



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IX

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SEP 06 2012

OFFICE OF THE  
REGIONAL ADMINISTRATOR

Mr. Eric Massey  
Director, Air Division  
Arizona Department of Environmental Quality  
1110 W. Washington St.  
Phoenix, Arizona 85007

Dear Mr. Massey:

This letter responds to Arizona Department of Environmental Quality's (ADEQ) March 14, 2012 submittal justifying that emissions generated by monsoonal thunderstorm outflow winds caused exceedances of the PM<sub>10</sub> NAAQS in the Phoenix PM<sub>10</sub> nonattainment area at numerous monitoring locations from July 3 – July 8, 2011.

EPA has reviewed the documentation provided by ADEQ to demonstrate that these exceedances on July 3 – July 8, 2011 meet the criteria for an exceptional event in the Exceptional Events Rule (EER). We note that the information and analyses presented in ADEQ's submittal do not represent all possible evidence for exceptional event packages, and additional or alternate evidence may be necessary to make an exceptional event determination in other instances or for other types of events. In the submitted demonstration for the dates of July 3 – July 8, 2011, EPA concurs based on the weight of the evidence that ADEQ has successfully made the demonstrations referred to in 40 CFR §50.14 to EPA's satisfaction. In addition, ADEQ has met the schedule and procedural requirements in section 50.14(c) with respect to the same data. A more detailed assessment of ADEQ's demonstration is enclosed. My staff has or shortly will enter "concurrence flags" for these data into EPA's AQS data system.

Based on these determinations, EPA will exclude these data from the following types of calculations and activities:

- EPA's Air Quality Data system (AQS) will not count these days as exceedances when generating user reports, or include them in design values estimates, unless the AQS user specifically indicates that they should be included.
- EPA will accept the exclusion of these data for the purposes of selecting appropriate background concentrations for New Source Review air quality analyses.<sup>1</sup>
- EPA will accept the exclusion of these data for the purposes of selecting appropriate background concentrations for transportation conformity hot spot analyses.<sup>2</sup>

<sup>1</sup> If we are the permitting authority, we will propose permits on this basis. If we are commenting on another permitting authority's proposed action, our comments will be consistent with the determinations in this letter.

<sup>2</sup> Applicable only to PM<sub>10</sub> and PM<sub>2.5</sub>.

In addition, EPA will rely on calculated values that exclude this data in proposed regulatory actions, such as a proposed designation, classification, attainment demonstration, or finding as to whether the Phoenix PM<sub>10</sub> nonattainment area has met the PM<sub>10</sub> NAAQS. These regulatory actions require EPA to provide an opportunity for public comment prior to taking a final Agency action. If EPA is pursuing one of these actions for the Phoenix PM<sub>10</sub> nonattainment area, EPA will open a new comment period during which EPA may receive comments on the exceptional event submission you have made and the determinations conveyed in this letter. If so, we must consider and respond to those comments before taking final regulatory action. Accordingly, the determinations conveyed in this letter do not constitute final EPA action regarding any matter on which EPA is required to provide an opportunity for public comment. In particular, this applies to determinations regarding the attainment status or classification of the area. Final actions will take place only after EPA completes notice and comment rulemaking on those determinations. As an additional clarification, the determinations conveyed in this letter are applicable only to determinations incorporating the submitted data relative to the PM<sub>10</sub> NAAQS.

If you have any questions or wish to discuss this matter further, please contact Deborah Jordan, Director of the Air Division at (415) 947-8715.

Sincerely,



Jared Blumenfeld

Enclosure

cc: Theresa Rigney, ADEQ  
Bryan Paris, ADEQ

## EXCEPTIONAL EVENTS RULE REQUIREMENTS

EPA promulgated the Exceptional Events Rule in 2007, pursuant to the 2005 amendment of Clean Air Act (CAA) Section 319. The EER added 40 CFR §50.1(j), (k) and (l); §50.14; and §51.930 to the Code of Federal Regulations (CFR). These sections contain definitions, criteria for EPA approval, procedural requirements, and requirements for air agency demonstrations, all of which must be met before EPA can concur under the EER on the exclusion of air quality data from regulatory decisions.

Under 40 CFR §50.14(c)(3)(iv), the air agency demonstration to justify exclusion of data must provide evidence that:

- A. "The event satisfies the criteria set forth in 40 CFR §50.1(j)" for the definition of an exceptional event;
  - The event "affects air quality."
  - The event "is not reasonably controllable or preventable."
  - The event is "caused by human activity that is unlikely to recur at a particular location or [is] a natural event."<sup>1</sup>
- B. "There is a clear causal relationship between the measurement under consideration and the event that is claimed to have affected the air quality in the area;"
- C. "The event is associated with a measured concentration in excess of normal historical fluctuations, including background;" and
- D. "There would have been no exceedance or violation but for the event."

## SUMMARY

### Overview

On March 14, 2011, ADEQ submitted exceptional events demonstrations for 29 exceedances of the 24-hour PM<sub>10</sub> standard that occurred at several monitoring stations within the Phoenix PM<sub>10</sub> nonattainment area on the following days: July 3, July 4, July 5, July 7, and July 8, 2011. Table 1 summarizes these exceedances.

ADEQ describes the July 3<sup>rd</sup> and 5<sup>th</sup> events as "large-scale and widespread dust events with mostly south-southeasterly winds carrying in the dust on the 3<sup>rd</sup>, and southeasterly winds carrying a massive dust wall into the Valley on the 5<sup>th</sup>," while the July 4<sup>th</sup> and 7<sup>th</sup> events "were smaller in scale, but were still related to thunderstorm activity and thunderstorm outflow boundary winds." Due to the timing of the July 7<sup>th</sup> event, ADEQ explains that, "the impacts in Apache Junction may have occurred around the midnight hour, leading to the exceedances there being measured for July 8<sup>th</sup>." ADEQ provides a comprehensive description and discussion of each of these events in Sections I, II, and V of the demonstration.

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<sup>1</sup>A natural event is further described in 40 CFR 50.1(k) as "an event in which human activity plays little or no direct causal role."

Table 1: EPA PM<sub>10</sub> Exceedance Summary

Exceedance Date	Monitor/Site Name	AQS ID	24-hour Avg. (µg/m <sup>3</sup> )
July 3, 2011	Buckeye	04-013-4011-1	385
	Central Phoenix	04-013-3002-4	279
	Durango Complex	04-013-9812-1	277
	Dysart	04-013-4010-1	239
	Glendale	04-013-2001-1	242
	Greenwood	04-013-3010-1	254
	Higley	04-013-4006-1	196
	JLG Supersite	04-013-9997-1	227
	JLG Supersite	04-013-9997-4	228
	South Phoenix	04-013-4003-1	280
	West Chandler	04-013-4004-1	198
	West 43 <sup>rd</sup>	04-013-4009-1	250
	West Phoenix	04-013-0019-1	243
	Zuni Hills	04-013-4016-1	260
July 4, 2011	Higley	04-013-4006-1	198
July 5, 2011	Buckeye	04-013-4011-1	163
	Central Phoenix	04-013-3002-4	277
	Durango Complex	04-013-9812-1	156
	Dysart	04-013-4010-1	219
	Glendale	04-013-2001-1	167
	Greenwood	04-013-3010-1	155
	Higley	04-013-4006-1	362
	JLG Supersite	04-013-9997-4	331
	South Phoenix	04-013-4003-1	206
	West Chandler	04-013-4004-1	360
	West Phoenix	04-013-0019-1	278
July 7, 2011	Higley	04-013-4006-1	266
	West Chandler	04-013-4004-1	214
July 8, 2011	Apache Junction	04-021-3002-1	194

**Not Reasonably Controllable or Preventable (nRCP)**

EPA evaluates whether an event was not reasonably controllable or preventable at the time of the event by taking into account controls in place and wind speed, along with other factors.<sup>2</sup> For *natural* sources of dust, a high wind dust event can generally be considered to be not reasonably controllable or preventable if winds are high enough to cause emissions from natural undisturbed areas. For *anthropogenic* sources of dust, a high wind dust event is also eligible to be considered to be not reasonably controllable or preventable if:

1. The anthropogenic sources of dust have reasonable controls in place,
2. The reasonable controls have been effectively implemented and enforced, and
3. The wind speed was high enough to overwhelm the reasonable controls.

In addressing reasonable controls, ADEQ provided detailed information on the current set of required controls in the Phoenix PM<sub>10</sub> nonattainment area, including information on rule implementation, rule effectiveness, compliance and enforcement, real-time monitoring alert systems and public notification activities that occurred on the event days. ADEQ concluded, “the Phoenix area is designated as a serious nonattainment area for PM<sub>10</sub> and is required to have BACM for all significant sources of PM<sub>10</sub>. BACM-

<sup>2</sup> See e.g., Affirmation of Attainment of PM-10 NAAQS for the San Joaquin Valley Nonattainment Area, 73 FR 14691 (March 19, 2008).

approved control measures on significant anthropogenic sources were in place and enforced during the events, and pro-active tracking and response to the events by regulatory agencies and local governments confirmed the uncontrollable nature of the dust emissions; therefore, these pre-existing/prior approved required controls are adequate for meeting the requirements of an exceptional event and should be considered 'reasonable' for these purposes."

ADEQ provided documentation showing that, with the exception of the July 7<sup>th</sup>-July 8<sup>th</sup> event, sustained wind speeds associated with these events were above 25 mph. For example, maximum sustained wind speeds of 26 to 31 mph were measured on July 3<sup>rd</sup>, 28 to 34 mph on July 4<sup>th</sup>, and 25 to 47 mph with gusts of 35 to 56 mph on July 5<sup>th</sup>. While sustained wind speeds only reached 18 mph on July 7<sup>th</sup>, ADEQ explains that "while winds recorded in Pinal and Maricopa County during the early morning hours of July 7<sup>th</sup> were only somewhat moderate, it is possible that the large-scale windblown dust event that occurred on July 5<sup>th</sup> had conditioned soils and deposited large amounts of loose dust such that stronger winds were not needed to entrain or re-entrain dust into the air." ADEQ also asserts that due to the timing of the July 7<sup>th</sup> late evening event, the conditions that led to exceedances at Higley and West Chandler on July 7<sup>th</sup> were similarly responsible for the exceedance measured at Apache Junction on July 8<sup>th</sup>.

ADEQ further explains that "despite the deployment of comprehensive control measures and sophisticated response programs, high wind conditions associated with thunderstorms and thunderstorm outflows brought high concentrations of PM<sub>10</sub> emissions into, and also overwhelmed controls within, the Phoenix PM<sub>10</sub> nonattainment area. The events discussed in this document that caused the exceedances in this request (see Sections II and V) were caused by thunderstorm driven outflow winds that transported dust into Maricopa County from areas largely outside of the Phoenix PM<sub>10</sub> nonattainment area. The fact that these were natural events involving strong thunderstorm outflow winds that transported PM<sub>10</sub> emissions into Maricopa County, with a majority of the PM<sub>10</sub> emissions recorded by Maricopa County area monitors coming from sources outside of the Phoenix PM<sub>10</sub> nonattainment area, provides strong evidence that the events and exceedances of July 2-8, 2011 recorded within the nonattainment area were not reasonably controllable or preventable."

Section V of ADEQ's documentation includes a complex GIS analysis of each of the events that supports the PM<sub>10</sub> transport described above. For all of the events, the analysis clearly demonstrates that monitors in the Phoenix PM<sub>10</sub> nonattainment area were affected by PM<sub>10</sub> transport from outside the nonattainment area, with the main source areas located to the south and southeast of the nonattainment area. In addition to transport, the spatial extent of elevated PM<sub>10</sub> concentrations throughout the area and the wind speeds associated with the thunderstorm outflows contributes to EPA's evaluation of whether these events are not reasonably controllable or preventable.

Table 2: Documentation of nRCP

Exceedance Date	Demonstration Citation	Quality of Evidence	Criterion Met?
July 3, 2011	Section IV: p.39-45, Section V: p.48-62	Sufficient	Yes
July 4, 2011	Section IV: p.39-45, Section V: p.63-73	Sufficient	Yes
July 5, 2011	Section IV: p.39-45, Section V: p.74-86	Sufficient	Yes
July 7, 2011	Section IV: p.39-45, Section V: p. 87-101	Sufficient	Yes
July 8, 2011	Section IV: p.39-45, Section V: p. 87-101	Sufficient	Yes

### **Historical Fluctuations (HF)**

EPA evaluates whether a measured exceedance is in excess of historical fluctuation by taking into account the level of the exceedance in relation to historical data, which is typically 3 to 5 years.

To demonstrate that this requirement was met, ADEQ provided 5-year time series plots of both PM<sub>10</sub> daily maximum hourly averages and PM<sub>10</sub> 24-hour averages. ADEQ also explains that PM<sub>10</sub> concentrations measured during the July 2<sup>nd</sup>-8<sup>th</sup> period were in the 99.5<sup>th</sup> percentile range when compared to historical data.

Table 3: Documentation of HF

<b>Exceedance Date</b>	<b>Demonstration Citation</b>	<b>Quality of Evidence</b>	<b>Criterion Met?</b>
July 3, 2011	Section III: p.35-38, App. A	Sufficient	Yes
July 4, 2011	Section III: p.35-38, App. A	Sufficient	Yes
July 5, 2011	Section III: p.35-38, App. A	Sufficient	Yes
July 7, 2011	Section III: p.35-38, App. A	Sufficient	Yes
July 8, 2011	Section III: p.35-38, App. A	Sufficient	Yes

### **Clear Causal Relationship (CCR)**

EPA considers a variety of evidence when evaluating whether there is a clear causal relationship between the measurement under consideration and the event that is claimed to have affected the air quality in the area. Demonstrations should include documentation showing that the event in fact occurred and that emissions related to the event were transported in the direction of the monitor(s) where measurements were recorded; the size of the area affected by the transported emissions; the relationship in time between the event, transport of emissions, and recorded concentrations; and, as appropriate, pollutant species-specific information supporting a causal relationship between the event and the measured concentration.

Section II of ADEQ's demonstration included a comprehensive conceptual model of the events, including a general overview of the geographic setting of the monitors, climate, and drought information for Phoenix area. The conceptual model also included a very detailed discussion of each of the events that occurred in the July 2<sup>nd</sup>-8<sup>th</sup> time period, which included time-lapse videos of the events and time series graphs for each event that included hourly PM<sub>10</sub> concentration, visibility, and reports of blowing dust or haze. The time-lapse videos can be found at the following locations:

- July 3, 2011: [http://www.phoenixvis.net/videos/640x480/SOMT1\\_07032011.swf](http://www.phoenixvis.net/videos/640x480/SOMT1_07032011.swf)
- July 4, 2011: [http://www.phoenixvis.net/videos/640x480/SUPM1\\_07042011.swf](http://www.phoenixvis.net/videos/640x480/SUPM1_07042011.swf)
- July 5, 2011: [http://www.phoenixvis.net/videos/640x480/SOMT1\\_07052011.swf](http://www.phoenixvis.net/videos/640x480/SOMT1_07052011.swf)
- July 7, 2011: [http://www.phoenixvis.net/videos/640x480/SUPM1\\_07072011.swf](http://www.phoenixvis.net/videos/640x480/SUPM1_07072011.swf)
- July 8, 2011: [http://www.phoenixvis.net/videos/640x480/SUPM1\\_07082011.swf](http://www.phoenixvis.net/videos/640x480/SUPM1_07082011.swf)

Section V of the demonstration includes a detailed and extensive GIS analysis, that show the spatial and temporal representation of the events as they move throughout Maricopa and Pinal Counties. The analysis includes PM<sub>10</sub> concentrations, sustained wind speeds, wind gusts, wind direction, visibility, and base velocity radar to track the transport of PM<sub>10</sub> throughout the region. Accompanying the analysis, ADEQ provides a discussion for every map that describes the conditions at that time. While not included in the demonstration, it is important to note that NOAA's National Climatic Data Center Storm events

database includes dust storm observations on July 2<sup>nd</sup> at 1815 hours (central deserts), July 3<sup>rd</sup> at 1743 hours (greater Phoenix area), July 4<sup>th</sup> at 1830 hours (central deserts), and July 5<sup>th</sup> at 1920 hours (greater Phoenix area). The timing of these dust storm reports for each of these events is consistent with the observed increased PM<sub>10</sub> concentrations in the area, increased wind speed, reduced visibility, and NWS station reports of thunderstorms (TS), blowing dust (BLDU), haze (HZ), and dust storms (DS).

ADEQ generally summarizes that “the events occurring from July 2-8 were directly related to strong and gusty winds generated by thunderstorm outflow boundaries” that “were also responsible for transporting PM into the Phoenix PM<sub>10</sub> nonattainment area from areas outside of the nonattainment area.” ADEQ further states that “while it is likely that some dust was generated within the PM<sub>10</sub> nonattainment area as gusts from the thunderstorm outflows passed through the area, the amount of dust generated locally was easily overwhelmed by, and largely unnoticeable as compared to the dust transported in from the source regions of the thunderstorm outflows.”

Table 4: Documentation of CCR

Exceedance Date	Demonstration Citation	Quality of Evidence	Criterion Met?
July 3, 2011	Section II: p.4-12, p.13-19, Section V: p.48-62, App. C&E	Sufficient	Yes
July 4, 2011	Section II: p.4-12, p.13-19, Section V: p.48-62, App. C&E	Sufficient	Yes
July 5, 2011	Section II: p.4-12, p.13-19, Section V: p.48-62, App. C&E	Sufficient	Yes
July 7, 2011	Section II: p.4-12, p.13-19, Section V: p.48-62, App. C&E	Sufficient	Yes
July 8, 2011	Section II: p.4-12, p.13-19, Section V: p.48-62, App. C&E	Sufficient	Yes

### **Affects Air Quality (AAQ)**

EPA will consider events to have affected air quality if the CCR and HF requirements have been adequately demonstrated. ADEQ states that due to the information presented in the demonstrations, “we can reasonably conclude the events in question affected air quality.”

Table 5: Documentation of AAQ

Exceedance Date	Demonstration Citation	Quality of Evidence	Criterion Met?
July 3, 2011	Section VII: p. 106	Sufficient	Yes
July 4, 2011	Section VII: p. 106	Sufficient	Yes
July 5, 2011	Section VII: p. 106	Sufficient	Yes
July 7, 2011	Section VII: p. 106	Sufficient	Yes
July 8, 2011	Section VII: p. 106	Sufficient	Yes

### **Natural Event**

EPA will consider an event to be a natural event if both the nRCP and CCR requirements have been adequately demonstrated. ADEQ generally states that, “the events shown to cause these exceedances were emissions of PM<sub>10</sub> driven by high winds caused by thunderstorm activity and related outflow boundaries during the period of July 2-8, 2011” and that “the events therefore qualify as natural events.”

Table 6: Documentation of Natural Event

Exceedance Date	Demonstration Citation	Quality of Evidence	Criterion Met?
July 3, 2011	Section VII: p. 106-107	Sufficient	Yes
July 4, 2011	Section VII: p. 106-107	Sufficient	Yes
July 5, 2011	Section VII: p. 106-107	Sufficient	Yes
July 7, 2011	Section VII: p. 106-107	Sufficient	Yes
July 8, 2011	Section VII: p. 106-107	Sufficient	Yes

**No Exceedance or Violation But For the Event (NEBF)**

Generally, the NEBF demonstration is similar to the demonstration of the nRCP and CCR requirements, and should show that the measured concentration would have been below the applicable NAAQS without the affect of the event.

ADEQ provides a summary of the analysis and information presented in the documentation that demonstrate both the nRCP and CCR requirements have been met and states that “the body of evidence ...provides no alternative that could tie the exceedances of July 2-8, 2011 to any other causal source but transported and re-entrained PM<sub>10</sub> generated from thunderstorm outflows, confirming that there would have been no exceedances but for the presence of these uncontrollable natural events.” While not explicitly stated in the documentation, EPA acknowledges that PM<sub>10</sub> concentrations before the periods of high winds on the event days were below the 24-hour PM<sub>10</sub> NAAQS, providing further support for ADEQ’s conclusion.

Table 7: Documentation of NEBF

Exceedance Date	Demonstration Citation	Quality of Evidence	Criterion Met?
July 3, 2011	Section VI: p. 105	Sufficient	Yes
July 4, 2011	Section VI: p. 105	Sufficient	Yes
July 5, 2011	Section VI: p. 105	Sufficient	Yes
July 7, 2011	Section VI: p. 105	Sufficient	Yes
July 8, 2011	Section VI: p. 105	Sufficient	Yes

**Schedule and Procedural Requirements**

In addition to technical demonstration requirements, 40 CFR §50.14 (c) specifies the schedule and procedural requirements an air agency must follow to request data exclusion. Table 8 outlines EPA’s evaluation of these requirements.

Table 8: Schedules and Procedural Criteria

	Reference	Demonstration Citation	Criterion Met?
Did the State provide prompt public notification of the event?	40 CFR §50.14 (c)(1)(i)	Section 1: p.1, Appendix B	Yes
Were flags and initial description placed on the data by July 1 <sup>st</sup> of the following year?	40 CFR §50.14 (c)(2)(iii)	Section 1: p.1	Yes
Was the demonstration submitted within 3 years of the end of the quarter in which the event occurred and 12 months prior to the date that any regulatory decision must be made by EPA?	40 CFR §50.14 (c)(3)(i)	March 14, 2012 letter <sup>3</sup>	Yes
Was the public comment process followed and documented?	40 CFR §50.14 (c)(3)(v)	Section 1: p.2, Appendix D	Yes

<sup>3</sup> See letter from Eric Massey, Director, Air Quality Division, ADEQ to Deborah Jordan, Director, U.S. EPA Region IX Air Division, dated March 14, 2012.

## CONCLUSION

EPA has reviewed documentation provided by ADEQ to support claims that dust emissions generated by monsoonal thunderstorm high winds were transported into the Phoenix PM<sub>10</sub> nonattainment area from areas in Pinal County and caused exceedances of the 24-hour PM<sub>10</sub> NAAQS at the locations outlined in Table 1 on July 3, July 4, July 5, July 7, and July 8, 2011. EPA has determined that the flagged exceedances at these locations and on these days meet the definition of an exceptional event: the exceedances affected air quality, were not reasonably controllable or preventable, and meet the definition of a natural event. Specifically, EPA has determined that events were not reasonably controllable and preventable either due to high wind conditions that transported PM<sub>10</sub> from sources outside of the nonattainment area and subsequently overwhelmed reasonable controls within the Phoenix PM<sub>10</sub> nonattainment area (July 3<sup>rd</sup>, July 4<sup>th</sup>, and July 5<sup>th</sup>) or moderate wind speeds re-entrained the large amount of PM<sub>10</sub> deposited by the large July 5<sup>th</sup> dust storm within and outside of the nonattainment area (July 7<sup>th</sup> and July 8<sup>th</sup>). Also, regardless of transport into the area, information pertaining to the controls implemented within the nonattainment area, the spatial extent of elevated PM<sub>10</sub> concentrations measured in the area, and the wind speeds associated with the thunderstorm outflows provide sufficient evidence to conclude that these events were not reasonably controllable or preventable. Furthermore, EPA has determined that there is a clear causal relationship between the events and the measured exceedances, there would have been no exceedance but for the events, and the measured exceedances are in excess of normal historical fluctuations.

EPA finds that the weight of evidence is sufficient for concurrence on the flagging of the data for these monitors on July 3, July 4, July 5, July 7, and July 8, 2011. These concurrences do not constitute final EPA action to exclude these data from consideration for purposes of determining the attainment status of the area. Final actions will come only after EPA completes notice and comment rulemaking on those determinations.