1974

AIR QUALITY DATA

FOR ARIZONA

August 1975

ARIZONA DEPARTMENT OF HEALTH SERVICES

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Name	Location of Sampler(s)
Neil Adams	Kingman
Juan Alegria	Nogales
Bob Anderson	Lake Havasu City
Harvey Ayers	Sierra Vista
John Bates	Douglas (15th Street)
Thomas Bell	Clarkdale
William Blomquist	San Manuel
William Eddings	Casa Grande
Donald Finical	Flagstaff
Hans Grimm	Hayden
Gary Harmon	Rillito NW & Rillito SE
William Harrison	Ajo
James Huddleston	Douglas NNE2 & Paul Spur
Robert Lautigar	Inspiration
Gene Legate	Page
L. K. Littlejohn	Show Low
Gail Lund	Eagar
Cecil McCullar	Morenci
Lawrence McDonald	Davis Dam
Jim Moser	Safford
Sandy Nichols	Grand Canyon
Robert Phillips	Tucson
Raul Resendez	Yuma
Vincent Rodriquez	Florence
Rick Santaro	Prescott
Lu Snider	Montezuma Castle National Monument
Conrad Strivings	Phoenix
George Trojanovich	Superior
Ronald Woody	Mineral Park
Superintendent	Organ Pipe Cactus National Monument

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1. INTRODUCTION

The Arizona Department of Health Services, Bureau of Air Quality Control, published air quality data for 1973 for Arizona in two separate reports--one presenting data collected by the State[a] and one presenting data developed by industry, universities, and governmental agencies[b]. For 1974 all air quality data, regardless of source, will be listed in this one report. State data is presented in the second section of this report, and all other data is presented in the third section.

For information purposes, United States Environmental Protection Agency guidelines for location of samplers, sampling methods and analyses, and data evaluation are included in Appendices A, B, and C.

1.1 Cities and Towns Monitored

Arizona cities and towns monitored for air quality, the operators of the monitoring sites, and the pollutants monitored are listed in Table 1. The operators of the monitoring sites are abbreviated as follows:

A-K	Joint operation by American Smelting and Refining Company and Kennecott Copper Corporation
APS	Arizona Public Service Company
Clark	Clark County, Nevada, District Health Department
Des Res	Desert Research Institute, University of Nevada System
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

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a. "Air Quality Monitoring Network Data - 1973"
b. "Air Quality Data for Arizona - 1973"

Pima	Pima County Health Department, Air Quality Control District
P-G	Pinal-Gila Counties Air Quality Control District
SRP	Salt River Project
State	Arizona Department of Health Services, Bureau of Air Quality Control
Ute	Ute Research Laboratories.

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

Table 1

Cities and Towns Monitored

City or Town	Carbon Monoxide	Hydrocarbons (Non-Methane)	Nitrogen Dioxide	Oxidants	Particulates	Sulfur Dioxide
Ajo					PD State	PD State
Apache Junction					P-G	
Bodaway					Ute	
Boys Ranch					PD	
Buckeye					PD	PD
Bullhead City			Des Res		Des Res	Des Res
Carefree					Maricopa	
Casa Grande					State	
Chandler					Maricopa	
Chloride						State
Clarkdale					State	
Clifton					Greenlee State	Greenlee State
Coolidge				PD	PD	PD
Coppermine					Ute	
Davis Dam			Des Res State	Des Res	Des Res State	Des Res State
Double Adobe						PD
Douglas					PD State	PD State
Eagar					State	
Flagstaff					State	
Florence			State	PD	PD State	PD State
Fraziers Well					Ute	
Glendale	Maricopa			Maricopa	Maricopa	Maricopa
Grand Canyon			State		State	State

Table 1 (continued)

City or Town	Carbon Monoxide	Hydrocarbons (Non-Methane)	Nitrogen Dioxide	Oxidants	Particulates	Sulfur Dioxide
Green Valley					PD Pima	PD
Guadalupe				Maricopa	Maricopa	
Hayden					State	A-K State
Hereford					PD	PD
Joseph City			APS		APS	APS
Kaibito					Ute	
Katherine's Landing			Des Res		Clark Des Res	Des Res
Keams Canyon					Ute	
Kingman					State	
Lake Havasu City					State	
Laveen					Maricopa	
Lechee Rock					Ute	
Lee's Ferry					Ute	
Litchfield Park					Maricopa	
Mammoth					P-G	Magma
Many Farms					Ute	
Marana					P-G	
McNeal						PD
Mesa	Maricopa			Maricopa	Maricopa	
Mescal					PD	PD
Miami					State	State
Moccasin					Ute	
Montezuma Castle National Monument					State	
Morenci					PD State	PD State
Nogales					State	
Oracle						Magma

Table 1 (continued)

City or Town	Carbon Monoxide	Hydrocarbons (Non-Methane)	Nitrogen Dioxide	Oxidants	Particulates	Sulfur Dioxide
Oracle Junction					PD	PD
Oraibi					Ute	
Organ Pipe Cactus National Monument					State	
Page			SRP State	SRP	SRP State	SRP State
Paradise Valley					Maricopa	
Paul Spur					State	
Payson					P-G	
Peach Springs					Ute	
Petrified Forest National Park			APS		APS	APS
Phoenix	Maricopa PD State	PD State	Maricopa PD State	Maricopa PD State	Maricopa PD State	Maricopa PD State
Pinon					Ute	
Prescott					State	
Redington						Magma
Red Rock					Ute	
Rillito					State	
Riviera			Des Res		Des Res	Des Res
Roosevelt Dam					P-G	
Safford					State	
St. David			State			
St. Johns			SRP		SRP	SRP
San Manuel					State	Magma State
Scottsdale	Maricopa			Maricopa	Maricopa	
Show Low					State	
Sierra Vista					State	
Snowflake			SRP		SRP	SRP

Table 1 (continued)

City or Town	Carbon Monoxide	Hydrocarbons (Non-Methane)	Nitrogen Dioxide	Oxidants	Particulates	Sulfur Dioxide
Stanfield					P-G	
Sun City					Maricopa	
Supai					Ute	
Superior					State	
Tasi Schizz Rock					Ute	
Teec Nos Pos					Ute	
Tuba City					Ute	
Tucson	PD Pima	PD	PD Pima State	PD Pima	PD Pima State	PD Pima State
Vail					PD Pima	PD
Winslow					State	
Yuma	State			State	State	

Note: State data is presented in Section 2; all other data is presented in Section 3 of this report.

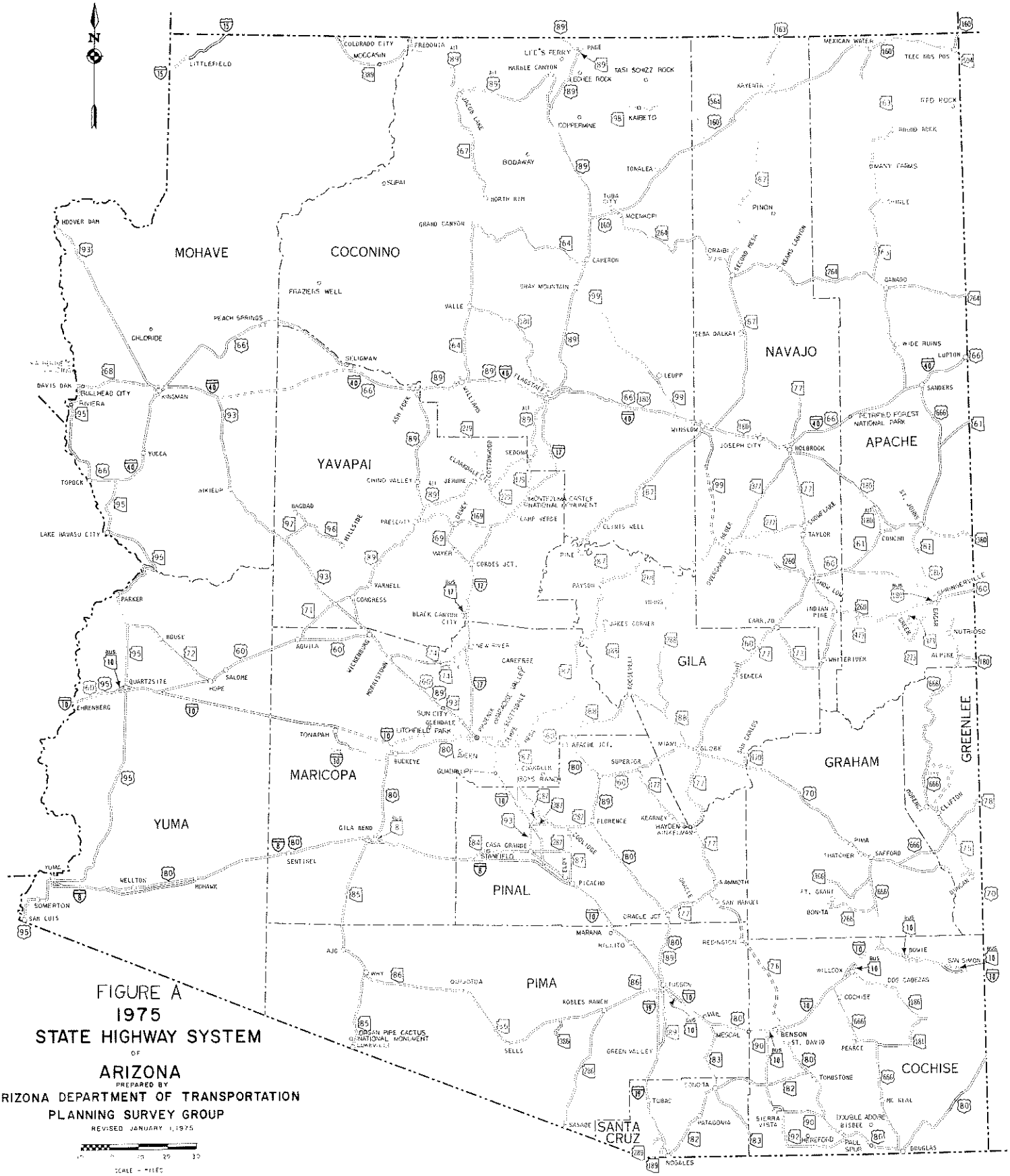


FIGURE A
1975
STATE HIGHWAY SYSTEM
OF
ARIZONA
PREPARED BY
ARIZONA DEPARTMENT OF TRANSPORTATION
PLANNING SURVEY GROUP
REVISED JANUARY 1, 1975

SCALE - MILES

CITIES AND TOWNS MONITORED

2. STATE DATA

2. STATE DATA

2.1 Carbon Monoxide (CO)

1974 data is summarized in Table 2. For comparison purposes, the State air quality standards for CO (same as Federal) are also listed. The instrument used for monitoring CO concentrations is also noted.

Typical variation of CO concentration with the time of day for Phoenix is shown in Figure B. CO concentrations increase at night, peak around midnight, decrease in the early morning, increase and peak again from 5 to 8 a.m., and decrease again until early nighttime. This is caused by the atmosphere becoming stagnant during early morning and nighttime hours which prevents vertical mixing and transport of air and contaminants in the air. Therefore, carbon monoxide emissions from vehicular traffic in the morning and late afternoon rush hours become concentrated or trapped near the earth's surface.

Air becomes stagnant when an inversion is present. An inversion is a meteorological condition wherein temperature increases with altitude instead of decreasing which is normal. An inversion in Arizona is caused by the rapid loss of heat from the earth's surface at night. The air next to the earth's surface is then cooled. This occurs frequently in Arizona because of clear nighttime skies which allow heat to radiate away from the earth. Inversions occur more frequently and of longer duration in winter because of the cooling effect of the longer nights.

After sunrise, heat from the sun first warms the ground which in turn warms the air near the ground until the entire ground inversion is "burned off" and ventilation takes place. Therefore, carbon monoxide concentrations decrease in the middle and afternoon hours of the day. Ventilation may also occur when strong winds associated with frontal weather systems develop.

Table 2

1974 Carbon Monoxide Data Summary
Non-Dispersive Infrared (Continuous) Analyzer
(in mg/m^3)

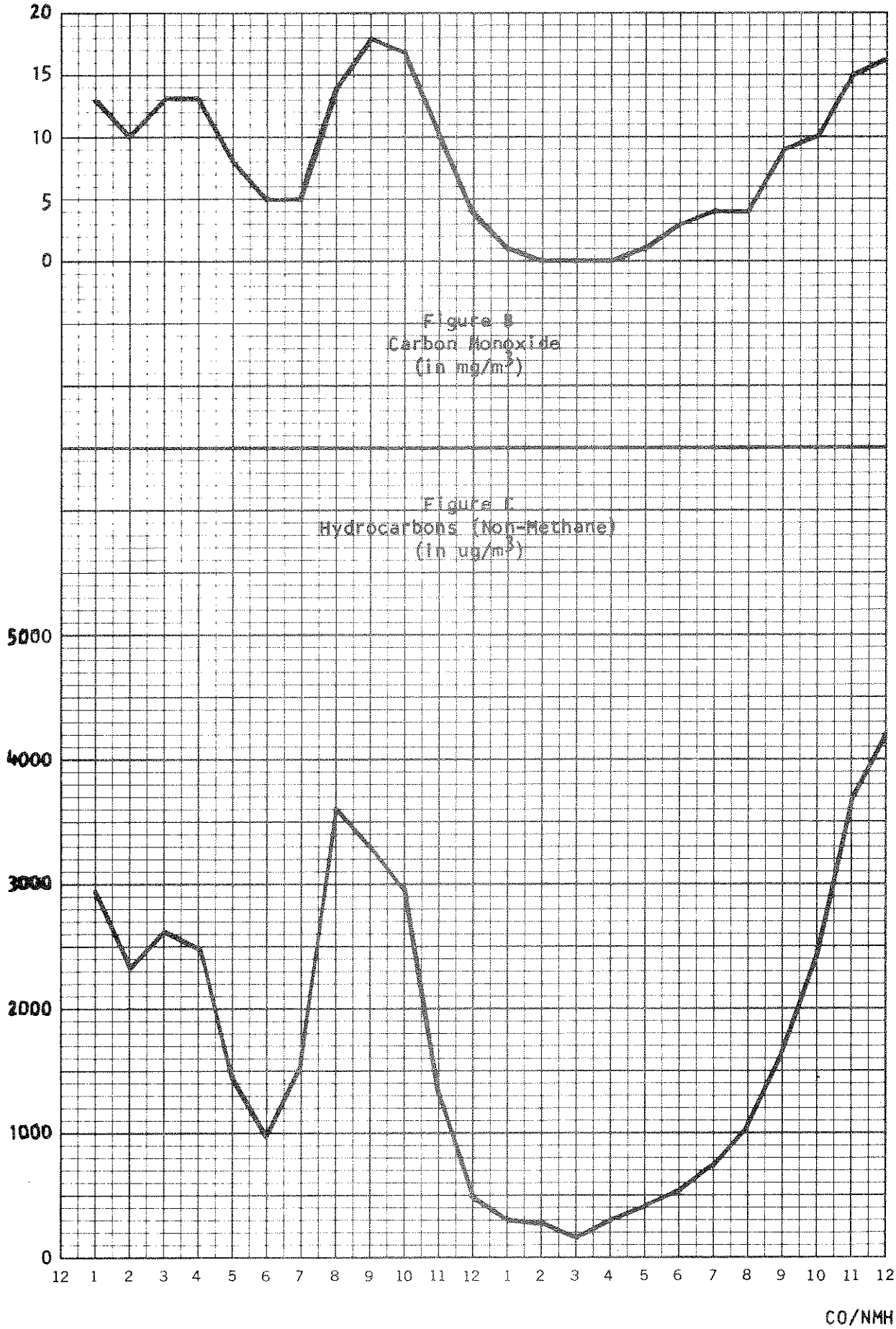
Site	Location	Max. 1-Hr. Avg.	Number of Times Standard Exceeded	Max. 8-Hr. Avg.	Number of Times Standard Exceeded	% Data Recovery
Phoenix[a]	1740 W. Adams	27	0	20	51	96.4
Yuma[b]	201 S. Second Ave.	3	0	1	0	99.0

State and Federal standards: 1-Hour Average $40\ mg/m^3$ 8-Hour Average $10\ mg/m^3$

a. Based on monitoring period 10/1/74 to 12/31/74

b. Based on monitoring period 5/30/74 to 9/30/74

Variation of Concentration with Time of Day
December 27, 1974
Phoenix



2.2 Hydrocarbons - Non-Methane (NMH)

A summary of 1974 data is listed in Table 3. The State standard for NMH (same as Federal) is included for comparison. The Federal NMH standard is a guide to devising state implementation plans to achieve the oxidant standard. The NMH standard does not have to be met if the oxidant standard is met. The instrument used for monitoring is also noted.

Typical variation of concentration in Phoenix with time of day is shown in Figure C. NMH follows the same pattern as carbon monoxide, increasing at night and decreasing in the middle of the day. The cause is the same--inversion formation at night resulting in stagnant air.

2.3 Nitrogen Dioxide (NO_2)

1974 data is summarized in Table 4. Classification of each site according to the type of surveillance such as background, source-oriented, or population-oriented, is included. Table 4 also includes the State standard for NO_2 (same as Federal) plus the methods used for monitoring.

2.4 Oxidants (O_x)

The annual summary is listed in Table 5. Typical variation of O_x concentration in Yuma with time of day is indicated in Figure D. O_x concentrations peak in the afternoon since sunlight is necessary for the formation of O_x from the photochemical reactions of hydrocarbons with nitrogen oxides. O_x concentrations are not as severely affected by inversions or stagnant air conditions as CO or NMH.

2.5 Particulates

1974 statistics for total suspended particulates (TSP) are listed in Table 6. This data summary includes classification of each site according to

Table 3

1974 Hydrocarbons (Non-Methane) Data Summary
Gas Chromatograph (Continuous) Analyzer
(in ug/m^3)

Site	Location	Max. 3-Hr. Avg. (6-9 a.m.)	Number of Times Standard Exceeded	% Data Recovery
Phoenix[a]	1740 W. Adams St.	3500	19	84.2

State and Federal standard: $\frac{\text{3-Hour Average (6-9 a.m.)}}{160\ \text{ug/m}^3}$

a. Based on monitoring period 12/10/74 to 12/31/74

Table 4

1974 Nitrogen Dioxide Data Summary
(in ug/m3)

Site	Location	Type of Surveillance[a]	Method	Annual Average	Maximums 1-Hr.	Maximums 24-Hr.	% Data Recovery
Davis Dam	U.S. Bureau of Reclamation	S	Bubbler	23	NA	68	90.2
Florence	22nd St. & Willow	P	Bubbler	23	NA	63	80.3
Grand Canyon	Grand Canyon Village	B	Bubbler	39[b]	NA	141	66.7
Page	Airport	S	Bubbler	24	NA	132	100.0
Phoenix	1845 E. Roosevelt	P	Bubbler	104[b]	NA	184	73.3
St. David	1.8 mi. SW of St. David	S	Color	22	325	83	58.4
Tucson	University of Arizona	P	Bubbler	59	NA	144	90.0

State and Federal Standard: $\frac{\text{Annual Average}}{100\ ug/m^3}$

a. B - background
P - population-oriented
S - source-oriented

b. Annual average does not meet EPA's guideline criteria

Table 5

1974 Oxidants Data Summary
(in ug/m^3)

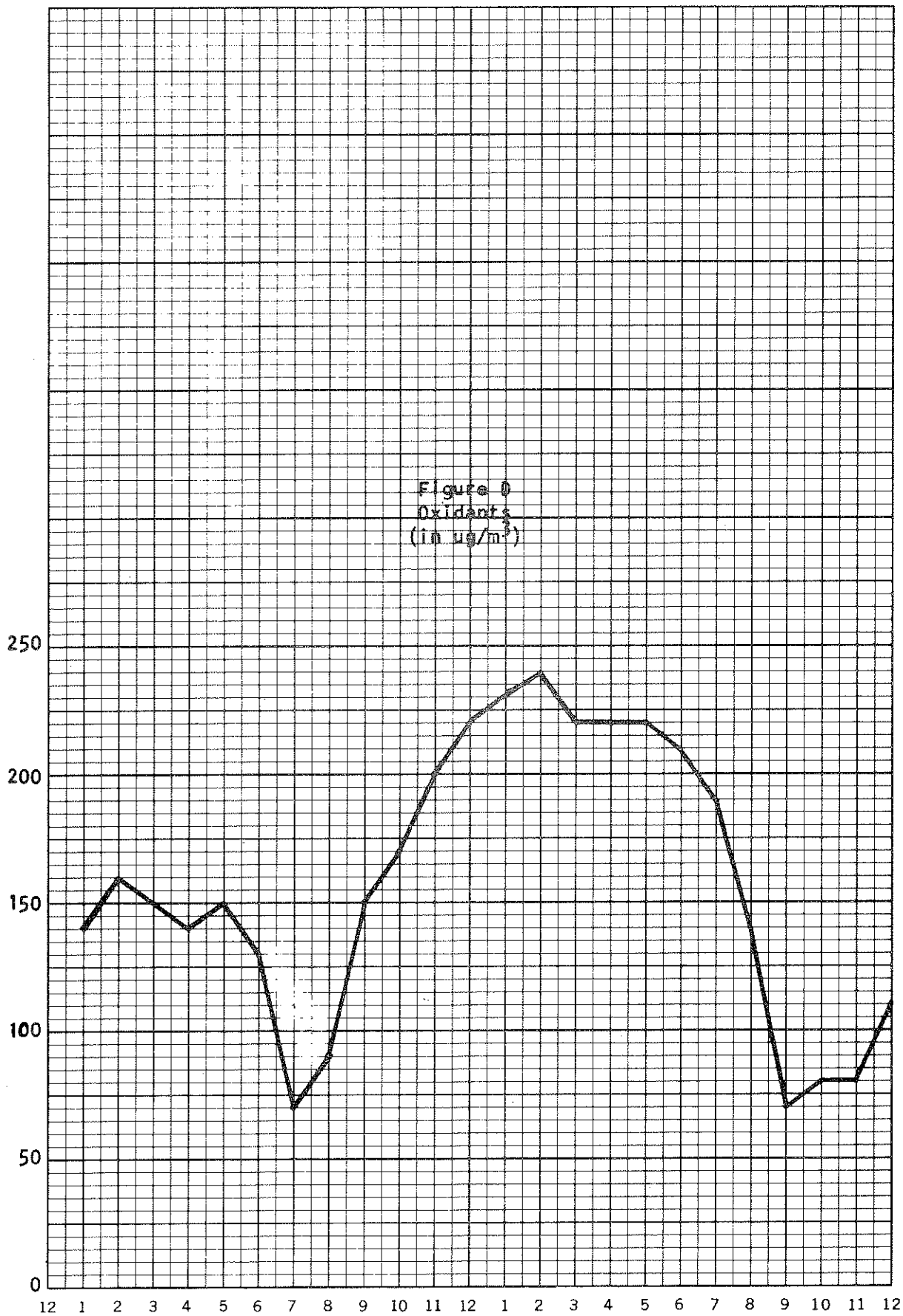
Site	Location	Method	Max. 1-Hr.	Number of Times Standard Exceeded	% Data Recovery
Phoenix[a]	1740 W. Adams St.	Color	85	0	84.4
Yuma[b]	201 S. Second Ave.	UV	330	102	92.9

State and Federal standard: $\frac{\text{1-Hour Average}}{160\ \text{ug/m}^3}$

a. Based on monitoring period 12/16/74 to 12/31/74

b. Based on monitoring period 2/27/74 to 12/31/74

Variation of Concentration with Time of Day
May 14, 1974
Yuma



O_x

Table 6

1974 Particulates Data Summary
High-Volume Sampler
(in ug/m3)

Site	Location	Type of Surveillance[a]	Annual Geom. Mean	24-Hr. Avgs. Max.	24-Hr. Avgs. 2nd High.	Number of Samples
Ajo	AZ DOT, Well Rd.	S	59	150	142	50
Casa Grande	401 N. Marshall St.	P	142	387	321	29
Clarkdale	High School Football Stadium	S	54	191	97	60
Clifton	U.S. Post Office, W. Coronado	S	60	96	88	12
Davis Dam	U.S. Bureau of Reclamation	S	30	95	87	59
Douglas	15th St. Park	P	100	346	261	20
Douglas	U.S. 666, 2 km. NNE of stack	S	43	97	95	61
Eagar	Town Hall	P	80	154	151	17
Flagstaff	Birch & San Francisco	P	53	124	115	49
Florence	22nd St. & Willow	P	85	163	159	52
Grand Canyon	Grand Canyon Village	B	17	54	54	24
Hayden	Old Town Jail, Canyon Drive	S	181	990	691	56
Kingman	305 W. Beale St.	P	58	116	110	58
Lake Havasu City	Lake Havasu Community Hospital	P	54	213	114	45
Miami	Inspiration, AZ Hwy. 88	S	59	174	130	53
Montezuma Castle National Monument	Park Maintenance Bldg.	B	27	72	64	58
Morenci	Stargo, Hwy. 666	S	56	159	115	44
Nogales	122 La Castellana Dr.	P	121	408	375	44
Organ Pipe Cactus National Monument	Visitors Center	B	23	92	84	44
Page	Airport	S	48	139	127	59
Paul Spur	Naco Hwy.	S	75	117	111	30
Phoenix	1740 W. Adams St.	P	127	460	295	34
Phoenix	1845 E. Roosevelt	P	106	326	182	24
Prescott	500 S. Marina St.	P	45	163	110	40
Rillito	2 mi. NW of plant	S	89	225	191	50
Rillito	T.G.&E. North Loop Substation, SE of plant	S	69	141	138	55
Safford	521 - 10th Ave.	P	105	230	224	30

Table 6 (continued)

Site	Location	Type of Surveillance[a]	Annual Geom. Mean	24-Hr. Avgs. Max.	24-Hr. Avgs. 2nd High.	Number of Samples
San Manuel	Trailer Park, Hwy. 76	S	66	141	134	53
Show Low	City Hall, Deuce of Clubs	P	49	180	110	42
Sierra Vista	1st St. & Bartow Drive	P	61	180	111	52
Superior	AZ DOT, 951 Main St.	P	84	429	214	46
Tucson	University of Arizona	P	69	114	111	25
Winslow	Airport	B	28	86	74	13
Yuma	201 S. Second Ave.	P	111	308	211	61

Standards (in ug/m^3)	Annual Geometric Mean	24-Hour Average
State	60	150
Federal Primary	75	260
Federal Secondary	60	150

a. B - background
P - population-oriented
S - source-oriented

the type of surveillance. State and Federal air quality standards are also included for comparison.

Long-term trends, 1969-1974, are tabulated for the oldest sites (see Table 7). Sites having at least two complete, consecutive years of data are listed.

Data for the chemical composition of particulates are summarized for 1974 in Table 8.

2.6 Sulfur Dioxide (SO_2)

Data for 1974 is presented in Table 9. Classification of each site according to surveillance type is included, as well as method used for monitoring. State and Federal standards are noted for comparison.

Long-term trends are indicated in Table 10--a list of annual average concentrations for 1969-1974. Sites having two or more complete, consecutive years of data are listed.

Table 7

Long-Term Trends in Particulates, 1969-1974
(Annual Geometric Means in ug/m^3)

Site	Location	1969	1970	1971	1972	1973	1974
Ajo	AZ DOT, Well Rd.	87	83	75	70	71	59
Clarkdale	High School Football Stadium	--	64	63	55	96	54
Davis Dam	U.S. Bureau of Reclamation	29	31	33	36	32	30
Douglas	U.S. 666, 2 km. NNE of stack	--	--	--	--	61	43
Flagstaff	Birch & San Francisco	--	74	50	42	73	53
Florence	22nd St. & Willow	149	153	124	124	120	85
Grand Canyon	Grand Canyon Village	15	21	40	12	18	17
Hayden	Old Town Jail, Canyon Drive	224	--	--	--	185	181
Montezuma Castle National Monument	Park Maint. Bldg.	--	--	21	26	28	27
Organ Pipe Cactus National Monument	Visitors Center	26	37	34	29	34	23
Page	Airport	17	9	--	31	52	48
Phoenix	1845 E. Roosevelt	112	121	135	144	--[b]	106
San Manuel	Trailer Park, Hwy. 76	43	55	74	--	77[a]	66
Superior	AZ DOT, 951 Main St.	139	204	144	99	101	84
Tucson	University of Arizona	78	96	88	98	--[b]	69
Yuma	201 S. Second Ave.	--	98	94	97	110	111

a. Sampler relocated in 1973
b. Site was operated by EPA as part of NASN network. Data is unavailable at this time.

Table 8

1974 Chemical Composition of Particulates
(in ug/m^3)

Site	Location	Benzene Soluble Organics Avg.	Benzene Soluble Organics Max. 24-Hr.	Sulfates Avg.	Sulfates Max. 24-Hr.	Copper Avg.	Copper Max. 24-Hr.	Iron Avg.	Iron Max. 24-Hr.	Lead Avg.	Lead Max. 24-Hr.	Zinc Avg.	Zinc Max. 24-Hr.
Ajo	AZ DOT, Well Rd.	1.2	5.9	9.6	61.2	.15	.38	.7	1.0	.1	.1	.02	.04
Casa Grande	401 N. Marshall St.	2.7	5.8	5.4	19.3	.05	.06	1.9	1.9	.4	.7	.06	.07
Clarkdale	High School Football Stadium	1.1	2.3	4.3	21.0	.08	.12	.8	1.9	.1	.1	.03	.09
Clifton	U.S. Post Office, W. Coronado	1.1	2.1	11.7	22.0	.30	.53	1.1	1.8	.4	.1	.05	.09
Davis Dam	U.S. Bureau of Reclamation	.8	4.8	4.9	13.9	.13	.46	.5	1.9	<.1	.1	.05	.18
Douglas	U.S. 666, 2 km. NNE of stack	.8	2.7	8.7	26.1	1.29	2.26	1.2	3.4	.3	.8	.13	.21
Eagar	Town Hall	11.4	38.1	6.0	11.1	.06	.06	1.5	2.0	.2	.2	.04	.04
Flagstaff	Birch & San Francisco	3.7	11.8	2.2	6.4	.12	.20	.9	1.3	.2	.4	.05	.14
Florence	22nd St. & Willow	1.8	6.6	7.4	26.5	.18	.43	.8	1.8	.2	.3	.08	.14
Hayden	Old Town Jail	3.7	20.3	18.8	64.8	3.64	9.65	4.7	9.1	.7	1.9	.22	.33
Kingman	305 W. Beale St.	2.0	7.3	5.2	12.3	.13	.28	.8	1.4	.3	.4	.06	.23
Lake Havasu City	Lake Havasu Community Hospital	1.4	8.7	3.8	9.4	.09	.12	.7	1.4	.2	.3	.03	.08
Miami	Inspiration, AZ Hwy. 88	1.4	4.9	9.4	31.4	.34	1.07	.8	1.2	.3	.7	.12	.20
Montezuma Castle National Monument	Park Maintenance Building	1.0	2.8	4.2	12.1	.10	.24	.3	.7	.1	.2	.03	.22
Morenci	Stargo, Hwy. 666	1.4	3.7	16.4	54.3	1.09	3.95	1.9	5.9	.1	.2	.16	.26
Nogales	122 La Castellana Drive	3.7	13.0	4.6	9.6	.11	.15	1.8	4.4	.3	1.1	.05	.11
Organ Pipe Cactus National Monument	Visitors Center	.6	3.9	4.8	15.5	.06	.09	.5	1.5	<.1	.1	.03	.09
Page	Airport	1.5	5.7	3.5	10.1	.10	.19	.6	1.8	.2	.3	.05	.17
Paul Spur	Naco Hwy.	.6	2.9	7.7	17.6	.29	.96	.6	1.0	.1	.1	.07	.11
Phoenix	1740 W. Adams St.	6.7	21.8	7.9	19.7	.09	.16	1.5	2.0	1.0	2.8	.14	.23
Prescott	500 S. Marina St.	2.5	15.4	3.4	11.7	.05	.07	.7	2.4	.1	.4	.03	.06
Rillito	2 mi. NW of plant	1.0	4.5	4.3	10.2	.08	.18	1.1	2.2	.1	.4	.06	.13
Rillito	T.G.&E. North Loop Substation, SE of plant	1.8	5.1	5.8	21.8	.24	.99	1.3	2.8	.2	.7	.04	.08
Safford	521 - 10th Ave.	2.5	4.9	7.5	18.8	.13	.20	1.3	1.9	.2	.3	.06	.09
San Manuel	Trailer Park, Hwy. 76	1.2	6.4	12.8	40.5	.64	1.75	1.0	1.9	.2	.5	.14	.29
Show Low	City Hall, Deuce of Clubs	2.7	7.3	3.9	14.1	.08	.13	.7	1.6	.1	.3	.04	.08
Sierra Vista	1st St. & Bartow Drive	1.3	4.1	6.1	12.3	.12	.34	1.0	2.4	.2	.6	.06	.13
Superior	AZ DOT, 951 Main St.	1.8	5.5	6.3	29.2	.17	.36	1.3	2.9	.4	.7	.07	.13
Winslow	Airport	1.1	2.2	3.9	7.9	.11	.12	.6	.8	.4	1.0	.02	.03
Yuma	201 S. Second Ave.	2.4	5.7	4.8	14.6	.06	.08	1.1	1.7	.2	.4	.05	.13

Determinations of concentrations of nitrates, arsenic, cadmium, chromium, cobalt, manganese, and nickel were discontinued after June 1974. Data is available upon request.

Table 9

1974 Sulfur Dioxide Data Summary
(in ug/m^3)

Site	Location	Type of Surveillance[a]	Method	Ann. Avg.	Max. 3-Hr.	Number of Times Standard Exceeded	Max. 24-Hr.	Number of Times Standards Exceeded		% Data Recovery
								Federal Primary	Arizona	
Ajo	AZ DOT, Well Rd.	S	Coul	55[b]	3179	15	1001	9	19	54.8
Chloride	Duval Mineral Park Mine	S	Bubbler	13[c]	NA	NA	55	0	0	98.2
Clifton	U.S. Post Office, W. Coronado	S	Coul	41[b,d]	1526	1	398	0	2	53.4
Davis Dam	U.S. Bureau of Reclamation	S	Bubbler	7	NA	NA	18	0	0	90.2
Douglas	U.S. 666, 2 km. NNE of stack	S	Coul	79	5667	38	1174	17	28	79.6
Douglas	2 km. NNW of stack	S	Coul	130	5284	96	1069	44	75	93.3
Florence	22nd & Willow	P	Bubbler	19	NA	NA	68	0	0	82.0
Grand Canyon	Grand Canyon Village	B	Bubbler	5[b]	NA	NA	16	0	0	56.7
Hayden	Old Town Jail, Canyon Drive	S	Coul	127	4887	52	1110	26	62	88.3
Hayden	Montgomery-Reese Ranch	S	Coul	381[b,e]	4517	27	1503	23	27	68.5
Miami	Inspiration, AZ Hwy. 88	S	Coul	43[f]	2669	5	482	4	8	93.2
Miami	Fire Station	S	Coul	79[g]	2817	5	575	2	5	99.1
Miami	Jones Ranch	S	Coul	170[b,e]	5992	19	1785	10	12	74.9
Morenci	Stargo, U.S. 666	S	Coul	160[h]	5445	82	1175	39	69	76.2
Morenci	U.S. 666, 4.5 km. NW of stack	S	Coul	437[e]	9625	49	2355	25	31	77.7
Page	Airport	S	Bubbler	8	NA	NA	22	0	0	93.4
Phoenix	1845 E. Roosevelt	P	Bubbler	6	NA	NA	20	0	0	76.7
San Manuel	Trailer Park, Hwy. 76	S	Coul	86	4333	32	772	13	28	75.8
Tucson	University of Arizona	P	Bubbler	10	NA	NA	39	0	0	83.3

State and Federal standards: (in ug/m^3)	Annual Average	3-Hour Average	24-Hour Average
State	50	1300	260
Federal Primary	80	--	365
Federal Secondary	--	1300	--

a. B - background, S - source-oriented, P - population-oriented
b. Annual average does not meet EPA's guideline criteria.
c. Based on monitoring period 2/4/74 to 12/31/74
d. Based on monitoring period 1/1/74 to 3/14/74
e. Based on monitoring period 11/1/74 to 12/31/74
f. Based on monitoring period 1/1/74 to 12/5/74
g. Based on monitoring period 12/5/74 to 12/31/74
h. Based on monitoring period 3/14/74 to 12/31/74

Table 10

Long-Term Trends in Sulfur Dioxide 1969-1974
(Annual Averages in ug/m^3)

Site	Location	1969	1970	1971	1972	1973	1974
Ajo	AZ DOT, Well Rd.	98	189	50	43	33	55
Davis Dam	U.S. Bureau of Reclamation	--	--	0	1	2	7
Douglas	2 km. NNW of stack	--	--	--	56	107	130
Florence	22nd St. & Willow	--	--	--	--	25	19
Grand Canyon	Grand Canyon Village	--[a]	--[a]	2	7	8	5
Hayden	Old Town Jail, Canyon Drive	377	481	336	274	191	127
Page	Airport	--	--	--	1	1	8
Phoenix	1845 E. Roosevelt	10	--[a]	10	8	14	6
San Manuel	Trailer Park, Hwy. 76	147	113	101	50	84[b]	86
Tucson	University of Arizona	10	7	7	5	10	10

a. Site was operated by EPA as part of NASN network. Data is unavailable at this time.

b. Sampler relocated in 1973.

3. DATA FROM OTHER SOURCES

Table 11

Abbreviations

In the tables of Section 3, Data from Other Sources, the following abbreviations are used:

General

NA	Not applicable
NR	Not reported
IDR	Insufficient data recovery
SSP	Short sampling period, usually associated with annual means and due to a late start in 1974.
No response	Operator did not respond to request for data

Operators

A-K	Joint operation by American Smelting and Refining Company and Kennecott Copper Corporation
APS	Arizona Public Service Company
Clark	Clark County, Nevada, District Health Department
Des Res	Desert Research Institute, University of Nevada System
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
State	Arizona Department of Health Services, Bureau of Air Quality Control
Ute	Ute Research Laboratories

Equipment Type

Carbon Monoxide	
NDIR	Non-dispersive infrared, continuous
GC	Gas chromatograph, continuous
Hydrocarbons - Non-methane	
GC	Gas chromatograph, continuous
Nitrogen Dioxide	
Color	Colorimetric, continuous
Chem	Chemiluminescent, continuous
Bubbler	Bubbler sampler, 24-hour, arsenite method
Oxidants	
Coul	Coulometric, continuous
Color	Colorimetric, continuous
Chem	Chemiluminescent, continuous
UV	Ultraviolet absorption, continuous
Particulates	
Hi-vol	High-volume air sampler, 24-hour
Sulfur Dioxide	
Coul	Coulometric, continuous
Cond	Conductimetric, continuous
Flame	Flame photometric, continuous total sulfur
Bubbler	Bubbler sampler, 24-hour, pararosaniline method
Color	Colorimetric, continuous

Table 12

1974 Carbon Monoxide Data Summary
(in mg/m^3)

Site	Location	Operator	Method	1-Hr. Avgs. Max.	1-Hr. Avgs. 2nd High.	8-Hr. Avgs. Max.	8-Hr. Avgs. 2nd High.	Number of Samples
Glendale	6000 W. Olive	Maricopa	NDIR	17	15	9	9	1830
Mesa	3rd Place & Center	Maricopa	NDIR	27	26	15	14	6963
Phoenix	1845 E. Roosevelt	Maricopa	NDIR	39	37	25	23	8132
Phoenix	8531 N. 6th St.	Maricopa	NDIR	25	22	11	11	1759
Phoenix	4732 S. Central	Maricopa	NDIR	24	23	13	13	1606
Phoenix	15 E. Monroe	PD	GC	28	25	17	11	8450
Phoenix	1740 W. Adams St.	State	NDIR	27	27	20	20	2128
Scottsdale	2857 N. Miller	Maricopa	NDIR	25	24	12	12	1111
Tucson	151 W. Congress	Pima	NDIR	28	20	13	10	8402
Tucson	22nd & Craycroft	Pima	NDIR	28	23	13	9	7002
Tucson	32 N. Stone, Home Federal Savings Tower, 3rd Floor	PD	GC	22	21	10	9	8325
Yuma	201 S. Second	State	NDIR	3	2	1	1	2931

State and Federal standards: (in mg/m^3)	1-Hour Average	8-Hour Average
	40	10

Table 13

1974 Hydrocarbons (Non-Methane) Data Summary
(in ug/m^3)

Site	Location	Operator	Method	3-Hr. Avgs. 6-9 a.m. Max.	3-Hr. Avgs. 6-9 a.m. 2nd High.	Number of Samples
Phoenix	15 E. Monroe	PD	GC	2338	2266	293
Phoenix	1740 W. Adams St.	State	GC	3500	2650	19
Tucson	32 N. Stone	PD	GC	1092	1070	353

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

Table 14

1974 Nitrogen Dioxide Data Summary
(in ug/m^3)

Site	Location	Operator	Method	Annual Avg.	Maximum 1-Hr.	Maximum 24-Hr.	Number of Samples 1-Hr.	Number of Samples 24-Hr.
Bullhead City	DRI Office, 224 Main St.	Des Res	Bubbler[a]	29	NA	77	NA	55
Davis Dam	DRI Mountain	Des Res	Bubbler[a]	11	NA	19	NA	55
Davis Dam	U.S. Bureau of Reclamation	State	Bubbler	23	NA	68	NA	55
Florence	22nd & Willow	State	Bubbler	23	NA	63	NA	49
Grand Canyon	Grand Canyon Village	State	Bubbler	39	NA	141	NA	20
Joseph City	Laboratory	APS	Bubbler	10	NA	27	NA	141
Joseph City	Leroux Substation, 9.5 mi. SE of Joseph City	APS	Bubbler	8	NA	21	NA	145
Joseph City	Woodruff Substation, 16 mi. SE of Joseph City	APS	Bubbler	7	NA	24	NA	143
Katherine's Landing	Ranger Maint. Yard	Des Res	Bubbler[a]	14	NA	28	NA	56
Page	Airport	SRP	Bubbler	10	NA	10	NA	NR
Page	Airport	State	Bubbler	24	NA	132	NA	61
Petrified Forest National Park	Visitor Center	APS	Bubbler	7	NA	17	NA	134
Phoenix	1845 E. Roosevelt	Maricopa	Color/ Chem[b]	75	376	154	7528	NA
Phoenix	15 E. Monroe	PD	Chem	51	564	130	4093	NA
Phoenix	1845 E. Roosevelt	State	Bubbler	104	NA	184	NA	22
Riviera	Camera Site	Des Res	Bubbler[a]	10	NA	21	NA	58
Riviera	Riverbend	Des Res	Bubbler[a]	15	NA	34	NA	57
St. David	1.8 mi. SW of St. David	State	Color	22	325	83	5120	NA
St. Johns	Airport	SRP	Chem	2	23	NR	5667	NA
Snowflake	8 mi. NNW of Snowflake	SRP	Chem	3[c]	43	NR	NR	NA
Tucson	32 N. Stone	PD	Chem	39	188	65	4457	NA

Table 14 (continued)

Site	Location	Operator	Method	Annual Avg.	Maximum 1-Hr.	Maximum 24-Hr.	Number of Samples 1-Hr.	Number of Samples 24-Hr.
Tucson	22nd & Craycroft	Pima	Color	56	226	136	8033	NA
Tucson	University of Arizona	State	Bubbler	59	NA	144	NA	27

a. Continuous data is available from Desert Research Institute.

b. Color from 1/1/74 - 7/17/74. Chem from 7/17/74 - 12/31/74.

c. For the period 2/14/74 - 8/31/74.

Note: For the bubbler method, accuracy is unknown for 24-hour averages below 5 ug/m^3.

Table 15

1974 Oxidants Data Summary
(in ug/m^3)

Site	Location	Operator	Method	1-Hr. Avgs. Max.	1-Hr. Avgs. 2nd High.	Number of Samples
Coolidge	2 mi. N of Coolidge	PD	Coul	154	130	8131
Davis Dam	DRI Mountain	Des Res	Chem	100	100	8631
Florence	2004 Main St.	PD	Coul	118	116	8221
Glendale	6000 W. Olive	Maricopa	UV	234	194	1819
Page	Airport	SRP	Coul	96	96	NR
Phoenix	1845 E. Roosevelt	Maricopa	UV	294	294	5657
Phoenix	15 E. Monroe	PD	Coul	200	188	8253
Phoenix	1740 W. Adams St.	State	Color	85	80	314
Scottsdale	2857 N. Miller Rd.	Maricopa	UV	69	53	1516
Tucson	32 N. Stone Ave.	PD	Coul	186	140	8657
Tucson	151 W. Congress	Pima	UV	235	215	7352
Tucson	22nd & Craycroft	Pima	Color	294	234	7928
Yuma	201 S. 2nd Ave.	State	UV	330	275	6858

State and Federal Standard: 1-Hour Average
160 ug/m^3

Table 16

1974 Particulates Data Summary
High Volume Sampler
(in ug/m^3)

Site	Location	Operator	Annual Geom. Mean	24-Hr. Avg. Max.	24-Hr. Avg. 2nd High.	Number of Samples
Ajo	Town Square	PD	113	1707	1460	303
Ajo	Oxidation Pond	PD	122	2783	2622	334
Ajo	S. Tailings Dam	PD	92	2230	2114	334
Ajo	Camelback Mountain	PD	34	395	368	338
Ajo	AZ DOT, Well Rd.	State	59	150	142	50
Apache Junction	1 mi. N of Junction (County Yard)	P-G	76	128	120	12
Bodaway	12 mi. W of Cedar Ridge	Ute	30[a]	290	139	95
Boys Ranch	General Motors Proving Grounds	PD	81	374	339	210
Buckeye	NR	PD	191	1531	1217	208
Bullhead City	DRI Office, 224 Main St.	Des Res	180	983	542	54
Carefree	Airport	Maricopa	34	91	78	55
Casa Grande	401 N. Marshall St.	State	142	387	321	29
Chandler	250 E. Commonwealth	Maricopa	132	261	224	57
Clarkdale	Mingus Union High School	State	54	191	97	60
Clifton	Courthouse	Greenlee	61	150	139	59
Clifton	U.S. Post Office, W. Coronado	State	60	96	88	12
Coolidge	2 mi. N of Coolidge	PD	104	490	321	209
Coppermine	NR	Ute	25[a]	441	355	132
Davis Dam	DRI Mountain	Des Res	44	289	109	50
Davis Dam	U.S. Bureau of Reclamation	State	30	95	87	59
Douglas	1012 G Ave. (Mercantile)	PD	96	540	402	280
Douglas	0.75 mi. N 15° E of stack	PD	64	805	407	285
Douglas	Cochise College, 6 mi. N 77° W of stack	PD	97	1756	1092	304
Douglas	Pirtleville, 1.3 mi. N 22.5° E of stack	PD	71	492	410	286
Douglas	15th Street Park	State	100	346	261	20
Douglas	U.S. 666, 2 km. NNE of stack	State	43	97	95	61
Eagar	Town Hall	State	80	154	151	17
Flagstaff	Birch & San Francisco	State	53	124	115	49

Table 16 (continued)

Site	Location	Operator	Annual Geom. Mean	24-Hr. Avg. Max.	24-Hr. Avg. 2nd High.	Number of Samples
Florence	2004 Main St.	PD	133	780	625	207
Florence	22nd St. & Willow	State	85	163	159	52
Fraziers Well	NR	Ute	15[b]	46	44	19
Glendale	6000 W. Olive	Maricopa	SSP	291	139	30[c]
Grand Canyon	Grand Canyon Village	State	17	54	54	24
Green Valley	2 mi. N of Townsite	PD	56	240	176	219
Green Valley	Fire Station	Pima	53	102	90	22
Guadalupe	Pump Station on Encinas Rd.	Maricopa	149	556	535	55
Hayden	Old Town Jail, Canyon Drive	State	181	990	691	56
Hereford	11 mi. W of Bisbee	PD	26	71	67	54
Joseph City	Laboratory	APS	49	285	215	140
Joseph City	Leroux Substation, 9.5 mi. ESE of Joseph City	APS	37	646	140	144
Joseph City	Woodruff Substation, 16 mi. SE of Joseph City	APS	31	278	223	139
Kaibito	NR	Ute	38[a]	325	219	174
Katherine's Landing	NR	Clark	49	153	120	36
Katherine's Landing	Ranger Maint. Yard	Des Res	60	713	269	46
Keams Canyon	NR	Ute	22[a]	260	219	135
Kingman	305 W. Beale St.	State	58	116	110	58
Lake Havasu City	Lake Havasu Community Hospital	State	54	213	114	45
Laveen	St. Johns Mission, 5 mi. S of Laveen	Maricopa	114	416	249	57
Lechee Rock	NR	Ute	33[a]	414	354	87
Lee's Ferry	NR	Ute	38[d]	319	160	81
Litchfield Park	Litchfield & Villa Nueva Rds.	Maricopa	123	226	225	40
Mammoth	County Courthouse	P-G	64	117	105	12
Many Farms	NR	Ute	33[a]	229	148	135
Marana	Marana Air Park	P-G	92	201	139	9
Mesa	3rd Pl. & Center	Maricopa	132	330	322	50
Mescal	El Paso Natural Gas Company Station, 9 mi. W of Benson	PD	41	288	249	218
Miami	Inspiration, AZ Hwy. 88	State	59	174	130	53
Moccasin	Pipe Springs National Monument Museum	Ute	23[a]	253	252	147

Table 16 (continued)

Site	Location	Operator	Annual Geom. Mean	24-Hr. Avg. Max.	24-Hr. Avg. 2nd High.	Number of Samples
Montezuma Castle National Monument	Park Maint. Bldg.	State	27	72	64	58
Morenci	East Plantsite, 2.5 mi. S 35° E of stack	PD	66	601	575	350
Morenci	Eagle Creek Rd., 4.75 mi. S 84° W of stack	PD	36	177	143	336
Morenci	Cadillac Pt., 2.75 mi. N 51° W of stack	PD	40	196	171	338
Morenci	Oroville, 2.75 mi. 48° E of stack	PD	45	266	184	325
Morenci	Tailings Pump House, 2.9 mi. S 19° E of stack	PD	39	430	405	353
Morenci	Power House, 0.1 mi. N 7° W of stack	PD	132	1048	599	355
Morenci	Stargo, 1.5 mi. N 63° W of stack	PD	59	497	343	356
Morenci	Clifton Fina, 1.75 mi. S 69° E of stack	PD	61	378	344	354
Morenci	Metcalf, 3.9 mi. N 28° W of stack	PD	34	164	134	292[e]
Morenci	Silver Basin, 1.9 mi. S 51° W of stack	PD	52	439	363	278[f]
Morenci	Stargo, Hwy. 666	State	56	159	115	44
Nogales	122 La Castellana Drive	State	121	408	375	44
Oracle Junction	NR	PD	36	214	146	217
Oraibi	NR	Ute	20[a]	219	137	122
Organ Pipe Cactus National Monument	Visitors Center	State	23	92	84	44
Page	Airport	SRP	38	541	506	338
Page	Airport	State	48	139	127	59
Paradise Valley	1602 E. Greenway	Maricopa	60	171	132	52
Paradise Valley	3456 E. Sweetwater	Maricopa	189	351	345	55
Paul Spur	Naco Hwy.	State	75	117	111	30
Payson	NR	P-G	213	528	372	13
Peach Springs	NR	Ute	27[g]	444	103	48
Petrified Forest National Park	NR	APS	23	200	104	142

Table 16 (continued)

Site	Location	Operator	Annual Geom. Mean	24-Hr. Avg. Max.	24-Hr. Avg. 2nd High.	Number of Samples
Phoenix	1845 E. Roosevelt	Maricopa	168	324	322	53
Phoenix	500 S. 3rd Ave.	Maricopa	178	480	455	56
Phoenix	4732 S. Central	Maricopa	179	359	287	43
Phoenix	3602 W. Elwood	Maricopa	166	369	324	59
Phoenix	8531 N. 6th St.	Maricopa	124	321	251	51
Phoenix	15 E. Monroe	PD	144	762	684	343
Phoenix	1740 W. Adams	State	127	460	295	34
Phoenix	1845 E. Roosevelt	State	106	326	182	24
Pinon	NR	Ute	24[a]	81	75	90
Prescott	500 S. Marina St.	State	45	163	110	40
Red Rock	NR	Ute	27[h]	178	120	163
Rillito	2 mi. NW of plant	State	89	225	191	50
Rillito	T.G.&E. North Loop Substation, SE of plant	State	69	141	138	55
Riviera	Camera Site	Des Res	54	263	207	56
Riviera	Riverbend	Des Res	180	598	551	55
Roosevelt Dam	NR	P-G	46	97	73	10
Safford	521 - 10th Ave.	State	105	230	224	30
St. Johns	Airport	SRP	20	74	74	133[i]
San Manuel	Trailer Park, Hwy. 76	State	66	141	134	53
Scottsdale	2857 N. Miller	Maricopa	116	218	216	39
Scottsdale	13665 N. Scottsdale Rd.	Maricopa	138	328	259	37
Show Low	City Hall, Deuce of Clubs	State	49	180	110	42
Sierra Vista	1st St. & Bartow Drive	State	61	180	111	52
Snowflake	8 mi. NNW of Snowflake	SRP	40	183	102	43[j]
Stanfield	County Courthouse	P-G	182	420	348	12
Sun City	Boswell Memorial Hospital, 10401 W. Thunderbird	Maricopa	72	164	134	50
Supai	NR	Ute	105[k]	567	538	149
Superior	AZ DOT, 951 Main St.	State	84	429	214	46
Tasi Schizz Rock	NR	Ute	24[a]	452	290	184

Table 16 (continued)

Site	Location	Operator	Annual Geom. Mean	24-Hr. Avg. Max.	24-Hr. Avg. 2nd High.	Number of Samples
Teec Nos Pos	NR	Ute	30[a]	201	184	134
Tuba City	NR	Ute	23[k]	226	173	146
Tucson	32 N. Stone, Home Federal Savings Tower, 3rd Floor	PD	64	454	240	357
Tucson	151 W. Congress	Pima	77	202	200	197
Tucson	1018 S. 6th Ave.	Pima	107	546	178	23
Tucson	1970 W. Ajo Way	Pima	60	112	83	23
Tucson	Davis Monthan AFB	Pima	80	142	117	24
Tucson	7901 E. Scarlett St.	Pima	89	132	132	25
Tucson	7920 E. Tanque Verde	Pima	47	92	88	22
Tucson	1010 W. Prince Rd.	Pima	81	182	142	24
Tucson	Orange Grove Rd. & El Camino de Terra	Pima	76	301	154	24
Tucson	Oracle & Magee Rds.	Pima	65	198	187	25
Tucson	University of Arizona	State	69	114	111	25
Vail	El Paso Natural Gas Company Station	PD	39	203	149	220
Vail	Corona de Tucson, 8 mi. S of Vail, APS Substation	Pima	25	54	45	24
Winslow	Airport	State	28	86	74	13
Yuma	201 S. 2nd Ave.	State	111	308	211	61

Standards (in ug/m^3):

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

a. From July 1973 through July 1974
b. From August 1973 through February 1974
c. From June through December 1974
d. From June 1973 through June 1974
e. From February through December 1974
f. From March through December 1974
g. From November 1973 through February 1974
h. From May 1973 through May 1974
i. From February 1974 through February 1975
j. From February through August 1974
k. From August 1973 through July 1974

Table 17

1974 Sulfur Dioxide Data Summary
(in ug/m^3)

Site	Location	Operator	Method	Ann. Avg.	3-Hr. Avgs. Max.	3-Hr. Avgs. 2nd High.	24-Hr. Avgs. Max.	24-Hr. Avgs. 2nd High.	No. of Samples 1-Hr.	No. of Samples 24-Hr.
Ajo	New Cornelia (Town Square)	PD	Coul	32	1817	1604	399	380	7119	NA
Ajo	New Cornelia (Oxidation Pond)	PD	Coul	101	2256	2224	974	880	8244	NA
Ajo	New Cornelia (S. Tailings Dam)	PD	Coul	26	5591	1757	1447	397	8344	NA
Ajo	New Cornelia (Camelback Mountain)	PD	Coul	31	2395	1831	660	570	8167	NA
Ajo	AZ DOT, Well Rd.	State	Coul	55[a]	3179	2665	1001	748	4799	NA
Buckeye	NR	PD	Coul	7	546	69	131	28	7489	NA
Bullhead City	DRI Office, 224 Main St.	Des Res	Bubbler[b]	<13	NA	NA	<13	<13	NA	56
Chloride	Duval Mineral Park Mine	State	Bubbler	13[a]	NA	NA	55	40	NA	55
Clifton	Greenlee County APC Office	Greenlee	Cond	45	2471	2395	645	592	8160	NA
Clifton	U.S. Post Office, W. Coronado Blvd.	State	Coul	41[a]	1526	1110	398	286	931	NA
Coolidge	NR	PD	Coul	11	297	269	99	95	6277	NA
Davis Dam	DRI Mountain	Des Res	Bubbler[b]	<13	NA	NA	<13	<13	NA	55
Davis Dam	U.S. Bureau of Reclamation	State	Bubbler	7	NA	NA	18	18	NA	55
Double Adobe	Approx. 11 mi. N 33° W of smelter stack	PD	Coul	9	2478	1432	470	205	7036	NA
Douglas	Mercantile	PD	Coul	82	7576	4823	1190	1057	7916	NA
Douglas	North	PD	Coul	117	6382	4146	1375	848	8350	NA
Douglas	West	PD	Coul	29	3150	2990	762	527	8348	NA
Douglas	Pirtleville	PD	Coul	97	10144	4841	1761	919	7494	NA
Douglas	Hill, approx. 5.5 mi. N 21° W of smelter stack	PD	Coul	59[c]	3278	2685	714	564	4679	NA
Douglas	El Paso, approx. 8 mi. N 45° E of smelter stack	PD	Coul	40[d]	1874	980	272	230	3988	NA
Douglas	Fairgrounds, approx. 3.08 mi. N 55° E of smelter stack	PD	Coul	56[e]	2603	2078	697	577	7840	NA
Douglas	Curtis, approx. 2.58 mi. N 30° W of smelter stack	PD	Coul	87[e]	5247	4928	931	826	7570	NA
Douglas	Northwest, approx. 1.24 mi. N 21.3° W of smelter stack	PD	Coul	158[e]	7210	5413	1275	1013	7566	NA
Douglas	Fir, approx. 1.4 mi. N 49° E of smelter stack	PD	Coul	70[e]	4738	3331	869	678	7491	NA
Douglas	Martin, approx. 4.21 mi. N 20° E of smelter stack	PD	Coul	50[e]	2338	2214	707	464	7612	NA
Douglas	U.S. 666, 2 km. NNE of stack	State	Coul	79	5667	4333	1174	968	6970	NA
Douglas	2 km. NNW of stack	State	Coul	130	5284	4683	1069	900	8172	NA
Florence	NR	PD	Coul	28	790	617	212	171	7527	NA
Florence	22nd & Willow Sts.	State	Bubbler	19	NA	NA	68	46	NA	50

Table 17 (continued)

Site	Location	Operator	Method	Ann. Avg.	3-Hr. Avgs. Max.	3-Hr. Avgs. 2nd High.	24-Hr. Avgs. Max.	24-Hr. Avgs. 2nd High.	No. of Samples 1-Hr.	No. of Samples 24-Hr.
Glendale	6000 W. Olive	Maricopa	Cond	25[f]	156	118	72	68	1148	NA
Grand Canyon	Grand Canyon Village	State	Bubbler	5[a]	NA	NA	16	9	NA	17
Green Valley	NR	PD	Coul	3	148	114	35	34	7480	NA
Hayden	Kearny	A-K	Coul	42	1149	991	290[g]	200[g]	8067	NA
Hayden	Crescent Ranch	A-K	Coul	80	1991	1681	601[g]	531[g]	7961	NA
Hayden	Hayden Junction	A-K	Coul	115	2466	2258	542[g]	542[g]	7794	NA
Hayden	Montgomery Ranch	A-K	Coul	262	4848	4205	1442[g]	1161[g]	7593	NA
Hayden	Hayden	A-K	Coul	174	5422	3466	1337[g]	915[g]	7517	NA
Hayden	Globe Highway	A-K	Coul	317	5916	5874	2379[g]	1874[g]	8163	NA
Hayden	Winkelman School	A-K	Coul	58[h]	2105	2105	397[g]	370[g]	7011	NA
Hayden	Meadows	A-K	Coul	42	1814	1315	385[g]	328[g]	7870	NA
Hayden	Old Town Jail, Canyon Drive	State	Coul	127	4887	3366	1110	830	7739	NA
Hayden	Montgomery-Reese Ranch	State	Coul	381[a]	4517	2717	1503	1473	1003	NA
Hereford	NR	PD	Coul	15[i]	937	542	174	169	2390	NA
Joseph City	Laboratory	APS	Bubbler/ Flame[j]	1	54[e]	52[e]	16	12	NR	139
Joseph City	Leroux Substation, 9.5 mi. ESE of Joseph City	APS	Bubbler/ Flame[j]	2	44[k]	41[k]	25	17	NR	137
Joseph City	Woodruff Substation, 16 mi. SE of Joseph City	APS	Bubbler/ Flame[j]	1	67[e]	63[e]	16	12	NR	136
Katherine's Landing	Ranger Maint. Yard	Des Res	Bubbler[b]	<13	NA	NA	<13	<13	NA	56
Mammoth	NR	Magma	Coul	20	1755	1520	419	314	6463	NA
McNeal	Approx. 17.2 mi. N 27° W of smelter stack	PD	Coul	8[c]	1155	672	215	175	4825	NA
Mescal	NR	PD	Coul	6	368	300	115	99	7583	NA
Miami	Inspiration, AZ Hwy. 88	State	Coul	43[a]	2669	1992	482	440	7573	NA
Miami	Fire Station	State	Coul	79[a]	2817	2783	575	546	627	NA
Miami	Jones Ranch	State	Coul	170[a]	5992	5575	1785	1629	1096	NA
Morenci	Clifton Dispensary, approx. 3.2 mi. SE of smelter	PD	Cond	83[l]	1661	1635	831	787	4154	NA
Morenci	East Plantsite	PD	Coul	36	3254	2525	707	451	6908	NA
Morenci	Eagle Creek Rd.	PD	Coul	48	2550	1705	576	526	7125	NA
Morenci	Cadillac Point-5500	PD	Coul	267	8090	6334	2276	2110	6113	NA
Morenci	Oroville	PD	Coul	60	2164	1970	466	423	6948	NA
Morenci	Stargo	PD	Coul	269	8485	6307	2502	1848	7119	NA

Table 17 (continued)

Site	Location	Operator	Method	Ann. Avg.	3-Hr. Avgs. Max.	3-Hr. Avgs. 2nd High.	24-Hr. Avgs. Max.	24-Hr. Avgs. 2nd High.	No. of Samples 1-Hr.	No. of Samples 24-Hr.
Morenci	Clifton Fina	PD	Coul	116	3922	3279	1471	967	7869	NA
Morenci	Metcalf, approx. 3.9 mi. N 28° W from smelter stack	PD	Coul	163[e]	6355	5891	1607	1133	5918	NA
Morenci	Silver Basin, approx. 1.9 mi. S 51° W from smelter stack	PD	Coul	192[h]	5042	4296	1596	1542	5518	NA
Morenci	Stargo	State	Coul	160[a]	5445	4660	1175	1004	5357	NA
Morenci	U.S. 666, 4.5 km. NW of stack	State	Coul	437[a]	9625	6367	2355	1824	1138	NA
Oracle	NR	Magma	Coul	20	1441	1153	314	262	5892	NA
Oracle Junction	NR	PD	Coul	12	1465	521	507	180	7674	NA
Page	Airport	SRP	Bubbler/ Cond[m]	<1	117	94	13	8	NA	NR
Page	105°, 3.6 km. from Navajo Generating Station	SRP	Flame	NR	105	42	26	13	NR	NA
Page	256°, 3.2 km. from Navajo Generating Station	SRP	Flame	NR	39	26	16	11	NR	NA
Page	186°, 7.6 km. from Navajo Generating Station	SRP	Flame	NR	18	13	8	5	NR	NA
Page	174°, 23.3 km. from Navajo Generating Station	SRP	Flame	NR	24	8	8	3	NR	NA
Page	265°, 23.6 km. from Navajo Generating Station	SRP	Flame	NR	68	68	18	16	NR	NA
Page	269°, 24.6 km. from Navajo Generating Station	SRP	Flame	NR	189	52	31	18	NR	NA
Page	257°, 25.1 km. from Navajo Generating Station	SRP	Color	NR	107	68	29	16	NR	NA
Page	123°, 8.7 km. from Navajo Generating Station	SRP	Flame	NR	84	55	26	24	NR	NA
Page	218°, 7.4 km. from Navajo Generating Station	SRP	Flame	NR	47	34	13	5	NR	NA
Page	170°, 6.6 km. from Navajo Generating Station	SRP	Color	NR	21	8	11	8	NR	NA
Page	246°, 11.3 km. from Navajo Generating Station	SRP	Color	NR	42	18	13	11	NR	NA
Page	135°, 3.5 km. from Navajo Generating Station	SRP	Color	NR	21	8	13	8	NR	NA
Page	204°, 4.5 km. from Navajo Generating Station	SRP	Color	NR	45	18	13	11	NR	NA
Page	283°, 24.4 km. from Navajo Generating Station	SRP	Color	NR	13	11	8	8	NR	NA
Page	194°, 19.3 km. from Navajo Generating Station	SRP	Color	NR	16	11	8	8	NR	NA
Page	252°, 28.1 km. from Navajo Generating Station	SRP	Color	NR	100	55	24	21	NR	NA
Page	192°, 15.7 km. from Navajo Generating Station	SRP	Flame	NR	21	16	5	3	NR	NA
Page	172°, 9.8 km. from Navajo Generating Station	SRP	Color	NR	18	11	11	8	NR	NA
Page	168°, 9.1 km. from Navajo Generating Station	SRP	Color	NR	16	0	8	0	NR	NA
Page	158°, 11.4 km. from Navajo Generating Station	SRP	Flame	NR	29	0	11	0	NR	NA
Page	144°, 8.7 km. from Navajo Generating Station	SRP	Color	NR	21	18	11	11	NR	NA
Page	Airport	State	Bubbler	8	NA	NA	22	20	NA	57
Petrified Forest National Park	NR	APS	Bubbler/ Flame[j]	1	82	65	14	11	NR	129

Table 17 (continued)

Site	Location	Operator	Method	Ann. Avg.	3-Hr. Avgs. Max.	3-Hr. Avgs. 2nd High.	24-Hr. Avgs. Max.	24-Hr. Avgs. 2nd High.	No. of Samples 1-Hr.	No. of Samples 24-Hr.
Phoenix	1845 E. Roosevelt	Maricopa	Cond	8	150	98	50	45	6013	NA
Phoenix	29th Floor of the Valley Bank Center	PD	Coul	16	217	184	92	88	7942	NA
Phoenix	NR	PD	Coul	12[n]	155	110	58	53	5552	NA
Phoenix	1845 E. Roosevelt	State	Bubbler	6	NA	NA	20	19	NA	23
Redington	NR	Magma	Coul	17	1441	943	262	157	6248	NA
Riviera	Camera Site	Des Res	Bubbler[b]	<13	NA	NA	<13	<13	NA	57
Riviera	Riverbend	Des Res	Bubbler[b]	<13	NA	NA	<13	<13	NA	57
St. Johns	Airport	SRP	Coul	5	362	358	90	37	7242	NA
San Manuel	Townsite	Magma	Coul	124	4009	3982	865	576	6642	NA
San Manuel	Golf Course	Magma	Coul	129	4297	3668	1022	681	6595	NA
San Manuel	Peppersauce	Magma	Coul	58[h]	4664	1310	812	393	5270	NA
San Manuel	Mine	Magma	Coul	73	3904	2987	917	812	4985	NA
San Manuel	Trailer Park, Hwy. 76	State	Coul	86	4333	2958	772	716	6640	NA
Snowflake	NR	SRP	Coul	6[o]	NR	NR	NR	NR	NR	NA
Tucson	6th Floor of Home Federal Savings Tower	PD	Coul	8	254	218	82	80	8029	NA
Tucson	151 W. Congress	Pima	Flame	6	87	86	42	33	4621	NA
Tucson	22nd & Craycroft	Pima	Coul	7	340	140	52	33	7707	NA
Tucson	University of Arizona	State	Bubbler	10	NA	NA	39	29	NA	25
Vail	NR	PD	Coul	5	440	216	119	111	7709	NA

Note: For the bubbler method, accuracy is unknown for 24-hour averages below 25 ug/m^3.

a. Annual average does not meet EPA's guideline criteria.
b. Continuous data is available from Desert Research Institute.
c. From January through July 1974
d. From January through June 1974
e. From February through December 1974
f. From November through December 1974
g. 24-Hour averages are for midnight to midnight, rather than running averages.
h. From March through December 1974
i. From September through December 1974
j. Bubbler data was reported for annual and 24-hour averages and flame data was reported for 3-hour average.
k. From February through April 1974
l. From January through August 1974
m. Bubbler data was reported for annual and 24-hour averages and cond data was reported for 3-hour average.
n. From May through December 1974
o. From February through August 1974

A P P E N D I C E S

APPENDIX A

EPA Guidelines for Location of Samplers

Specific guidelines for locating air monitoring instruments in areas of estimated maximum pollutant concentrations are given in the table attached[a]. General guidelines in addition to the specific guidelines in the table include:

1. Avoid locations where there are restrictions to air flow in the vicinity of the air inlet such as buildings, parapets, trees, etc.

2. Avoid locations that are influenced by downwash from a minor local source such as a stack on the roof of a building where the air inlet is located.

3. Avoid locations that are influenced by reentrainment of ground dust such as close to ground level near unpaved roads or other dusty surfaces. The sampler should be elevated 10 to 20 feet above ground level to avoid these problems.

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a. "Sampling Location Guidelines," Environmental Protection Agency, National Environmental Research Center, Division of Atmospheric Surveillance, Research Triangle Park, November, 1971.

SAMPLING LOCATION GUIDELINES FOR AREAS OF ESTIMATED MAXIMUM POLLUTANT CONCENTRATION

POLLUTANT CATEGORY	POLLUTANT	STATION LOCATION	POSITION OF AIR INLET		
			Height from Ground, ft.	Vertical Clearance Above Supporting Structure, ft.	Horizontal Clearance Beyond Supporting Structure, ft.[1]
Primary Stationary Source Pollutant	1. SO_2	Determined from atmospheric diffusion model, historical data, emission density, or other information and representative of population exposure.	<50	>3	>5
	2. NO_2	Same as above	<50	>3	>5
	3. Particulates	Same as above.	<50	>3	>3
Primary Mobile Source Pollutant	1. CO (1-hr. averaging time)	Representing area of high traffic density, slow moving traffic and obstructions to air flow (tall buildings) and pedestrian population such as major downtown traffic intersections. <20' from street curb.	<15	>3	>3
	2. CO (8-hr. averaging time)	Representing area of high traffic density in residential area such as major thoroughfare in center city or suburban area. <50' from street curb.	<15	>3	>3
Secondary Pollutant	1. O_x	Representing residential area downwind of downtown area (5-15 miles from downtown and >300' from major traffic arteries or parking areas).	<50	>3	>5
	2. NO_2	Representing residential area downwind of downtown area (<5 miles from downtown).[2]	<50	>3	>5

[1] Not applicable where air inlet is located above supporting structure.
[2] Downwind of prevailing daytime wind direction during the oxidant season.

APPENDIX B

EPA Rules and Regulations for Sampling and Analysis

1. Reference Methods

The reference methods for sampling and analysis were published by EPA on April 30, 1971 in conjunction with the National Primary and Secondary Ambient Air Quality Standards[a]. Since then, there has been one change in the reference methods. The original reference method for NO_2, the Jacobs-Hochheiser method, was found to be inaccurate and was discontinued by EPA. Official notice of rejection of the method was published on June 8, 1973[b]. As replacement, three tentative candidate methods have been proposed. These methods and all other reference methods are listed below.

Pollutant	Reference Method
Carbon monoxide	Non-dispersive infrared spectrometry
Hydrocarbons (non-methane)	Gas chromatographic separation-Flame ionization detection
Nitrogen dioxide	Candidate methods: 1. sodium arsenite bubbler 2. chemiluminescence 3. colorimetry
Oxidants	Chemiluminescence (ethylene method)
Particulates	High volume sampling
Sulfur dioxide	Pararosaniline bubbler

2. Equivalent Methods

Equivalent methods were initially published by EPA on August 14, 1971 in conjunction with the requirements for preparation, adoption, and submittal of

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a. "National Primary and Secondary Ambient Air Quality Standards," Federal Register, Volume 36, Number 84, April 30, 1971.

b. "Ambient Air Quality Standards, Reference Method for Determination of Nitrogen Dioxide," Federal Register, Volume 38, Number 110, June 8, 1973.

implementation plans[c]. These methods are listed below.

Pollutant	Equivalent Method, 1971-1974
Carbon monoxide	Gas chromatographic separation-Catalytic conversion-Flame ionization detection
Hydrocarbons	none
Nitrogen dioxide	none
Oxidants	1. KI colorimetry (provided a correction is made for SO_2 and NO_2) 2. U.V. photometry (provided a correction is made for interferences) 3. Chemiluminescence differing from reference method
Particulates	Tape sampler
Sulfur dioxide	1. Gas chromatographic separation-Flame photometric detection (provided teflon sample lines are used) 2. Flame photometry (provided interfering sulfur compounds are removed) 3. Coulometry (provided interferences such as O_3, NO_2, and H_2S are removed 4. Automated pararosaniline method

Any other methods used, together with those listed above, were considered equivalent if they met EPA performance specifications.

On February 18, 1975 EPA published new rules and regulations which substantially changed the definition of equivalent methods for CO, oxidants, and SO_2.[d] Any CO, O_x, and SO_2 method which meets EPA performance specifications in accordance with EPA testing procedures is considered equivalent. Performance specifications and test procedures are detailed in the new rules. Instrument manufacturers will test their instruments and submit the test results to EPA for certification. EPA may test instruments in certain cases. Notice of

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c. "Requirements for Preparation, Adoption, and Submittal of Implementation Plans," Federal Register, Volume 36, Number 158, August 14, 1971.

d. "Ambient Air Monitoring Reference and Equivalent Methods," Federal Register, Volume 40, Number 33, February 18, 1975.

certification for an instrument will be published in the Federal Register within 15 days of certification.

EPA has requested that any methods not designated as equivalent or reference be replaced within the following time limits:

Continuous methods for SO_2, CO, and O_x - within 5 years

Manual methods for SO_2, CO, and O_x - within 6 months.

The new equivalency rules do not apply to hydrocarbons, nitrogen dioxide, or particulates. Guidance for the selection of automated methods for hydrocarbons and nitrogen dioxide may be found in the EPA Environmental Monitoring Series document (EPA-650/4-74-018), "Guidelines for Determining Performance Characteristics of Automated Methods for Measuring Nitrogen Dioxide and Hydrocarbons Corrected for Methane in Ambient Air," November, 1974.

APPENDIX C

EPA Guidelines for Data Evaluation

Data evaluation guidelines are discussed in detail in several EPA documents[a,b,c,d]. The key points are summarized below.

1. Suggested Reporting Accuracy for Raw Data

Pollutant	Number of Decimal Places ug/m^3	ppm
Suspended particulates	0	--
Benzene soluble organics	1	--
Sulfates	1	--
Carbon monoxide	1*	0
Hydrocarbons	1	1
Nitrogen dioxide	0	2
Oxidants	0	2
Ozone	0	3
Sulfur dioxide	0	2

*mg/m^3

2. Minimum Detectable Limits

Pollutant	Sampling Method	Minimum Detectable Limits - ug/m^3
Carbon monoxide	Nondispersive IR	.6*
Oxidants	Colorimetric (Neut. KI)	20
Particulates	Hi-vol	1.0
Sulfates	Hi-vol	.5
Sulfur dioxide	Gas bubbler	5.0

*mg/m^3

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a. "Guidelines for the Evaluation of Air Quality Data," QAQPS No. 1.2-015, U.S. Environmental Protection Agency, Research Triangle Park, N.C., February 1974.

b. "Guidelines for the Evaluation of Suspect Air Quality Data," QAQPS No. 1.2-006, U.S. Environmental Protection Agency, RTP, NC, February 1974.

c. "Guidelines for the Evaluation of Air Quality Trends," QAQPS No. 1.2-014, U.S. Environmental Protection Agency, RTP, NC, February 1974.

d. "Guidelines for the Interpretation of Air Quality Standards," U.S. Environmental Protection Agency, RTP, NC, August, 1974.

3. Summary Criteria for Continuous Measurements

Time Interval	Minimum Number of Observations
3-Hour	3 consecutive hourly observations
8-Hour	6 hourly observations
24-Hour	18 hourly observations
Monthly	21 daily observations
Quarterly	3 consecutive monthly averages
Yearly	9 monthly averages with at least two monthly averages per quarter

For continuous measurements, at least 75% of the total possible observations should be present before summary statistics are calculated. The summary criteria are required because of the strong seasonal and diurnal patterns in air quality data.

While these conventions are used in general, it is possible to modify them for certain applications. For the most part, the general intention of these restrictions is to ensure adequate coverage for an annual mean. For peak value statistics such as the number of times a certain value is exceeded, the constraint is not essential in showing violations. For example, two hourly oxidant values in excess of the standard are sufficient to show non-compliance even if there were no other observations that year.

4. Criteria for Counting Number of Violations of Air Quality Standards

In counting violations of the three-, eight-, and twenty-four hour standards for CO and SO_2, the question of overlapping time intervals arises. The rule is that time intervals counted as violations must not contain any common hourly observations. In other words, the time intervals--three-, eight-, or twenty-four hours--are discrete, non-overlapping periods.