12 ppm, daily maximum 1-hr. average, not to be exceeded more than 1.0 times per year, based on a 3-year running average.

3.5.3 Other Areas

Relative to 1979, no significant variations in ozone levels occurred in 1980. However, over the past several years, concentrations have changed, most notably at Yuma where the maximum and second highest readings increased by .06 ppm in 1978. After this large increase, the highest concentrations in Yuma tended to level out at .11-.12 ppm in 1979 and then decreased to .08 ppm in 1980.

In Flagstaff and Sierra Vista the year-to-year variations have been insignificant, on the order of .01 ppm or less. These data are listed in the following table.

TABLE 3-7

Ozone Data for Flagstaff, Sierra Vista and Yuma

City	Year	Highest 1-Hr. Concentrations (ppm) Maximum	2nd Highest
Flagstaff	1977	.09	.09
	1978	.08	.08
	1979	.07	.06
	1980	.08	.07
Sierra Vista	1978	.08	.08
	1979	.09	.08
	1980	.10	.09
Yuma	1976	.07	.07
	1977	.06	.05
	1978	.12	.11
	1979	.12	.11
	1980	.08	.08

Standard: .12 ppm, daily maximum 1-hr. average, not to be exceeded more than 1.0 times per year, based on a 3-year running average.

3.6 Particulates

3.6.1 Phoenix

In general particulate levels were down in 1980, as much as 22% at north Scottsdale, 16% at Glendale, 15% at the N. 6th St. site in Phoenix, and 12% at Scottsdale. In contrast, the S. Central Ave. site recorded an insignificant increase, 6%, while concentrations were virtually unchanged at the Roosevelt St. and Mesa sites.

From a long-term perspective, concentrations appear to be declining at Glendale, Scottsdale, and N. 6th St. in Phoenix. On the other hand, at Mesa and the Roosevelt St. site in Phoenix, no change is apparent in the annual means over the past five years. Data for the north Scottsdale and S. Central Avenue sites are difficult to assess due to the large year-to-year fluctuations in the annual means. It is interesting to note that in 1977 both sites measured increases, but in 1978 and 1980 N. Scottsdale was reduced while S. Central was elevated. In 1979 the situation was reversed with levels up at N. Scottsdale. These fluctuations are probably caused by variations in fugitive dust emissions and in meteorology.

TABLE 3-8

Concentrations of Particulates in the Phoenix Area

	Annual Geometric Mean Concentration (ug/m^3)				
Site	1976	1977	1978	1979	1980
Glendale-6000 W. Olive	101	112	97	105	88
Mesa-Broadway & Brooks	-	-	86	87	86
Scottsdale-2857 N. Miller	124	118	92	99	87
Phoenix-1845 E. Roosevelt	121	144	120	121	120
Phoenix-4732 S. Central	120	155	218	171	182
Phoenix-8531 N. 6th St.	127	109	106	117	100
Scottsdale-13665 N. Scottsdale	118	179	128	147	115

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

3.6.2 Tucson

In 1980 particulate concentrations were reduced at all sites except one, the Hughes Access - Nogales Highway site, where the annual mean was the same as in 1979. Reductions at the other 11 monitoring stations ranged from 1% at the Orange Grove Road site to 16% at Alvernon and Ft. Lowell Roads. Evidently meteorological conditions were favorable for suppression of fugitive dust in the city.

At Alvernon and Ft. Lowell Roads the sharpest trend is evident, a continuous, downward shift in particulate levels since 1976. The annual geometric mean was 101 ug/m^3 in 1980, 40% less than in 1976. However, this site is one of four which continue to exceed the annual standard, 75 ug/m^3.

Lesser reductions occurred at the Ajo Way and S. 6th Ave. stations, 20% and 18%, respectively, since 1976. On the other hand, at Orange Grove Rd. concentrations shifted upward in 1979 and 1980, 27% higher than in 1976-1978.

At the other eight sites listed in Table 3-9 below no significant trends are apparent.

TABLE 3-9

Concentrations of Particulates in Tucson

Annual Geometric Mean Concentration (ug/m^3)

Site	1976	1977	1978	1979	1980
151 W. Congress Street	71	68	56	70	61
Alvernon & Ft. Lowell Rd.	168	155	126	120	101
1970 W. Ajo Way	76	72	66	69	61
Davis - Monthan AFB	72	76	69	69	67
Golf Links Road & Harrison	57	63	55	65	59
Hughes Access & Nogales Hwy.	51	50	43	54	54
7920 E. Tanque Verde	59	67	56	61	56
Orange Grove & El Camino del Terra	85	85	87	109	108
Pima College	-	50	42	47	43
Prince Road and Fairview	-	122	110	129	117
1810 S. 6th Avenue	118	119	117	101	97
University of Arizona	73	71	61	89	75

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

3.6.3 Other Areas

Annual mean data for particulates for 1976 through 1980 and a brief review of these data are given in Tables 3-10 and 3-11 which follow. Highlights of this review include:

At Douglas (City Park) an 84% increase in particulate concentrations attributed to traffic on unpaved roads developed in 1979.

At Hayden (Jail) a 28% addition to particulate concentrations which began in 1978 was probably caused by traffic on a nearby unpaved road.

A 27% decline in Lake Havasu City occurred which is thought to be due to reduced construction activity and to stabilization of soil surfaces with vegetation and desert landscaping.

At Miami (Jones Ranch), San Manuel, and Superior decreases of 50%, 33%, and 39%, respectively, were detected, but no probable reasons for these decreases are known.

TABLE 3-10

Concentrations of Particulates in Non-Urban Areas of Arizona

Site	Annual Geometric Mean Concentration (ug/m^3)				
	1976	1977	1978	1979	1980
Ajo	92	72[d]	69	67[d]	85
Casa Grande	122	118[d]	98	100	105
Clarkdale	48	51	47[d]	100[d]	71[d]
Douglas (U.S. 666)	43[d]	46	20[d]	48	57
Douglas (City Park)	74	82	74	121	136
Eagar	73	74	82	114[d]	83
Flagstaff	79	79[d]	104[d]	82[b]	81[d]
Florence	107[d]	93	67	88	106[d]
Grand Canyon (Hopi Point	-	-	-	22[b]	11[d]
Grand Canyon (Visitors Center)	14[d]	18[d]	11[d]	20[c]	21[b]
Hayden (Jail)	119	92[d]	134[d]	172	152[d]
Hayden (Ranch)		57[b]	46[d]	53	50
Joseph City	46[d]	54[d]	31[d]	31	50[d]
Kingman	56	51	55[d]	83[d]	43[d]
Lake Havasu City	37	44	31[d]	31[d]	27
Miami (Jones Ranch)	38	43	20[d]	30	17[d]
Miami (Fire Station)	-	99[d]	85	118	86
Montezuma Castel National Monument	30	30[d]	24[d]	33	27[d]
Morenci	50	47[d]	37	55	50
Nelson	-	22[b]	18[d]	12[d]	37[d]
Nogales	122[d]	88[d]	85[d]	85[d]	147[b]

TABLE 3-10 (Cont'd)

Concentrations of Particulates in Non-Urban Areas of Arizona

SITE	Annual Geometric Mean Concentration (ug/m^3)				
	1976	1977	1978	1979	1980
Organ Pipe Cactus National Monument	33	33	28[d]	31	36[d]
Page	41[d]	37	25[d]	34	36
Parker	-	119[d]	114	44[d]	82[d]
Paul Spur (Housing Area)	-	-	-	395	381
Prescott (Marina Street)	50	47	38[d]	41	39[c]
Rillito	112	143[d]	100	132	114
Safford	158	143[d]	123	159	125
St. Johns (Mesa Parada)	-	-	-	12[d]	17[c]
San Manuel	43	50	26	30	29
Show Low	61	64	70	93	62
Sierra Vista	59	63[d]	53	65	52[d]
Superior	101	96	69[d]	76	62[d]
Yuma	142	133	112[d]	139	126

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

TABLE 3-11

Particulate Concentration Trends

Site	Trends - 1976 through 1980
Ajo	No significant change.
Casa Grande	No significant change in the past 3 years; 20% decrease through 1978.
Clarkdale	Incomplete data during the past 3 years.
Douglas (U.S. 666)	No change, except for a 23% increase in 1980.
Douglas (City Park)	84% increase which occurred primarily in 1979.
Eagar	14% increase which occurred primarily in 1978.
Flagstaff	Probably no change, but difficult to make definite conclusion due to incomplete data.
Florence	Probably no change, but difficult to make definite conclusion due to incomplete data.
Grand Canyon (H.P.)	Incomplete data.
Grand Canyon (V.C.)	Incomplete data.
Hayden (Jail)	28% increase which began in 1978.
Hayden (Ranch)	No significant change since sampling began in 1977.
Joseph City	Probably no change, but difficult to make definite conclusion due to incomplete data.
Kingman	Probably no change, but difficult to make definte conclusion due to incompete data.
Lake Havasu City	27% decrease which appears to have developed in 1978.
Miami (Ranch)	Concentrations have decreased approximately 50% starting in 1978.
Miami (Fire Station)	No significant change since sampling began in 1977.
Montezuma C.N.M.	No significant change.
Morenci	No significant change.

TABLE 3-11 (Cont'd)

Particulate Concentration Trends

Site	Trends - 1976 through 1980
Nelson	Incomplete data.
Nogales	Incomplete data.
Organ Pipe C.N.M	No significant change.
Page	No significant change.
Parker	Incomplete data.
Paul Spur	No significant change since sampling began in 1979.
Prescott (Marana St.)	Decreasing trend with an overall reduction of about 20%.
Rillito	No significant change; concentrations cycling up and down.
Safford	No consistent trend; levels cycling up and down.
St. Johns	Incomplete data. Sampling by the State was terminated because SRP operates sampler at this site.
San Manuel	33% decline beginning in 1978.
Show Low	No long-term change.
Sierra Vista	No significant change.
Superior	Overall 39% decrease starting in 1978.
Yuma	No continual pattern; concentrations cycling.

3.7 Sulfur Dioxide

Annual average concentrations were much lower in 1980, primarily due to a strike in the copper industry which lasted for several months. Reductions as large as 62%, 45%, and 41% were recorded at Miami, San Manuel and Hayden, respectively. At Ajo and Douglas, a much smaller decrease, 18%, in the sulfur dioxide concentrations was observed. In contrast, the Morenci site detected a 5% increase in 1980 relative to 1979. It should be noted that two areas, Hayden and Morenci, exceeded the annual standard of 80 ug/m^3 in 1980.

Over the past six years, the greatest changes in average concentrations occurred in 1976 when many of the copper smelters began operating supplementary control systems and continued the operation of sulfur removal processes. Beyond 1976 very little improvement is noted, except in 1980 as discussed above and in 1978 and 1979 at Hayden. The improvements at Hayden most likely were the result of improved supplementary control and sulfur removal systems.

TABLE 3-12

Concentrations of Sulfur Dioxide in Smelter Areas of Arizona

Site	1975	1976	1977	1978	1979	1980
Ajo (Oxidation Pond)	72	33	24	43	51	42
Douglas (County Hospital)	146	51	48	55	67	45
Hayden (Montgomery Ranch)	184	183	180	133	158	93
Miami (Jones Ranch)	51	56	84	64	79	30
Morenci (Stargo)	219	130	80	78	75	98
San Manuel (Golf Course)	107	75	79	62	65	36

Standard: 80 ug/m^3, annual average

A different trend for short-term concentrations, specifically, for 3-hr and 24-hr periods, was followed. 1978 was the year in which a sharp drop in the number of exceedances of the short-term standards was achieved. For example, the number of 24-hr. exceedances statewide was down to 39 in 1978 from 127 in 1977, representing a 69% decrease. There were a few exceptions to this trend. In Ajo, 1979 was the year where the number of 3-hr. exceedances dropped to zero; whereas in Morenci, 1977 was the year when significant progress was achieved. In Miami and San Manuel, 1980 was a noteworthy year for improvements. In most of the cities these

3.7 (Cont'd)

advancements were primarily due to refinements in supplementary control systems. Reference data are listed as follows:

TABLE 3-13

Exceedances of Sulfur Dioxide Air Quality Standards

3-Hr Std. = 1300 ug/m^3 24-Hr. std. = 365 ug/m^3

City	Year	No. of 3-Hr. Exceedances	No. of 24-Hr. Exceedances
Ajo	1976	0	0
	1977	2	1
	1978	5	2
	1979	0	2
	1980	8	2
Douglas	1976	8	1
	1977	14	1
	1978	7	0
	1979	12	6
	1980	8	0
Hayden	1976	114	106
	1977	102	84
	1978	13	9
	1979	40	21
	1980	13	6
Miami	1976	31	10
	1977	50	22
	1978	34	14
	1979	56	21
	1980	13	5
Morenci	1976	101	49
	1977	61	17
	1978	44	11
	1979	27	5
	1980	73	28
San Manuel	1976	22	12
	1977	22	2
	1978	24	3
	1979	19	6
	1980	7	0
Statewide	1976	276	173
	1977	251	127
	1978	127	39
	1979	154	61
	1980	122	41

4. NON-CRITERIA POLLUTANTS

TABLE 4-1

1980 Benzene Soluble Organics Data Summary[f]
High Volume Sampler (in ug/m^3)

COUNTY AND CITY	SITE LOCATION	OPERATOR	ANNUAL AVERAGE	MAXIMUM 24-HOUR AVERAGE	NO. OF SAMPLES
APACHE:					
Eagar	Town Hall	State	8.4[d]	36.9	52
St. Johns	Mesa Parada	State	1.3[d]	3.8	34
COCHISE:					
Bisbee[b]	Warren City Hall	State	2.1[d]	5.1	16
Douglas	1.2 mi. N. of Smelter	State	1.6	3.4	49
Douglas	0.8 mi. N. of Smelter	PD	1.3	NA	52
Douglas	1012 G Avenue	PD	2.0	NA	53
Douglas	Pirtleville	PD	1.5	NA	52
Douglas	City Park	State	3.0[d]	8.2	17
Hereford	P.D. Experimental Farm	PD	1.5	NA	56
Paul Spur	Housing Area	State	2.1	8.0	49
Sierra Vista	Bartow Drive	State	2.1[d]	5.7	41
COCONINO:					
Flagstaff	218 N. Leroux Street	State	12.2[d]	47.9	31
Grand Canyon	Hopi Point	State	1.5[d]	2.1	15
Page	Airport	State	5.0	28.7	55
GILA:					
Hayden	Jail	State	5.0[d]	24.6	39
Hayden	Montgomery Ranch	State	1.3	3.0	46
Miami	Fire Station	State	2.7	6.7	53
Miami	Jones Ranch	State	.9	2.8	39
GRAHAM:					
Safford	523 10th Avenue	State	2.6	6.5	56

TABLE 4-1 (Cont'd)

1980 Benzene Soluble Organics Data Summary[f]
High Volume Sampler (in ug/m^3)

COUNTY AND CITY	SITE LOCATION	OPERATOR	ANNUAL AVERAGE	MAXIMUM 24-HOUR AVERAGE	NO. OF SAMPLES
GREENLEE:					
Morenci	Cadillac Point	PD	1.5	NA	56
Morenci	Fina Station	PD	1.4	NA	57
Morenci	Fairbanks	PD	1.9	NA	60
Morenci	Stargo	PD	1.0[d]	NA	8
Morenci	Stargo	State	1.7	4.2	56
Morenci	Standpipe	PD	1.4	NA	57
MARICOPA:					
Boys Ranch	GM Proving Ground	PD	1.3	NA	58
Buckeye	N. 4th Street	PD	1.6[d]	NA	59
Glendale	6000 W. Olive Avenue	Maricopa	6.4	27.8	45
Mesa	Broadway & Brooks	Maricopa	4.5	25.0	60
Phoenix	15 E. Monroe Street	PD	2.9	NA	60
Phoenix	1845 E. Roosevelt	Maricopa	8.7	26.0	49
Phoenix	201 N. Central	PD	1.9	NA	60
Phoenix	8531 N. 6th Street	Maricopa	6.2	24.2	55
Phoenix	4732 S. Central	Maricopa	7.7	30.5	54
Scottsdale	2857 N. Miller Road	Maricopa	5.9	24.4	60
Scottsdale	13665 N. Scottsdale Road	Maricopa	3.8	19.8	53
MOHAVE:					
Kingman	305 W. Beale Street	State	2.8[d]	13.1	33
Lake Havasu City	Community Hospital	State	1.6	4.2	53
NAVAJO:					
Joseph City	S.E. Joseph City	State	1.5[d]	6.0	30
Show Low	Deuce of Clubs Avenue	State	4.6	28.1	49

TABLE 4-1 (Cont'd)

1980 Benzene Soluble Organics Data Summary[f]
High Volume Sampler (in ug/m^3)

COUNTY AND CITY	SITE LOCATION	OPERATOR	ANNUAL AVERAGE	MAXIMUM 24-HOUR AVERAGE	NO. OF SAMPLES
PIMA:					
Ajo	Well Road	State	2.3	6.1	47
Ajo	Camelback Mt.	PD	1.2	NA	61
Ajo	Oxidation Pond	PD	1.6	NA	58
Ajo	S. Tailings Dam	PD	1.3	NA	61
Ajo	Town Square	PD	1.5	NA	55
Green Valley	2 mi. N. of Townsite	PD	1.2	NA	60
Organ Pipe	Visitors Center	State	1.3[d]	3.2	43
Rillito	Miller's Market	State	2.5	5.1	58
Tucson	32 N. Stone	PD	1.5	NA	59
Tucson	Pomona Road	PD	1.8	NA	59
Vail	El Paso Natural Gas Co. Station	PD	1.1	NA	53
PINAL:					
Casa Grande	401 N. Marshall Road	State	3.3	9.4	57
Coolidge	2 mi. N. of Coolidge	PD	1.5	NA	60
Florence	22nd Street & Willow	State	2.7[d]	6.0	39
Maricopa	6.5 mi. N.W. of Town	PD	1.3	NA	58
Oracle Junction	Highways 89 & 77	PD	1.2	NA	58
San Manuel	LDS Church	State	1.3	6.4	50
Superior	951 Main Street	State	1.8[d]	4.4	42
SANTA CRUZ:					
Nogales	U. S. Post Office	State	7.6[d]	26.1	26
YAVAPAI:					
Clarkdale	Football Stadium	State	1.5[d]	3.2	24

TABLE 4-1 (Cont'd)

1980 Benzene Soluble Organics Data Summary[f]
High Volume Sampler (in ug/m^3)

COUNTY AND CITY	SITE LOCATION	OPERATOR	ANNUAL AVERAGE	MAXIMUM 24-HOUR AVERAGE	NO. OF SAMPLES
YAVAPAI:					
Montezuma Castle	Maint. Building	State	1.5[d]	4.9	44
Nelson	1 mi. N. of Lime Plant	State	1.2[d]	3.5	36
Prescott	500 S. Marina Street	State	1.7[d]	6.3	45
Prescott	Co. Maint. Yard	State	19.9[d]	25.0	4
YUMA:					
Parker	914 Arizona Avenue	State	3.0[d]	13.3	31
Yuma	201 S. 2nd Avenue	State	4.3	9.2	54

TABLE 4-2

1980 Nitrates Data Summary
High Volume Sampler (in ug/m^3)

COUNTY AND CITY	SITE LOCATION	OPERATOR	ANNUAL AVERAGE	MAXIMUM 24-HOUR AVERAGE	NO. OF SAMPLES
APACHE:					
Eagar	Town Hall	State	1.5	14.0	52
St. Johns[c]	Mesa Parada	State	.6[d]	3.2	34
COCHISE:					
Bisbee[b]	Warren-City Hall	State	8.6[d]	2.7	16
Douglas	City Park	State	1.1[d]	2.9	17
Douglas	1.2 mi. N. of Smelter	State	1.4	4.7	49
Paul Spur	Housing Area	State	6.1	37.0	49
Sierra Vista	Bartow Drive	State	1.0[d]	2.6	41
COCONINO:					
Flagstaff	218 N. Leroux Street	State	.9[d]	7.0	31
Grand Canyon	Hopi Point	State	1.3[d]	2.8	15
Page	Airport	State	2.0	12.9	55
GILA:					
Hayden	Jail	State	.8[d]	2.3	39
Hayden	Montgomery Ranch	State	1.1	3.7	46
Miami	Fire Station	State	1.1[d]	3.2	53
Miami	Jones Ranch	State	.6[d]	2.2	39
GRAHAM:					
Safford	523 - 10th Avenue	State	.9	3.5	56
GREENLEE:					
Morenci	Stargo	State	.9	3.1	56

TABLE 4-2 (Cont'd)

1980 Nitrates Data Summary
High Volume Sampler (in ug/m^3)

COUNTY AND CITY	SITE LOCATION	OPERATOR	ANNUAL AVERAGE	MAXIMUM 24-HOUR AVERAGE	NO. OF SAMPLES
MARICOPA:					
Glendale	6000 W. Olive Avenue	Maricopa	1.9[d]	8.5	45
Mesa	Broadway & Brooks	Maricopa	1.6	7.9	60
Phoenix	1845 E. Roosevelt	Maricopa	1.9	7.8	51
Phoenix	4732 S. Central	Maricopa	1.8	7.1	55
Phoenix	8531 N. 6th Street	Maricopa	1.6	6.4	57
Scottsdale	2857 N. Miller Road	Maricopa	1.3	4.6	58
Scottsdale	13665 N. Scottsdale Road	Maricopa	1.3	6.5	55
MOHAVE:					
Kingman	305 W. Beale Street	State	2.9[d]	6.5	33
Lake Havasu	Community Hospital	State	2.3	7.5	53
NAVAJO:					
Joseph City	3.25 mi. S.E. of Town	State	.9[d]	3.3	30
Show Low	Deuce of Clubs Avenue	State	.5	3.4	49
PIMA:					
Ajo	Well Road	State	1.4	6.3	47
Organ Pipe	Visitors Center	State	1.1[d]	6.2	43
Rillito	Miller's Market	State	2.7	5.7	58
PINAL:					
Casa Grande	401 N. Marshall Road	State	2.6	10.2	57
Florence	22nd Street & Willow	State	1.9[d]	4.7	39
San Manuel	LDS Church	State	.6[d]	3.2	34
Superior	951 Main Street	State	1.7[d]	4.5	42

TABLE 4-2 (Cont'd)

1980 Nitrates Data Summary
High Volume Sampler (in ug/m^3)

COUNTY AND CITY	SITE LOCATION	OPERATOR	ANNUAL AVERAGE	MAXIMUM 24-HOUR AVERAGE	NO. OF SAMPLES
SANTA CRUZ:					
Nogales[b]	U. S. Post Office	State	1.6[d]	11.0	26
YAVAPAI:					
Clarkdale	Football Stadium	State	2.5[d]	5.8	24
Montezuma Castle	Maint. Building	State	1.0[d]	4.0	44
Nelson	1 mi. N. of Lime Plant	State	1.4[d]	4.0	36
Prescott[c]	500 S. Marina Street	State	1.2[d]	4.2	45
Prescott[b]	Co. Maint. Yard	State	3.2[d]	5.2	4
YUMA:					
Parker	914 Arizona Avenue	State	2.0[d]	7.9	31
Yuma	201 S. 2nd Avenue	State	2.9	12.5	54

TABLE 4-3

1980 Sulfates Data Summary
High Volume Sampler (in ug/m^3)

COUNTY AND CITY	SITE LOCATION	OPERATOR	ANNUAL AVERAGE	MAXIMUM 24-HOUR AVERAGE	NO. OF SAMPLES
APACHE:					
Eagar	Town Hall	State	3.5	8.1	52
St. Johns[c]	Mesa Parada	State	1.8[d]	7.1	34
COCHISE:					
Bisbee[b]	Warren-City Hall	State	5.2[d]	11.2	16
Douglas	1.2 mi. N. of Smelter	State	7.6	28.3	49
Douglas	City Park	State	5.4[d]	13.1	17
Paul Spur	Housing Area	State	10.9	42.2	49
Sierra Vista	Bartow Drive	State	3.5[d]	10.4	41
COCONINO:					
Flagstaff	218 N. Leroux	State	3.8[d]	8.9	31
Grand Canyon	Hopi Point	State	1.1[d]	3.3	15
Page	Airport	State	3.3	9.4	55
GILA:					
Hayden	Jail	State	8.5[d]	15.1	39
Hayden	Montgomery Ranch	State	9.1	27.1	46
Miami	Fire Station	State	8.9	38.7	53
Miami	Jones Ranch	State	3.3[d]	13.3	39
GRAHAM:					
Safford	523 10th Avenue	State	4.5	11.6	56
GREENLEE:					
Morenci	Stargo	State	9.0	34.5	56

TABLE 4-3 (Cont'd)

1980 Sulfates Data Summary
High Volume Sampler (in ug/m^3)

COUNTY AND CITY	SITE LOCATION	OPERATOR	ANNUAL AVERAGE	MAXIMUM 24-HOUR AVERAGE	NO. OF SAMPLES
MARICOPA:					
Glendale	6000 W. Olive Avenue	Maricopa	4.2	8.5	47
Mesa	Broadway & Brooks	Maricopa	4.0	11.3	60
Phoenix	1845 E. Roosevelt	Maricopa	5.4	11.3	51
Phoenix	4732 S. Central	Maricopa	4.8	12.3	56
Phoenix	8531 N. 6th Street	Maricopa	3.7	9.9	57
Scottsdale	2857 N. Miller Road	Maricopa	4.0	10.2	58
Scottsdale	13665 N. Scottsdale Road	Maricopa	3.4	9.6	55
MOHAVE:					
Kingman	305 W. Beale Street	State	3.6[d]	7.9	33
Lake Havasu City	Community Hospital	State	2.0	11.8	53
NAVAJO:					
Joseph City	3.25 mi. S.E. of Town	State	5.8[d]	17.7	30
Show Low	Deuce of Clubs Avenue	State	2.6	6.6	49
PIMA:					
Ajo	Well Road	State	5.0	14.0	47
Green Valley	245 W. Esperanza	Pima	3.4[d]	10.1	24
Organ Pipe	Visitors Center	State	2.7[d]	11.5	43
Rillito	Miller's Market	State	5.0	12.5	58
Tucson	Ft. Lowell	Pima	4.7[d]	9.9	23
Tucson	151 W. Congress	Pima	4.1[d]	10.6	24
Tucson	Davis-Montham A.F.B.	Pima	4.4[d]	9.3	24
Tucson	1810 S. 6th Avenue	Pima	4.3[d]	10.4	23
Tucson	Orange Grove	Pima	4.3[d]	11.3	23
Tucson	Prince Road	Pima	4.6[d]	10.1	24

TABLE 4-3 (Cont'd)

1980 Sulfates Data Summary
High Volume Sampler (in ug/m^3)

COUNTY AND CITY	SITE LOCATION	OPERATOR	ANNUAL AVERAGE	MAXIMUM 24-HOUR AVERAGE	NO. OF SAMPLES
PINAL:					
Casa Grande	401 N. Marshall	State	3.9	12.4	57
Florence	22nd & Willow Street	State	4.2[d]	15.6	39
San Manuel	LDS Church	State	6.8	22.6	50
Superior	951 Main Street	State	4.0[d]	26.9	42
SANTA CRUZ:					
Nogales[b]	U. S. Post Office	State	5.3[d]	10.4	26
YAVAPAI:					
Clarkdale	Football Stadium	State	1.6[d]	6.6	24
Montezuma Castle	Maint. Building	State	1.6	5.3	44
Nelson	1 mi. N. of Lime Plant	State	1.1[d]	5.2	36
Prescott[c]	500 S. Marina Street	State	1.3[d]	5.2	45
Prescott[b]	Co. Maint. Yard	State	4.3[d]	4.6	4
YUMA:					
Parker	914 Arizona Avenue	State	3.1[d]	10.0	31
Yuma	201 S. 2nd Avenue	State	4.2	12.9	54

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.)	.12	.12
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 was units of mg/m^3 and ozone which has units of ppm. Reference conditions are 25°C 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 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 monitored by two methods, infrared absorption or gas chromatography. 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 chromatographic technique utilizes a chromatographic 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 chromatograph using a flame ionization detector. Ambient air is drawn into the chromatograph 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 chromatographic 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 convertor 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 chemiluminescence. 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 aqueous 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.