

1973

**AIR QUALITY DATA
FOR ARIZONA**



State Department of Health Services

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SEPTEMBER 1974

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ACKNOWLEDGEMENTS

Grateful acknowledgement is made of the assistance provided by the following in supplying air quality data for the preparation of this report:

Mr. Lloyd Kostow, U.S. Environmental Protection Agency, Region IX
Mr. Jim Layden, Maricopa County Health Department
Mr. Richard Bloomingdale, Pima County Health Department
Mr. L. C. Kopisch, Pinal-Gila Counties Air Quality Control District
Ms. Janette Smith, District Health Department, Clark County, Nevada
Mr. James Weiss, Arizona Public Service Company
Mr. M. J. Winkel, American Smelting and Refining Company
Mr. I. G. Pickering, Kennecott Copper Corporation
Mr. Robert Groves, Magma Copper Company
Dr. J. D. Forrester, Phelps Dodge Corporation
Dr. Edwin Roberts, Dames & Moore (Salt River Project).

Mr. R. Bruce Scott, Manager, Air Quality Section, Arizona State Bureau of Air Pollution Control, coordinated the collection of the air quality data included herein and directed the preparation of this report. He was assisted by Mr. Jim Guyton and Mr. Duane Calkins of the Air Quality Section.

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1. INTRODUCTION

In accordance with United States Environmental Protection Agency pre-maintenance grant agreement No. A009053, a survey was made evaluating all air pollution monitoring devices being operated in the State of Arizona. A report, presenting the results of the survey, was published in December 1973.

The survey revealed that:

- a. a total of 329 ambient air quality monitoring instruments or devices were being operated in the State of Arizona,
- b. several companies, universities, research facilities, and other agencies operated extensive networks of monitoring devices, and
- c. many of the monitoring devices were in areas not monitored by the State or which would complement the State's network.

After review of the above survey results, it was concluded that an effort should be made to compile a State of Arizona Air Quality Report and include data from as many devices identified in the inventory report as possible. The State of Arizona annually prepares such a report for its network of monitoring devices. "Air Quality Monitoring Network Data - 1973" was published in March 1974 and made available to the public by the Bureau of Air Pollution Control.

A letter was sent to the respondents of the monitoring devices inventory report requesting that air quality data developed by the identified devices be submitted for the calendar year 1973. The Bureau proposed to act as the "clearinghouse" for the data submitted and to publish the resultant air quality data in report form. This report is the tabulation of the submitted air quality data.

It should be noted that data is not included herein for all of the identified 329 ambient air quality monitoring instruments being operated in Arizona. It was

found that a number of the instruments included in the original inventory were research instruments and that data which could be compared with Federal or State standards were not available. These instruments are not tabulated in this report. In addition, some operators of identified monitoring sites did not submit the requested air quality data. Those sites, however, are still noted in this report. It should be noted further that additional sites were identified as the result of the request for data. These new sites and the associated air quality data are included.

Table I
ABBREVIATIONS

In the data tables of subsequent sections of this report, the following abbreviations are used:

General

N/R	Data not reported or available
I/S	Insufficient sampling, normally associated with annual averages
No response	Operator did not respond to request for data

Operators

<u>State</u>	Arizona Department of Health Services, Bureau of Air Pollution Control
EPA	United States Environmental Protection Agency
Maricopa	Maricopa County Health Department, Bureau of Air Pollution Control
Pima	Pima County Health Department, Air Pollution Control District
Pinol-Gila	Pinol-Gila Counties Air Quality Control District
Greenlee	County of Greenlee, Air Pollution Control
Clark	Clark County, Nevada, District Health Department
Colo Plat	Colorado Plateau Environmental Advisory Council
NAU	Northern Arizona University
Desert Res.	Desert Research Institute, University of Nevada System
Ute Lab.	Ute Research Laboratories, Utah
APS	Arizona Public Service Company
A-K	Joint installation of the American Smelting and Refining Company and the Kennecott Copper Corporation
Magma	Magma Copper Company
PD	Phelps Dodge Corporation
SRP	Salt River Project

Equipment Type

Particulates

Hi-vol	Hi-volume air sampler, 24-hour
Neph	Nephelometer, continuous

Sulfur Dioxide

Coul	Coulometric, continuous
Cond	Conductimetric, continuous
Flame	Flame photometric, continuous total sulfur
Bubbler	Bubbler sampler, 24-hour, West-Gaeke

Carbon Monoxide

Cond	Conductimetric, continuous
IR	Nondispersive infrared, continuous
Gas	Gas chromatograph, continuous

Nitrogen Dioxide

Color	Colorimetric, continuous
Chem	Chemiluminescence, continuous
Bubbler	Bubbler sampler, 24-hour, Arsenite or Saltzman methods

Hydrocarbons

Gas	Gas chromatograph, continuous
FI	Flame ionization, continuous

Oxidants

Coul	Coulometric, continuous
Color	Colorimetric (neutral KI), continuous
Chem	Chemiluminescence, continuous
UV	Ultraviolet absorption, continuous

2. PARTICULATES

2.1 Particulate Monitoring Network

As is shown in Table II, a total of 131 particulate monitoring devices were operational in the State of Arizona in 1973. An additional 15 devices have been or may be added to the State's network during 1974.

2.2 Methodology

In accordance with 40 CFR Part 50, Appendix B, and Part 51.17, the use of high-volume or tape samplers are EPA approved methods for measuring suspended particulate matter. The minimum frequency of high-volume sampling is one 24-hour sample every 6 days, which is equivalent to 61 random samples per year. Pre-weighed, glass-fiber filters are used to capture the particles. One sample every 2 hours is the minimum sampling frequency for tape samplers.

2.3 Air Quality Data

Table III presents particulate air quality data for the State of Arizona for 1973. The Federal and Arizona State air quality standards for suspended particulates are noted for reference purposes.

Table II
PARTICULATE MONITORING DEVICES

<u>Operator</u>	<u>Devices Operational in 1973</u>	<u>New Devices (in 1974)</u>	<u>Total</u>
Arizona Bureau of Air Pollution Control	21	8	29
United States Environmental Protection Agency	11	--	11
Maricopa County Health Department	16	6	22
Pima County Health Department	12	--	12
Pinal-Gila Counties Air Quality Control District	6	1*	7
Clark County, Nevada, District Health Department	1	--	1
Northern Arizona University	6	--	6
Desert Research Institute	5	--	5
Ute Research Laboratories	14	--	14
Arizona Public Service Company	5	--	5
American Smelting and Refining Company	6**	--	6**
Kennecott Copper Corporation	6**	--	6**
Phelps Dodge Corporation	26	--	26
Salt River Project	2	--	2
Grand Total	131	15	146

Note: * - One site which existed in 1973 was not operational.

** - Joint installations.

Table III
AIR QUALITY DATA
PARTICULATES
1973

County and Site	Location	Operator	Equip. Type	Air Quality Data, ug/m ³			No. of Samples
				Annual Geom. Mean	24-Hr. Max.	Averages Second High.	
Federal (U.S. EPA) Air Quality Standards - Primary				75	--	260	
	- Secondary			60	--	150	
Arizona State Air Quality Standards				60	150	--	
<u>Apache</u>							
Springerville	To be installed in 1974	State	Hi-vol	(Not operational in 1973.)			
Cove	Near Red Rock	Ute Lab.	Hi-vol	(Data not submitted by EPA)			
Many Farms		Ute Lab.	Hi-vol	(Data not submitted by EPA)			
Teeec Nos Pos		Ute Lab.	Hi-vol	(Data not submitted by EPA)			
Petrified Forest	Kachina Point	APS	Hi-vol	(Data not submitted by EPA)			
<u>Cochise</u>							
Douglas	Near cemetery - NNE 2 mi.	State	Hi-vol	61	177	137	42
Douglas	15th Street Park (NASN)	EPA	Hi-vol	87	261	172	17
Douglas	Fairgrounds	EPA	Hi-vol	(No response)			
Douglas	Mercantile site	PD	Hi-vol	103	393	368	334
Douglas	North site	PD	Hi-vol	86	376	340	316
Douglas	West site (Cochise College)	PD	Hi-vol	93	529	516	310
Douglas	Pirtleville	PD	Hi-vol	84	440	318	299
Paul Spur	To be installed in 1974	State	Hi-vol	(Not operational in 1973.)			
<u>Cochonino</u>							
Flagstaff	Coconino County Court-house	State	Hi-vol	73	202	160	44
Flagstaff		NAU	Hi-vol	(No response)			
Flagstaff		NAU	Hi-vol	(No response)			
Flagstaff		NAU	Hi-vol	(No response)			
Flagstaff		NAU	Hi-vol	(No response)			
Flagstaff		NAU	Hi-vol	(No response)			

Table III

County and Site	Location	Operator	Equip. Type	Air Quality Data, ug/m ³			No. of Samples
				Annual	24-Hr.	Averages	
Geom.	Mean	Max.	Second	High.			
<u>Flagstaff</u>							
Grand Canyon	Visitor Center (NASN) in Grand Canyon	NAU EPA	Neph Hi-vol	(No response) 22	51	51	19
Supai	Page Airport	Ute Lab State	Hi-vol	(Data not submitted by EPA)			
Page		SRP	Hi-vol	52	202	159	51
Page		SRP	Hi-vol	27	213	184	348
Page		SRP	Neph	(Data reported as visibility)			
Tuba City	12 miles west of Cedar Ridge	Ute Lab	Hi-vol	(Data not submitted by EPA)			
Bodaway	Copper Mine	Ute Lab	Hi-vol	(Data not submitted by EPA)			
	Near Page	Ute Lab	Hi-vol	(Data not submitted by EPA)			
	Kaibito	Ute Lab	Hi-vol	(Data not submitted by EPA)			
	Tsa' Schizi Rock	Ute Lab	Hi-vol	(Data not submitted by EPA)			
<u>Gila</u>							
Globe	Claypool	Pinal-Gila	Hi-vol	I/S	216	N/R	7
	State Highway mainten- ance yard	State	Hi-vol	144	473	271	27
Miami	2 miles NNE of smelter	EPA	Hi-vol	(No response)			
Hayden	Hayden City Jail	State	Hi-vol	185	1005	770	51
Hayden	Montgomery-Reese Ranch	EPA	Hi-vol	(No response)			
Hayden		A-K	Hi-vol	115	--	--	48
Hayden		A-K	Hi-vol	N/R	N/R	N/R	N/R
Payson	Pinal-Gila	Pinal-Gila	Hi-vol	(Not operational in 1973)			
Roosevelt		Pinal-Gila	Hi-vol	I/S	69	N/R	6
<u>Graham</u>	Safford	C of C Building (new site 6-74)	Hi-vol	(Not operational in 1973)			
<u>Greenlee</u>	Clifton	East Plantsite near school	State	Hi-vol	69	475	215
		Mine site near highway	EPA	(No response)			
Morenci	East Plantsite (new site 5-73)	PD	Hi-vol	I/S	999	878	222

Table III

County and Site	Location	Operator	Equip. Type	Air Quality Data, ug/m ³				No. of Samples	
				Annual		24-Hr. Averages			
				Geom.	Mean	Max.	Second		
Morenci	Eagle Creek Cadillac Point (new site 6-73)	PD	Hi-vol	4.5	146	140	344		
Morenci	Oroville	PD	Hi-vol	I/S	330	186	191		
Morenci	Tailings pump house	PD	Hi-vol	69	274	268	330		
Morenci	Power house	PD	Hi-vol	54	54.0	226	361		
Morenci	Stargo (new site 12-73)	PD	Hi-vol	173	94.6	674	363		
Morenci	Clifton Fina service station (new site 11-73)	PD	Hi-vol	I/S	349	252	26		
<hr/>									
Maricopa									
Phoenix	State Lab (new site 6-74)	State	Hi-vol	(Not operational in 1973)					
Phoenix	State Health Building Co. Health Dept. (NASN) 1845 E. Roosevelt, Co. Health Dept.	State EPA	Neph Hi-vol	149	(Not operational in 1973)	331	283	25	
Phoenix	30 W. Corona, South Phoenix	Maricopa	Hi-vol	144	337	335	54		
Phoenix	8531 N. 6th St., North Phoenix	Maricopa	Hi-vol	186	481	456	53		
Phoenix	47th Ave. & Osborn, West Phoenix	Maricopa	Hi-vol	135	439	423	60		
Phoenix	3546 E. Sweetwater, Paradise Valley (new site 6-73)	Maricopa	Hi-vol	215	450	423	61		
Phoenix	1602 E. Greenway, Paradise Valley (new site 6-73)	Maricopa	Hi-vol	I/S	459	439	26		
Phoenix	3602 W. Elwood (new site 6-73)	Maricopa	Hi-vol	I/S	146	119	29		
Phoenix	500 S. 3rd Ave., CBD (new site 6-73)	Maricopa	Hi-vol	I/S	398	369	30		
Phoenix	Fairgrounds (June- Dec 73)	Maricopa	Hi-vol	I/S	513	482	27		
								21	

Table III

County and Site	Location	Operator	Equip. Type	Air Quality Data, ug/m ³			No. of Samples
				Annual	24-Hr. Averages	Second High.	
Phoenix	Arizona Title Building	PD	Hi-vol	94	374	301	363
Scottsdale	6402 E. Thomas Rd.	Maricopa	Hi-vol	136	364	360	37
GM Proving Grounds	13300 S. Ellsworth Rd.	Maricopa	Hi-vol	74	380	233	54
GM Proving Grounds	14 miles SE of Mesa	PD	Hi-vol	72	289	287	364
Chandler	250 E. Commonwealth (new site 6-73)	Maricopa	Hi-vol	I/S	355	274	29
Sun City	10401 Thunderbird Blvd. (new site 7-73)	Maricopa	Hi-vol	I/S	224	223	23
Carefree	Tonto Hills Obs. (NASN) Airport (new site 6-73)	EPA	Hi-vol	47	91	86	26
Carefree		Maricopa	Hi-vol	I/S	144	123	28
Guadalupe		Maricopa	Hi-vol	I/S	817	255	28
St. Johns		Maricopa	Hi-vol	I/S	304	236	27
Buckeye		PD	Hi-vol	176	766	530	364
Mohave							
Kingman	Mohave Co. Health Dept. (new site 11-73)	State	Hi-vol	I/S	110	64	7
Davis Dam	at Dam site	State	Hi-vol	32	141	112	61
Bullhead City	Lake Mohave Resort, Katherine's Landing	Clark	Hi-vol	34	80	78	38
Bullhead City		Desert Res.	Hi-vol		(No response)		
Bullhead City		Desert Res.	Hi-vol		(No response)		
Bullhead City		Desert Res.	Hi-vol		(No response)		
Bullhead City		Desert Res.	Hi-vol		(No response)		
Lake Havasu City	Hospital, (new site 11-73)	Desert Res.	Hi-vol		(No response)		
Peach Springs		State	Hi-vol	I/S	181	138	7
Navajo		Ute Res.	Hi-vol		(Data not submitted by EPA)		
Winslow	Airport	State	Hi-vol	58	430	375	49
Joseph City		APS	Hi-vol	45	232	229	N/R
Joseph City		APS	Neph		(Data reported as visibility)		
Holbrook	Woodruff sub sta., 8 mi S	APS	Hi-vol	28	215	176	N/R

Table III

County and Site	Location	Operator	Air Quality Data, ug/m ³				No. of Samples
			Equip. Type	Annual Geom. Mean	24-Hr. Max.	Averages Second High.	
Holbrook	Leroux sub sta., 2 mi N City Hall Bldg. (new site 3-74)	APS	Hi-vol	32	249	145	N/R
Show Low							
Keams Canyon		State	Hi-vol			(Not operational in 1973)	
Bacobi	Ute Res.	Hi-vol				(Data not submitted by EPA)	
Pinon	Ute Res.	Hi-vol				(Data not submitted by EPA)	
Pima	Ute Res.	Hi-vol				(Data not submitted by EPA)	
Tucson	22nd St. & Craycroft (new site 7-73)						
Tucson	151 W. Congress	Pima	Neph	78	201	200	235
Tucson	1010 W. Prince Rd.	Pima	Hi-vol	109	228	199	26
Tucson	1018 S. 6th Ave.	Pima	Hi-vol	116	231	218	25
Tucson	7920 E. Tanque Verde	Pima	Hi-vol	47	95	92	25
Tucson	Davis Monthan AFB	Pima	Hi-vol	88	158	155	25
Tucson	7901 E. Scarlet	Pima	Hi-vol	101	231	219	26
Tucson	1970 W. Ajo Way	Pima	Hi-vol	73	140	134	26
Tucson	Corona de Tucson	Pima	Hi-vol	25	50	49	26
Tucson	Oracle Rd. & Magee Rd.	Pima	Hi-vol	45	94	82	26
Tucson	151 W. Congress	Pima	Neph			(Data reported as visibility)	
Tucson	University of Arizona (NASN)	EPA	Hi-vol	74	157	136	24
Tucson	Home Federal Savings Tower	PD	Hi-vol	63	209	173	363
Tucson		Pima	Hi-vol	50	136	96	26
Green Valley	Well site, 20 mi S.						
Green Valley	Tucson	PD	Hi-vol	57	254	189	354
Vail	Gas compressor station	PD	Hi-vol	39	185	151	365
Mescal	Gas compressor station	PD	Hi-vol	50	589	485	365
Ajo	State Highway yard	State	Hi-vol	71	730	381	50
Ajo	Camelback Mountain	EPA	Hi-vol			(No response)	
Ajo	Town square	PD	Hi-vol	103	1964	1694	256
Ajo	Oxidation Pond (new site 6-73)	PD	Hi-vol	I/S	9062	2078	187

Table III

County and Site	Location	Operator	Equip. Type	Air Quality Data, ug/m ³			No. of Samples
				Annual Geom.	Mean	24-Hr. Averages Max.	
Ajo	South tailings dam (new site 6-73)	PD	Hi-vol	I/S	1938	583	174
Ajo	Camelback Mountain (new site 9-73)	PD	Hi-vol	I/S	123	115	139
Organ Pipe Cactus National Monument	Park maintenance yard SE, power substation (new site 11-73)	State	Hi-vol	34	99	85	46
Rillito	2 mi. NW cement plant (new site 1-74)	State	Hi-vol	I/S	214	190	8
Rillito	State	Hi-vol	(Not operational in 1973)				
Pinal	State Highway maintenance yard	State	Hi-vol	120	443	252	61
Florence	Water tank enclosure	PD	Hi-vol	107	451	416	365
Coolidge		A-K	Hi-vol	63	--	--	50
Coolidge	Parker Davis, 2 mi. N	PD	Hi-vol	104	550	456	364
Superior	State Highway maintenance yard	State	Hi-vol	101	368	244	55
Apache Jct.	Pinal-Gila	Hi-vol	83	182	N/R	N/R	24
Kearny	A-K	Hi-vol	45	--	--	--	41
Winkelman	A-K	Hi-vol	N/R	N/R	N/R	N/R	N/R
Mammoth	Pinal-Gila	Hi-vol	I/S	177	N/R	N/R	12
San Manuel	Trailer Park	State	Hi-vol	77	299	181	40
San Manuel	Pump Station No. 2	EPA	Hi-vol	(No response)			
San Manuel	Burns	A-K	Hi-vol	37	--	--	49
Apache Jct.	Well site	PD	Hi-vol	33	111	92	362
Stanfield		Pinal-Gila	Hi-vol	I/S	421	N/R	12
Marana Air Base	State Econ. Security	Pinal-Gila	Hi-vol	I/S	140	N/R	13
Casa Grande	Bldg. (new 12-73)	State	Hi-vol	(Not operational in 1973)			
Santa Cruz	Co. Health Bldg. (new 10-73)	State	Hi-vol	I/S	406	337	10
Nogales							

Table III

County and Site	Location	Operator	Air Quality Data, ug/m ³				No. of Samples
			Equip.	Type	Annual	24-Hr. Averages	
					Geom.	Mean	Second High.
<u>Yavapai</u>							
Prescott	Co. Health Bldg. (new site 10-73) Near high school	State	Hi-vol	I/S	104	76	8
Clarkdale		State	Hi-vol	96	229	125	21
Montezuma Castle							
National Monument	Roof of pump house	State	Hi-vol	28	54	54	51
<u>Yuma</u>							
Yuma	Co. Health Dept. Bldg.	State	Hi-vol	110	287	277	59

3. SULFUR DIOXIDE

3.1 Sulfur Dioxide Monitoring Network

A total of 118 sulfur dioxide monitoring devices were operational in the State in 1973 as is shown in Table IV. Four additional devices have been added during 1974. However, an equipment failure was suffered at one site in 1973, and it was not replaced.

3.2 Methodology

The EPA approved measurement method for sulfur dioxide in accordance with 40 CFR Part 50, Appendix A, and Part 51.17 is the pararosaniline (gas bubbler - West & Gaeke) method or its equivalent. The minimum frequency of sampling is one 24-hour sample every 6 days. This is equivalent to 61 random samples per year.

Equivalent methods are:

a. Gas Chromatographic Separation - Flame Photometric Detection provided Teflon is used throughout the instrument system in parts exposed to the air stream.

b. Flame Photometric Detection provided interfering sulfur compounds present in significant quantities are removed.

c. Coulometric Detection provided oxidizing and reducing interferences such as O₃, NO₂, and H₂S are removed.

d. Automated Pararosaniline Procedure.

3.3 Air Quality Data

Sulfur dioxide air quality data for the State for 1973 are presented in Table V. The Federal and State air quality standards for sulfur dioxide are noted for reference purposes.

Table IV
SULFUR DIOXIDE MONITORING DEVICES

<u>Operator</u>	<u>Devices Operational in 1973</u>	<u>New Devices (in 1974)</u>	<u>Total</u>
Arizona Bureau of Air Pollution Control	10	1	11
United States Environmental Protection Agency	34	3	37
Maricopa County Health Department	2*	--	1
Pima County Health Department	2	--	2
County of Greenlee	1	--	1
Northern Arizona University	1	--	1
Desert Research Institute	5	--	5
Arizona Public Service Company	7	--	7
American Smelting and Refining Company	20**	--	20**
Kennecott Copper Corporation	20**	--	20**
Magma Copper Company	6	--	6
Phelps Dodge Corporation	28	--	28
Salt River Project	2	--	2
	—	—	—
Grand Total	118	4	121

Note: * - One device failed during 1973. The site was discontinued.
 ** - Joint installations.

Table V

AIR QUALITY DATA
SULFUR DIOXIDE
1973

County and Site	Location	Operator	Equip. Type	Air Quality Data, ug/m ³			
				Annual Average	3-Hr. Avg.	Max.	24-Hr. Avg. Second High.
Federal (U.S. EPA) Air Quality Standards							
Arizona State Air Quality Standards				80	--	1300	--
Apache	Petrified Forest	Kachina Point	APS	Bubbler	4	--	31
Cochise	Douglas	NEL site, Highway yard, relocated to NNE2 site 4-73.	State	Coul	46	3605	3016
Douglas		NNE2 site, near cemetery (4-73)	State	Coul	90*	5385	5105
Douglas		NNW2, Co. Hospital	State	Coul	107	7408	6224
Douglas		Fairgrounds (new 9-73)	EPA	Coul	17**	3575	3355
Douglas		Fairgrounds (new 9-73)	EPA	Bubbler	93*	--	--
Douglas		5 mi. ENE of smelter	EPA	Bubbler	71*	--	--
Douglas		Slag pile area, 1 mi. south Mercantile site, 1.9 mi. SE North site, 0.75 mi. NE	EPA	Bubbler	171*	--	--
Douglas		West site (Cochise College)	PD	Coul	79	5101	4598
Douglas		Pirtleville	PD	Coul	143	5525	5347
Douglas		Hill site, 5.5 mi. NW	PD	Coul	35	5909	5436
Douglas				Coul	116	8984	7797
				Coul	64	4266	3637
						826	798

Table V

County and Site	Location	Operator	Equip. Type	Air Quality Data, ug/m ³			
				Annual Average	3-Hr. Max.	24-Hr. Avg.	Max. Second High.
Douglas	El Paso site, 8 mi. NE	PD	Coul	30	7077	6074	1593
Douglas	Double Adobe site, 11 mi. NW	PD	Coul	22	3277	2701	658
Douglas	McNeal site, 17.2 mi. N	PD	Coul	18	2693	2629	498
Coconino	Page Airport	State SRP	Bubbler Cond	1 N/R	--	--	5
Page	Page	SRP	Bubbler	2.6	39	36	5
Page	Flagstaff	NAU	Bubbler (No response)	--	--	26	N/R
Grand Canyon	Visitor Center (NASN)	EPA	Bubbler	6	--	--	26
Gila	Claypool						9
Inspiration	State Highway maintenance yard (relocated 11-73 to Inspiration)	State	Coul	52*	3127	2739	542
Miami	2.4 mi. NE near Highway 88 (new 11-73)	State EPA	Coul Coul	I/S (Not operational in 1973)	1000	896	209
Miami	2 mi. NNE (new 10-73)	EPA	Bubbler	(Not operational in 1973)			209
Miami	Jones Ranch, 2 mi. SSW	EPA	Coul	208**	6112	5217	1366
Miami	Jones Ranch, 2 mi. SSW	EPA	Bubbler	224*	--	--	660
Miami	Slag pile, 0.7 mi. N	EPA	Bubbler	243*	--	--	1030
Miami	Golden Hill Apts., 2 mi. E	EPA	Bubbler	(Not operational in 1973)			628

Table V

County and Site	Location	Operator	Equip. Type	Air Quality Data, ug/m ³			
				Annual Average	3-Hr. Max.	Avg. Second	24-Hr. Avg. Righ.
Hayden	Hayden City jail Montgomery-Reese Ranch, 2.1 mi. NW (new 7-73)	EPA	Coul	478**	7532	6819	2091
Hayden	Montgomery-Reese Ranch, 2.1 mi. NW	EPA	Bubbler	670*	--	--	2319
Hayden	Winkelman School, 1 mi. SE	EPA	Coul	118**	4277	3873	1449
Hayden	Winkelman School, 1 mi. SE (new 7-73)	EPA	Bubbler	144*	--	--	698
Hayden	Water resource, 1 mi. S (new 10-73)	EPA	Bubbler	271*	--	--	1713
Hayden	Slag pile, 0.6 mi. W (new 10-73)	EPA	Bubbler	411*	--	--	1276
Hayden	Hayden Control (new 3-73)	A-K A-K	Cond Cond	424 307	8892 5564	7878 5278	1934 1841
Hayden	Old Hayden Bush site (dis- continued 3-73)	A-K	Cond	23	858	832	151
Hayden	Crescent Ranch****	A-K	Coul	201	1917	1738	597
Hayden	Montgomery****	A-K	Coul	741	6216	5506	2114
Hayden	Hayden Jct.****	A-K	Coul	244	4844	4520	870
Hayden	Hayden Control****	A-K	Coul	339	4901	4718	1463
Hayden	Globe Highway****	A-K	Coul	395	4520	3999	1325
<u>Greenlee</u>	U.S. Post Office Greenlee Co. Air Pollution Office Clifton Dispensary 3.2 mi. SE	State Greenlee PD	Coul Cond Cond	82 I/S 98	2909 N/R 2701	2894 N/R 2665	1155 873 1146
<u>Clifton</u>							1130

Table V

County and Site	Location	Operator	Equip. Type	Air Quality Data, ug/m ³			
				Annual Average	Max.	3-Hr. Avg.	
						Second	High.
Clifton	Fina Station, 1.75 mi. SE (new 11-73)	PD	Coul	I/S	2558	2487	1394
Morenci	East Plantsite, 2.5 mi. SE (new 5-73)	PD	Coul	I/S	1713	1577	295
Morenci	Eagle Creek, 4.75 mi. SW (new 10-73)	PD	Coul	I/S	1254	1165	333
Morenci	Cadillac Pt., 2.75 mi. NW (new 7-73)	PD	Coul	I/S	10925	8561	3039
Morenci	Oroville, 2.75 mi. NE (new 7-73)	PD	Coul	I/S	1834	1637	450
Morenci	Stargo, 1.5 mi. NW (new 12-73)	PD	Coul	I/S	6337	5985	2917
Morenci	Near open pit, 1.5 mi. NW (new 10-73)	EPA	Coul	308**	4678	4565	1169
Morenci	Near open pit, 1.5 mi. NW (new 10-73)	EPA	Bubbler	421*	--	--	2335
Morenci	East Plantsite, 3 mi. SE (new 10-73)	EPA	Coul	13**	1349	1012	N/R
Morenci	East Plantsite, 3 mi. SE (new 10-73)	EPA	Bubbler	75*	--	--	419
Morenci	Eagle Creek, 4 mi. W (new 11-73)	EPA	Bubbler	105*	--	--	400
Morenci	San Fran. River site, 2 mi. NE	EPA	Bubbler	88*	--	--	467
<u>Maricopa</u> <u>Phoenix</u>	State Health Bldg. Co. Health Dept. (NASN)	State	Coul	(Not operational in 1973)			
Phoenix	1845 E. Roosevelt, Co. Health Dept.	EPA	Bubbler	14	--	--	90
Phoenix	Maricopa Co. Health Dept.	Cond	9	N/R	N/R	N/R	N/R

Table V

County and Site		Location		Operator	Equip. Type	Air Quality Data, ug/m ³		
Annual Avg.	3-Hr. Avg.	Max.	Second High.			24-Hr. Avg.	Max.	Second High.
Phoenix	12th floor Arizona Title Bldg.	PD	Coul	15	272	256	148	146
GM Proving Grounds	13300 S. Ellsworth Rd.	Maricopa PD	Cond Bubbler	(Equipment failure in 1973, site discontinued)	2	--	--	33
Buckeye	At dam site	State PD	Bubbler	2	--	--	10	4
Mohave	Bullhead City	Desert Res.	Flame	(No response)				
Davis	Bullhead City	Desert Res.	Flame	(No response)				
Bullhead City	Bullhead City	Desert Res.	Flame	(No response)				
Bullhead City	Bullhead City	Desert Res.	Flame	(No response)				
Bullhead City	Bullhead City	Desert Res.	Cond	(No response)				
Navajo	Joseph City	APS Flame	< 26	208***	156***	N/R	N/R	
	Joseph City	APS Bubbler	5	--	--	54	27	
Holbrook	Woodruff sub sta., 8 mi. S	APS Flame	< 26	650***	78***	N/R	N/R	
Holbrook	Woodruff sub sta., 8 mi. S	APS Bubbler	4	--	--	54	31	
Holbrook	Leroux sub sta., 2 mi. N	APS Flame	< 26	88***	78***	N/R	N/R	
Holbrook	Leroux sub sta., 2 mi. N	APS Bubbler	5	--	--	75	33	
Pima	22nd St. & Craycroft (new 7-73)	Pima Coul	I/S	234	N/R	52	N/R	
Tucson	University of Arizona (NASN)	EPA Bubbler	7	--	--	18	13	
Tucson	151 W. Congress	Pima Flame	I/S	130	N/R	60	N/R	
Tucson	6th floor Home Fed. Savings Tower	PD	Coul	13	261	219	108	107

Table V

County and Site	Location	Operator	Equip. Type	Air Quality Data, ug/m ³			
				Annual Average	3-Hr. Avg.		24-Hr. Avg.
					Max.	Second High.	
Ajo	State Highway yard Camelback Mtn., 1 mi. W (new 10-73)	State	Coul	33	1835	1676	545
Ajo	Camelback Mtn. Oxidation Pond, 1.5 mi. N (new 10-73)	EPA EPA	Coul Bubble	3** 40*	N/R --	N/R --	545 N/R 258
Ajo	Oxidation Pond, 1.5 mi. N (new 10-73)	EPA	Coul	62**	3232	2825	742
Ajo	Tailings Pond, 1 mi. E 4 mi. NW Town square, 0.5 mi. NW	EPA EPA PD	Bubbler Bubbler Coul	106* 23* 18*	-- -- --	-- -- --	436 784 115
Ajo	Oxidation Pond, 1.2 mi. NE (new 6-73)	PD	Coul	34	3151	2676	623
Ajo	S. tailings dam, 1.3 mi. NE (new 6-73)	PD	Coul	I/S	3484	3068	914
Ajo	Camelback Mtn., 1.2 mi. W (new 8-73)	PD	Coul	I/S	4406	3722	952
Green Valley Vail	Gas compressor station	PD	Coul Coul	I/S 3	1349 137	999 104	292 70
Mescal	Gas compressor station	PD	Coul	6	310	259	84
Pinal		PD	Coul	11	800	535	234
Florence	State Highway maintenance yard	State A-K	Bubbler Cond	25 31	-- 858	-- 754	186 252
Florence							114 208

Table V

County and Site	Location	Operator	Equip. Type	Air Quality Data, $\mu\text{g}/\text{m}^3$				
				Annual Average	3-Hr. Avg.	Second High.	Max.	24-Hr. Avg. Second High.
Florence Coolidge Coolidge	Water tank enclosure Parker-Davis, 2 mi. N (discontinued 9-73) *** Meadows*** (new 3-73)	PD A-K A-K A-K A-K A-K	Coul Cond Bubbler Cond Coul Coul Coul Cond	31 18 9 94 112 107 143	953 702 -- 2314 914 3264 2990	846 572 -- 1638 759 3036 2886	339 367 -- 424 313 574 720	335 226 245 369 214 506 601
Kearny Kearny Winkelman Winkelman Winkelman	Robinson site *** Shartzzer site Trailer Park Pump site (new 7-73)	A-K A-K A-K Magnus State EPA	Cond Cond Cond Cond Cond Coul	39 89 159 13 16 84	2314 2288 3857 1326 1430 3937	2288 2236 3702 1222 1196 3832	471 390 638 190 224 646	434 356 565 160 159 646
Winkelman Winkelman Mammoth Mammoth San Manuel San Manuel	Pump site (new 9-73) Slag pile (new 9-73) Slag pile (new 9-73) plant site (new 9-73) Mine site (new 9-73)	EPA EPA EPA EPA EPA	Bubbler Bubbler Coul Bubbler Bubbler	73* -- 25** 143* 59*	-- -- 2299 -- --	1397 -- 2209 -- --	N/R -- N/R N/R N/R	N/R 342 N/R N/R 441
San Manuel San Manuel San Manuel San Manuel San Manuel	Burns site Townsit Golf course Mine site	A-K Magnus Magnus Magnus Magnus	Bubbler Cond Coul Coul Coul	115* 23 158 187 131	-- 2080 8507 5335 3072	-- 6448 4814 4814 2980	505 390 1332 955 970	405 315 975 866 883
San Manuel San Manuel San Manuel San Manuel	Mine site Redington	Magnus Magna	Coul Coul Coul Coul	30	1207	1105	334	246

Table V

County and Site	Location	Operator	Equip. Type	Air Quality Data, ug/m ³			
				Annual Average	3-Hr. Avg.	24-Hr. Avg.	Max. Second High.
Oracle Jct.	Magna	Coul	Coul	40	3041	2778	494
Oracle Jct.	PD	Coul	Coul	24	1190	1072	492

Note: * - Average for period monitored
 ** - EPA did not report data less than 0.3 ppm
 *** - 1-hour averages
 **** - Averages are for only from 10-15-73 to 12-13-73. Because of numerous problems, validity is subject to question.

4. CARBON MONOXIDE

4.1 Carbon Monoxide Monitoring Network

As is shown in Table VI, a total of seven carbon monoxide monitoring instruments were operational in the State of Arizona in 1973. An additional 11 analyzers are being added to the State's network during 1974.

4.2 Methodology

In accordance with 40 CFR Part 50, Appendix C, and Part 51.17, the EPA approved measurement method for carbon monoxide is the nondispersive infrared method or its equivalent. The only equivalent method identified by EPA is the Gas Chromatographic Separation-Catalytic Conversion-Flame Ionization Detection method.

4.3 Air Quality Data

Table VII presents carbon monoxide air quality data for the State of Arizona for 1973. The Federal and Arizona State air quality standards for carbon monoxide are noted for reference purposes.

Table VI
CARBON MONOXIDE MONITORING DEVICES

<u>Operator</u>	<u>Devices Operational in 1973</u>	<u>New Devices (in 1974)</u>	<u>Total</u>
Arizona Bureau of Air Pollution Control	--	3	3
Maricopa County Health Department	2	7	9
Pima County Health Department	2	1	3
Northern Arizona University	1	--	1
Phelps Dodge Corporation	2	--	2
	—	—	—
Grand Total	7	11	18

Table VII

AIR QUALITY DATA
CARBON MONOXIDE
1973

County and Site	Location	Operator	Equip. Type	Air Quality Data, mg/m ³			
				Max.	Second High.	Max.	8-Hr. Avg.
Federal (U.S. EPA) Air Quality Standards							
Arizona State Air Quality Standards				--	40	--	10
Coconino							
Flagstaff		NAU	Cond	(No response)			
Maricopa							
Phoenix	State Health Bldg. (to be moved to Flagstaff)	State	IR	(Not operational in 1973)			
Phoenix	State Health Bldg. 1845 E. Roosevelt, Co. Health	State	Gas	(Not operational in 1973)			
Phoenix	47th Ave. & Osborn (new 10-73)	Maricopa	IR	40.1	37.8	27.8	27.5
Phoenix	4732 S. Central, S. Phoenix	Maricopa	IR	33.2	32.1	N/R	N/R
Phoenix	Glendale Comm. College 8531 N. 6th St., N. Phoenix	Maricopa	IR	(Not operational in 1973)			
Phoenix	E. Thomas Rd., Scottsdale 13665 N. Scottsdale Rd., Paradise Valley	Maricopa	IR	(Not operational in 1973)			
Phoenix	Litchfield Park	Maricopa	IR	(Not operational in 1973)			
Phoenix	3rd Place & Center, Mesa 2nd floor, Arizona Title Bldg.	Maricopa	IR	(Not operational in 1973)			
Pima	PD	Gas		50	34	19	18
Tucson	151 W. Congress (new 7-73)	Pima	IR	32	N/R	10	N/R
Tucson	22nd St. & Craycroft (new 7-73)	Pima	IR	23	N/R	9.3	N/R

Table VII

County and Site	Location	Operator	Air Quality Data, mg/m ³		
			1-Hr. Avg.	8-Hr. Avg.	Max.
Tucson	Broadway and Alvernon	Pima	IR	(Not operational in 1973)	
Tucson	3rd floor, Home Federal Savings Tower	PD	Gas	24	15
Yuma	Co. Health Dept. Bldg.	State	IR	(Not operational in 1973)	
Yuma				10	8

5. NITROGEN DIOXIDE

5.1 Nitrogen Dioxide Monitoring Network

A total of 20 nitrogen dioxide monitoring instruments were operational in the State in 1973 as is shown in Table VIII. One additional monitoring instrument has been added during 1974.

5.2 Methodology

The EPA "tentative candidate" measurement method for nitrogen dioxide in accordance with 40 CFR Part 50, Appendix F, and Part 51.17 and the proposed rules published in the Federal Register of June 8, 1973 is the 24-hour, gas bubbler, arsenite-modified Jacobs-Hochheiser method. The minimum frequency of sampling is one 24-hour sample every 14 days which is equivalent to 26 random samples per year. Final approval by EPA of this candidate method as the reference method is pending.

Tentative equivalent methods for continuous measurement of nitrogen dioxide as noted in the June 8, 1973 Federal Register are:

- a. Chemiluminescent Detection
- b. Colorimetric Detection

5.3 Air Quality Data

Nitrogen dioxide air quality data for the State during 1973 are presented in Table IX. The Federal and State of Arizona air quality standards for nitrogen dioxide are noted for reference purposes.

Table VIII
NITROGEN DIOXIDE MONITORING DEVICES

<u>Operator</u>	<u>Devices Operational in 1973</u>	<u>New Devices (in 1974)</u>	<u>Total</u>
Arizona Bureau of Air Pollution Control	4	1	5
United States Environmental Protection Agency	4	--	4
Maricopa County Health Department	1	--	1
Pima County Health Department	1	--	1
Northern Arizona University	1	--	1
Desert Research Institute	4	--	4
Arizona Public Service Company	4	--	4
Salt River Project	1	--	1
	—	—	—
Grand Total	20	1	21

Table IX

AIR QUALITY DATA
NITROGEN DIOXIDE
1973

County and Site	Location	Operator	Equip. Type	Air Quality Data, ug/m ³		
				Annual Avg.	1-Hour Max.	24-Hour Max.
Federal (U.S. EPA) Air Quality Standard						
Apache	Kachina Point	APS	Bubbler	100	--	--
Petrified Forest Cochise St. David	1.8 mi. SE St. David, 1 mi. NW powder plant (new site 12-73)	State	Color	100	--	--
Coconino	NAU	Bubbler	(No response)	49		
Flagstaff Page Page	State	Bubbler	--	49		
Grand Canyon	SRP	Bubbler	--	37		
Maricopa	EPA	Bubbler	--	47		
Phoenix	State Health Building	Color	(Not operational in 1973)			
Phoenix	Co. Health Dept. (NASN)	Bubbler				
Phoenix	Co. Health Dept.	Chem				
Phoenix	1845 E. Roosevelt, Co. Health Dept.	Maricopa	(No response)			
Mohave	At dam site	State	Bubbler	12	--	52
Davis Dam	Desert Res.	Color	(No response)			
Bullhead City	Desert Res.	Color	(No response)			
Bullhead City	Desert Res.	Color	(No response)			
Bullhead City	Desert Res.	Color	(No response)			
Navajo	Desert Res.	Color	(No response)			
Joseph City	APS	Bubbler	17	--	92	
Holbrook	APS	Bubbler	11	--	53	
Holbrook	APS	Bubbler	11	--	55	
Woodruff sub. sta., 8 mi. S Leroux sub. sta., 2 mi N						

Table IX

County and Site	Location	Operator	Equip.	Type	Air Quality Data, $\mu\text{g}/\text{m}^3$		
					Annual	1-Hour	24-Hour Max.
Pima							
Tucson	22nd St. & Craycroft (new 7-73)	Yuma	Color	I/S	281	150	
	University of Arizona (NASN)	EPA	Bubbler	53	--	143	
Pinal							
Florence	State Highway maintenance yard	State	Bubbler	20	--	--	65

6. HYDROCARBONS

6.1 Hydrocarbons Monitoring Network

As is shown in Table X, a total of five hydrocarbon analyzers were operational in the State of Arizona in 1973. Two additional instruments are being added to the State's network during 1974.

6.2 Methodology

In accordance with 40 CFR Part 50, Appendix E, the EPA approved measurement method for hydrocarbons is the Gas Chromatographic Separation-Flame Ionization Detection method. There are no EPA approved equivalent methods.

6.3 Air Quality Data

Table XI presents hydrocarbon air quality data for the State for 1973. The Federal and Arizona State air quality standards for hydrocarbons are noted for reference purposes.

Table X
HYDROCARBON MONITORING DEVICES

<u>Operator</u>	<u>Devices Operational in 1973</u>	<u>New Devices (in 1974)</u>	<u>Total</u>
Arizona Bureau of Air Pollution Control	--	1	1
Maricopa County Health Department	1	--	1
Pima County Health Department	--	1	1
Colorado Plateau Environmental Advisory Council	1	--	1
Northern Arizona University	1	--	1
Phelps Dodge Corporation	2	--	2
	—	—	—
Grand Total	5	2	7

Table XI
AIR QUALITY DATA
HYDROCARBONS
1973

County and Site	Location	Operator	Equip. Type	Air Quality Data, ug/m ³			
				3-Hour Average, 6 AM - 9 AM		Non-Methane Hydrocarbons	
				Total Max.	Second High.	Max.	Second High.
Federal (U.S. EPA) Air Quality Standard							
Arizona State Air Quality Standard				--	--	--	160
Coconino							--
Flagstaff		NAU	Gas	(No response)			
Page		Colo. Plat.	Gas	(No response)			
Maricopa		State	Gas	(Not operational in 1973)			
Phoenix	State Health Bldg. 1845 E. Roosevelt, Co. Health Bldg.	Maricopa	FI	N/R	N/R	N/R	N/R
Phoenix	2nd Floor, Arizona Title Bldg.	PD	Gas	8489	7074	4258	3603
Pima	22nd St. & Craycroft 3rd floor, Home Fed.	Pima	FI	(Not operational in 1973)			
Tucson	Savings Tower	PD	Gas	3210	1638	1594	1441

7. OXIDANTS

7.1 Oxidants Monitoring Network

A total of 10 photochemical oxidants monitoring devices were operational in the State in 1973 as is shown in Table XII. Three additional monitoring instruments have been added to the State's network in 1974.

7.2 Methodology

The EPA approved measurement method for photochemical oxidants in accordance with 40 CFR Part 50, Appendix D, and Part 51.17 is the gas phase chemiluminescence method or its equivalent. Equivalent methods are as follows:

- a. Potassium Iodide Colorimetric Detection provided a correction is made for SO₂ and NO₂.
- b. Ultraviolet Photometric Detection of ozone provided compensation is made for interfering substances.
- c. Chemiluminescence Methods differing from that of the reference method.

7.3 Air Quality Data

Photochemical oxidants air quality data for the State of Arizona during 1973 are presented in Table XIII. The Federal and State air quality standards for oxidants are noted for reference purposes.

Table XII
OXIDANTS MONITORING DEVICES

<u>Operator</u>	<u>Devices Operational in 1973</u>	<u>New Devices (in 1974)</u>	<u>Total</u>
Arizona Bureau of Air Pollution Control	--	2	2
United States Environmental Protection Agency	1	--	1
Maricopa County Health Department	2	1	3
Pima County Health Department	2	--	2
Desert Research Institute	1	--	1
Phelps Dodge Corporation	3	--	3
Salt River Project	1	--	1
Grand Total	10	3	13

Table XIII

AIR QUALITY DATA
OXIDANTS
1973

<u>County</u> <u>and Site</u>	<u>Location</u>	<u>Air Quality Data, ug/m³</u>			
		<u>Operator</u>	<u>Equip.</u>	<u>1-Hour Average</u>	<u>Avg.</u>
				<u>Max.</u>	<u>Second High.</u>
Federal (U.S. EPA) Air Quality Standard					
Arizona State Air Quality Standard					
<u>Cochise</u>					
<u>Page</u>					
<u>Maricopa</u>					
<u>Phoenix</u>	State Health Building	SRP	Coul	78	78
<u>Phoenix</u>	1845 E. Roosevelt, Co. Health Bldg.	Maricopa	Color	(Not operational in 1973)	
<u>Phoenix</u>	1845 E. Roosevelt, Co. Health Bldg.	Maricopa	UV	(Not operational in 1973)	
<u>Phoenix</u>	47th Ave. & Osborn (new 10-73) Co. Health Building	Maricopa	Color	294	236
<u>Phoenix</u>	12th floor, Arizona Title Bldg.	EPA	Chem	(No response)	
<u>Phoenix</u>		PD	Coul	140	116
<u>Mohave</u>					
<u>Bullhead City</u>					
<u>Pima</u>	Desert Res.	Chem	(No response)		
<u>Tucson</u>	151 W. Congress	Pima	UV	235	216
<u>Tucson</u>	22nd St. & Craycroft (new 7-73)	Pima	Color	260	N/R
<u>Tucson</u>	6th floor, Home Federal Savings Tower	PD	Coul	161	160
<u>Pinal</u>					
<u>Coolidge</u>	Parker Davis site, 2 mi. N	PD	Coul	146	140
<u>Yuma</u>	Co. Health Dept. Building	State	UV	(Not operational in 1973)	