



Janet Napolitano  
Governor

# ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY

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Stephen A. Owens  
Director

## Assessment of Qualification for Treatment under the Arizona Natural and Exceptional Events Policy for the High Particulate (PM<sub>10</sub>) Concentration Events in the Yuma Area on November 29, 2006

### Background

The Arizona Department of Environmental Quality (ADEQ) issues Dust Control Action Forecasts for the Yuma and Phoenix areas as part of the Natural Events Action Plan for these areas. On Tuesday November 28, 2006, in response to an approaching frontal system forecast to pass through the State of Arizona, ADEQ air quality forecasters issued the Yuma and Vicinity Dust Control Action Forecast which called for a high wind-blown dust risk for November 29, 2006. Strong down-river winds were expected with a strong but dry surface cold front. Wind speeds of 15-30 mph with the potential for gusts up to 40 mph were forecast, and this equated to a high risk of exceeding the PM<sub>10</sub> National Ambient Air Quality Standards (NAAQS) in the Yuma area on November 29<sup>th</sup>. The forecasts/advisories satisfy the requirement in 40 CFR 51.920(a)(1).

Strong winds were observed during the daytime hours of November 29, 2006 in and around Yuma, and these winds continued to gust as the cold front approached. The National Weather Service (NWS) Yuma Marine Corps Air Station monitor went down for unknown reasons during the afternoon hours, and all data after 1 p.m. are missing. However, the initialization of the high wind event is still evident in both the NWS and Arizona Meteorological Network (AZMET) monitors in Yuma. Before malfunctioning, the NWS monitor in Yuma reported significant sustained winds near 30 mph and wind gusts as high as 40 mph, while the Yuma AZMET station reported

sustained winds near 20 mph and gusts to 30 mph. Other nearby stations in California, which may be considered as representative of the local meteorological conditions west of Yuma, also reported strong and gusty winds. Imperial, CA had a similar missing data issue to what occurred in Yuma, as data are only available from 5:00 a.m. to 11:00 a.m. The available hours of observations include reports of strong gusty winds as well as reduced visibility and blowing dust during the 9:00 a.m. and 10:00 a.m. hours (see attachments). 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."

The event brought significant winds and elevated ambient concentrations of PM<sub>10</sub> that exceeded the NAAQS at the Yuma Supersite and Mexico Supersite monitors operated by ADEQ. While increases in PM<sub>10</sub> levels also occurred at the Yuma Courthouse site, NAAQS were not exceeded, and thus no flag is being applied for the Yuma Courthouse data. The fact that ambient concentrations exceed the NAAQS satisfies the criteria in 40 CFR 50.1(j) that the event "affects air quality." The reason for the discrepancies between the Yuma Courthouse and Yuma Supersite data are not fully understood, but one possible explanation is given in section 3 of this analysis. The following are the key PM<sub>10</sub> monitor readings for the monitors examined in this report:

Monitor (Operator/Type)	AQS ID*	24-hr Avg PM <sub>10</sub>	1-hr Max PM <sub>10</sub>	Time of Max 1-hr	Flag***
<b>YUMA AREA</b>					
Yuma Courthouse (ADEQ/BAM)	04-027-0004*	85	285	1000	None
Yuma Supersite (ADEQ/BAM)	04-027-8011*	246	1000**	1000	A or RJ
Mexico Supersite (ADEQ/BAM)	80-026-8012*	252	995**	1100	A or RJ

\* EPA Air Quality System Identification Number

\*\* Upper range of instrument. Actual PM<sub>10</sub> concentrations likely exceeded recorded value

\*\*\* 24-hr PM<sub>10</sub> concentration influenced by natural or exceptional event to be flagged.

Type Abbreviations: BAM – Beta-Attenuation Mass Monitor (Continuous monitor)

The preliminary findings from this analysis were presented at a stakeholders meeting on November 13, 2007, and were made available for public review during a comment period that ended November 30, 2007. During that time, no comments were received from the public. ADEQ presented and discussed this final demonstration at a stakeholder

meeting on May 28<sup>th</sup> 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).

NWS-EI Centro, CA							
Hr	T(F)	VR	Dust	Spd	Gust	Dir	
1	50	10		9	9	W	
2	49	10		8	8	W	
3	46	10		7	7	W	
4	50	10		7	7	W	
5	46	10		3	3	W	
6	46	7		5	5	NW	
7	47	7		7	7	N	
8	55	7		14	14	N	
9	58	7		13	13	N	
10	61	4	BLDU	22	28	N	
11	62	4	BLDU	20	28	N	
12	62	7		15	24	N	

NWS-Imperial, CA							
Hr	T(F)	VR	Dust	Spd	Gust	Dir	
1	50	10		9	9	W	
2	49	10		8	8	W	
3	46	10		7	7	W	
4	50	10		7	7	W	
5	46	10		3	3	W	
6	46	10		6	6	NW	
7	49	10		6	6	N	
8	54	10		9	9	N	
9	58	10		14	14	N	
10	60	10		20	24	N	
11	61	7		26	32	N	
12	62	10		17	23	N	

NWS-Yuma MCAS							
Hr	T(F)	VR	Dust	Spd	Gust	Dir	
1	54	7		9	9	NW	
2	54	7		10	10	NW	
3	54	7		9	9	N	
4	53	7		8	8	N	
5	52	7		7	7	N	
6	46	7		9	9	N	
7	49	10		10	10	N	
8	50	7		8	8	N	
9	53	7		17	17	N	
10	55	7		30	38	N	
11	57	4		30	40	N	
12	58	6	HZ	28	34	N	

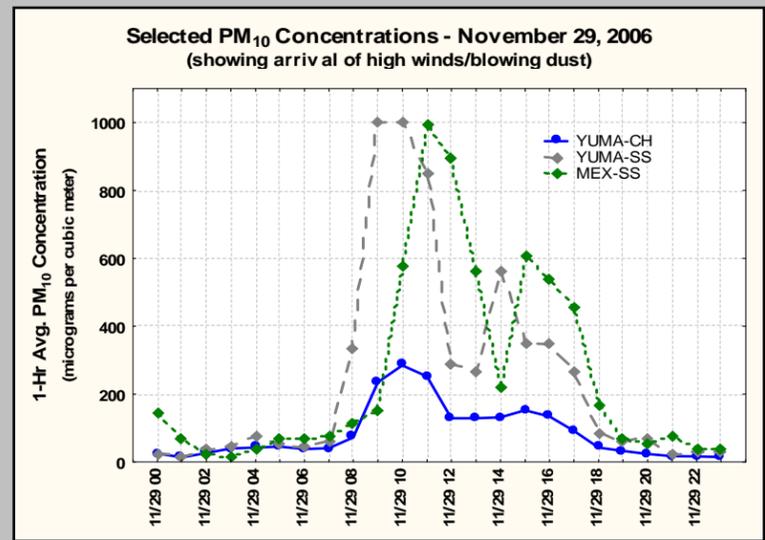
Event Contrib. Analysis				
Hourly PM <sub>10</sub> Conc. (µg/m <sup>3</sup> )				
MONITORS:	Hr	1	2	3
1-YUMA SS	1	26	26	142
2-YUMA CH	2	16	14	65
3-MEXICO SS	3	35	27	25
24-Hr. Avg. PM <sub>10</sub>	4	49	40	18
with w/o	5	74	43	42
Monitor: Event	6	50	46	71
1-YUMA S	7	43	38	72
2-YUMA C	8	61	41	79
3-MEXICO	9	335	73	113
> NAAQS	10	1000	235	154
Pink=Event Contrib.	11	1000	285	578
Conclusion: As shown above, the PM <sub>10</sub> concentration would have been below the NAAQS "BUT FOR" the event contribution (hours highlighted in pink).	12	847	253	995



**Figure 1. Key Data for Event of November 29, 2006**

MISC. DATA	KEY	PM10 PLOT
CEN. AZ WINDS	SO AZ WINDS	YUMA MAP & FORECAST

**SUMMARY OF EVENT**  
A vigorous, but dry, surface cold front was forecasted to move through the Yuma area bringing strong down-river winds and a high probability of blowing dust. The cold front did move through the area causing exceedances at the Yuma and Mexico Supersite monitors.

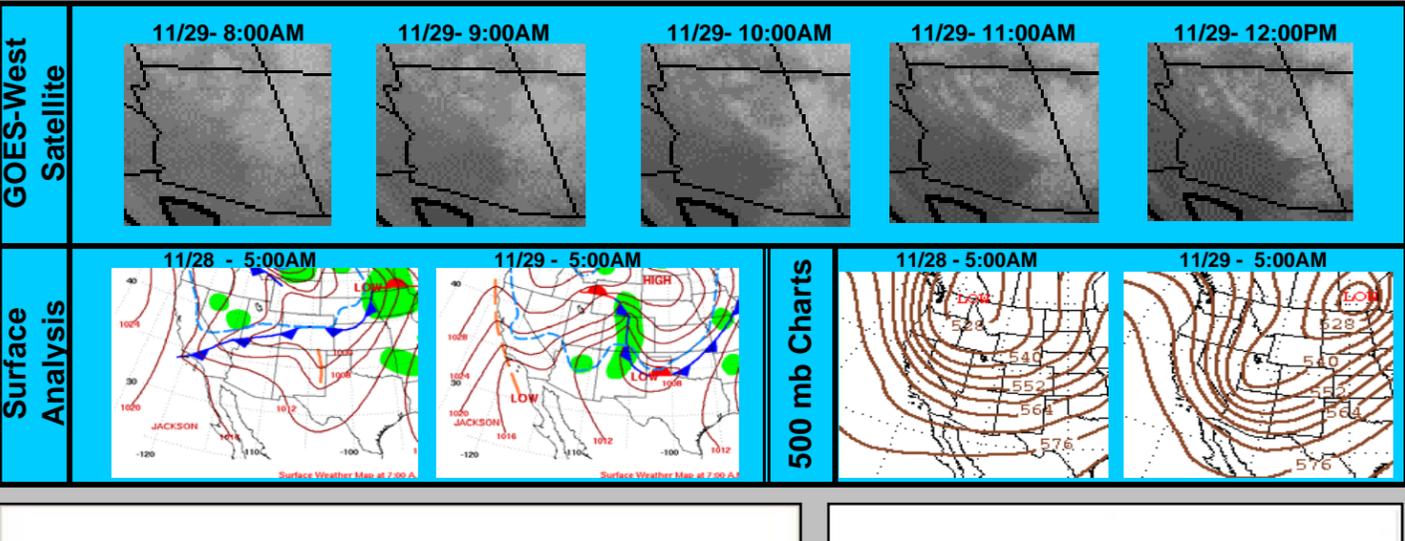


PARKER						
Hr	T(F)	RH	Rn	Spd	Max	Dir
1	53	29	-	23	31	NW
2	51	31	-	23	31	NW
3	50	33	-	18	28	NW
4	49	34	-	16	22	NW
5	47	34	-	12	16	NW
6	46	33	-	9	15	NW
7	46	31	-	10	14	NW
8	46	28	-	9	14	NW
9	49	25	-	13	21	N
10	53	19	-	20	30	N
11	54	17	-	25	31	N
12	54	15	-	25	36	N

BUCKEYE						
Hr	T(F)	RH	Rn	Spd	Max	Dir
1	44	68	-	2	4	NW
2	41	72	-	2	4	NW
3	37	83	-	3	5	W
4	40	69	-	5	7	NW
5	40	66	-	5	9	NW
6	39	65	-	5	8	NW
7	36	65	-	3	5	W
8	37	62	-	4	11	NW
9	44	45	-	10	15	NW
10	51	28	-	13	24	NW
11	54	17	-	18	26	NW
12	54	11	-	21	28	NW

MARICOPA						
Hr	T(F)	RH	Rn	Spd	Max	Dir
1	51	58	-	3	5	SW
2	51	58	-	3	6	W
3	51	57	-	3	6	SW
4	47	65	-	2	6	SW
5	49	61	-	4	9	W
6	50	58	-	6	8	W
7	47	62	-	4	6	S
8	46	45	-	5	10	W
9	49	32	-	9	14	W
10	52	29	-	12	18	W
11	55	20	-	15	24	NW
12	56	15	-	14	20	NW

Historical Distribution				
5-Yr. Dist. of Values (µg/m <sup>3</sup> )				
MONITORS:	Column Index			
1-YUMA SS	Yr	- All Data (5-Yrs)		
2-YUMA CH	Sea	- Data for Autumn season only (5-Yrs)		
3-MEXICO SS	Yr	Sea	Yr	Sea
Cum. Freq.	Mon 1	Mon 2	Mon 3	
Min	8	14	8	12
0.5%	13	17	12	13
1.0%	17	20	14	15
2.5%	20	21	16	20
5%	22	24	19	22
10%	25	26	23	26
25%	34	38	31	34
50%	45	52	42	46
75%	63	64	57	58
90%	85	73	77	73
95%	107	87	96	86
97.5%	147	103	127	94
99.0%	196	170	186	131
99.5%	235	208	211	204
Max	291	246	349	320
Flagged Value	246	85	252	
Conclusion: Flagged Value is exceptional in nature (eg. greater than 95% of all data)				

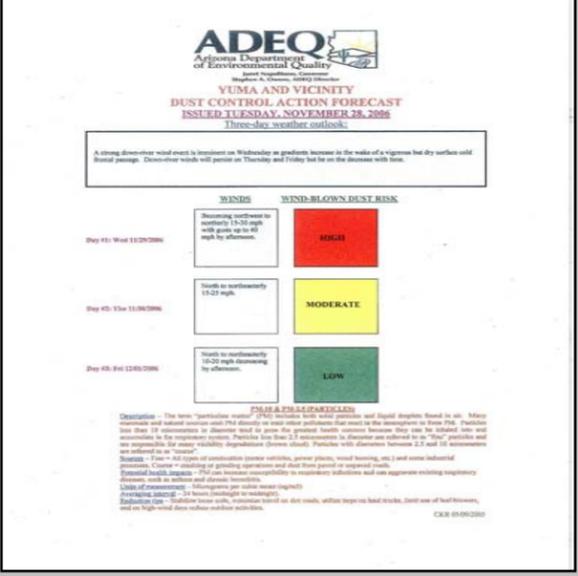
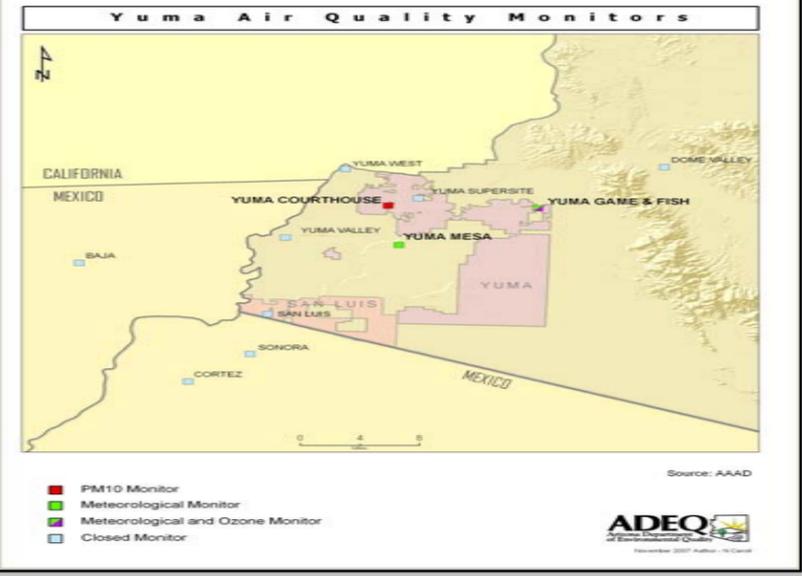


YUMA						
Hr	T(F)	RH	Rn	Spd	Max	Dir
1	55	43	-	14	20	NW
2	55	45	-	12	20	N
3	55	46	-	10	21	NW
4	51	35	-	4	9	N
5	52	30	-	5	12	N
6	51	32	-	6	11	N
7	51	31	-	6	11	N
8	50	32	-	7	15	N
9	52	29	-	10	18	N
10	55	21	-	16	28	N
11	56	15	-	17	28	N
12	57	14	-	17	26	N

PALOMA						
Hr	T(F)	RH	Rn	Spd	Max	Dir
1	42	75	-	5	6	SW
2	40	80	-	4	6	SW
3	39	81	-	5	6	SW
4	38	84	-	4	6	SW
5	38	82	-	5	7	SW
6	37	78	-	4	6	SW
7	36	75	-	4	7	SW
8	37	71	-	4	6	SW
9	43	62	-	4	9	SW
10	50	43	-	9	15	NW
11	53	27	-	16	24	NW
12	55	24	-	15	22	NW

MARANA						
Hr	T(F)	RH	Rn	Spd	Max	Dir
1	55	62	-	6	10	SW
2	54	67	-	6	12	SW
3	53	72	-	5	9	W
4	51	76	-	2	6	W
5	51	74	-	1	3	W
6	51	77	-	1	4	S
7	50	76	-	1	3	NW
8	50	77	-	3	6	NW
9	51	72	-	6	13	NW
10	53	47	-	11	16	NW
11	55	35	-	13	24	NW
12	56	24	-	20	28	NW

TUCSON						
Hr	T(F)	RH	Rn	Spd	Max	Dir
1	46	76	-	1	4	SE
2	47	76	-	1	2	E
3	47	76	-	1	2	SE
4	45	82	-	1	2	E
5	45	82	-	1	3	S
6	47	83	-	1	2	E
7	47	89	-	1	4	SE
8	49	93	-	1	4	SE
9	51	79	-	7	12	NW
10	52	63	-	10	18	NW
11	53	45	-	11	21	NW
12	53	39	-	14	23	NW



## 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<sub>10</sub> readings from Yuma Courthouse, Mexico Supersite, and Yuma Supersite were valid for November 29<sup>th</sup>. Audits of the analyzers revealed operations were within acceptable tolerance. No local sources were reported as significantly contributing to the air quality episode.

2. Review suspected contributing sources. The AzMET and NWS surface data for the Yuma, El Centro, CA and Imperial, CA stations provide a good explanation as to what meteorological conditions were in place on November 29, 2006 in southwestern Arizona. Most of these strong northerly winds recorded by the AzMET stations began during the morning hours at nearly the same time across the State, as can be seen in the bottom left of Figure 1. Near Yuma, this allowed for dry and loose soils to be easily picked up and transported. Blowing dust reports at the El Centro NWS station west of Yuma in California, which occurred at a time coincident with the strong wind gusts in and around the Yuma area, demonstrate that strong winds capable of picking up and transporting dust were occurring in the area. The plot of hourly PM<sub>10</sub> concentration data in the upper right corner of Figure 1, in conjunction with the wind data, confirms the identical timing of the wind and elevated PM<sub>10</sub> concentrations. Finally, high winds and reduced visibility reported at Yuma MCAS and El Centro were coincident with elevated PM<sub>10</sub> concentrations measured at the Yuma and Mexico Supersites.

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 measured concentrations in excess of normal historical fluctuations, including background (i.e., concentrations greater than the 95<sup>th</sup> percentile). Monitors with readings greater than that of the NAAQS on November 29, 2006, which should be flagged, include Yuma Supersite and Mexico Supersite. A potential explanation for the discrepancy between the concentrations measured at the Yuma Courthouse and Yuma Supersite may be the local differences in the surrounding environments of the monitors. The Yuma Courthouse monitor is located on the roof of a large building, while the

Yuma Supersite monitor is located closer to the surface at the south end of a dirt lot. It is possible that the Yuma Supersite monitor was measuring localized dust and suspended soils from the dirt lot.

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. On November 29, 2006, an intense surface frontal system caused strong, gusty winds over portions of Arizona including the Yuma area. As a result, elevated PM<sub>10</sub> values occurred in Yuma and nearby areas in the southwestern portion of Arizona. In Yuma, hourly wind gusts monitored by an AZMET station remained above 20 mph through the afternoon and finally dipped below 20 mph after the 6 p.m. hour.

5. Perform a qualitative attribution to emission source(s). All evidence indicates the elevated PM<sub>10</sub> concentrations in the Yuma area can be attributed to soil emissions that were transported over a broad area in southwestern Arizona. No source specific emission allocation is possible based on the data available for analysis. The hourly concentration data do not show any significant sources other than the wind-blown dust event occurring on November 29, 2006. Observational reports of haze and blowing dust from trained officials in Yuma as well as El Centro, CA are further proof that the elevated PM<sub>10</sub> concentrations were attributed to soil emissions.

6. Estimation of Contribution from Source or Event. The primary source appears to be wind-blown dust over a wide geographic region for which there is not an effective or efficient method to estimate 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 exceedances or violations but for the event (i.e., the contribution during the event overwhelmed the 24-hour averages).

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 concentrations at the Yuma monitoring site and at Mexico Supersite were attributed to a natural event.

## Conclusion

Long-range transport of dust from soils. The elevated PM<sub>10</sub> event on November 29, 2006 in Yuma was the result of the transport of dust and soils from high winds that suspended natural soils and 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 reading indicated in the table at the beginning of this report, as the monitors would have been below NAAQS but for the contribution of the event.



Janet Napolitano, Governor  
 Stephen A. Owens, ADEQ Director

**YUMA AND VICINITY  
 DUST CONTROL ACTION FORECAST  
 ISSUED TUESDAY, NOVEMBER 28, 2006**

Three-day weather outlook:

A strong down-river wind event is imminent on Wednesday as gradients increase in the wake of a vigorous but dry surface cold frontal passage. Down-river winds will persist on Thursday and Friday but be on the decrease with time.

WINDS

WIND-BLOWN DUST RISK

Day #1: Wed 11/29/2006

Becoming northwest to northerly 15-30 mph with gusts up to 40 mph by afternoon.

**HIGH**

Day #2: Thu 11/30/2006

North to northeasterly 15-25 mph.

**MODERATE**

Day #3: Fri 12/01/2006

North to northeasterly 10-20 mph decreasing by afternoon.

**LOW**

**PM-10 & PM-2.5 (PARTICLES)**

Description – The term “particulate matter” (PM) includes both solid particles and liquid droplets found in air. Many manmade and natural sources emit PM directly or emit other pollutants that react in the atmosphere to form PM. Particles less than 10 micrometers in diameter tend to pose the greatest health concern because they can be inhaled into and accumulate in the respiratory system. Particles less than 2.5 micrometers in diameter are referred to as “fine” particles and are responsible for many visibility degradations (brown cloud). Particles with diameters between 2.5 and 10 micrometers are referred to as “coarse”.

Sources – Fine = All types of combustion (motor vehicles, power plants, wood burning, etc.) and some industrial processes. Coarse = crushing or grinding operations and dust from paved or unpaved roads.

Potential health impacts – PM can increase susceptibility to respiratory infections and can aggravate existing respiratory diseases, such as asthma and chronic bronchitis.

Units of measurement – Micrograms per cubic meter (ug/m<sup>3</sup>)

Averaging interval – 24 hours (midnight to midnight).

Reduction tips – Stabilize loose soils, minimize travel on dirt roads, utilize tarps on haul trucks, limit use of leaf-blowers, and on high-wind days reduce outdoor activities.

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

**QUALITY CONTROLLED LOCAL  
CLIMATOLOGICAL DATA  
(final)  
HOURLY OBSERVATIONS TABLE  
NAF (23199)  
EL CENTRO , CA  
(11/2006)**

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

Elevation: -43 ft. below sea level

Latitude: 32.817

Longitude: -115.667

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
29	0555	5	FEW060	7.00		46	7.8	40	4.2	31	-0.5	56	5	300		30.12			30.08	AA		30.08
29	0655	5	CLR	7.00		47	8.3	38	3.4	25	-3.9	42	7	010		30.16	1	016	30.12	AA		30.12
29	0755	5	CLR	7.00		55	12.8	41	4.9	19	-7.2	24	14	010		30.21			30.17	AA		30.17
29	0855	5	CLR	7.00		58	14.4	42	5.7	18	-7.8	21	13	010		30.25			30.21	AA		30.21
29	0955	5	CLR	4.00	BLDU	61	16.1	44	6.4	17	-8.3	18	22	010	28	30.27	2	037	30.23	AA		30.23
29	1055	5	CLR	4.00	BLDU	62	16.7	42	5.8	8	-13.3	12	20	010	28	30.28			30.24	AA		30.24
29	1155	5	CLR	7.00		62	16.7	43	5.8	9	-12.8	12	15	010	24	30.28			30.24	AA		30.24

Dynamically generated Mon Oct 29 12:17:46 EST 2007 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  
IMPERIAL COUNTY AIRPORT (03144)  
IMPERIAL , CA  
(11/2006)**

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

Elevation: -59 ft. below sea level  
Latitude: 32.834  
Longitude: -115.579  
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
29	0053	12	CLR	10.00		50	10.0	43	5.8	33	0.6	52	9	280		30.03			29.97	AA		29.97
29	0153	12	CLR	10.00		49	9.4	41	5.1	31	-0.6	50	8	290		30.05	1	009	29.99	AA		29.99
29	0253	12	CLR	10.00		46	7.8	39	4.0	30	-1.1	54	7	290		30.06			30.00	AA		30.00
29	0353	12	CLR	10.00		50	10.0	43	5.8	33	0.6	52	0	000		30.08			30.02	AA		30.02
29	0453	12	CLR	10.00		46	7.8	40	4.4	32	0.0	58	3	270		30.10	1	018	30.04	AA		30.04
29	0553	12	CLR	10.00		46	7.8	40	4.2	31	-0.6	56	6	300		30.14			30.08	AA		30.08
29	0653	12	CLR	10.00		49	9.4	40	4.6	28	-2.2	44	6	350		30.18			30.11	AA		30.12
29	0753	12	CLR	10.00		54	12.2	41	5.1	22	-5.6	29	9	360		30.22	3	032	30.16	AA		30.16
29	0853	12	CLR	10.00		58	14.4	42	5.4	16	-8.9	19	14	010		30.26			30.20	AA		30.20
29	0953	12	CLR	10.00		60	15.6	42	5.7	13	-10.6	16	20	360	24	30.29	1	038	30.23	AA		30.23
29	1053	12	CLR	7.00		61	16.1	42	5.5	8	-13.3	12	26	350	32	30.29			30.23	AA		30.23
29	1153	12	CLR	10.00		62	16.7	42	5.8	8	-13.3	12	17	360	23	30.30			30.24	AA		30.24
29	1253	12	CLR	10.00		62	16.7	42	5.6	6	-14.4	11	21	350	25	30.30	3	005	30.24	AA		30.24
29	1353	12	CLR	9.00		61	16.1	41	4.9	-1	-18.3	8	24	360	30	30.31			30.24	AA		30.25
29	1453	12	CLR	10.00		60	15.6	41	5.0	6	-14.4	11	18	350	31	30.33			30.26	AA		30.27
29	1553	12	CLR	10.00		58	14.4	40	4.4	6	-14.4	12	13	340	20	30.34	3	014	30.28	AA		30.28
29	1653	12	CLR	8.00		54	12.2	37	3.0	3	-16.1	12	11	020		30.37			30.31	AA		30.31
29	1753	12	CLR	10.00		52	11.1	36	2.2	1	-17.2	12	21	040		30.39			30.33	AA		30.33
29	1853	12	CLR	10.00		51	10.6	35	1.8	-2	-18.9	11	13	020		30.44	3	034	30.38	AA		30.38
29	1953	12	CLR	10.00		50	10.0	35	1.4	-2	-18.9	11	11	010		30.48			30.42	AA		30.42
29	2053	12	CLR	10.00		49	9.4	34	1.1	-3	-19.4	11	9	020		30.51	1	028	30.44	AA		30.45
29	2153	12	CLR	10.00		46	7.8	32	0.2	-1	-18.3	14	6	010		30.52			30.46	AA		30.46
29	2253	12	CLR	10.00		44	6.7	32	-0.2	2	-16.7	17	7	VR		30.54			30.47	AA		30.48
29	2353	12	CLR	10.00		40	4.4	29	-1.3	4	-15.6	22	6	240		30.53			30.46	AA		30.47

Dynamically generated Mon Oct 29 12:13:39 EST 2007 via <http://cdo.ncdc.noaa.gov/qclcd/QCLCD>

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

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

**QUALITY CONTROLLED LOCAL  
CLIMATOLOGICAL DATA  
(final)  
HOURLY OBSERVATIONS TABLE  
YUMA MARINE CORPS AIR STATION/YUMA INTL  
AIRPORT (23195)  
YUMA , AZ  
(11/2006)**

Elevation: 0 ft. above sea level  
Latitude: 32.657  
Longitude: -114.606  
Data Version: VER2

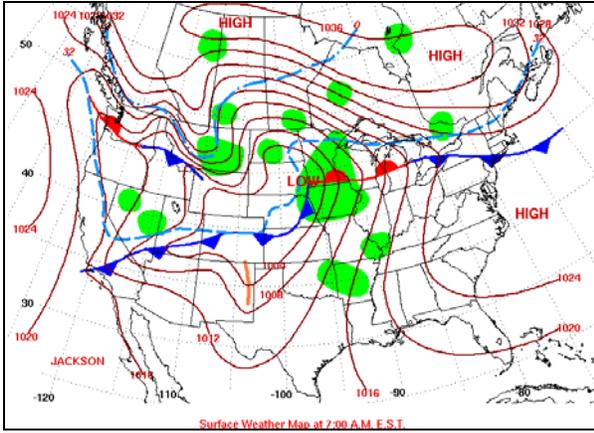
Date	Time (LST)	Station Type	Sky Conditions	Visibility (SM)	Weather Type	Dry Bulb Temp		Wet Bulb Temp		Dew Point Temp		Rel Humd %	Wind Speed (MPH)	Wind Dir	Wind Gusts (MPH)	Station Pressure (in. hg)	Press Tend	Net 3-hr Chg (mb)	Sea Level Pressure (in. hg)	Report Type	Precip. Total (in)	Alti-meter (in. 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
29	0056	0	CLR	7.00		54	12.2	45	7.1	34	1.1	47	9	310		29.71			29.93	AA		29.94
29	0156	0	CLR	7.00		54	12.0	45	7.1	34	1.0	47	10	320		29.72			M	AA		29.95
29	0256	0	CLR	7.00		54	12.0	43	5.8	27	-3.0	35	9	350		29.74			M	AA		29.97
29	0356	0	CLR	7.00		53	11.7	40	4.4	20	-6.7	27	8	020		29.76			29.98	AA		29.99
29	0456	0	CLR	7.00		52	11.0	40	4.3	21	-6.0	30	7	010		29.77			M	AA		30.00
29	0556	0	CLR	7.00		52	11.0	40	4.3	21	-6.0	30	9	350		29.79			M	AA		30.02
29	0656	0	CLR	7.00		52	11.0	40	4.3	21	-6.0	30	10	010		29.82			M	AA		30.05
29	0756	0	CLR	7.00		50	10.0	39	4.0	23	-5.0	35	8	020		29.85	3	030	30.08	AA		30.08
29	0856	0	CLR	7.00		53	11.7	40	4.6	21	-6.1	29	17	010		29.88			30.11	AA		30.12
29	0956	0	CLR	7.00		55	13.0	39	4.0	12	-11.0	18	30	360	38	29.93			M	AA		30.16
29	1056	0	CLR	4.00		57	13.9	40	4.2	8	-13.3	14	30	010	40	29.96	1	034	30.18	AA		30.19
29	1156	0	CLR	6.00	HZ	58	14.4	40	4.5	8	-13.3	13	28	360	34	29.96			30.19	AA		30.20
29	1256	0	CLR	7.00		58	14.4	40	4.5	7	-13.9	13	31	360	37	29.98			30.20	AA		30.21

Dynamically generated Mon Oct 29 12:48:09 EST 2007 via <http://cdo.ncdc.noaa.gov/qclcd/QCLCD>

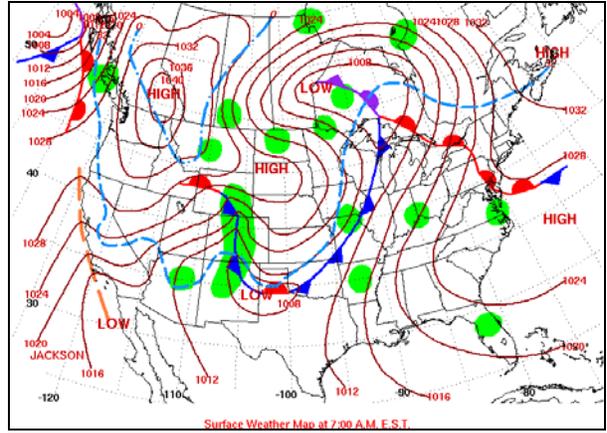
# Weather Charts for November 28-29, 2006

## Surface Analysis

11/28/2006 5:00 AM

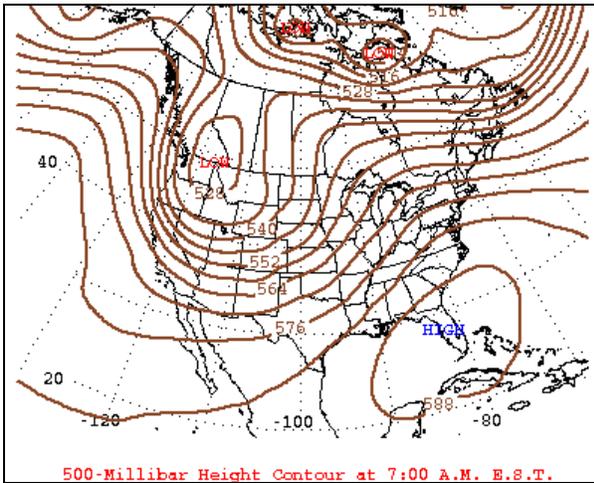


11/29/2006 5:00 AM



## 500 mb Chart

11/28/2006 5:00 AM



11/29/2006 5:00 AM

