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 Yuma Area on February 27, 2007

## 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 Monday February 26, 2007, ADEQ air quality forecasters issued the Yuma and Vicinity Dust Control Action Forecast calling for a high risk of exceeding the $PM_{10}$ National Ambient Air Quality Standard (NAAQS) in the Yuma area for Tuesday February 27th and Wednesday February 28th. The forecast discussion mentioned the likelihood of significant westerly winds and a high potential for blowing dust occurring locally. The forecast also mentioned the possibility of suspended dust being transported from areas west of Yuma (see attachment). The forecasts/advisories satisfy the requirement in 40 CFR 51.920(a)(1).

During the late evening hours of February 27th, a cold front associated with a strong but dry upper level trough approached the western Arizona border. As the trough of low pressure advanced eastward toward Yuma, strong northwesterly winds began to increase. Elevated hourly measurements of $PM_{10}$ first occurred nearly simultaneously at Yuma Court House, Yuma Supersite, and Mexico Supersite. All three sites began to show elevated $PM_{10}$ values during the 6:00 p.m. hour of data with their maximum $PM_{10}$ concentrations occurring during the 8:00 p.m. hour. The high wind and blowing dust was a region-wide event that not only affected the Yuma area, but also affected numerous locations in southeastern California. National Weather Service (NWS) data from Imperial County Airport indicate high winds throughout the day with haze being reported during the 12:00 p.m. and 1:00 p.m. hours and visibilities being reduced to 5 miles. In El Centro, California, where winds gusted to 49 mph, blowing dust occurred over 7 reporting hours, both during the late morning and then again in the early evening. Visibility there was reduced to 1 mile. As evidenced by the strong winds and elevated $PM_{10}$ concentrations, these weather conditions also persisted throughout the evening in the Yuma area. Blowing dust was reported at the Yuma Marine Corp Air Station (MCAS) during the 9:00, 10:00, and 11:00 p.m. reporting hours on February 27th. In addition, a significant reduction in visibility occurred, with the minimum visibility reported at the Yuma MCAS at 3 miles. 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."

It appears that blowing dust, originating in southeastern California, reached the Yuma area during the late evening hours of February 27th. The event brought significant wind and elevated ambient concentrations of $PM_{10}$ that exceeded the NAAQS at the ADEQ Yuma Courthouse and Yuma Supersite continuous BAMS monitors as well as the Mexico Supersite continuous BAMS monitor operated by ADEQ. 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 $PM_{10}$ | Time of Max | Flag*** |
|---|---|---|---|---|---|
| YUMA AREA | | | | | |
| Yuma Courthouse (ADEQ/BAM) | 04-027-0004* | 170 | 995** | 2000 | A or RJ |
| Yuma Supersite (ADEQ/BAM) | 04-027-8011* | 191 | 1000** | 2000 | A or RJ |
| Mexico Supersite (ADEQ/BAM) | 80-026-8012* | 153 | 666 | 2100 | A or RJ |

* EPA Air Quality System Identification Number
** Upper range of instrument. Actual $PM_{10}$ concentrations likely exceeded recorded value
*** 24-hr $PM_{10}$ 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, 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-Imperial, CA

| | Hr | T(F) | VR | Dust | Spd | Gust | Dir |
|---|---|---|---|---|---|---|---|
| NWS-Imperial, CA | 1 | 57 | 10 | | 21 | 28 | W |
| | 2 | 58 | 10 | | 22 | 22 | W |
| | 3 | 58 | 10 | | 21 | 28 | W |
| | 4 | 58 | 10 | | 20 | 20 | W |
| | 5 | 55 | 10 | | 10 | 10 | W |
| | 6 | 57 | 10 | | 18 | 26 | W |
| | 7 | 58 | 10 | | 18 | 28 | SW |
| | 8 | 61 | 10 | | 22 | 31 | SW |
| | 9 | 64 | 10 | | 23 | 34 | SW |
| | 10 | 66 | 10 | | 26 | 37 | SW |
| | 11 | 68 | 7 | | 30 | 43 | W |
| | 12 | 70 | 6 | HZ | 31 | 44 | SW |
| | 1 | 70 | 5 | HZ | 31 | 40 | SW |
| | 2 | 72 | 10 | | 23 | 37 | W |
| | 3 | 69 | 10 | | 25 | 33 | SW |
| | 4 | 67 | 10 | | 28 | 38 | W |
| | 5 | 64 | 10 | | 29 | 43 | W |
| | 6 | 61 | 7 | | 36 | 44 | W |
| | 7 | 59 | 10 | | 25 | 36 | W |
| | 8 | 58 | 10 | | 21 | 21 | W |
| | 9 | 56 | 10 | | 13 | 13 | W |
| | 10 | 55 | 10 | | 3 | 3 | N |
| | 11 | 53 | 10 | | 6 | 6 | *VR |
| | 12 | 52 | 10 | | 5 | 5 | NW |

## NWS-El Centro, CA

| | Hr | T(F) | VR | Dust | Spd | Gust | Dir |
|---|---|---|---|---|---|---|---|
| NWS-El Centro, CA | 1 | 57 | 10 | | 24 | 24 | W |
| | 2 | 56 | 10 | | 15 | 15 | W |
| | 3 | 57 | 10 | | 18 | 18 | SW |
| | 4 | 57 | 10 | | 15 | 15 | W |
| | 5 | 54 | 10 | | 5 | 5 | W |
| | 6 | 56 | 10 | | 21 | 26 | SW |
| | 7 | 57 | 10 | | 17 | 17 | W |
| | 8 | 62 | 10 | | 18 | 29 | SW |
| | 9 | 65 | 10 | | 26 | 26 | SW |
| | 10 | 66 | 3 | BLDU | 32 | 40 | SW |
| | 11 | 69 | 7 | BLDU | 30 | 38 | SW |
| | 12 | 70 | 2 | BLDU | 38 | 44 | SW |
| | 1 | 70 | 1 | BLDU | 39 | 45 | SW |
| | 2 | 70 | 10 | | 28 | 38 | W |
| | 3 | 70 | 10 | | 24 | 31 | W |
| | 4 | 67 | 10 | | 29 | 34 | W |
| | 5 | 63 | 1 | BLDU | 39 | 49 | W |
| | 6 | 61 | 3 | BLDU | 32 | 44 | W |
| | 7 | 58 | 10 | BLDU | 20 | 23 | W |
| | 8 | 57 | 10 | | 26 | 33 | W |
| | 9 | 56 | 10 | | 23 | 23 | W |
| | 10 | 55 | 10 | | 24 | 24 | W |
| | 11 | 54 | 10 | | 23 | 23 | W |
| | 12 | 54 | 10 | | 23 | 34 | W |

## NWS-Yuma MCAS

| | Hr | T(F) | VR | Dust | Spd | Gust | Dir |
|---|---|---|---|---|---|---|---|
| NWS-Yuma MCAS | 1 | 58 | 10 | | 15 | 15 | NW |
| | 2 | 57 | 10 | | 16 | 16 | W |
| | 3 | 56 | 10 | | 21 | 21 | W |
| | 4 | 54 | 10 | | 17 | 17 | W |
| | 5 | 53 | 10 | | 10 | 10 | W |
| | 6 | 52 | 10 | | M | M | M |
| | 7 | 52 | 10 | | M | M | M |
| | 8 | 52 | 10 | | M | M | M |
| | 9 | 54 | 10 | | M | M | M |
| | 10 | 59 | 10 | | 10 | 10 | W |
| | 11 | 66 | 7 | | 24 | 30 | W |
| | 12 | 68 | 10 | | 11 | 11 | W |
| | 1 | 70 | 10 | | 13 | 13 | W |
| | 2 | 71 | 10 | | 8 | 8 | S |
| | 3 | 72 | 10 | | 13 | 13 | W |
| | 4 | 73 | 10 | | 13 | 13 | W |
| | 5 | 71 | 10 | | 16 | 16 | W |
| | 6 | 67 | 10 | | 18 | 25 | NW |
| | 7 | 64 | 10 | | 16 | 25 | NW |
| | 8 | 62 | 7 | | 14 | 22 | NW |
| | 9 | 59 | 3 | BLDU | 20 | 30 | NW |
| | 10 | 57 | 3 | BLDU | 21 | 36 | W |
| | 11 | 56 | 6 | BLDU | 20 | 28 | NW |
| | 12 | 54 | 10 | | 17 | 17 | NW |

## Event Contrib. Analysis

### Hourly $PM_{10}$ Conc. ($\mu g/m^3$)

**MONITORS:**
1-YUMA CH
2-YUMA SS
3-MEX SS

| Hr | 1 | 2 | 3 |
|---|---|---|---|
| 1 | 24 | 35 | 38 |
| 2 | 27 | 36 | 41 |
| 3 | 38 | 39 | 36 |
| 4 | 19 | 17 | 37 |
| 5 | 14 | 16 | 48 |
| 6 | 20 | 28 | 45 |
| 7 | 52 | 34 | 56 |
| 8 | 94 | 51 | 178 |
| 9 | 70 | 68 | 195 |
| 10 | 35 | 58 | 76 |
| 11 | 173 | 159 | 101 |
| 12 | 92 | 279 | 79 |
| 1 | 71 | 97 | 72 |
| 2 | 70 | 83 | 93 |
| 3 | 53 | 120 | 61 |
| 4 | 31 | 53 | 78 |
| 5 | 58 | 67 | 35 |
| 6 | 110 | 126 | 185 |
| 7 | 286 | 495 | 148 |
| 8 | 382 | 413 | 225 |
| 9 | 995 | 1000 | 438 |
| 10 | 774 | 749 | 666 |
| 11 | 472 | 419 | 444 |
| 12 | 134 | 152 | 299 |

**24-Hr. Avg $PM_{10}$**

| Monitor: | with Event | w/o Event |
|---|---|---|
| 1-YUMA CH | 170 | 58 |
| 2-YUMA SS | 191 | 75 |
| 3-MEX SS | 153 | 74 |
| > 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).

## AZMET Monitoring Locations

See http://ag.arizona.edu/azmet/
wnd @3m agl / Dir corrected to true north

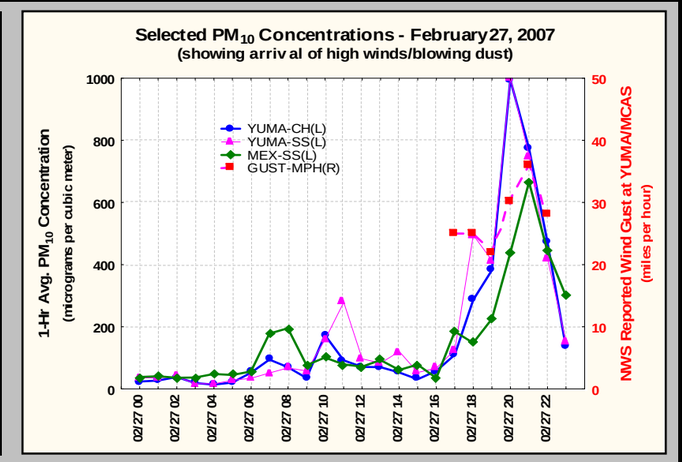
| HIGHLIGHTING | Col. | Parameter |
|---|---|---|
| Max Wind | T(F) | Temp. (Deg. F.) |
| > 15 mph | RH | Rel Humidity % |
| >25 mph | Rn | Rain (Inches/hr) |
| HR - Time (End) | Spd | Avg Speed mph |
| A.M. | Max | Max Speed mph |
| P.M. | Dir | Wind Dir. (from) |

## Figure 1. Key Data for Event of February 27, 2007

| MISC DATA | KEY | PM10 PLOT |
|---|---|---|
| CEN. AZ WINDS | SAT IMAGES | |
| SO AZ WINDS | YUMA MAP & FORECAST | |

**SUMMARY OF EVENT**

A strong upper level trough brought gusty winds and dust to the Yuma area. Dust was regional in nature occuring over a broad area. NWS reported continuous gusty winds in the 25-40 mph range for several hours during the event.




## PARKER

| | Hr | T(F) | RH | Rn | Spd | Max | Dir |
|---|---|---|---|---|---|---|---|
| 08-Parker | 1 | 56 | 57 | - | 15 | 21 | SW |
| | 2 | 55 | 60 | - | 13 | 17 | S |
| | 3 | 54 | 62 | - | 14 | 20 | S |
| | 4 | 51 | 67 | - | 11 | 17 | S |
| | 5 | 50 | 68 | - | 8 | 11 | S |
| | 6 | 48 | 71 | - | 8 | 12 | S |
| | 7 | 47 | 72 | - | 7 | 10 | S |
| | 8 | 47 | 73 | - | 6 | 13 | S |
| | 9 | 55 | 58 | - | 2 | 8 | S |
| | 10 | 59 | 53 | - | 13 | 20 | SW |
| | 11 | 62 | 46 | - | 14 | 20 | SW |
| | 12 | 66 | 37 | - | 14 | 20 | SW |
| | 1 | 69 | 31 | - | 16 | 27 | SW |
| | 2 | 70 | 32 | - | 20 | 29 | SW |
| | 3 | 70 | 34 | - | 16 | 24 | SW |
| | 4 | 69 | 35 | - | 19 | 27 | SW |
| | 5 | 67 | 37 | - | 19 | 26 | SW |
| | 6 | 65 | 37 | - | 22 | 30 | SW |
| | 7 | 62 | 36 | - | 21 | 30 | SW |
| | 8 | 59 | 41 | - | 17 | 24 | SW |
| | 9 | 56 | 46 | - | 14 | 18 | SW |
| | 10 | 53 | 52 | - | 11 | 16 | S |
| | 11 | 52 | 52 | - | 8 | 14 | S |
| | 12 | 51 | 50 | - | 4 | 10 | SE |

## BUCKEYE

| | Hr | T(F) | RH | Rn | Spd | Max | Dir |
|---|---|---|---|---|---|---|---|
| 26-Buckeye | 1 | 56 | 53 | - | 1 | 4 | SE |
| | 2 | 52 | 60 | - | 2 | 4 | NE |
| | 3 | 51 | 62 | - | 3 | 7 | W |
| | 4 | 51 | 63 | - | 2 | 4 | SW |
| | 5 | 53 | 57 | - | 1 | 2 | SW |
| | 6 | 51 | 62 | - | 1 | 4 | SE |
| | 7 | 48 | 71 | - | 4 | 6 | E |
| | 8 | 49 | 69 | - | 4 | 6 | E |
| | 9 | 55 | 60 | - | 5 | 8 | SE |
| | 10 | 59 | 48 | - | 8 | 11 | SE |
| | 11 | 63 | 38 | - | 7 | 13 | S |
| | 12 | 64 | 36 | - | 8 | 15 | SW |
| | 1 | 65 | 37 | - | 10 | 18 | SW |
| | 2 | 67 | 34 | - | 13 | 21 | W |
| | 3 | 68 | 30 | - | 13 | 21 | SW |
| | 4 | 69 | 25 | - | 15 | 23 | SW |
| | 5 | 67 | 26 | - | 13 | 21 | SW |
| | 6 | 65 | 29 | - | 12 | 19 | W |
| | 7 | 62 | 35 | - | 11 | 19 | W |
| | 8 | 62 | 35 | - | 8 | 17 | W |
| | 9 | 58 | 47 | - | 5 | 9 | NW |
| | 10 | 57 | 48 | - | 3 | 6 | W |
| | 11 | 55 | 57 | - | 6 | 9 | W |
| | 12 | 55 | 49 | - | 11 | 17 | NW |

## MARICOPA

| | Hr | T(F) | RH | Rn | Spd | Max | Dir |
|---|---|---|---|---|---|---|---|
| 06-Maricopa | 1 | 49 | 57 | - | 5 | 8 | S |
| | 2 | 50 | 52 | - | 5 | 8 | S |
| | 3 | 51 | 45 | - | 6 | 7 | S |
| | 4 | 49 | 50 | - | 5 | 8 | S |
| | 5 | 48 | 49 | - | 6 | 8 | S |
| | 6 | 49 | 48 | - | 6 | 8 | S |
| | 7 | 47 | 54 | - | 5 | 7 | S |
| | 8 | 45 | 56 | - | 3 | 6 | NW |
| | 9 | 51 | 48 | - | 3 | 6 | W |
| | 10 | 57 | 38 | - | 5 | 8 | S |
| | 11 | 62 | 38 | - | 4 | 8 | SW |
| | 12 | 66 | 31 | - | 4 | 9 | S |
| | 1 | 70 | 26 | - | 4 | 17 | S |
| | 2 | 73 | 21 | - | 10 | 17 | NW |
| | 3 | 74 | 20 | - | 13 | 21 | NW |
| | 4 | 73 | 20 | - | 13 | 20 | NW |
| | 5 | 72 | 21 | - | 13 | 19 | NW |
| | 6 | 69 | 23 | - | 11 | 18 | W |
| | 7 | 66 | 24 | - | 7 | 15 | W |
| | 8 | 64 | 25 | - | 7 | 12 | W |
| | 9 | 63 | 27 | - | 5 | 7 | W |
| | 10 | 61 | 29 | - | 4 | 7 | W |
| | 11 | 60 | 32 | - | 6 | 9 | SW |
| | 12 | 59 | 37 | - | 7 | 15 | W |

## Historical Distribution

### 5-Yr. Dist. of Values ($\mu g/m^3$)

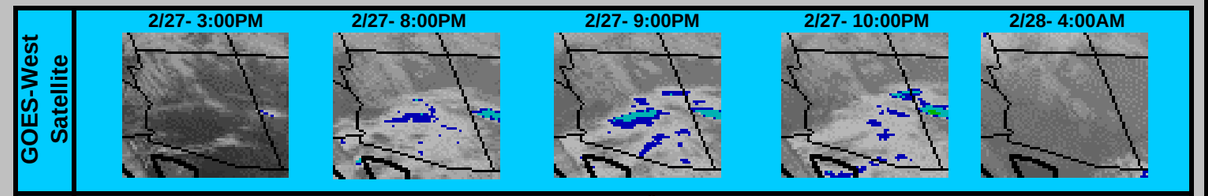
**MONITORS:**
1-YUMA CH
2-YUMA SS
3-MEX SS

**Column Index**
Yr - All Data (5-Yrs)
Sea - Data for Winter season only (5-Yrs)

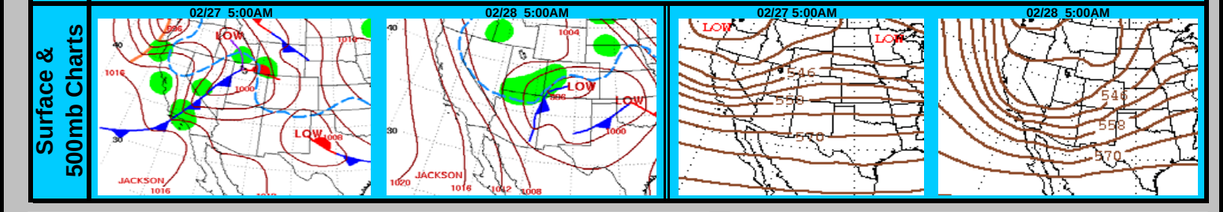
| Cum. Freq. | Mon 1 Yr | Mon 1 Sea | Mon 2 Yr | Mon 2 Sea | Mon 3 Yr | Mon 3 Sea |
|---|---|---|---|---|---|---|
| Min | 8 | 10 | 8 | 17 | 13 | 53 |
| 0.5% | 12 | 12 | 13 | 18 | 29 | 57 |
| 1.0% | 14 | 13 | 17 | 19 | 35 | 60 |
| 2.5% | 16 | 14 | 20 | 23 | 46 | 66 |
| 5% | 19 | 17 | 22 | 33 | 54 | 72 |
| 10% | 23 | 20 | 25 | 35 | 62 | 80 |
| 25% | 31 | 28 | 34 | 40 | 79 | 95 |
| 50% | 42 | 35 | 45 | 53 | 104 | 129 |
| 75% | 57 | 50 | 63 | 70 | 149 | 184 |
| 90% | 77 | 70 | 85 | 103 | 206 | 234 |
| 95% | 96 | 86 | 107 | 168 | 247 | 278 |
| 97.5% | 127 | 107 | 147 | 195 | 290 | 297 |
| 99.0% | 186 | 168 | 196 | 229 | 318 | 321 |
| 99.5% | 211 | 181 | 235 | 260 | 351 | 337 |
| Max | 349 | 186 | 291 | 291 | 446 | 352 |
| Flagged Value | 170 | | 191 | | 153 | |

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

## GOES-West Satellite




## Surface & 500mb Charts




## YUMA

| | Hr | T(F) | RH | Rn | Spd | Max | Dir |
|---|---|---|---|---|---|---|---|
| 02-YumaValley | 1 | 57 | 52 | - | 11 | 17 | NW |
| | 2 | 56 | 52 | - | 15 | 24 | NW |
| | 3 | 55 | 54 | - | 16 | 22 | NW |
| | 4 | 54 | 58 | - | 11 | 20 | NW |
| | 5 | 52 | 60 | - | 8 | 12 | W |
| | 6 | 54 | 57 | - | 9 | 16 | NW |
| | 7 | 51 | 62 | - | 6 | 13 | W |
| | 8 | 47 | 70 | - | 3 | 7 | S |
| | 9 | 52 | 64 | - | 5 | 14 | W |
| | 10 | 59 | 48 | - | 9 | 15 | NW |
| | 11 | 63 | 39 | - | 16 | 26 | NW |
| | 12 | 66 | 34 | - | 15 | 23 | W |
| | 1 | 69 | 31 | - | 11 | 21 | W |
| | 2 | 71 | 29 | - | 15 | 23 | SW |
| | 3 | 71 | 29 | - | 13 | 20 | W |
| | 4 | 70 | 31 | - | 12 | 17 | W |
| | 5 | 69 | 33 | - | 13 | 19 | W |
| | 6 | 66 | 35 | - | 17 | 24 | NW |
| | 7 | 63 | 37 | - | 19 | 32 | NW |
| | 8 | 60 | 35 | - | 18 | 29 | NW |
| | 9 | 58 | 33 | - | 23 | 35 | NW |
| | 10 | 57 | 37 | - | 23 | 34 | NW |
| | 11 | 55 | 39 | - | 22 | 33 | NW |
| | 12 | 54 | 41 | - | 23 | 35 | NW |

## PALOMA

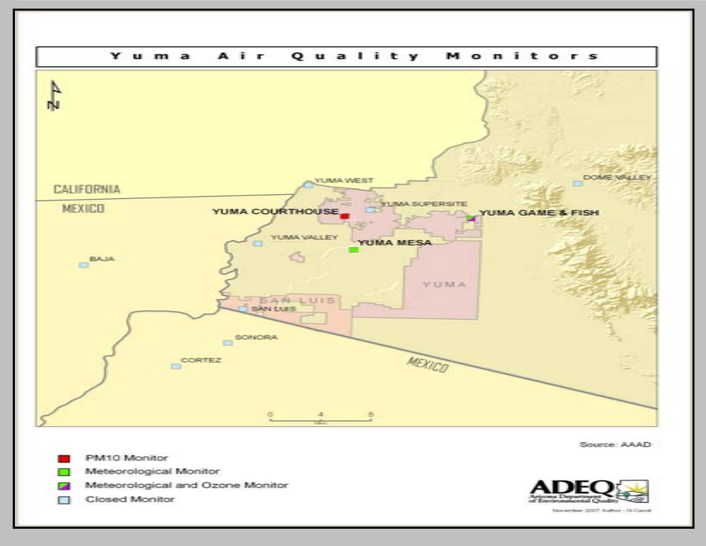
| | Hr | T(F) | RH | Rn | Spd | Max | Dir |
|---|---|---|---|---|---|---|---|
| 19-Paloma | 1 | 50 | 55 | - | 3 | 7 | S |
| | 2 | 49 | 59 | - | 2 | 4 | SW |
| | 3 | 46 | 62 | - | 1 | 2 | SW |
| | 4 | 46 | 63 | - | 2 | 5 | SW |
| | 5 | 42 | 76 | - | 4 | 7 | SW |
| | 6 | 41 | 72 | - | 4 | 6 | S |
| | 7 | 42 | 67 | - | 2 | 6 | S |
| | 8 | 41 | 73 | - | 3 | 5 | SW |
| | 9 | 49 | 67 | - | 3 | 5 | SW |
| | 10 | 58 | 53 | - | 7 | 11 | SW |
| | 11 | 63 | 43 | - | 11 | 17 | SW |
| | 12 | 65 | 41 | - | 13 | 19 | SW |
| | 1 | 67 | 38 | - | 13 | 19 | SW |
| | 2 | 68 | 34 | - | 13 | 20 | W |
| | 3 | 69 | 33 | - | 13 | 19 | W |
| | 4 | 69 | 31 | - | 12 | 20 | W |
| | 5 | 67 | 34 | - | 11 | 18 | W |
| | 6 | 64 | 38 | - | 6 | 13 | W |
| | 7 | 60 | 42 | - | 2 | 6 | W |
| | 8 | 59 | 43 | - | 2 | 5 | W |
| | 9 | 55 | 56 | - | 6 | 7 | SW |
| | 10 | 56 | 51 | - | 7 | 11 | W |
| | 11 | 55 | 49 | - | 10 | 15 | W |
| | 12 | 54 | 48 | - | 11 | 17 | W |

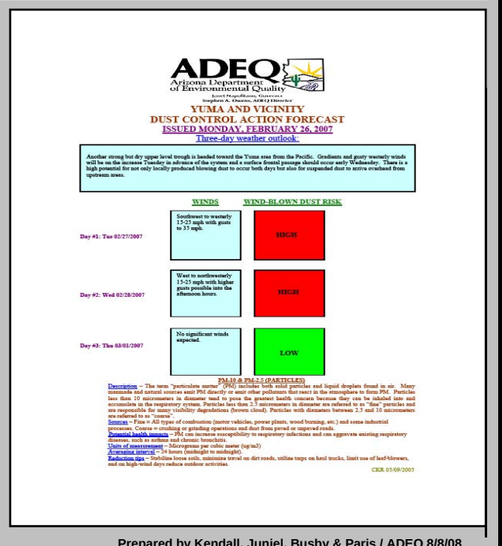
## MARANA

| | Hr | T(F) | RH | Rn | Spd | Max | Dir |
|---|---|---|---|---|---|---|---|
| 13-Marana | 1 | 48 | 40 | - | 3 | 5 | E |
| | 2 | 46 | 45 | - | 5 | 8 | E |
| | 3 | 46 | 47 | - | 6 | 10 | E |
| | 4 | 46 | 48 | - | 7 | 10 | SE |
| | 5 | 44 | 51 | - | 7 | 9 | SE |
| | 6 | 45 | 50 | - | 9 | 13 | SE |
| | 7 | 43 | 52 | - | 11 | 16 | SE |
| | 8 | 45 | 49 | - | 11 | 15 | SE |
| | 9 | 52 | 36 | - | 13 | 18 | SE |
| | 10 | 59 | 27 | - | 14 | 18 | SE |
| | 11 | 66 | 22 | - | 9 | 15 | SE |
| | 12 | 72 | 16 | - | 7 | 18 | SW |
| | 1 | 74 | 11 | - | 11 | 19 | W |
| | 2 | 76 | 11 | - | 13 | 22 | SW |
| | 3 | 77 | 10 | - | 15 | 26 | W |
| | 4 | 76 | 10 | - | 17 | 28 | W |
| | 5 | 75 | 10 | - | 14 | 21 | W |
| | 6 | 73 | 10 | - | 11 | 17 | W |
| | 7 | 70 | 10 | - | 11 | 18 | W |
| | 8 | 66 | 13 | - | 7 | 13 | NW |
| | 9 | 62 | 21 | - | 4 | 7 | NW |
| | 10 | 61 | 24 | - | 2 | 6 | S |
| | 11 | 60 | 24 | - | 4 | 7 | SW |
| | 12 | 59 | 19 | - | 5 | 9 | SW |

## TUCSON

| | Hr | T(F) | RH | Rn | Spd | Max | Dir |
|---|---|---|---|---|---|---|---|
| 01-Tucson | 1 | 45 | 52 | - | 2 | 4 | E |
| | 2 | 43 | 53 | - | 1 | 3 | E |
| | 3 | 43 | 54 | - | 2 | 4 | E |
| | 4 | 42 | 56 | - | 2 | 4 | E |
| | 5 | 41 | 59 | - | 2 | 4 | E |
| | 6 | 41 | 61 | - | 2 | 3 | E |
| | 7 | 40 | 64 | - | 3 | 4 | SE |
| | 8 | 44 | 55 | - | 2 | 6 | SE |
| | 9 | 54 | 39 | - | 4 | 6 | SE |
| | 10 | 60 | 30 | - | 5 | 9 | SE |
| | 11 | 65 | 26 | - | 6 | 10 | SE |
| | 12 | 68 | 23 | - | 5 | 10 | E |
| | 1 | 71 | 16 | - | 4 | 13 | W |
| | 2 | 74 | 10 | - | 11 | 23 | W |
| | 3 | 75 | 10 | - | 14 | 25 | W |
| | 4 | 75 | 9 | - | 12 | 21 | W |
| | 5 | 74 | 9 | - | 11 | 20 | W |
| | 6 | 72 | 10 | - | 9 | 15 | W |
| | 7 | 71 | 11 | - | 6 | 11 | W |
| | 8 | 69 | 10 | - | 7 | 12 | W |
| | 9 | 66 | 14 | - | 5 | 11 | W |
| | 10 | 64 | 16 | - | 4 | 10 | W |
| | 11 | 63 | 15 | - | 2 | 11 | SW |
| | 12 | 62 | 19 | - | 5 | 11 | SE |




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 Yuma Courthouse, Yuma Supersite, and Mexico Supersite were valid for February 27th. For both the Yuma Courthouse and Yuma Supersite, there was one hour in which the measured $PM_{10}$ concentrations likely exceeded the high end of the instrument's range. These values were recorded as 995 and 1000 $\mu g/m^3$ for the Yuma Courthouse and Yuma Supersite respectively. It is likely that the actual $PM_{10}$ concentrations during this hour were greater than those recorded by the instruments. Audits of the analyzers revealed operations were within acceptable tolerance. No local sources were reported as significantly contributing to the event.

2. Review suspected contributing sources. The Arizona Meteorological Network (AzMET) and NWS surface data from the Phoenix metro area and southwestern Arizona / southeast California provide a good explanation of the meteorological conditions that were in place throughout the day of February 27th. Strong winds in conjunction with a lack of precipitation occurring throughout the region allowed for dry and loose soils to be easily picked up and transported. While no visibility network exists for the Yuma area, blowing dust reports from multiple NWS stations, made by trained experts, throughout southwest Arizona and southeast California, are proof that strong winds picked up and transported dust and soils. The plot of hourly $PM_{10}$ 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 $PM_{10}$ concentrations. Finally, strong wind, blowing dust and reduced visibility reported at the Yuma MCAS were coincident with strong winds and elevated $PM_{10}$ concentrations measured at the Yuma Courthouse, Yuma Supersite, and Mexico Supersite.

3. Examine all air quality monitoring information. Data from all monitors in the network were reviewed. Monitors from the Yuma area are summarized in the table in the Background section of this assessment. All monitors that were properly functioning in the Yuma area exceeded the NAAQS which suggests regional contribution to the event. 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 95th percentile). Monitors with readings greater than that of the NAAQS, which should be flagged, include the Yuma Supersite, Yuma Courthouse and Mexico Supersite $PM_{10}$ monitors.

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. Blowing dust, first reported in areas west of Yuma in California and then later in the Yuma area, can be attributed to northwesterly winds associated with the passing of a frontal boundary. As the frontal boundary reached the Yuma area, winds increased, shifted to the northwest, and wind-blown dust entered southwestern Arizona causing elevated $PM_{10}$ values in Yuma.

5. Perform a qualitative attribution to emission source(s). All evidence indicates the elevated $PM_{10}$ concentrations in the Yuma area can be attributed to soil emissions in the area west and northwest of Yuma that were transported over a broad area. 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 major wind-blown dust event for the evening episode. Observational reports of haze and blowing dust from trained officials are further proof that the elevated $PM_{10}$ 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 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 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 flagged monitoring sites were attributed to a natural event.

## Conclusion

Long-range transport of dust from soils. The regional wide elevated $PM_{10}$ event on February 27, 2007, in Yuma County were a result of long-range 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 readings indicated in the summary table at the beginning of this report, as monitors would have been below the NAAQS but for the contribution of the event.

ADEQ
Arizona Department of Environmental Quality

Janet Napolitano, Governor
Stephen A. Owens, ADEQ Director

# YUMA AND VICINITY
# DUST CONTROL ACTION FORECAST
## ISSUED MONDAY, FEBRUARY 26, 2007
## Three-day weather outlook:

Another strong but dry upper level trough is headed toward the Yuma area from the Pacific. Gradients and gusty westerly winds will be on the increase Tuesday in advance of the system and a surface frontal passage should occur early Wednesday. There is a high potential for not only locally produced blowing dust to occur both days but also for suspended dust to arrive overhead from upstream areas.

| | WINDS | WIND-BLOWN DUST RISK |
|---|---|---|
| Day #1: Tue 02/27/2007 | Southwest to westerly 15-25 mph with gusts to 35 mph. | HIGH |
| Day #2: Wed 02/28/2007 | West to northwesterly 15-25 mph with higher gusts possible into the afternoon hours. | HIGH |
| Day #3: Thu 03/01/2007 | No significant winds expected. | 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/m3)

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.

CKR 05/09/2005

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

# QUALITY CONTROLLED LOCAL CLIMATOLOGICAL DATA (final) HOURLY OBSERVATIONS TABLE NAF (23199) EL CENTRO , CA (02/2007)

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 |
| 27 | 0056 | 5 | CLR | 10.00 | | 57 | 13.9 | 48 | 8.8 | 38 | 3.3 | 49 | 24 | 250 | | 29.98 | 3 | 006 | 29.99 | AA | | 29.94 |
| 27 | 0156 | 5 | CLR | 10.00 | | 56 | 13.3 | 47 | 8.5 | 38 | 3.3 | 51 | 15 | 250 | | 29.98 | | | 29.98 | AA | | 29.94 |
| 27 | 0256 | 5 | CLR | 10.00 | | 57 | 13.9 | 48 | 9.0 | 39 | 3.9 | 51 | 18 | 240 | | 29.97 | | | 29.98 | AA | | 29.93 |
| 27 | 0356 | 5 | CLR | 10.00 | | 57 | 13.9 | 48 | 8.8 | 38 | 3.3 | 49 | 15 | 250 | | 29.96 | 8 | 010 | 29.96 | AA | | 29.92 |
| 27 | 0456 | 5 | CLR | 10.00 | | 54 | 12.2 | 46 | 7.8 | 37 | 2.8 | 53 | 5 | 260 | | 29.95 | | | 29.95 | AA | | 29.91 |
| 27 | 0556 | 5 | FEW100 | 10.00 | | 56 | 13.3 | 47 | 8.5 | 38 | 3.3 | 51 | 21 | 240 | 26 | 29.95 | | | 29.95 | AA | | 29.91 |
| 27 | 0656 | 5 | FEW060 SCT100 | 10.00 | | 57 | 13.9 | 48 | 8.8 | 38 | 3.3 | 49 | 17 | 250 | | 29.98 | 3 | 006 | 29.98 | AA | | 29.94 |
| 27 | 0756 | 5 | FEW060 | 10.00 | | 62 | 16.7 | 51 | 10.3 | 39 | 3.9 | 43 | 18 | 240 | 29 | 29.99 | | | 30.00 | AA | | 29.95 |
| 27 | 0856 | 5 | FEW060 SCT100 | 10.00 | | 65 | 18.3 | 52 | 11.3 | 40 | 4.4 | 40 | 26 | 240 | | 29.98 | | | 29.99 | AA | | 29.94 |
| 27 | 0956 | 5 | FEW060 | 3.00 | BLDU | 66 | 18.9 | 53 | 11.5 | 40 | 4.4 | 39 | 32 | 240 | 40 | 29.97 | 8 | 001 | 29.98 | AA | | 29.93 |
| 27 | 1056 | 5 | FEW060 | 7.00 | BLDU | 69 | 20.6 | 54 | 12.2 | 40 | 4.4 | 35 | 30 | 240 | 38 | 29.96 | | | 29.97 | AA | | 29.92 |
| 27 | 1137 | 5 | CLR | 1.75 | BLDU | 70 | 21.0 | 55 | 12.7 | 41 | 5.0 | 35 | 38 | 240 | 44 | 29.95 | | | M | SP | | 29.91 |
| 27 | 1156 | 5 | SCT020 | 3.00 | BLDU | 69 | 20.6 | 55 | 12.5 | 41 | 5.0 | 36 | 33 | 240 | | 29.95 | | | 29.95 | AA | | 29.91 |
| 27 | 1232 | 5 | FEW002 | 2.00 | BLDU | 70 | 21.0 | 56 | 13.1 | 43 | 6.0 | 38 | 34 | 240 | 45 | 29.91 | | | M | SP | | 29.87 |
| 27 | 1237 | 5 | VV001 | 1.00 | BLDU | 70 | 21.0 | 56 | 13.1 | 43 | 6.0 | 38 | 39 | 230 | 45 | 29.91 | | | M | SP | | 29.87 |
| 27 | 1241 | 5 | SCT020 | 0.75 | BLDU | 70 | 21.0 | 56 | 13.1 | 43 | 6.0 | 38 | 38 | 230 | 46 | 29.91 | | | M | SP | | 29.87 |
| 27 | 1256 | 5 | SCT020 | 2.50 | BLDU | 70 | 21.1 | 55 | 12.7 | 41 | 5.0 | 35 | 36 | 230 | 46 | 29.90 | 8 | 025 | 29.90 | AA | | 29.86 |
| 27 | 1259 | 5 | CLR | 3.00 | BLDU | 70 | 21.0 | 55 | 12.7 | 41 | 5.0 | 35 | 32 | 230 | 45 | 29.90 | | | M | SP | | 29.86 |
| 27 | 1356 | 5 | SCT030 | 10.00 | | 70 | 21.1 | 55 | 12.7 | 41 | 5.0 | 35 | 28 | 260 | 38 | 29.89 | | | 29.90 | AA | | 29.85 |
| 27 | 1456 | 5 | SCT030 SCT100 | 10.00 | | 70 | 21.1 | 54 | 12.1 | 38 | 3.3 | 31 | 24 | 250 | 31 | 29.87 | | | 29.87 | AA | | 29.83 |
| 27 | 1556 | 5 | CLR | 10.00 | | 67 | 19.4 | 52 | 11.1 | 37 | 2.8 | 33 | 29 | 270 | 34 | 29.88 | 5 | 007 | 29.88 | AA | | 29.84 |
| 27 | 1626 | 5 | FEW002 | 1.50 | | 64 | 18.0 | 50 | 10.2 | 36 | 2.0 | 36 | 39 | 250 | 44 | 29.87 | | | M | SP | | 29.83 |
| 27 | 1629 | 5 | VV002 | 0.75 | | 64 | 18.0 | 50 | 10.2 | 36 | 2.0 | 36 | 34 | 240 | 48 | 29.87 | | | M | SP | | 29.83 |
| 27 | 1637 | 5 | FEW002 | 1.25 | | 64 | 18.0 | 50 | 10.2 | 36 | 2.0 | 36 | 33 | 250 | 41 | 29.88 | | | M | SP | | 29.84 |
| 27 | 1641 | 5 | SCT030 BKN150 | 4.00 | | 64 | 18.0 | 50 | 10.2 | 36 | 2.0 | 36 | 32 | 260 | 41 | 29.87 | | | M | SP | | 29.83 |
| 27 | 1649 | 5 | SCT030 BKN150 | 1.75 | | 64 | 18.0 | 50 | 9.8 | 34 | 1.0 | 33 | 39 | 260 | 49 | 29.88 | | | M | SP | | 29.84 |
| 27 | 1656 | 5 | SCT030 BKN150 | 1.00 | BLDU | 63 | 17.2 | 50 | 9.7 | 35 | 1.7 | 35 | 39 | 250 | 49 | 29.87 | | | 29.87 | AA | | 29.83 |
| 27 | 1700 | 5 | SCT030 BKN150 | 0.75 | BLDU | 63 | 17.0 | 49 | 9.5 | 34 | 1.0 | 34 | 41 | 250 | 47 | 29.87 | | | M | SP | | 29.83 |
| 27 | 1756 | 5 | SCT030 BKN150 | 3.00 | BLDU | 61 | 16.1 | 47 | 8.3 | 30 | -1.1 | 31 | 32 | 260 | 44 | 29.88 | | | 29.88 | AA | | 29.84 |
| 27 | 1856 | 5 | SCT030 BKN150 | 10.00 | BLDU | 58 | 14.4 | 46 | 7.8 | 32 | 0.0 | 37 | 20 | 270 | 23 | 29.89 | 3 | 005 | 29.90 | AA | | 29.85 |
| 27 | 1956 | 5 | SCT030 BKN150 | 10.00 | | 57 | 13.9 | 46 | 7.6 | 32 | 0.0 | 39 | 26 | 270 | 33 | 29.90 | | | 29.90 | AA | | 29.86 |
| 27 | 2056 | 5 | FEW060 BKN150 | 10.00 | | 56 | 13.3 | 45 | 7.3 | 32 | 0.0 | 40 | 23 | 280 | | 29.90 | | | 29.91 | AA | | 29.86 |
| 27 | 2156 | 5 | FEW060 SCT150 | 10.00 | | 55 | 12.8 | 46 | 7.6 | 35 | 1.7 | 47 | 24 | 250 | | 29.92 | 3 | 009 | 29.92 | AA | | 29.88 |
| 27 | 2256 | 5 | FEW060 SCT150 | 10.00 | | 54 | 12.2 | 44 | 6.7 | 32 | 0.0 | 43 | 23 | 250 | | 29.91 | | | 29.91 | AA | | 29.87 |
| 27 | 2356 | 5 | CLR | 10.00 | | 54 | 12.2 | 44 | 6.7 | 32 | 0.0 | 43 | 23 | 280 | 34 | 29.93 | | | 29.93 | AA | | 29.89 |

*Dynamically generated Tue Oct 30 09:09:46 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
## (02/2007)

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 |
| 27 | 0053 | 12 | CLR | 10.00 | | 57 | 13.9 | 48 | 9.0 | 39 | 3.9 | 51 | 21 | 250 | 28 | 29.99 | 3 | 001 | 29.93 | AA | | 29.93 |
| 27 | 0153 | 12 | CLR | 10.00 | | 58 | 14.4 | 49 | 9.3 | 39 | 3.9 | 49 | 22 | 250 | | 29.99 | | | 29.92 | AA | | 29.93 |
| 27 | 0253 | 12 | CLR | 10.00 | | 58 | 14.4 | 49 | 9.3 | 39 | 3.9 | 49 | 21 | 250 | 28 | 29.97 | | | 29.91 | AA | | 29.91 |
| 27 | 0353 | 12 | CLR | 10.00 | | 58 | 14.4 | 48 | 9.1 | 38 | 3.3 | 48 | 20 | 250 | | 29.97 | 7 | 008 | 29.91 | AA | | 29.91 |
| 27 | 0453 | 12 | CLR | 10.00 | | 55 | 12.8 | 47 | 8.0 | 37 | 2.8 | 51 | 10 | 270 | | 29.96 | | | 29.90 | AA | | 29.90 |
| 27 | 0553 | 12 | CLR | 10.00 | | 57 | 13.9 | 48 | 8.8 | 38 | 3.3 | 49 | 18 | 260 | 26 | 29.96 | | | 29.90 | AA | | 29.90 |
| 27 | 0653 | 12 | CLR | 10.00 | | 58 | 14.4 | 48 | 9.1 | 38 | 3.3 | 48 | 18 | 240 | 28 | 29.98 | 3 | 006 | 29.92 | AA | | 29.92 |
| 27 | 0753 | 12 | CLR | 10.00 | | 61 | 16.1 | 50 | 10.1 | 39 | 3.9 | 44 | 22 | 240 | 31 | 29.99 | | | 29.93 | AA | | 29.93 |
| 27 | 0853 | 12 | CLR | 10.00 | | 64 | 17.8 | 52 | 11.0 | 40 | 4.4 | 42 | 23 | 240 | 34 | 29.99 | | | 29.93 | AA | | 29.93 |
| 27 | 0953 | 12 | CLR | 10.00 | | 66 | 18.9 | 53 | 11.5 | 40 | 4.4 | 39 | 26 | 240 | 37 | 29.99 | 0 | 003 | 29.93 | AA | | 29.93 |
| 27 | 1053 | 12 | CLR | 7.00 | | 68 | 20.0 | 54 | 12.0 | 40 | 4.4 | 36 | 30 | 250 | 43 | 29.96 | | | 29.90 | AA | | 29.90 |
| 27 | 1153 | 12 | CLR | 6.00 | HZ | 70 | 21.1 | 55 | 12.9 | 42 | 5.6 | 36 | 31 | 240 | 44 | 29.94 | | | 29.88 | AA | | 29.88 |
| 27 | 1253 | 12 | FEW085 | 5.00 | HZ | 70 | 21.1 | 55 | 12.7 | 41 | 5.0 | 35 | 31 | 240 | 40 | 29.92 | 6 | 025 | 29.86 | AA | | 29.86 |
| 27 | 1353 | 12 | BKN080 | 10.00 | | 72 | 22.2 | 56 | 13.4 | 42 | 5.6 | 34 | 23 | 250 | 37 | 29.91 | | | 29.85 | AA | | 29.85 |
| 27 | 1453 | 12 | CLR | 10.00 | | 69 | 20.6 | 53 | 11.8 | 38 | 3.3 | 32 | 25 | 240 | 33 | 29.89 | | | 29.83 | AA | | 29.83 |
| 27 | 1553 | 12 | CLR | 10.00 | | 67 | 19.4 | 52 | 11.1 | 37 | 2.8 | 33 | 28 | 250 | 38 | 29.89 | 6 | 011 | 29.83 | AA | | 29.83 |
| 27 | 1653 | 12 | CLR | 10.00 | | 64 | 17.8 | 50 | 10.0 | 35 | 1.7 | 34 | 29 | 260 | 43 | 29.88 | | | 29.82 | AA | | 29.82 |
| 27 | 1753 | 12 | CLR | 7.00 | | 61 | 16.1 | 47 | 8.5 | 31 | -0.6 | 32 | 36 | 260 | 44 | 29.89 | | | 29.83 | AA | | 29.83 |
| 27 | 1853 | 12 | CLR | 10.00 | | 59 | 15.0 | 47 | 8.1 | 32 | 0.0 | 36 | 25 | 270 | 36 | 29.89 | 3 | 003 | 29.83 | AA | | 29.83 |
| 27 | 1953 | 12 | CLR | 10.00 | | 58 | 14.4 | 46 | 7.8 | 32 | 0.0 | 37 | 21 | 280 | | 29.92 | | | 29.85 | AA | | 29.86 |
| 27 | 2053 | 12 | FEW075 | 10.00 | | 56 | 13.3 | 45 | 7.3 | 32 | 0.0 | 40 | 13 | 270 | | 29.93 | | | 29.87 | AA | | 29.87 |
| 27 | 2153 | 12 | SCT065 | 10.00 | | 55 | 12.8 | 44 | 6.8 | 31 | -0.6 | 40 | 3 | 020 | | 29.93 | 1 | 013 | 29.87 | AA | | 29.87 |
| 27 | 2253 | 12 | CLR | 10.00 | | 53 | 11.7 | 43 | 6.3 | 31 | -0.6 | 43 | 6 | VR | | 29.93 | | | 29.87 | AA | | 29.87 |
| 27 | 2353 | 12 | CLR | 10.00 | | 52 | 11.1 | 43 | 5.8 | 30 | -1.1 | 43 | 8 | 320 | | 29.95 | | | 29.89 | AA | | 29.89 |

*Dynamically generated Tue Oct 30 09:11:23 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 YUMA MCAS (03145) YUMA , AZ (02/2007)

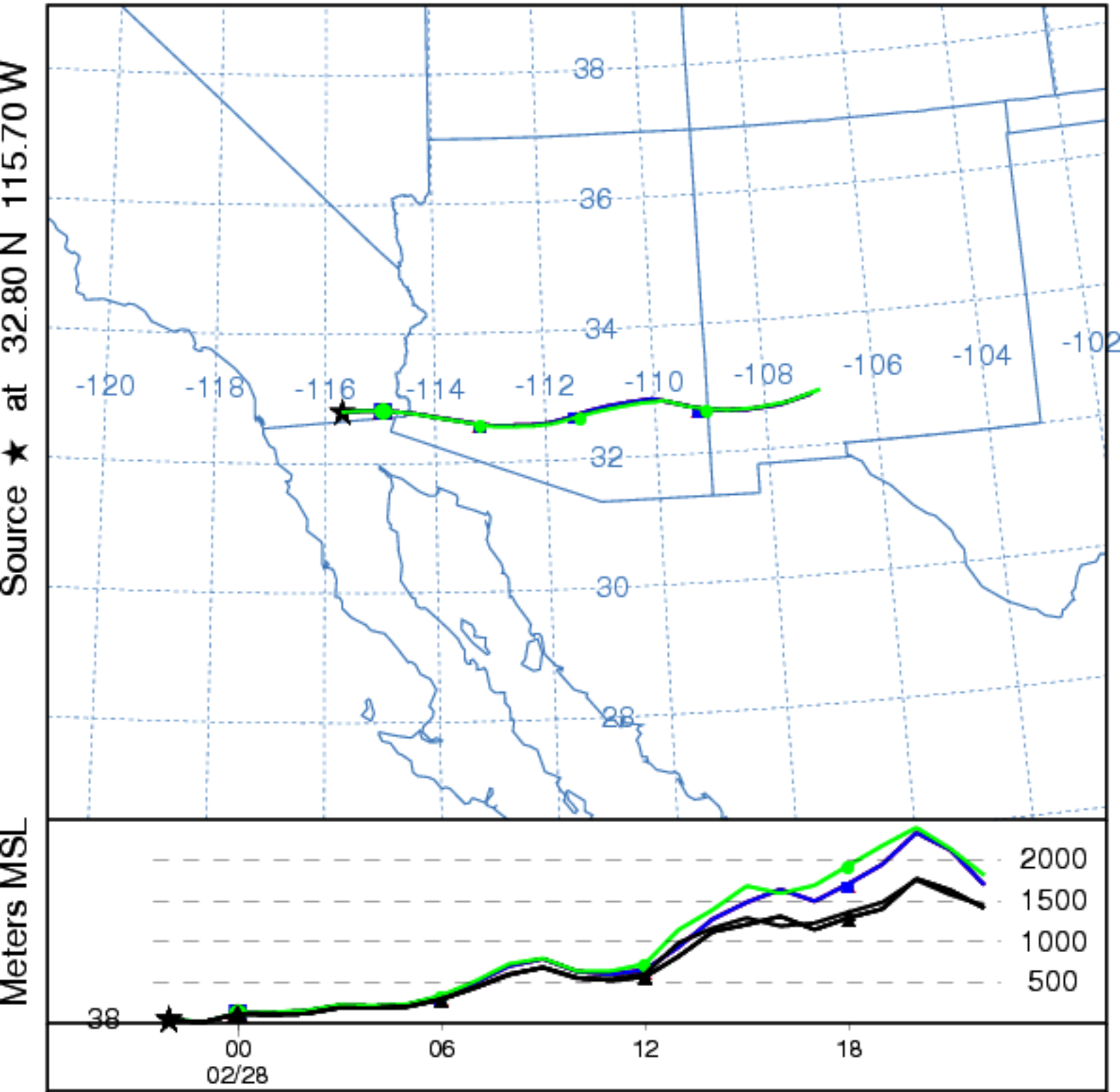
National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, North Carolina 28801

Elevation: 213 ft. above sea level
Latitude: 32.650
Longitude: -114.617
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 |
| 27 | 0051 | 5 | CLR | 10.00 | | 58 | 14.4 | 49 | 9.3 | 39 | 3.9 | 49 | 15 | 300 | | 29.69 | | | 29.90 | AA | | 29.92 |
| 27 | 0151 | 5 | CLR | 10.00 | | 57 | 13.9 | 48 | 8.8 | 38 | 3.3 | 49 | 16 | 290 | | 29.68 | 8 | 005 | 29.90 | AA | | 29.91 |
| 27 | 0251 | 5 | CLR | 10.00 | | 56 | 13.3 | 48 | 8.7 | 39 | 3.9 | 53 | 21 | 290 | | 29.68 | | | 29.90 | AA | | 29.91 |
| 27 | 0351 | 5 | CLR | 10.00 | | 54 | 12.2 | 47 | 8.2 | 39 | 3.9 | 57 | 17 | 290 | | 29.69 | | | 29.90 | AA | | 29.92 |
| 27 | 0451 | 5 | CLR | 10.00 | | 53 | 11.7 | 46 | 7.9 | 39 | 3.9 | 59 | 10 | 290 | | 29.68 | 8 | 000 | 29.90 | AA | | 29.91 |
| 27 | 0551 | 5 | CLR | 10.00 | | 52 | 11.1 | 45 | 7.4 | 38 | 3.3 | 59 | 0 | 000 | | 29.67 | | | 29.89 | AA | | 29.90 |
| 27 | 0651 | 5 | SCT200 | 10.00 | | 52 | 11.1 | 45 | 7.4 | 38 | 3.3 | 59 | 0 | 000 | | 29.68 | | | 29.90 | AA | | 29.91 |
| 27 | 0751 | 5 | SCT200 | 10.00 | | 52 | 11.1 | 46 | 7.7 | 39 | 3.9 | 61 | 0 | 000 | | 29.70 | 3 | 007 | 29.92 | AA | | 29.93 |
| 27 | 0851 | 5 | SCT200 | 10.00 | | 54 | 12.2 | 46 | 8.0 | 38 | 3.3 | 55 | 0 | 000 | | 29.72 | | | 29.94 | AA | | 29.95 |
| 27 | 0951 | 5 | SCT200 | 10.00 | | 59 | 15.0 | 49 | 9.5 | 39 | 3.9 | 48 | 10 | 290 | | 29.73 | | | 29.95 | AA | | 29.96 |
| 27 | 1051 | 5 | FEW200 | 7.00 | | 66 | 18.9 | 52 | 10.9 | 37 | 2.8 | 34 | 24 | 270 | 30 | 29.71 | 0 | 004 | 29.93 | AA | | 29.94 |
| 27 | 1151 | 5 | FEW200 | 10.00 | | 68 | 20.0 | 52 | 11.2 | 36 | 2.2 | 31 | 11 | 260 | | 29.70 | | | 29.92 | AA | | 29.93 |
| 27 | 1251 | 5 | FEW050 SCT200 | 10.00 | | 70 | 21.1 | 53 | 11.8 | 37 | 2.8 | 30 | 13 | 260 | | 29.67 | | | 29.89 | AA | | 29.90 |
| 27 | 1351 | 5 | FEW050 SCT200 | 10.00 | | 71 | 21.7 | 54 | 12.1 | 37 | 2.8 | 29 | 8 | 180 | | 29.64 | 8 | 025 | 29.86 | AA | | 29.87 |
| 27 | 1451 | 5 | FEW050 SCT200 | 10.00 | | 72 | 22.2 | 54 | 12.3 | 37 | 2.8 | 28 | 13 | 250 | | 29.61 | | | 29.82 | AA | | 29.84 |
| 27 | 1551 | 5 | FEW050 SCT150 BKN200 | 10.00 | | 73 | 22.8 | 54 | 12.3 | 36 | 2.2 | 26 | 13 | 260 | | 29.58 | | | 29.80 | AA | | 29.81 |
| 27 | 1651 | 5 | FEW030 BKN150 BKN200 | 10.00 | | 71 | 21.7 | 54 | 12.3 | 38 | 3.3 | 30 | 16 | 260 | | 29.57 | 6 | 022 | 29.80 | AA | | 29.80 |
| 27 | 1751 | 5 | FEW030 BKN150 BKN200 | 10.00 | | 67 | 19.4 | 53 | 11.5 | 39 | 3.9 | 36 | 18 | 300 | 25 | 29.57 | | | 29.79 | AA | | 29.80 |
| 27 | 1851 | 5 | FEW030 BKN150 BKN200 | 10.00 | | 64 | 17.8 | 50 | 10.2 | 36 | 2.2 | 36 | 16 | 310 | 25 | 29.57 | | | 29.79 | AA | | 29.80 |
| 27 | 1951 | 5 | SCT150 BKN200 | 7.00 | | 62 | 16.7 | 48 | 9.1 | 33 | 0.6 | 34 | 14 | 300 | 22 | 29.56 | 6 | 003 | 29.78 | AA | | 29.79 |
| 27 | 2023 | 5 | SCT001 | 5.00 | | 61 | 16.0 | 47 | 8.2 | 30 | -1.0 | 31 | 21 | 310 | 26 | 29.57 | | | M | SP | | 29.80 |
| 27 | 2042 | 5 | BKN001 | 4.00 | | 61 | 16.0 | 46 | 7.9 | 28 | -2.0 | 29 | 21 | 300 | 30 | 29.58 | | | M | SP | | 29.81 |
| 27 | 2049 | 5 | BKN150 BKN200 | 3.00 | | 59 | 15.0 | 46 | 7.7 | 30 | -1.0 | 33 | 22 | 310 | 30 | 29.58 | | | M | SP | | 29.81 |
| 27 | 2051 | 5 | BKN150 BKN200 | 3.00 | BLDU | 59 | 15.0 | 46 | 7.7 | 30 | -1.1 | 33 | 20 | 300 | 30 | 29.57 | | | 29.80 | AA | | 29.80 |
| 27 | 2058 | 5 | BKN150 BKN200 | 3.00 | BLDU | 59 | 15.0 | 46 | 7.7 | 30 | -1.0 | 33 | 22 | 300 | 30 | 29.58 | | | M | SP | | 29.81 |
| 27 | 2108 | 5 | BKN150 BKN200 | 2.00 | BLDU | 59 | 15.0 | 46 | 7.7 | 30 | -1.0 | 33 | 22 | 300 | 31 | 29.58 | | | M | SP | | 29.81 |
| 27 | 2121 | 5 | BKN150 BKN200 | 4.00 | BLDU | 57 | 14.0 | 45 | 7.2 | 30 | -1.0 | 36 | 25 | 290 | 33 | 29.59 | | | M | SP | | 29.82 |
| 27 | 2149 | 5 | SCT150 BKN200 | 2.50 | BLDU | 57 | 14.0 | 46 | 7.5 | 32 | 0.0 | 39 | 21 | 290 | 36 | 29.59 | | | M | SP | | 29.82 |
| 27 | 2151 | 5 | SCT150 BKN200 | 3.00 | BLDU | 57 | 13.9 | 46 | 7.5 | 32 | 0.0 | 39 | 21 | 300 | 32 | 29.59 | | | 29.81 | AA | | 29.82 |
| 27 | 2251 | 5 | FEW030 SCT150 BKN200 | 6.00 | BLDU | 56 | 13.3 | 45 | 7.1 | 31 | -0.6 | 39 | 20 | 310 | 28 | 29.61 | 1 | 011 | 29.83 | AA | | 29.84 |
| 27 | 2351 | 5 | FEW150 SCT200 | 10.00 | | 54 | 12.2 | 44 | 6.5 | 31 | -0.6 | 42 | 17 | 330 | | 29.62 | | | 29.84 | AA | | 29.85 |

*Dynamically generated Thu Aug 30 15:30:44 EDT 2007 via http://cdo.ncdc.noaa.gov/qclcd/QCLCD*

# NOAA HYSPLIT MODEL
## Forward trajectories starting at 22 UTC 27 Feb 07
### EDAS Meteorological Data




Job ID: 396189 Job Start: Tue Apr 29 18:20:37 GMT 2008
Source 1 lat.: 32.8 lon.: -115.7 hgts: 1, 5, 10 m AGL

Trajectory Direction: Forward Duration: 24 hrs Meteo Data: EDAS40
Vertical Motion Calculation Method: Model Vertical Velocity
Produced with HYSPLIT from the NOAA ARL Website (http://www.arl.noaa.gov/ready/)