Janet Napolitano
Governor

ARIZONA DEPARTMENT
OF
ENVIRONMENTAL QUALITY

1110 West Washington Street • Phoenix, Arizona 85007
(602) 771-2300 • www.azdeq.gov

Stephen A. Owens
Director

Assessment of Qualification for Treatment under the Arizona Natural and Exceptional Events Policy for the High Particulate (PM_{10}) Concentration Events in the Phoenix Area on August 13, 2007

Background

The Arizona Department of Environmental Quality (ADEQ) issues Dust Control Action Forecasts as part of the Natural Events Action Plan for the Phoenix area. On Sunday August 12, 2007, in response to the potential for thunderstorm development during the late afternoon and evening hours in and around the Phoenix area, ADEQ air quality forecasters issued the Maricopa County Dust Control Action Forecast, which called for a moderate risk of wind-blown dust for Monday, August 13th. The ADEQ Dust Control Forecast also mentioned that "during active summer monsoon episodes, outflows from event distant thunderstorms have the potential to cause periods of gusty winds and dense blowing dust." The forecasts/advisories satisfy the requirement in 40 CFR 51.920(a)(1).

The forecast for August 13th called for a chance of monsoonal thunderstorms capable of producing strong winds and wind-blown dust. This potential wind-blown dust event equated to a moderate risk of exceeding the PM_{10} National Ambient Air Quality Standards (NAAQS) in Maricopa County. During the late evening hours of August 13th, a strong cluster of thunderstorms developed south of the Phoenix area. The storm moved north and generated blowing dust which moved into the Phoenix Metro area from the south. All appropriate State Implementation Plan (SIP) control measures were in place during the event demonstrating, per 40 CFR 50.1(j), that the event "is not reasonably controllable or preventable."

Strong winds were observed throughout portions of Maricopa County and the Phoenix Metro area on August 13, 2007. The initialization of the wind-blown dust event is evident in the Phoenix visible camera images as well as the Arizona Meteorological Network (AzMET) and National Weather Service (NWS) monitors (see Fig. 1). Strong, gusty winds greater than 20 and 30 mph were reported during the 10:00 p.m. and 11:00 p.m. hours at several Phoenix area monitoring locations. In addition, Phoenix Sky Harbor Airport reported reduced visibility and blowing dust during the late-night thunderstorm event. This significant event brought elevated ambient concentrations of PM_{10} to the Phoenix area that exceeded the NAAQS at the South Phoenix monitor operated by Maricopa County. The fact that ambient concentrations exceed the NAAQS satisfies the criteria in 40 CFR 50.1(j) that the event "affects air quality."

The following are the key PM_{10} monitor readings for the monitors examined in this report:

Monitor (Operator/Type)	AQS ID*	24-hr Avg PM_{10}	1-hr Max PM_{10}	Max Time	Flag**
PHOENIX METRO AREA					
West 43rd Ave (MC/TEOM)	04-013-4009	117	1753	2300	None
Durango Complex (MC/TEOM)	04-013-9812	104	791	2300	None
Greenwood (MC/TEOM)	04-013-3010	104	1227	2300	None
Higley (MC/TEOM)	04-013-4006	77	502	2200	None
West Phoenix (MC/TEOM)	04-013-0019	70	532	2300	None
Central Phoenix (MC/TEOM)	04-013-3002	149	2423	2300	None
JLG Supersite (ADEQ/TEOM)	04-013-9997	72	845	2300	None
Coyote Lakes (MC/TEOM)	04-013-4014	53	254	0700	None
South Phoenix (MC/TEOM)	04-013-4003	159	2599	2300	A or RJ

* EPA Air Quality System Identification Number
** 24-hr PM_{10} concentration influenced by natural or exceptional event to be flagged
Type Abbreviations: TEOM – Tapered Element Oscillating Microbalance Monitor (Continuous monitor)

The preliminary findings from this analysis were presented at a stakeholders meeting on June 11, 2008. ADEQ has finalized this demonstration, which was made available for public comment from August 11, 2008, through September 10, 2008. Any comments that were received were forwarded to EPA with this demonstration pursuant to 40 CFR 51.14(c)(3)(i).

SOUTHEAST PHOENIX — 22-Queen Creek

Hr	T(F)	RH	Rn	Spd	Max	Dir
1	90	36	-	4	6	SE
2	86	45	-	5	7	SE
3	86	43	-	5	7	SE
4	83	51	-	4	6	SE
5	81	54	-	4	6	SE
6	80	55	-	4	6	SE
7	85	45	-	5	9	SE
8	92	36	-	6	10	SE
9	96	32	-	7	10	SE
10	99	27	-	8	14	S
11	101	26	-	8	13	S
12	103	21	-	7	13	S
1	105	20	-	6	13	SW
2	107	17	-	7	14	SW
3	106	19	-	6	15	W
4	107	18	-	5	11	SW
5	108	19	-	3	10	W
6	103	26	-	6	11	NW
7	99	34	-	5	7	NW
8	94	40	-	4	6	NW
9	92	42	-	3	5	NW
10	91	39	-	8	27	S
11	85	50	-	16	23	SW
12	85	48	-	8	18	SW

NORTH PHOENIX — 12-PHX Greenway

Hr	T(F)	RH	Rn	Spd	Max	Dir
1	90	41	-	1	3	S
2	87	48	-	0	2	S
3	86	45	-	0	2	S
4	87	41	-	0	2	S
5	89	36	-	1	3	N
6	87	40	-	1	2	E
7	89	37	-	2	6	NE
8	92	34	-	6	11	E
9	96	29	-	8	13	E
10	100	26	-	7	11	SE
11	101	25	-	7	12	SE
12	103	25	-	6	12	S
1	104	21	-	7	14	SW
2	104	19	-	6	12	SW
3	106	18	-	5	11	SW
4	107	18	-	5	11	SW
5	107	18	-	5	10	SW
6	107	18	-	4	9	SW
7	106	18	-	5	9	SW
8	103	21	-	4	9	SW
9	102	23	-	4	9	W
10	100	22	-	4	8	W
11	99	22	-	4	11	N
12	96	28	-	8	19	SE

NWS-Phx Sky Harbor

Hr	T(F)	VR	Dust	Spd	Gust	Dir
1	100	10		5	5	W
2	98	10		5	5	SW
3	96	10		0	0	N
4	95	10		0	0	N
5	93	10		7	7	S
6	92	10		9	9	E
7	93	10		10	10	E
8	95	10		8	8	E
9	99	10		10	10	E
10	102	10		8	8	E
11	105	10		7	7	SE
12	106	10		9	0	N
1	110	10		13	20	SW
2	107	10		3	3	*VR
3	109	10		3	3	*VR
4	110	10		8	8	SW
5	111	10		8	8	W
6	110	10		13	20	W
7	108	10		11	11	W
8	106	10		8	8	W
9	104	10		7	7	W
10	103	10		9	20	W
11	97	5	BLDU	10	33	SW
12	93	6	TS B	15	24	SE

Event Contrib. Analysis

Hourly PM_{10} Conc. (µg/m^3)

MONITORS: 1-South PHX

24-Hr. Avg PM_{10}

Monitor:	with Event	w/o Event
1-South PH	159	53

> NAAQS | < NAAQS

Pink=Event Contrib.

Conclusion: As shown above, the PM_{10} concentration would have been below the NAAQS "BUT FOR" the event contribution (hours highlighted in pink).

Hr	1
1	31
2	33
3	24
4	31
5	36
6	47
7	76
8	65
9	53
10	48
11	41
12	42
1	52
2	99
3	97
4	88
5	69
6	51
7	43
8	51
9	39
10	42
11	72
12	2599

AZMET Monitoring Locations

See http://ag.arizona.edu/azmet/

wnd @3m agl / Dir corrected to true north

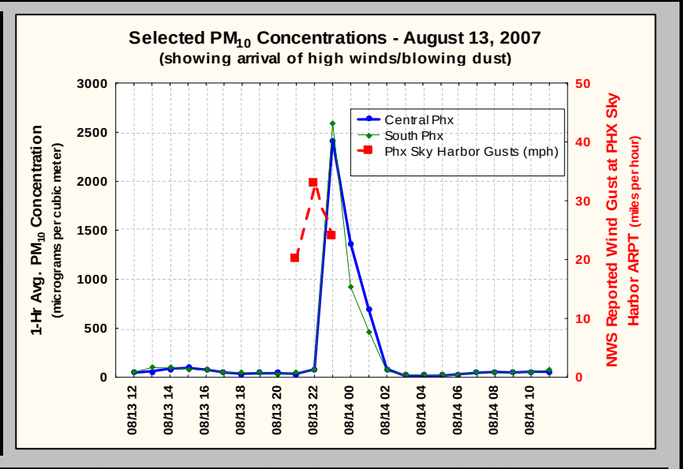
HIGHLIGHTING	Col.	Parameter
Max Wind	T(F)	Temp. (Deg. F.)
> 15 mph	RH	Rel Humidity %
>25 mph	Rn	Rain (Inches/hr)
HR - Time (End)	Spd	Avg Speed mph
A.M.	Max	Max Speed mph
P.M.	Dir	Wind Dir. (from)

Figure 1. Key Data for Event of August 13, 2007

PHX WINDS	KEY	PM10 PLOT
CEN. AZ WINDS		SAT IMAGES
SO AZ WINDS		PHX VIS. CAMERAS

SUMMARY OF EVENT

An intense thunderstorm cell formed southwest of Phoenix, bringing high winds and blowing dust into the Phoenix Metro area shortly before midnight. Sky Harbor reported blowing dust and dlminished visibility. An exceedance was measured at the South Phoenix monitor.



BUCKEYE — 26-Buckeye

Hr	T(F)	RH	Rn	Spd	Max	Dir
1	85	53	-	3	5	W
2	85	47	-	3	7	NW
3	88	34	-	4	6	N
4	86	35	-	3	4	N
5	86	34	-	2	5	NW
6	81	50	-	2	5	NW
7	83	39	-	4	7	NW
8	94	22	-	2	5	N
9	98	27	-	3	5	E
10	94	37	-	5	11	S
11	98	26	-	6	10	SW
12	99	30	-	6	10	SW
1	101	27	-	7	11	SW
2	103	27	-	7	13	SW
3	105	24	-	6	11	SW
4	107	20	-	7	12	SW
5	108	20	-	7	13	SW
6	106	22	-	6	11	SW
7	104	23	-	5	10	SW
8	97	31	-	5	8	SW
9	92	37	-	4	6	SW
10	91	38	-	5	8	W
11	92	36	-	5	10	SW
12	91	36	-	5	9	SW

COOLIDGE — 05-Coolidge

Hr	T(F)	RH	Rn	Spd	Max	Dir
1	80	69	-	3	6	SE
2	78	80	-	2	4	SE
3	77	78	-	3	5	SE
4	77	75	-	2	4	SW
5	77	76	-	2	4	SE
6	75	82	-	1	3	SW
7	78	77	-	2	4	NE
8	87	59	-	1	2	NE
9	93	48	-	1	3	SE
10	95	44	-	5	9	SW
11	98	31	-	6	9	SW
12	100	30	-	5	10	SW
1	102	27	-	6	12	SW
2	103	25	-	6	9	S
3	104	25	-	5	9	S
4	101	31	-	3	6	S
5	107	25	-	1	6	W
6	100	28	-	4	8	NW
7	98	32	-	3	5	N
8	94	40	-	2	6	NW
9	93	34	-	4	10	W
10	87	48	-	12	28	S
11	78	69	0.04	15	27	SW
12	82	54	-	8	17	SW

MARICOPA — 06-Maricopa

Hr	T(F)	RH	Rn	Spd	Max	Dir
1	86	51	-	2	4	SE
2	85	53	-	1	3	SE
3	83	58	-	2	4	SE
4	85	44	-	4	7	S
5	84	44	-	5	8	S
6	84	46	-	6	9	S
7	85	48	-	5	9	S
8	90	40	-	4	6	S
9	95	30	-	5	8	S
10	99	25	-	6	10	S
11	102	21	-	4	10	W
12	105	18	-	6	12	W
1	106	17	-	8	15	W
2	107	17	-	8	15	SW
3	108	16	-	5	11	SW
4	109	16	-	5	12	W
5	108	17	-	5	11	W
6	108	18	-	6	15	W
7	105	20	-	8	12	W
8	103	22	-	6	10	W
9	101	24	-	6	10	W
10	98	28	-	6	10	SW
11	91	41	0.02	17	32	S
12	86	51	-	16	25	SW

Historical Distribution

5-Yr. Dist. of Values (µg/m^3)

MONITORS: 1-South PHX

Column Index

Yr - All Data (5-Yrs)

Sea - Data for Summer season only (5-Yrs)

Cum. Freq.	Mon 1 Yr	Mon 1 Sea
Min	7	17
0.5%	7	17
1.0%	10	17
2.5%	13	17
5%	18	19
10%	24	24
25%	36	39
50%	49	49
75%	64	63
90%	85	84
95%	94	91
97.5%	126	132
99.0%	147	164
99.5%	164	164
Max	171	164
Flagged Value	159	

Conclusion: Flagged Value is exceptional in nature (eg. greater than 95% of all data)

YUMA — 02-YumaValley

Hr	T(F)	RH	Rn	Spd	Max	Dir
1	93	17	-	4	10	NW
2	96	14	-	10	16	NW
3	96	17	-	11	17	NW
4	94	20	-	6	16	N
5	91	23	-	3	6	E
6	85	28	-	1	4	NE
7	84	31	-	1	4	SW
8	87	34	-	5	17	SW
9	94	24	-	9	15	S
10	99	21	-	11	16	S
11	102	20	-	8	13	S
12	104	19	-	8	15	S
1	106	20	-	7	14	S
2	108	19	-	6	12	S
3	109	17	-	5	14	S
4	111	15	-	6	12	SW
5	111	15	-	5	13	SW
6	109	20	-	13	21	SW
7	105	27	-	13	18	SW
8	100	30	-	9	13	S
9	96	33	-	6	11	SW
10	93	42	-	6	11	SW
11	91	43	-	4	9	S
12	89	44	-	5	10	S

PALOMA — 19-Paloma

Hr	T(F)	RH	Rn	Spd	Max	Dir
1	85	40	-	5	7	SW
2	85	38	-	5	7	SW
3	83	42	-	5	7	SW
4	78	58	-	4	6	SW
5	78	63	-	3	5	SW
6	78	68	-	2	5	NW
7	79	69	-	2	5	NE
8	85	57	-	1	3	SE
9	87	57	-	4	10	SW
10	93	35	-	10	17	SW
11	97	34	-	10	16	SW
12	99	32	-	9	13	SW
1	99	35	-	8	13	W
2	103	27	-	6	13	W
3	105	25	-	6	11	SW
4	105	27	-	7	12	SW
5	103	30	-	6	11	SW
6	100	33	-	6	12	SW
7	96	36	-	6	9	SW
8	93	37	-	5	6	SW
9	96	30	-	11	17	SW
10	94	30	-	10	15	SW
11	94	28	-	12	19	S
12	89	39	-	8	16	SW

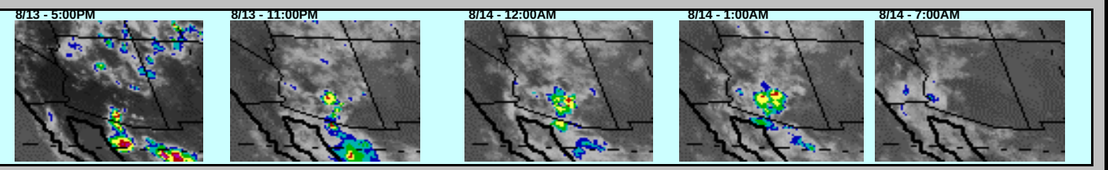
MARANA — 13-Marana

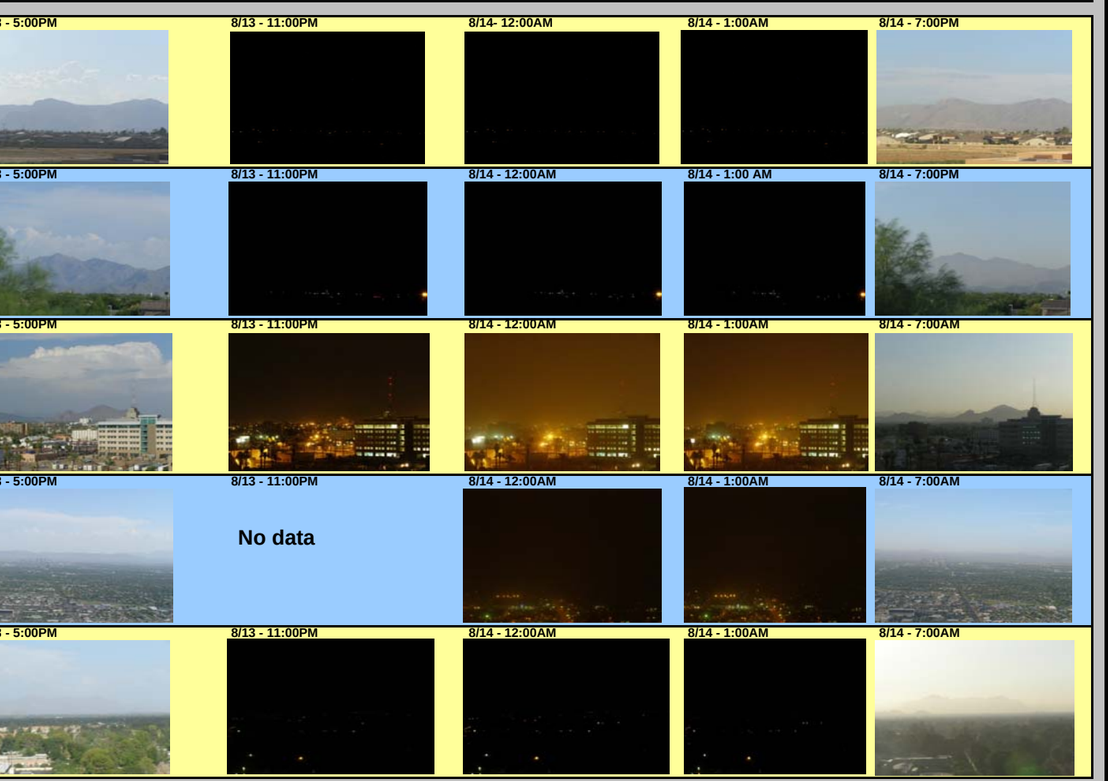
Hr	T(F)	RH	Rn	Spd	Max	Dir
1	87	42	-	3	8	E
2	87	41	-	7	15	SE
3	84	48	-	3	8	SE
4	83	51	-	5	8	SE
5	83	49	-	6	9	E
6	82	52	-	7	11	SE
7	81	55	-	8	11	SE
8	86	48	-	7	15	SE
9	90	40	-	6	11	SE
10	94	35	-	6	11	SW
11	97	32	-	4	9	SW
12	98	29	-	4	10	W
1	100	27	-	5	10	W
2	102	23	-	5	12	W
3	104	20	-	5	11	NW
4	105	20	-	4	10	N
5	105	19	-	4	9	W
6	102	23	-	6	11	NW
7	94	30	-	6	14	W
8	91	34	-	7	16	SW
9	88	40	-	7	17	SW
10	86	41	-	4	11	S
11	85	46	-	7	13	SW
12	81	56	-	4	9	W

TUCSON — 01-Tucson

Hr	T(F)	RH	Rn	Spd	Max	Dir
1	85	45	-	3	7	E
2	83	50	-	2	4	SE
3	81	58	-	1	3	E
4	80	60	-	2	3	E
5	79	60	-	3	4	E
6	78	61	-	2	4	E
7	79	60	-	2	4	E
8	83	51	-	3	6	E
9	88	44	-	5	9	E
10	90	42	-	7	11	E
11	93	36	-	5	11	E
12	96	30	-	3	8	SE
1	98	26	-	4	8	N
2	100	23	-	4	9	NW
3	102	21	-	4	8	NE
4	103	19	-	5	11	N
5	104	19	-	3	9	NE
6	104	18	-	3	7	N
7	99	24	-	6	15	SW
8	92	32	-	5	12	SW
9	89	37	-	3	6	SE
10	84	54	-	3	11	E
11	81	61	-	2	7	S
12	81	64	-	2	7	NE

GOES-West Satellite





Prepared by Kendall, Juniel, Busby & Paris / ADEQ 8/8/08

Assessment under the Technical Criteria Document (TCD)

1. Properly qualify and validate the air quality measurement to be flagged. As this was not a filter sampling date (1-in-6 run day), only data from the continuous analyzers were examined. The air quality monitoring data were reviewed by the agency responsible for operation of the monitor. All hourly PM_{10} readings from the South Phoenix monitoring site were valid for August 13th. Audits of the analyzers revealed operations were within acceptable tolerance. No local sources were reported as significantly contributing to the air quality episode. Exceedances of the NAAQS were recorded at the South Phoenix monitoring site operated by Maricopa County.

2. Review suspected contributing sources. The NWS and AzMET surface data for Arizona, along with the visible camera images in Phoenix, provide a good explanation as to what meteorological conditions were in place on August 13th. Strong, southerly winds were occurring in the Phoenix area due to an outflow boundary from thunderstorms that developed over south-central Arizona during the late evening of August 13th. The plot of hourly PM_{10} concentration data in the upper right corner of Figure 1 confirm the identical timing of elevated PM_{10} at the South Phoenix monitor and strong wind gusts at Sky Harbor Airport. While PM_{10} concentrations also spiked at several other monitors, including Central Phoenix, the 24-hour averages remained slightly below that of the NAAQS. Finally, reduced visibility reported at the Sky Harbor airport was coincident with elevated PM_{10} concentrations measured at South Phoenix.

3. Examine all air quality monitoring information. Data from all monitors in the network were reviewed. Monitors from the affected areas are summarized in the table in the Background section of this assessment. Pursuant to 40 CFR 50.14(c)(3)(iii)(C), the "Historical Distribution" Table in Figure 1 has been included to demonstrate that the event is associated with a measured concentration in excess of normal historical fluctuations, including background (i.e., concentrations greater than the 95th percentile). The monitor with readings greater than that of the NAAQS on August 13, 2007, which should be flagged, is South Phoenix.

4. Examine the meteorological conditions before and during the event. The AzMET meteorological data are summarized in Figure 1. The wind data are highlighted yellow if the max wind speed in the hour exceeds 15 mph and orange if it exceeds 25 mph. As can be seen in Figure 1, wind speeds did not pick up in central Arizona until approximately 10:00 or 11:00 p.m., when several stations reported gusty winds that approached 30 mph at times. This timing corresponds to the onset of elevated PM_{10} concentrations recorded at the South Phoenix monitoring site, which remained elevated during the Midnight and 1:00 a.m. hours of the following day.

5. Perform a qualitative attribution to emission source(s). All evidence indicates the elevated PM_{10} concentrations in the Phoenix area can be attributed to soil emissions that were transported over portions of the Phoenix Metro area in Maricopa County. No source specific emission allocation is possible based on the data available for analysis. The hourly concentration data do not show any significant source other than the wind-blown dust event occurring on August 13th, 2007. Observational reports of haze and blowing dust from trained officials along with reduced visibility through portions of south Phoenix, are further proof that the elevated PM_{10} concentrations were attributed to soil emissions transported due to wind gusts associated with a thunderstorm (see attachments). These reports, in addition to the visual evidence of reduced visibility seen in the lower right portion of Figure 1, provide proof that the elevated PM_{10} concentrations in Phoenix can be attributed to soil emissions.

6. Estimation of Contribution from Source or Event. The primary source appears to be wind-blown dust over central Arizona for which there is not an effective or efficient method to estimate the relative contributions from specific sources. The demonstration analysis contained in this report establishes the linkage between the measurements to be flagged and the event, thus satisfying the requirement in 40 CFR 50.14(c)(3)(iii)(B). Pursuant to 40 CFR 50.14(c)(3)(iii)(D), the "Event Contrib. Analysis" Table in Figure 1 has been included to demonstrate that there would have been no exceedance or violation but for the event (i.e., the contribution during the event overwhelmed the 24-hour average).

7. Determination that a Natural or Exceptional Event Contributed To an Exceedance. Based on this analysis, the event satisfies the requirement in 40 CFR 50.1(j) that the elevated concentration in South Phoenix was attributed to a natural event.

Conclusion

Long-range transport of dust from soils. The region wide elevated PM_{10} event on August 13, 2007 in Maricopa County was the result of the transport of dust and soils from high winds that suspended natural soils and soils soils from areas where Best Available Control Measures are in place and should be flagged for air quality planning purposes. The "high wind" flag (A or RJ) should be applied to the monitor readings indicated in the table at the beginning of this report, as the monitor would have been below the NAAQS but for the contribution of the event.

U.S. Department of Commerce
National Oceanic & Atmospheric Administration

QUALITY CONTROLLED LOCAL CLIMATOLOGICAL DATA (final) HOURLY OBSERVATIONS TABLE WILLIAMS GATEWAY AIRPORT (23104) PHOENIX , AZ (08/2007)

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, North Carolina 28801

Elevation: 1382 ft. above sea level
Latitude: 33.308
Longitude: -111.650
Data Version: VER2

Date	Time (LST)	Station Type	Sky Conditions	Visibility (SM)	Weather Type	Dry Bulb Temp		Wet Bulb Temp		Dew Point Temp		Rel Humd %	Wind Speed (MPH)	Wind Dir	Wind Gusts (MPH)	Station Pressure (in. hg)	Press Tend	Net 3-hr Chg (mb)	Sea Level Pressure (in. hg)	Report Type	Precip. Total (in)	Alti-meter (in. hg)
						(F)	(C)	(F)	(C)	(F)	(C)											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
13	0055	0	OVC075	10.00		95	35.0	72	22.3	61	16.0	32	5	110		28.43			M	AA		29.89
13	0155	0	OVC080	10.00		90	32.0	71	21.5	61	16.0	38	5	100		28.42			M	AA		29.88
13	0255	0	OVC080	10.00		91	33.0	71	21.7	61	16.0	37	7	110		28.42			M	AA		29.88
13	0356	0	OVC080	10.00		88	31.0	70	21.2	61	16.0	40	9	130		28.43			M	AA		29.89
13	0456	0	OVC080	10.00		84	29.0	69	20.6	61	16.0	46	7	120		28.44			M	AA		29.90
13	0547	0	FEW080 FEW120 SCT250	30.00		84	29.0	69	20.6	61	16.0	46	9	130		28.45			M	AA		29.91
13	0647	0	FEW100 SCT250	30.00		86	30.0	70	20.9	61	16.0	43	10	110		28.46			M	AA		29.93
13	0747	0	FEW100 SCT250	30.00		95	35.0	71	21.8	59	15.0	30	7	120		28.48			M	AA		29.94
13	0847	0	FEW100 SCT250	30.00		99	37.0	74	23.5	63	17.0	31	11	140		28.48			M	AA		29.95
13	0947	0	FEW100 SCT250	30.00		100	38.0	72	22.0	57	14.0	24	9	170		28.48			M	AA		29.95
13	1047	0	FEW100 SCT250	30.00		102	39.0	72	22.3	57	14.0	23	10	180		28.48			M	AA		29.95
13	1147	0	FEW100 SCT250	30.00		104	40.0	72	22.1	55	13.0	20	6	180		28.46			M	AA		29.93
13	1247	0	FEW100 FEW250	30.00		106	41.0	72	22.2	54	12.0	18	6	230		28.45			M	AA		29.91
13	1347	0	FEW100 SCT250	30.00		108	42.0	71	21.6	50	10.0	14	9	210		28.51			M	AA		29.98
13	1447	0	SCT100 SCT250	30.00		108	42.0	71	21.6	50	10.0	14	9	210		28.40			M	AA		29.86
13	1547	0	SCT100 BKN250	30.00		108	42.0	72	22.0	52	11.0	16	11	270		28.37			M	AA		29.83
13	1647	0	SCT100 BKN250	30.00		108	42.0	71	21.6	50	10.0	14	3	VR		28.35			M	AA		29.81
13	1747	0	SCT100 SCT250	30.00		108	42.0	72	22.0	52	11.0	16	3	VR		28.33			M	AA		29.79
13	1847	0	SCT100 SCT250	30.00		106	41.0	M	M	50	10.0	M	8	270		M			M	AA		M
13	1958	0	BKN080 BKN095	10.00		106	41.0	72	22.4	55	13.0	19	6	280		28.35			M	AA		29.81
13	2055	0	BKN080	10.00	-TSRA	102	39.0	71	21.8	55	13.0	21	13	350		28.36			M	AA		29.82
13	2159	0	CLR	10.00		100	38.0	70	21.3	54	12.0	21	11	360		28.39			M	AA		29.85
13	2237	0	BKN008 BKN018 BKN120	3.00		95	35.0	72	22.3	61	16.0	32	3	110		28.42			M	AA		29.88
13	2359	0	SCT050 BKN060 BKN080	10.00		91	33.0	72	22.3	63	17.0	39	0	000		28.46			M	AA		29.92

Dynamically generated Thu Mar 20 17:33:43 EDT 2008 via http://cdo.ncdc.noaa.gov/qclcd/QCLCD

U.S. Department of Commerce
National Oceanic & Atmospheric Administration

QUALITY CONTROLLED LOCAL CLIMATOLOGICAL DATA
(final)
HOURLY OBSERVATIONS TABLE
PHOENIX SKY HARBOR INTL AIRPORT (23183)
PHOENIX , AZ
(08/2007)

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, North Carolina 28801

Elevation: 1105 ft. above sea level
Latitude: 33.443
Longitude: -111.990
Data Version: VER3

Date	Time (LST)	Station Type	Sky Conditions	Visibility (SM)	Weather Type	Dry Bulb Temp		Wet Bulb Temp		Dew Point Temp		Rel Humd %	Wind Speed (MPH)	Wind Dir	Wind Gusts (MPH)	Station Pressure (in. hg)	Press Tend	Net 3-hr Chg (mb)	Sea Level Pressure (in. hg)	Report Type	Precip. Total (in)	Alti-meter (in. hg)
						(F)	(C)	(F)	(C)	(F)	(C)											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
13	0051	11	FEW090 SCT250	10.00		100	37.8	72	22.3	58	14.4	25	5	290		28.66			29.76	AA		29.83
13	0151	11	FEW250	10.00		98	36.7	71	21.7	57	13.9	26	5	230		28.66			29.76	AA		29.83
13	0251	11	FEW200	10.00		96	35.6	70	21.2	56	13.3	26	0	000		28.66	0	003	29.75	AA		29.83
13	0351	11	FEW150 SCT200	10.00		95	35.0	70	21.0	56	13.3	27	0	000		28.66			29.77	AA		29.84
13	0451	11	FEW150 SCT200	10.00		93	33.9	72	22.3	62	16.7	36	7	160		28.68			29.78	AA		29.85
13	0551	11	FEW100 SCT130 SCT200	10.00		92	33.3	72	22.2	62	16.7	37	9	090		28.69	3	008	29.80	AA		29.87
13	0651	11	FEW100 SCT130 SCT200	10.00		93	33.9	72	22.0	61	16.1	34	10	090		28.71			29.82	AA		29.89
13	0751	11	FEW100 SCT130 SCT200	10.00		95	35.0	72	22.1	60	15.6	31	8	110		28.72			29.83	AA		29.90
13	0851	11	FEW120 SCT250	10.00		99	37.2	73	22.7	60	15.6	28	10	090		28.73	1	016	29.83	AA		29.91
13	0951	11	SCT120 SCT250	10.00		102	38.9	73	22.9	59	15.0	24	8	090		28.73			29.83	AA		29.91
13	1051	11	FEW110 SCT150 SCT250	10.00		105	40.6	73	22.8	57	13.9	21	7	140		28.73			29.84	AA		29.91
13	1151	11	FEW120 SCT250	10.00		106	41.1	73	22.9	57	13.9	20	0	000		28.71	3	002	29.82	AA		29.89
13	1251	11	FEW120 SCT250	10.00		110	43.3	73	22.8	54	12.2	16	13	230	20	28.69			29.79	AA		29.87
13	1351	11	FEW120 SCT250	10.00		107	41.7	72	22.1	53	11.7	17	3	VR		28.66	8	022	29.77	AA		29.84
13	1451	11	FEW120 SCT250	10.00		109	42.8	72	22.4	53	11.7	16	3	VR		28.65			29.75	AA		29.82
13	1551	11	FEW120 SCT150 SCT250	10.00		110	43.3	73	23.0	55	12.8	16	8	240		28.62			29.71	AA		29.79
13	1651	11	FEW120 SCT150 SCT250	10.00		111	43.9	74	23.1	55	12.8	16	8	250	20	28.60	6	025	29.70	AA		29.77
13	1751	11	FEW120 SCT150 SCT250	10.00		110	43.3	74	23.5	57	13.9	18	13	280		28.58			29.68	AA		29.75
13	1851	11	FEW120 SCT150 SCT250	10.00		108	42.2	74	23.2	57	13.9	19	11	260		28.58	5	001	29.68	AA		29.75
13	1951	11	FEW120 SCT150 SCT250	10.00		106	41.1	74	23.2	58	14.4	21	8	260		28.59			29.69	AA		29.76
13	2051	11	FEW120 SCT150 SCT250	10.00		104	40.0	73	22.9	58	14.4	22	7	250	20	28.61			29.71	AA		29.78
13	2151	11	FEW120 SCT250	10.00	VCTS BLDU	103	39.4	73	22.7	58	14.4	23	9	280		28.62	3	024	29.72	AA		29.79
13	2251	11	SCT090 SCT120 BKN250	10.00	-RA BLDU	100	37.8	73	22.6	59	15.0	26	16	200	33	28.66			29.76	AA		29.83
13	2300	11	SCT090CB BKN120 BKN250	5.00	TS BLDU	97	36.0	73	22.7	61	16.0	30	10	210	21	28.68			M	SP		29.85
13	2319	11	FEW012 SCT080 BKN120	4.00	TS BLDU	99	37.0	73	22.9	61	16.0	29	15	180		28.68			M	SP		29.85
13	2324	11	SCT011 BKN080CB OVC120	3.00	TS BLDU	99	37.0	73	22.9	61	16.0	29	9	160	24	28.68			M	SP	T	29.85
13	2334	11	BKN011 BKN050 OVC080CB	3.00		99	37.0	73	22.9	61	16.0	29	9	170		28.68			M	SP		29.85
13	2351	11	SCT014 BKN031 OVC080CB	6.00		93	34.0	73	22.9	64	18.0	38	15	140		28.69			29.80	AA		29.87

Dynamically generated Thu Mar 20 17:36:17 EDT 2008 via http://cdo.ncdc.noaa.gov/qclcd/QCLCD