# Interim Guidance to Implement Requirements for the Treatment of Air Quality Monitoring Data Influenced by Exceptional Events

# FACT SHEET

## ACTIONS

### Issuance of Interim Exceptional Events Implementation Guidance

- On May 10, 2013, the U.S. Environmental Protection Agency (EPA) issued interim guidance to help air agencies manage air quality data recorded during "exceptional events." Exceptional events include natural events such as high winds, wildfires, and volcanic and seismic activities.

- EPA's interim guidance will ensure that public health is protected, while providing air agencies the flexibility they need to show that monitoring data from these unique events should be excluded for regulatory purposes.

- The interim guidance includes a memorandum and two attachments that clarify key provisions of the 2007 Exceptional Events Rule (EER) and respond to questions and issues that have arisen since the rule was promulgated. The interim guidance also includes examples of approved demonstrations on the EPA's website at http://www.epa.gov/ttn/analysis/exevents.htm. The attachments to the memorandum include the following documents:

    - The "Interim Exceptional Events Rule Frequently Asked Questions" document (the interim Q&A document) provides interim responses to questions that have arisen since the EPA promulgated the EER.

    - The "Interim Guidance on the Preparation of Demonstrations in Support of Requests to Exclude Ambient Air Quality Data Affected by High Winds Under the Exceptional Events Rule" (the High Winds Guidance document) is a resource for air agencies when flagging data and preparing demonstrations packages for high wind dust events that have affected $PM_{10}$ and $PM_{2.5}$ concentrations. The interim document applies the provisions of the EER and the general guidance conveyed in the guidance memorandum and in the interim Q&A document to the particular situation of a high wind dust event.

**Rule Revisions to the 2007 Exceptional Events Rule**

- With the issuance of interim exceptional event implementation guidance, EPA will also pursue revisions to the 2007 Exceptional Events Rule. EPA anticipates proposing these rule revisions in late 2013 or early 2014 and finalizing a revised rule in late 2014 or early 2015.

- As EPA moves forward with a notice and comment rulemaking process, there will be an opportunity for all interested parties, including those that commented during the 2012 public comment period, to raise any issues or concerns.

**Implementation Guidance to Support Data Exclusion Requests for Wildfire-related Events that may affect Ozone Concentrations**

- EPA recognizes the need for separate guidance to address the preparation of demonstrations to support data exclusion requests for wildfire-related events that may have affected ozone concentrations.

- EPA anticipates developing this guidance within the same timeframe as the Exceptional Event Rule revisions with draft guidance available in late 2013 or early 2014 and a final guidance available in late 2014 or early 2015. EPA expects to provide opportunities for stakeholder input on this guidance.

**BACKGROUND**

- On March 22, 2007, EPA promulgated the "Treatment of Data Influenced by Exceptional Events; Final Rule" (72 FR 13560) pursuant to the 2005 amendment of Clean Air Act (CAA) Section 319. This rule is known as the Exceptional Events Rule (EER).

- The EER contains definitions, procedural requirements, requirements for air agency demonstrations, and criteria for EPA approval for the exclusion of air quality data from regulatory decisions.

- Since promulgation of the EER, stakeholders have encouraged EPA to develop guidance to clarify expectations and the implementation process.

- EPA first released draft exceptional events implementation guidance documents to state, local, and tribal agencies, and to other parties as requested, in May of 2011.

- EPA incorporated some of the commenters' feedback into the revised draft guidance documents, which were made available for broad public review in a July 6, 2012, *Federal Register* Notice of Availability (77 FR 39959).

- Today's interim guidance clarifies EPA's intention to provide recommendations and to indicate the EPA's current thinking on exceptional event issues, rather than conveying requirements not already stated in the Clean Air Act and the Exceptional Events Rule. Additionally, the EPA revised the interim guidance materials to correct typographical errors, to make editorial changes to reflect the December 14, 2012, promulgation of the $PM_{2.5}$ NAAQS, and to reflect terminology consistent with the ongoing ozone NAAQS review.

**FOR MORE INFORMATION**

- For more information on the Exceptional Event Implementation Guidance Materials go to EPA's Web site at http://www.epa.gov/ttn/analysis/exevents.htm or contact Beth W. Palma at 919-541-5432 or palma.elizabeth@epa.gov.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
RESEARCH TRIANGLE PARK, NC 27711

MAY 10 2013

OFFICE OF
AIR QUALITY PLANNING
AND STANDARDS

**MEMORANDUM**

**SUBJECT:** Interim Guidance to Implement Requirements for the Treatment of Air Quality Monitoring Data Influenced by Exceptional Events

**FROM:** Stephen D. Page, Director
Office of Air Quality Planning and Standards

**TO:** Regional Air Directors, Regions I-X

This memorandum and its attachments clarify key provisions of the 2007 Exceptional Events Rule (EER) to respond to questions and issues that have arisen since the rule was promulgated. The interim guidance in this memorandum and the attachments, along with examples of approved demonstrations on the EPA's website[1] (collectively the "interim exceptional events guidance materials"), are provided to help ensure an efficient and effective process to make determinations regarding air quality data affected by exceptional events. Our intent is to streamline processes and reduce costs for air agencies[2] preparing requests and the EPA offices reviewing these submittals. The EPA is neither setting new policies nor raising novel issues through this guidance.

We first released draft exceptional events implementation guidance documents to air agencies, Federal Land Managers, and to other parties as requested, in May of 2011. We incorporated some of the commenters' feedback into the revised draft guidance documents, which were made available for broad public review in a July 6, 2012, *Federal Register* Notice of Availability (77 FR 39959) and in the associated docket (Docket ID No. EPA-HQ-OAR-2011-0887). An accounting of the comment and response process from the 2011 preliminary review is documented in the docketed response to comments document.[3]

One important difference between the interim exceptional events guidance documents released today and the draft guidance documents made available to the public via the July 2012 *Federal Register* Notice of Availability is the EPA's clarification that this interim guidance is intended to provide recommendations and to indicate the EPA's current thinking on exceptional event issues, rather than conveying requirements not already stated in the Clean Air Act (CAA) and the EER. Additionally, the EPA revised the interim guidance materials to correct typographical errors, to make editorial changes to reflect the December 14, 2012, promulgation of the fine particle ($PM_{2.5}$) National Ambient Air Quality Standards (NAAQS), and to reflect terminology consistent with the ongoing ozone NAAQS review.

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[1] Additional information and examples of exceptional event submissions and best practice components can be found at the EPA's Exceptional Events website located at *http://www.epa.gov/ttn/analysis/exevents.htm*.
[2] References to "air agencies" are meant to include state, local, and tribal air agencies responsible for implementing the EER.
[3] Response to Comment document titled, "Responses to Significant First-Round Comments on the Draft Guidance Documents on the Implementation of the Exceptional Events Rule."

With this memorandum and its attachments, the EPA's Office of Air and Radiation is simultaneously announcing its intent to pursue revisions to the 2007 EER. We anticipate proposing these rule revisions in late 2013 or early 2014 and finalizing a revised rule in late 2014 or early 2015. As we move forward with a notice and comment rulemaking process, there will be an opportunity for all interested parties, including those that commented during the 2012 public comment period, to raise any issues or concerns. The EPA's regional offices should use the interim guidance as we undertake rule revisions because it is consistent with the EER and the guidance already provided in the preamble to the rule.

The interim guidance materials are based on the following principles:

1. Air agencies should not be held accountable for exceedances due to exceptional events that were beyond their control at the time of the event.
2. It is desirable to implement reasonable controls to protect public health.[4]
3. Clear expectations will enable the EPA and other air agencies to better manage resources related to the exceptional events process.

These interim guidance materials identify the four independent criteria on which exclusion of event-affected data depends, describe the administrative process and associated timing for submittal and review of demonstrations, provide answers to frequently asked questions, and provide previously reviewed demonstrations and best practice components. The EPA recognizes the challenges that air agencies face in preparing exceptional event demonstration packages. The EPA also recognizes the limited resources of the air agencies that prepare and submit exceptional event demonstration packages and of the EPA regional offices that review these demonstration packages. One of the EPA's goals in developing exceptional event implementation guidance is to establish clear expectations to enable affected air agencies to better manage resources as they prepare the documentation required under the EER. These interim guidance documents and the exceptional events website present examples to illustrate specific points. The example analyses and level of detail are not necessarily needed for all demonstrations. Submitters should prepare and submit the appropriate level of supporting documentation, which will vary on a case-by-case basis using the weight-of-evidence approach. The EPA anticipates that the resources needed to prepare (and review) packages will decrease as we continue to identify ways to streamline the process and continue to build our database of example demonstrations and analyses. In addition, extreme exceptional events may justify a more limited demonstration package.

**Exceptional Event Rule Provisions**

On March 22, 2007, the EPA promulgated the "Treatment of Data Influenced by Exceptional Events; Final Rule" (72 FR 13560) pursuant to the 2005 amendment of CAA Section 319. This rule, known as the EER, superseded the EPA's previous natural events guidance and those sections of the interim fire policy document that address exceptional events.[5] The EER created a regulatory process codified at 40

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[4] With respect to exceptional events, Section 319 of the CAA states the following guiding principles (among others);

(i) the principle that protection of public health is the highest priority

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(iv) the principle that each State must take necessary measures to safeguard public health regardless of the source of the air pollution

[5] Previous guidance and policy documents that either implied or documented the need for identifying data affected by an exceptional event include:

i) "Guideline for Interpretation of Air Quality Standards," U.S. EPA, OAQPS No. 1.2-008, Revised February 1977.

ii) "Guideline On the Identification and Use of Air Quality Data Affected by Exceptional Events" (the Exceptional Events Policy), U.S. EPA, OAQPS, July 1986.

CFR parts 50 and 51 (50.1, 50.14 and 51.930). These regulatory sections contain definitions, procedural requirements, requirements for air agency demonstrations, and criteria for EPA approval for the exclusion of air quality data from regulatory decisions under the EER.

The definition of an exceptional event at 40 CFR §50.1(j) repeats the CAA definition, which provides that an exceptional event is one that affects air quality, is not reasonably controllable or preventable, and is caused by human activity that is unlikely to recur at a particular location or a natural event. 40 CFR §50.1(k) further defines a natural event as one in which human activity plays little or no direct causal role. Additional requirements in 40 CFR §50.14(a)(2) and (b)(1) identify that an air agency must demonstrate "a clear causal relationship between the measured exceedance or violation of such standard and the event" and that "an exceptional event caused a specific air pollution concentration in excess of one or more national ambient air quality standards." The rule further requires at 40 CFR §50.14(c)(3)(iv) that the demonstration to justify data exclusion shall provide evidence that the event is associated with a measured concentration in excess of normal historical fluctuations, including background, and evidence that there would have been no exceedance or violation but for the event.

**Treatment of Technical Criteria for Exclusion of Data Affected by Events**

When considered together, the EER provisions summarized above identify the following six elements that air agencies must address when requesting that the EPA exclude event-related concentrations from regulatory determinations:

- the event affected air quality
- the event was not reasonably controllable or preventable
- the event was caused by human activity that is unlikely to recur at a particular location, or was a natural event
- there exists a clear causal relationship between the specific event and the monitored concentration
- the event is associated with a measured concentration in excess of normal historical fluctuations including background
- there would have been no exceedance or violation but for the event

In reviewing exceptional events demonstration packages, the EPA has found that the following EER elements, along with historical fluctuations, play a significant role in the air agencies' supporting documentation:

1. not reasonably controllable or preventable
2. if the event was caused by human activity, that human activity is unlikely to recur at a particular location[6]

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iii) "Areas Affected by PM10 Natural Events" (the PM10 Natural Events Policy), memorandum from Mary D. Nichols, Assistant Administrator for Air and Radiation, to the EPA regional offices, May 30, 1996.
iv) "The Interim Air Quality Policy on Wildland and Prescribed Fires" (the Interim Fire Policy), memorandum from Richard D. Wilson, Acting Assistant Administrator for Air and Radiation, to the EPA regional administrators, May 15, 1998.
v) "Guideline on Data Handling Conventions for the PM NAAQS," U.S. EPA, OAQPS, EPA-454/R-98-017, December 1998.

[6] Neither the statutory nor regulatory definition of "exceptional event" requires a demonstration of "unlikely to recur" for natural events.

3. clear causal relationship between specific event and monitored concentration
4. no exceedance or violation but for the event[7]

As described in the interim guidance materials, the EPA's technical review of a demonstration package therefore focuses on these elements. While the EER requires and the EPA anticipates complete demonstration packages to contain narrative and evidence supporting all six elements, the EPA's position is that these four elements represent distinct facts for air agencies to demonstrate for the EPA to concur on an event claim.[8] If an event is natural, then the second element (e.g., human activity unlikely to recur) is generally not considered in a demonstration review. In the case of an event that is initiated by a natural process, such as a volcano or high wind dust event, the event would be considered a natural event if sources are entirely natural or contributing anthropogenic sources are reasonably controlled.[9] This concept is explained in more detail in Attachment 2, the interim High Winds Guidance document.

The EPA recognizes the inherent linkages between all six elements and expects that some sections of a demonstration package (e.g., affects air quality, natural event) may repeat or refer to other sections of the demonstration package (e.g., clear causal relationship, but for). Further, each potential event can have varied and differing characteristics, and thus would usually necessitate a case-specific demonstration and evaluation. Therefore, the EPA would use a "weight-of-evidence" approach in evaluating each element within an exceptional event demonstration package.

In the interim guidance materials, the requirement that the event was not reasonably controllable or preventable, which is part of the definition of an exceptional event in both the CAA and the EER, would mean that if a set of control measures *should reasonably have been in place* for contributing sources at the time of the event, then it *must* have been in place for the event to qualify as an exceptional event under the EER. Whether a set of controls should reasonably have been in place is event-, time-, and place-dependent, and involves judgement by the air agency when preparing the demonstration and by the EPA when reviewing the demonstration. The EER requirement for reasonable control applies to all events but is more complicated for high wind dust events because these events typically include both natural and anthropogenic sources of dust. In contrast, an event such as a lightning-induced wildfire

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[7] Criteria 1, 3, and 4 on this list, along with historical fluctuations, are considered "independent elements" in the interim High Winds Guidance document.

[8] The EPA generally does not consider the two remaining elements, "affects air quality" and "historical fluctuations," to represent "distinct facts." The EPA believes that the "affects air quality" element is generally satisfied once the air agency satisfies the clear causal and historical fluctuations showings. While the "historical fluctuations" element is considered an independent element, it also plays an important role in the "clear causal relationship" and "no exceedance but for" demonstrations. The EPA will review air agency submissions using a weight-of-evidence approach. The air agency's role in satisfying this element is to provide appropriate analyses and statistics comparing the event-affected concentration to normal historical fluctuations and conclude that the provided data show that the event was in excess of normal historical fluctuations. The EPA will review the information provided by the air agency. "Normal historical fluctuations" will generally be defined by those days without events for the previous years. The EPA acknowledges that natural events can recur and still be eligible for exclusion under the EER; therefore, events do not necessarily have to be rare to satisfy this element. However, in most cases, the EPA anticipates that less conclusive "historical fluctuations" comparisons will likely indicate less conclusive "clear causal relationship" and/or "no exceedance but for" relationships.

[9] The EPA will generally consider human activity to have played little or no *direct* role in causing emissions of the dust generated by high wind for purposes of the regulatory definition of "natural event" if contributing anthropogenic sources of dust are reasonably controlled, regardless of the amount of dust coming from these reasonably controlled anthropogenic sources, and thus the event could be considered a natural event. In such cases, the EPA believes that it would generally be a reasonable interpretation of its regulations to find that the anthropogenic source had "little" direct causal role. If anthropogenic sources of windblown dust that are reasonably controllable but that did not have those reasonable controls applied at the time of the high wind event have contributed significantly to a measured concentration, the event would not be considered a natural event. See footnote 11, 72 FR 13566.

generally does not include an anthropogenic contribution to the event.[10] Among other factors to consider, reasonableness would need to be judged in light of the technical information available to the air agency at the time the event occurred. The EPA anticipates that nonattainment areas already have the technical information needed to reasonably control anthropogenic sources in their jurisdiction. Generally, the EPA does not expect areas classified as attainment, unclassifiable, or maintenance for a NAAQS to have the same level of controls as areas that are nonattainment for the same NAAQS. Also, if an area has been recently designated to nonattainment but has not yet been required to implement controls, the EPA will expect the level of controls that is appropriate for the planning stage. Regardless of attainment status or natural/anthropogenic source contribution, each demonstration package should address the question of reasonable controls. In general, reasonable controls would not include any control on emissions-generating activity outside of the state or tribal boundaries of the state (or tribal lands) within which the concentration at issue was monitored. As with the other elements, whether an event was not reasonably controllable or preventable would be evaluated on a case-by-case basis. If and when the EPA takes a regulatory action that hinges on a decision to exclude data under the EER, the EPA will consider and appropriately respond to any public comments on whether the event was "not reasonably controllable or preventable."

**Timing of EER Demonstration Package Submittal and Review**

The EPA understands that the initial identification of data affected by exceptional events and the subsequent preparation, submittal, and review of demonstration packages is a resource intensive process. Delays in processing and making decisions on submitted packages create regulatory uncertainty and potentially increase the workload for both the submitting air agency and the EPA. In addition, the backlog of pending actions makes retrieval of data to support new submittals potentially more difficult. Further, air agencies and the EPA often face timelines by which they must make regulatory decisions that can be affected by the inclusion or exclusion of event-affected data.

The EPA will work with air agencies as they prepare complete demonstration packages that meet the requirements of the EER. In an effort to streamline this identification, preparation, submittal, and review process, the EPA has developed the following interim guidelines.

1. Identification of data affected by exceptional events in the EPA's Air Quality System (AQS) – The EPA is aware that air agencies routinely review their air quality monitoring data, which may result in the identification of certain data being affected by an exceptional event. Although air agencies may flag any data in AQS that they wish to flag, the EPA encourages air agencies to flag only data that might have a regulatory consequence and for which an approvable demonstration is likely.[11] Should air agencies wish to flag values for informational purposes, the EPA prefers that they use the AQS flags intended for this purpose.

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[10] The EPA recognizes that wildfires and emissions from wildfires are generally not reasonable to prevent or control. Although the EER requires documentation of this criterion for all event types, the EPA believes that it will generally be sufficient for air agencies to provide a brief statement to document the "not reasonably controllable or preventable" criterion for wildfires. See Question 20b of the *Interim Exceptional Events Rule Frequently Asked Questions* document for example language.

[11] Air agencies should place flags and an initial event description in AQS either in accordance with the special schedules promulgated with new or revised NAAQS or in accordance with the general AQS data submission schedules (i.e., within 90 days of the end of the previous quarter) but not later than July 1st of the calendar year following the event in which the flagged measurement occurred. Note that for data certification purposes, we recommended flagging data prior to submitting data certification (May 1st).

2a. Air agency submittal of letter of intent to submit a package *(optional)* – To promote early communication, the EPA suggests that air agencies provide a letter of intent to submit a demonstration package for flagged data in AQS as soon as possible, if possible within 12 months from the event occurrence, after the air agency identifies the event(s) as being significant.[12] This initial notification can assist both the air agency and the EPA in the planning and prioritization process.

2b. Air agency notification of intent to submit a package *(optional)* - Air agencies choosing not to submit a letter of intent are still encouraged to contact their EPA regional office more informally to alert it of the forthcoming demonstration submittal.

3. EPA response to air agency letter of intent – The EPA anticipates responding to the air agency's letter of intent within 60 days of receipt. The EPA response will provide the regional office's best assessment of the priority that can be given to the submission once received and any case-specific advice the EPA may have to offer for the preparation of the demonstration.

4. Air agency submittal of exceptional event demonstration packages[13] – Air agencies should prepare a technical demonstration package, taking into account the information in the EPA's guidance documents, which shows that a particular air quality monitored value(s) was influenced by an exceptional event. The EPA acknowledges that extreme exceptional events may justify more limited demonstration packages. Air agencies that believe their demonstration packages are tied to near-term regulatory actions should submit their demonstration packages well in advance of the regulatory deadline. Air agencies should also identify the relationship between the exceptional event-related flagged data and the anticipated regulatory action in the cover letter that accompanies their initial submittal package to the reviewing EPA regional office.

5. EPA prioritization of submitted demonstration packages – The EPA will generally give priority to exceptional event determinations that may affect near-term regulatory decisions, such as state implementation plan (SIP) submittal actions, NAAQS designations, and clean data findings.

6. EPA review of prioritized demonstration packages – The EPA generally intends to conduct its initial review of a submitted exceptional event demonstration package within 120 days of receipt. Following this initial review, the EPA will generally send a letter to the submitting air agency that includes a completeness determination and/or a request for additional information, a date by which the supplemental information should be submitted (if applicable), and an indicator of the timing of the EPA's final review. The EPA encourages air agencies to provide supplemental information for which the EPA asks. The EPA anticipates a 60-day response time for states to

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[12] The Letter of Intent is an optional step and the EPA recognizes that air agencies may need additional time to prepare and submit demonstration packages particularly where the basis of the exclusion is violating an annual standard or a 3-year design value. Similarly, an air agency could consider submitting an annual letter of intent if annual submittal makes sense for resource planning or for historically seasonal events. If an air agency decides to submit a letter of intent, the EPA recommends that it be submitted as expeditiously as possible after the air agency identifies the event or events as having significance.

[13] The general schedule in the EER allows air agencies to submit packages up to 3 years following the end of the calendar quarter in which the event occurred, or 12 months prior to the date that a regulatory decision must be made by the EPA. When the EPA promulgates a new or revised NAAQS, we may change this schedule to allow air agencies to flag and submit documentation for data relevant to the new/revised NAAQS.

provide additional requested information.[14] The EPA intends to make a decision regarding event concurrence as expeditiously as necessary if required by a near-term regulatory action, but no later than 18 months following submittal of a complete package. Determinations on exceptional event demonstrations do not constitute final agency action until they are relied upon in a regulatory decision such as a finding of attainment or nonattainment which will be conducted through notice-and-comment rulemaking procedures.

**Interim Exceptional Events Rule Frequently Asked Questions Document (Attachment 1)**

The "Interim Exceptional Events Rule Frequently Asked Questions" document (the interim Q&A document) provides interim responses to questions that have arisen since the EPA promulgated the EER. The questions are grouped into six broad areas. The EPA encourages those involved in flagging data and preparing demonstration packages to review the questions and answers and to provide input regarding their usefulness and appropriateness and regarding additional questions which need answers. The following bullets identify key points of interest in the interim Q&A document:

- Natural events, such as volcanic eruptions, do not have to be infrequent to qualify as exceptional events under the EER (see Question 1 of the interim Q&A document). Frequent events with natural triggers that have a contribution from anthropogenic activities that are reasonably controlled could be eligible "exceptional" events, provided the events meet the demonstration requirements for the technical criteria.

- The EER does not prohibit air agencies from flagging individual concentration values below the level of the NAAQS. However, in general, only such data that contribute to a violation of the NAAQS are excludable. Questions 29-31 describe the few, limited situations in which concentration values below the level of the NAAQS contribute to violations of the NAAQS.

- An event that an air agency has concluded is associated with a measured concentration "in excess of normal historical fluctuations" will be reviewed using a weight-of-evidence approach. The comparison of the measured concentration to normal historical concentrations will also influence how much information is needed to successfully meet other technical elements. For example, when the observed concentration is high compared to historical concentrations, the EPA may need less additional evidence to demonstrate the "but for" finding. Questions 1-5 provide recommendations for showing how the observed concentration compares to the distribution of historical concentrations.

- Question 6 describes types of evidence that could be submitted as part of a demonstration showing that an ozone exceedance would not have occurred but for the effect of a fire event. In particular, statistical or photochemical dispersion model predictions of the ozone concentration that would have occurred in the absence of the fire would be a relevant type of evidence, provided the demonstration package is transparent about the technical basis for the model and its uncertainties. Also, as noted below, the EPA intends to develop a separate draft document to provide guidance in preparing demonstrations for wildfire-related events that influence ambient ozone concentrations.

[14]The EPA recognizes that air agencies may need more than 60 days to prepare and submit some types of supplemental information. The EPA will work with air agencies on supplemental timeframes; however, the mandatory timing of the EPA actions may limit the response time the EPA allows.

- Not every natural or infrequent anthropogenic event that affects air quality is a true "exceptional event" under the definition of that term in the EER. Ambient data affected by an event that does not meet the "but for" criterion cannot be excluded under the authority of the EER even if in all other respects the event meets the definition of an exceptional event. The EER does not address data handling associated with events that are not considered "exceptional" under the EER, and does not provide the EPA with authority to exclude such data. Yet, the event-related concentration could still influence design values. An air agency incorporating the event-related concentration in a design value used for a prospective attainment demonstration might seem to need more emission reductions to attain the NAAQS by its attainment deadline than is actually the case. The EPA plans to more formally address this topic on a pollutant/NAAQS basis, the first of which will be ozone guidance in the preamble of a soon-to-be-proposed rulemaking on SIP requirements for areas designated nonattainment for the 2008 ozone NAAQS. Until the planned guidance for a pollutant and NAAQS of interest is issued, air agencies should consult with their EPA regional office if they face this situation. The EPA further discusses this issue in Question 13.

- To remove any possible confusion, the passages of the preamble that were declared to be a legal nullity by the court that reviewed the EER are specifically identified in Question 20.[15] While air agencies cannot rely on these passages as the EPA guidance on interpretation of the EER, this interim guidance overview document and its attachments are consistent with those sections.

- The EPA identifies in Question 28a currently existing mechanisms that air agencies can use at various points in the exceptional events process to resolve disagreements regarding non-concurrence on submittal packages.

**Interim High Winds Guidance Document (Attachment 2)**

The attached "Interim Guidance on the Preparation of Demonstrations in Support of Requests to Exclude Ambient Air Quality Data Affected by High Winds Under the Exceptional Events Rule" (the High Winds Guidance document) is a resource for air agencies when flagging data and preparing demonstrations packages for high wind dust events that have affected particulate matter concentrations – both particles less than or equal to 10 micrometers (μm) in diameter ($PM_{10}$) and $PM_{2.5}$. The interim document applies the provisions of the EER, the general guidance conveyed in this memorandum, and the general guidance in the interim Q&A document to the particular situation of a high wind dust event. While the document is specific to high wind dust events, it outlines how the EPA generally intends to implement the preparation and review process for exceptional events and, therefore, may have relevance for other types of exceptional events. The following are some of the highlights of the interim High Winds Guidance document:

- In nonattainment areas, a reference point for considering what constitutes reasonable control of wind-blown dust during high wind events would be the set of measures that are identified as Reasonably Available Control Measures (RACM) or Best Available Control Measures (BACM) in the approved SIPs of other areas with similar wind-blown dust conditions, depending on area classification. U.S. Department of Agriculture (USDA) / Natural Resources Conservation Service (NRCS)-approved conservation management practices designed to effectively reduce fugitive dust air emissions and prevent loss of soil during high winds could also be considered.

[15] See *NRDC v. EPA*, No. 07-1151 (D.C. Cir. 3/20/09).

All dust-related control measures and/or dust suppression measures in an area's own approved SIP should be considered part of the set of controls that would have been reasonable to have been in place at the time of the event. The assessment of whether an event was not reasonably controllable will be made on a case-by-case basis. Like other elements included in an exceptional events demonstration, when the EPA takes a regulatory action that hinges on a decision to exclude data under the EER, the EPA will consider and appropriately respond to any public comments on whether the event was "not reasonably controllable or preventable."

- Reasonable controls generally would not need to be implemented for wind-blown dust from undisturbed natural landscapes or previously disturbed landscapes that are being allowed to return to natural conditions.

- For purposes of qualifying for the exclusion of data affected by wind events with sustained wind speeds above 25 miles per hour (or above another threshold determined to be appropriate for a particular area), the demonstration of reasonable controls applied to disturbed landscapes and other anthropogenic sources of dust could be less rigorous because: (1) the contribution from natural undisturbed lands is likely to be high and, (2) at such high wind speeds many available controls would have been ineffective in significantly reducing wind-generated dust emissions.

- In response to commenter feedback, the EPA has added the *optional* prospective controls analysis, which air agencies can prepare to document *existing* controls and facilitate the EPA's review and evaluation of the not reasonably controllable and preventable criterion. In the prospective controls analysis, the air agency would provide information on attainment status, identify natural and anthropogenic windblown dust sources and emissions, provide the status of SIP submittals and their implementation (if applicable), and identify the wind speed up to which the collective windblown dust controls are expected to be effective. Air agencies would submit their prospective controls analysis in advance of an air agency submittal and the EPA review of any specific demonstration submittal, with a letter of intent, or with their demonstration package submittal. The EPA review and approval of controls and an appropriate high wind threshold would typically be effective for a minimum of three years.

- If the EPA has approved a SIP containing wind-blown dust controls within the past three years, then the submitting air agency has the option of using their current, implemented SIP-approved controls and specifying a high wind threshold to which the controls are expected to be effective to constitute the set of controls that would have been reasonable to implement.

- Air agencies are encouraged to work with the EPA regional offices to develop High Wind Action Plans, which need not be incorporated into the SIP, as a way to develop a mutual understanding of what additional controls are reasonable to implement in light of foreseeable high wind conditions. Similar to a Natural Events Action Plan[16], the optional High Wind Action Plan is a mechanism to implement necessary controls on newly-identified sources needing reasonable controls such that the EPA could consider future high wind events not reasonably controllable or preventable.

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[16]On May 30, 1996, Mary D. Nichols, Assistant Administrator for Air and Radiation issued a memorandum to the EPA regional offices titled, "Areas Affected by $PM_{10}$ Natural Events." The policy, known as the $PM_{10}$ Natural Events Policy, or simply the Natural Events Policy, set forth procedures for protecting public health through the development of a Natural Events Action Plan, which implements Best Available Control Measures for human-generated particulate emissions in areas that could violate the $PM_{10}$ NAAQS due to natural events. Promulgation of the EER superseded the Natural Events Policy.

**On-line Availability of Exceptional Event Packages and Best Practice Components**

To assist air agencies in deciding what type and how much evidence/technical analysis to include in their demonstration packages, the EPA has developed a public website at *http://www.epa.gov/ttn/analysis/exevents.htm* that contains EPA-approved demonstration packages and links to best practice components. The EPA developed this website to provide examples to illustrate specific points; the example analyses and level of rigor are not necessarily needed for all demonstrations. The website will continue to evolve as air agencies submit, and the EPA reviews, additional demonstration packages.

**Draft Guidance Under Development**

The EPA is currently developing a separate draft guidance document addressing the preparation of demonstrations to support data exclusion requests for wildfire-related events that may have affected ozone concentrations. We anticipate preparing this guidance within the same timeframe as the EER revisions with draft guidance available in late 2013/early 2014 and final guidance available in late 2014/early 2015. We will provide an opportunity for stakeholder input on this guidance.

**Conclusion**

Regional offices should use the interim guidance provided in this overview document and its attachments as we undertake rule revisions, because it is consistent with the EER and the guidance already provided in the preamble to the rule.

Staff in the EPA's Office of Air Quality Planning and Standards are available for assistance and consultation. For interim guidance-related questions, please contact Beth W. Palma at (919) 541-5432 or *palma.elizabeth@epa.gov*.

Attachments:
1. Interim Exceptional Events Rule Frequently Asked Questions
2. Interim Guidance on the Preparation of Demonstrations in Support of Requests to Exclude Ambient Air Quality Data Affected by High Winds Under the Exceptional Events Rule

# Interim Exceptional Events Rule Frequently Asked Questions

**United States Environmental Protection Agency**

**May 2013**

**Note:** This May 14, 2013, document replaces the original document posted on May 13, 2013, to include the inadvertent omission of footnote 16 on page 28. There are no additional changes and document pagination is the same in both versions of this document.

# ATTACHMENT 1

## Interim Exceptional Events Rule Frequently Asked Questions

The Exceptional Events Rule of 2007[1] superseded the EPA's previous Exceptional Events guidance and policy documents and created a regulatory process codified at 40 CFR parts 50 and 51 (50.1, 50.14 and 51.930). The Exceptional Events Rule (EER) recognizes that each potentially eligible event can have different or unique characteristics, and thus, necessitates a case-by-case demonstration and evaluation. Therefore, the EER adopts a "weight-of-evidence" approach for reviewing each demonstration to justify excluding data affected by an exceptional event. The EPA acknowledges that extreme[2] exceptional events may justify more limited demonstration packages.

Air agencies and other stakeholders have raised technical questions and issues related to implementation since the EPA promulgated the EER. This Question and Answer (Q&A) document is intended to respond to some of these frequently asked questions and to provide guidance and clarification to air agencies[3] implementing the EER. The EPA recognizes the limited resources of the air agencies that prepare and submit exceptional event demonstration packages and of the EPA regional offices that review these demonstration packages. One of the EPA's goals in developing exceptional event implementation guidance is to establish clear expectations to enable affected air agencies to better manage resources as they prepare the documentation required under the EER. Submitters should prepare and submit the appropriate level of supporting documentation, which will vary on a case-by-case basis under the weight-of-evidence approach. The EPA anticipates that the resources needed to prepare (and review) packages will decrease as we continue to identify ways to streamline the process and continue to build our database of example demonstrations and analyses. In addition, as noted above, the EPA acknowledges that extreme exceptional events may justify more limited demonstration packages.

For organizational ease, this document has been divided into the following topical sections:

A. Historical Fluctuations
B. "But For" Test
C. Exceptional Event Data Flagging Schedules
D. General AQS Procedures
E. General Exceptional Events Rule Applicability and Implementation Issues

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[1] "Treatment of Data Influenced by Exceptional Events; Final Rule," 72 FR 13563, March 22, 2007.
[2] Extreme exceptional events may justify a more limited demonstration package. Whether a particular event should be considered "extreme" for this purpose depends on the type and severity of the event, pollutant concentration, spatial extent, temporal extent, and proximity of the event to the violating monitor. Several meteorological phenomena that could be considered extreme events include hurricanes, tornadoes, haboobs, and catastrophic volcanic eruptions. The EPA addresses "extreme" high wind dust events in Question 17a in this document.
[3] References to "air agencies" are meant to include state, local, and tribal air agencies responsible for implementing the EER.

F. Exceptional Event Data Flagging for Air Quality Concentrations that Could Contribute to an Exceedance or Violation of the National Ambient Air Quality Standards

Each section contains related questions. Readers of this document can find additional information at the EPA's Exceptional Events website located at http://www.epa.gov/ttn/analysis/exevents.htm. The EPA's interim guidance documents and the exceptional events website present examples to illustrate specific points. The example analyses and level of rigor are not necessarily needed for all demonstrations.

**Disclaimer**

The Exceptional Events Rule is the source of the regulatory requirements for exceptional events and exceptional event demonstrations. This interim Q&A document provides guidance and interpretation of the Exceptional Events Rule rather than imposing any new requirements and shall not be considered binding on any party. Note: If and when the EPA takes a regulatory action that hinges on a decision to exclude data under the Exceptional Events Rule, the EPA will consider and appropriately respond to any public comments on any aspect of a supporting exceptional events demonstration submittal.

## A. Historical Fluctuations

> *40 CFR 50.14(c)(3)(iv): "The demonstration to justify data exclusion shall provide evidence that:*
> * * *
> *(C) The event is associated with a measured concentration in excess of normal historical fluctuations, including background;*

1. **Question:** Is the Exceptional Events Rule demonstration requirement to provide evidence to support "a measured concentration in excess of normal historical fluctuations, including background" a test that can be "passed" or "failed" based on the outcome of the statistical comparison? For example, must the concentration affected by an event exceed a specific percentile rank in the historical data?

   **Answer:** The "historical fluctuations" criterion is a test, but there is no specific percentile rank that the EPA will use to determine whether the test has been passed. The EPA will use a weight-of-evidence approach to review each demonstration on a case-by-case basis. The air agency's role in satisfying this element is to provide appropriate analyses and statistics and conclude that the provided data show that the event was in excess of normal historical fluctuations. The EPA will review the information provided by the air agency. "Normal historical fluctuations" will generally be defined by those days without events for the previous years. The EPA acknowledges that natural events can recur and still be eligible for exclusion under the EER; therefore, events do not necessarily have to be rare to satisfy this element.

   The submittal of data showing how the event concentration compared with historical concentrations will help the EPA determine whether the air agency has satisfied the "clear causal relationship," "but for," and "affects air quality" criteria. Air agencies need to satisfy these EER criteria, as well as "not reasonably controllable or preventable," for the EPA to concur on an exceptional event claim. The EPA anticipates that less conclusive historical fluctuation comparisons will likely indicate less conclusive "clear causal relationship" and/or "but for" relationships. However, a demonstration without a historical fluctuations comparison would prevent the EPA from being able to approve exclusion of the data in question.

   The EPA recommends that each "historical fluctuation" demonstration submittal contain a minimum set of statistical analyses described in more detail in Questions 2 and 3. The EPA generally will consider submission of the identified statistical analyses to have met the requirement to "provide evidence."

   It is important to note, however, that there is no outcome of the "historical fluctuation" statistical comparison that, by itself, can guarantee successful demonstration of the clear causal relationship and "but for" elements. The EPA will consider in its weight-of-evidence approach the comparison of the concentrations during event(s) in question with historical concentration data. For example, a uniquely high concentration in an area (and season) with no previous exceedances, with a clear causal connection, and with no

evidence of any other plausible explanation would be a case in which the weight-of-evidence would generally indicate that the "but for" criterion has been demonstrated. In contrast, if the event-affected concentration does not stand out much from normally occurring exceedance concentrations for the same place and season, the statistical comparison generally will not by itself provide much support for "but for" in the weight-of-evidence consideration.

2. **Question:** What evidence does the EPA want included in the demonstration as part of a comparison of a measured concentration with normal historical fluctuations, including background?

   **Answer:** The EPA would prefer an analysis showing how the observed concentration compares to the distribution of historical concentrations. To aid the EPA's review, reduce requests for additional information, and facilitate the EPA's understanding of the air agency's position, a submitting air agency can consider providing some of the following types of statistics, graphics, and explanatory text:

   - Comparison of concentrations on the claimed event day with past historical data (see Question 3 for additional detail). The historical comparisons can be made on an annual and/or seasonal basis, depending on which is more appropriate. For example, if PM or ozone data at the location show clear seasonality (i.e., exceedances are nonexistent or extremely rare in some seasons but not others, or concentrations vary according to season due to meteorological conditions), discussing that information in the demonstration is likely appropriate. In contrast, if exceedances are likely throughout the year, analysis of annual data may be more appropriate. For seasonal comparisons, the EPA recommends using all available seasonal data from 3-5 years (or more, if available). The analysis should discuss the seasonal nature of pollution for the location being evaluated. Depending on the quantity of data, it may be appropriate to present monthly maximums; however, generally it is not appropriate to present monthly-averaged daily data or any other average of the daily data as this masks high values. Regardless of whether seasonal or annual data are presented, data are most helpful when provided in the form relevant to the standard that is being considered for data exclusion (see Question 30). Specific examples of analyses of annual and seasonal data, as well as analyses of historical speciated $PM_{2.5}$ fluctuations and spatial distribution fluctuations are included in the presentation located at http://www.epa.gov/ttn/analysis/docs/IdeasforShowingEEEvidence.ppt. Examples of graphics are also included in the response to Question 3.

   Additionally, it may be useful for the comparison of concentrations on the claimed event day with past historical data to label appropriate data points as being associated with concurred exceptional events, suspected exceptional events, or other unusual occurrences. As additional evidence to use in interpreting the data, it may also be useful to include comparisons omitting such points. The intent of these comparisons is to present a time series of concentration data for the event area, thereby fully and accurately portraying the historical context for the claimed event day.

- Comparison of concentrations on the claimed event day with a narrower set of similar days: Similar days could include neighboring days (*e.g.,* a time series of two weeks) and/or other days with similar meteorological conditions (possibly from other years). This type of comparison could demonstrate that the event caused higher concentrations than would be expected for given meteorological and/or local emissions conditions.

- Percentile rank of concentration relative to annual data. The percentile rank of the event-day concentration should be provided for the event day relative to all measurement days over the previous 3-5 years. To ensure statistical robustness, the EPA generally recommends that submitting agencies include a minimum of 300 data points in this calculation. The daily statistic (e.g., 24-hour average, maximum 8-hour average, or maximum 1-hour) should be appropriate for the form of the standard being considered for data exclusion (see Question 30).

- Percentile rank of concentration relative to seasonal data. The percentile rank of the event-day concentration should be provided for the event day relative to all measurement days for the season (or appropriate alternative 3-month period) of the event over the previous 3-5 years. It is generally appropriate to use the same time horizon as used for the percentile rank calculated relative to annual data.

*(Note: The use of percentile ranks is illustrative and should not be seen as a bright line to be passed or failed when comparing observed concentrations with historical values.)*

3. **Question:** How will the EPA consider the submitted "historical fluctuations" evidence when assessing whether the "but for" and "clear causal relationship" criteria are met?

   **Answer:** The EPA will review the submitted analyses showing how the observed concentration compares to the distribution of historical concentrations to determine whether the event is associated with a measured concentration in excess of normal historical fluctuations and will assess the other criteria, in part, based on this historical fluctuations comparison. When the observed concentration is higher than all or nearly all normal historical concentrations (i.e., concentrations when there was not an event), the EPA may need less additional evidence to demonstrate the "but for" finding. When the concentration is similar to or lower than a large number of normal historical values, the EPA may want additional evidence (*e.g.,* PM or VOC speciation data) to support the "but for" and "clear causal relationship" demonstration requirements. The additional evidence will help differentiate the concentration increment caused by the event in question from other, non-event causes.

   Stated another way, the EPA's intended use of the data is to review the historical fluctuations prong, which may influence how much information of other types is needed to successfully meet the other demonstration criteria (i.e., "but for" and "clear causal relationship") of 40 CFR § 50.14 based, in part, on the degree to which the measured concentration is in excess of normal historical fluctuations.

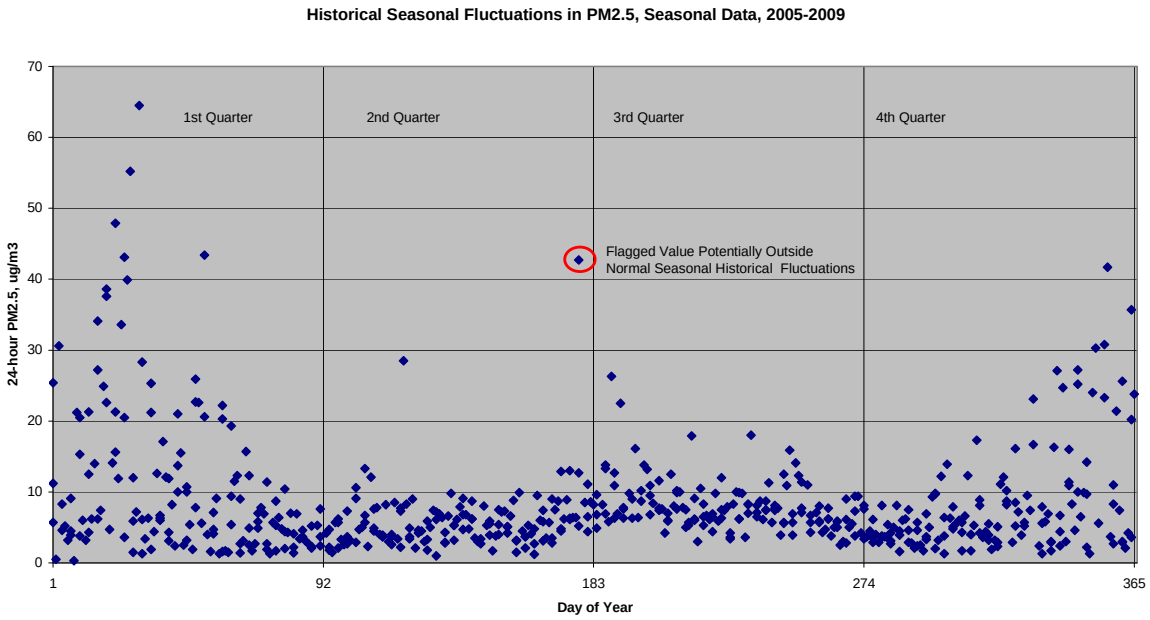
Submitting agencies are encouraged to discuss available historical fluctuation evidence with the appropriate EPA regional office prior to submitting the event demonstration package to determine if specific information might assist in the review process.

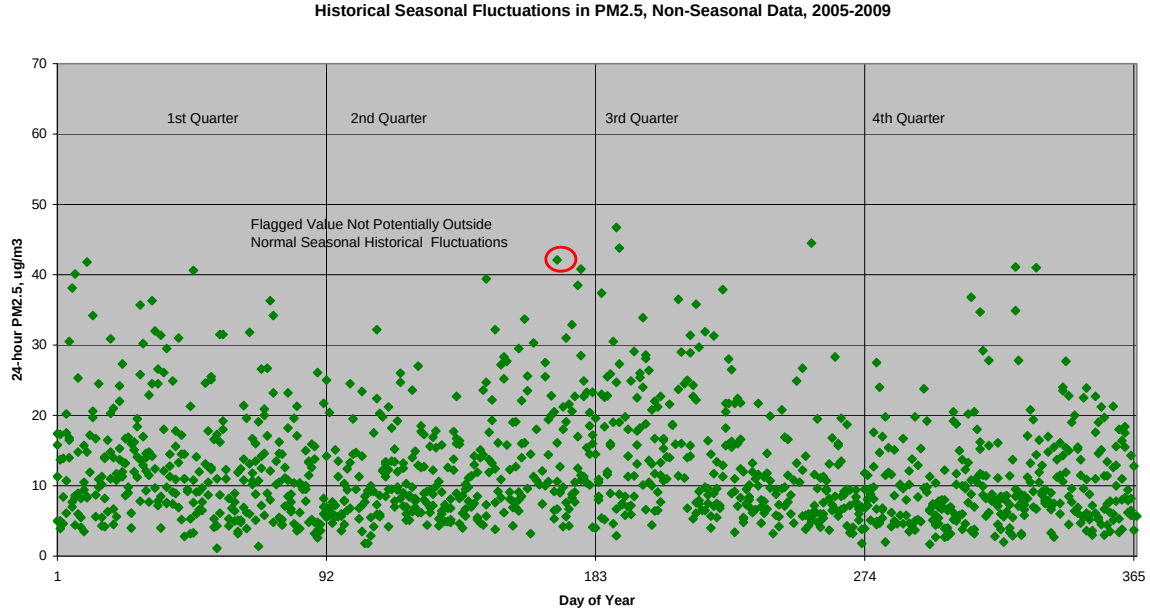
Additional Examples and Explanation Concerning "Historical Fluctuations" Evidence

*(Note: The discussion and graphics that follow illustrate the type of analyses and discussion that are described in this question and in Question 2 and that an air agency might include in a submittal showing that an event is associated with a measurement "in excess of normal historical fluctuations.")*

The evidence comparing the event-affected concentration with historical concentrations is most helpful to an air agency's demonstration if it shows that the event-affected concentration is high compared to all, or nearly all, historical concentrations generated by normal emissions and ambient conditions. This scenario makes it more plausible that the event caused the observed excess concentration rather than that some other causal event occurred on the same day as the known event. If similar events have been very rare in the past, it may be possible to make this point by labeling appropriate data points as being associated with concurred exceptional events, suspected exceptional events, or other unusual occurrences. To facilitate the EPA's understanding of the influence of these events, air agencies may also include comparisons omitting such points.

The following figures demonstrate the concept of seasonal emissions fluctuations. The first figure shows an exceedance level $PM_{2.5}$ value in late spring that is outside the range of the 3 to 5-year historical data set for non-wintertime $PM_{2.5}$, while the second figure shows a similar data value for a different part of the country where similar exceedance concentrations occur throughout the year, suggesting that some non-event process(es) can cause high concentrations all during the year. In the first case, a seasonal assessment of historical fluctuations generally would be appropriate, while annualized data analysis might be more appropriate for the second case to provide the most robust yet also representative historical data set.




4. **Question:** The Preamble to the EER states that less documentation or evidence may be needed to demonstrate that an event affected air quality for flagged data > 95th percentile than for values > 75th percentile. For ozone, $PM_{10}$ and 24-hour $PM_{2.5}$, in areas near the standard, exceedances are often near or above the 95th percentile of historical data. In these cases, will the EPA accept less documentation to demonstrate that an event affected air quality simply because an event-affected concentration is above the 95$^{th}$ percentile of the historical concentrations?

   **Answer:** The preamble statement paraphrased in the question above was intended to address National Ambient Air Quality Standards (NAAQS) that are based on averaging

periods of many days, such as annual, quarterly and/or 3-month rolling average NAAQS. NAAQS with 1-hour, 8-hour or 24-hour averaging periods only allow a small percentage of days to have concentrations above the level of the NAAQS. Flagging and excluding data falling at around the 75th percentile point of the historical concentrations are extremely unlikely to influence an area's attainment status with respect to such a short-term NAAQS. Data around the 75th percentile point can, however, affect compliance with NAAQS having a quarterly average, 3-month average, or annual average standard. For the annual $PM_{2.5}$ NAAQS, it is true that showing that the Exceptional Events Rule criteria are met will be more difficult for values near the 75th percentile point than for values near the 95th percentile point because it is more likely that values near the 75th percentile point are related to non-event causes.

Other questions and answers in this Q&A document address situations involving NAAQS with short averaging periods.

5. **Question:** Some pollutant demonstrations do not (or poorly) characterize the historical fluctuations of the observed concentrations at the monitor affected by the event. How can one judge whether the demonstration is adequate in this regard?

   **Answer:** As previously stated in the response to the historical fluctuations question, the EPA will review the submitted analyses showing how the observed concentration compares to the distribution of historical concentrations to assess whether the event is associated with a measured concentration in excess of normal historical fluctuations, and when assessing the exceptional event demonstration criteria of "affects air quality," "clear causal relationship," and "but for" causation. Because the "historical fluctuations" showing is not a statistical demonstration with any defined bright line, air agencies should consider submitting (with appropriate descriptions and discussion) the type of statistical analyses described in the responses to Questions 2 and 3. The EPA will review these analyses and look at both the relationship between the claimed concentration and historical concentrations and the strength of the data set to help inform the evidence needed to demonstrate the clear causal relationship and "but for" criteria.

   In the response to Question 2, we identified that air agencies completing historical fluctuation analyses should consider using 3 to 5 years of data to ensure a representative dataset. We recognize, however, that these data may not be available for all monitors and/or all pollutants. If data are not available, please consult with the reviewing EPA regional office.

## B. "But For" Test

> *Section 319 of the Clean Air Act requires that "a clear causal relationship must exist between the measured exceedances of a national ambient air quality standard and the exceptional event to demonstrate that the exceptional event caused a specific air pollution concentration at a particular air quality monitoring location…" and that [States] can petition [EPA] to "[E]xclude data that is directly due to exceptional events from use in determinations…with respect to exceedances or violations."*

*The implementing language in the EER at 40 CFR 50.14(c)(3)(iv) states: "The demonstration to justify data exclusion shall provide evidence that:*
* * *
*(D) There would have been no exceedance or violation but for the event.*

6. **Question:** What types of evidence can air agencies include in a demonstration that ozone exceedances would not have occurred but for the effect of a fire event?

   **Answer:** Air Agencies may include any evidence that they consider relevant to the "but for" requirement recognizing that the effects of a fire on ozone are complex. Fire can generate ozone precursors, but it can also reduce solar radiation needed to drive ozone formation. Also, fire plumes containing ozone and ozone precursors can pass over a monitoring site without mixing down to ground level and affecting the monitored concentration. Additionally, wildfires often occur during the same seasons that exhibit high ozone caused by anthropogenic precursor emissions making it difficult to separate the wildfire contribution from a high ozone event that would have occurred without the fire.

   Examples of relevant evidence follow. The EPA recognizes that the following example analyses have limitations and may not conclusively or quantitatively demonstrate the "but for" criterion. For this reason, the EPA considers "but for" evidence using a weight-of-evidence approach on a case-by-case event basis.

   - Statistical evidence that shows that for the place, time of year, and prevailing weather conditions at the time of the event, past ozone data show no history of exceedances on days that were not affected by a fire event, or shows that exceedances were so infrequent as to make the fire at issue the more likely cause of the observed exceedance.
   - Unusual diurnal patterns of hourly or minute-by-minute ozone concentrations, such as a spike or peak other than at the normal time of day. This could be demonstrated by comparing the event pattern to the range of diurnal patterns exhibited on typical high ozone days.
   - Evidence that the normally good correlation between the affected monitor and a monitor clearly outside the area of influence of the fire was disrupted on the day of the fire event in a manner not seen on non-fire days.
   - Evidence that there were no known unusual emission releases from non-fire sources at the time of the fire event, such as from traffic due to a sports or entertainment event or source non-compliance.
   - Evidence that the plume from the fire passed over the location of the monitoring site and mixed down to ground level. This can include satellite images, wind data including HYSPLIT trajectories, visual smoke observations, and chemical analysis of PM filters showing elements and compounds that are markers for biomass burning.

- Altered pollutant amounts, ratios, or patterns that indicate the influence of the event rather than non-event sources. This information could include the level, timing and patterns of CO and PM; PM size distribution or composition; indicators of precursor composition and "age," such as oxygenated VOCs, radicals, sulfates, and timing and pattern of $NO_2$ and NO; and pollutant ratios, such as $CO/NO_x$, $CO/PM_{10}$, Elemental Carbon (EC)/Organic Carbon (OC), $O_3/NO_y$ and $O_3/CO$.
- A prediction that the "normal" ozone concentration would have been below the level of the NAAQS. "Normal" ozone concentrations can be predicted using statistical methods based on previous-day ozone and same-day weather variables (like methods used for air quality advisories in some areas) or using air quality models. The EPA asks that demonstration packages using these predictive techniques also include an easily understandable narrative describing the application of the technique and information on the uncertainty of the prediction methods (i.e., information on its past success in predicting normal ozone levels).
- A prediction based on air quality/photochemical modeling of the incremental ozone concentration due to the emissions from the fire, from comparing modeling results with and without the emissions from the fire. A demonstration that includes such evidence should address the uncertainties in the emission estimates for the fire including the speciation of the VOC and $NO_x$ emissions, and the uncertainties due to other aspects of the modeling platform such as grid cell size, etc.

The EPA is currently developing a separate guidance document for preparing a demonstration for wildfire events that are believed to have affected ozone concentrations. In addition, the EPA will post on its exceptional events website example demonstration packages that illustrate the type and scope of analyses that constitute complete submittals for ozone-related exceptional events.[4]

## C. Exceptional Event Data Flagging Schedules

*Note: "Flag" is the common terminology for a data qualifier code in the EPA's AQS (Air Quality System). Unless explicitly noted, the process of "flagging" data refers to adding Request Exclusion ("R") data qualifier codes to selected data in AQS. "R" flags are the only AQS flags that satisfy the EER requirement for initial data flagging. The EPA can act/concur only on an "R" flag.*

7. **Question:** When the EPA revises the National Ambient Air Quality Standards, how will it notify air agencies of the schedules and deadlines for flagging and documenting exceptional event data for designations purposes?

   **Answer:** When the EPA promulgated 40 CFR § 50.14, "Treatment of Air Quality Monitoring Data Influenced by Exceptional Events," in March 2007, the EPA was mindful that designations would be occurring under the then-recently revised $PM_{2.5}$ NAAQS. Exceptions to the generic deadline of July 1 of the calendar year following the

[4] http://www.epa.gov/ttn/analysis/exevents.htm

datum year (see 40 CFR § 50.14(c)(2)(iii)) were included for $PM_{2.5}$ in the rule. The EPA was also mindful that similar issues would arise for subsequent new or revised NAAQS. The Exceptional Events Rule at section 50.14(c)(2)(vi) indicates "when EPA sets a NAAQS for a new pollutant, or revises the NAAQS for an existing pollutant, it may revise or set a new schedule for flagging data for initial designation of areas for those NAAQS." See as examples, the data flagging schedule identified in the 2012 $SO_2$ NAAQS final rule at 75 FR 35592, the data flagging schedule identified in the 2010 $NO_2$ NAAQS final rule at 75 FR 6531, or the data flagging schedule identified in the 2012 $PM_{2.5}$ NAAQS final rule at 78 FR 3086.

## D. General AQS Procedures

8. **Question:** What is the difference between the "R" series flags and the "I" series flags, and how should they be used?

   **Answer:** Within AQS, monitoring agencies can use two types of data validation, or data qualifier, codes: the *Request Exclusion* flags ("R") and the *Informational Only* flags ("I"). Agencies should use the "I" series flags when identifying informational data and the "R" series flags to identify data points for which the agency intends to request an exceptional event exclusion and the EPA's concurrence. As an example, air agencies may use an "I" series flag to initially identify values they believe were affected by an event. Once the air agency collects additional supporting data, it may change the flag to an "R" series flag and submit an initial event description. Or, the air agency may find that additional information does not support flagging the data as an exceptional event, and the air agency may, therefore, delete the flag or retain the "I" series flag. Air agencies may also use the "I" series flags simply to note activities or conditions occurring on the data collection day that are unrelated to exceptional events.

   The EPA does not intend to review or concur on the "I" series flags. Air agencies must submit "R" flags by July 1 of the calendar year following the year in which the flagged measurement occurred or by the other deadlines identified with individual NAAQS revisions (see Question 7). Air agencies intending to change "I" flagged data to "R" flagged data should be aware of the EER flagging and initial event description deadline of July 1 of the year following the sample measurement. Air agencies should change the flag status from "I" to "R" BEFORE the July 1 deadline. Normally, air agencies should not modify the flag status after this date and, therefore, if they went beyond July 1, they may not be able to meet the EER initial flagging and event description deadlines.

9. **Question:** May an air agency flag any data in AQS?

   **Answer:** Yes, but the EPA asks air agencies to use the "R" flags to identify data that might have a regulatory consequence and for which an air agency intends to request exclusion and submit an approvable demonstration. Air agencies should use the "I" series flags to identify values for informational purposes (see Question 8). AQS only allows the EPA to place concurrence flags on data identified with an "R" flag. "I" flags never affect regulatory summary statistics (e.g., design values, number of exceedances, 98$^{th}$ percentile

values) generated by AQS for NAAQS determinations purposes. "R" flags will not affect the regulatory summary statistics unless or until they are concurred by the EPA.

Further, while the EER does not prohibit air agencies from flagging individual concentration values below the level of the NAAQS, in general, air agencies can only request exclusion for data that contribute to a violation or an exceedance of the NAAQS. See Questions 29-31 for more information, including clarifications and examples, particularly for $PM_{2.5}$ and $PM_{10}$, in which flagging individual concentration values below the level of the NAAQS is acceptable.

10. **Question:** The EPA requires air agencies to provide an initial description for data flagged with an "R" data qualifier code. Is it possible for an initial description to be inadequate (for example, "fires in surrounding states")?

    **Answer:** Although the EPA is not specifying pass/fail criteria for the initial description associated with "R" flagged data, it is possible for an air agency to enter inadequate initial descriptions in AQS. The preamble to the Exceptional Events Rule explains: "At the time the [request exclusion] flag is inserted into the AQS database, the State must also provide an initial description of the event in the AQS comment field. This initial description *should include such information as the direction and distance from the event to the air quality monitor in question, as well as the direction of the wind on the day in question.*" 72 FR 13568 (emphasis added). AQS maintains event definitions, including their initial descriptions, in fields separate from the raw data flagging fields. As a result, air agencies can enter more detailed event descriptions either before or after the raw data measurements are flagged. Regardless of precise timing, the intent of this initial description is to initially explain why the flagged data warrant consideration as exceptional events. Although the initial description is not likely to provide enough information to assist the EPA with exceptional event planning and prioritization, the act of providing the initial description encourages air agencies to review and identify data having regulatory consequence and for which they are likely to submit an approvable demonstration. To facilitate the EPA's review of the initial event description, the EPA suggests that air agencies notify the appropriate regional office after the air agency creates the event description. This allows the air agency and the EPA to discuss and, if necessary, develop a mutually agreed-upon description. This initial discussion and the *optional* letter of intent (see Question 27) can assist the EPA and air agencies with exceptional event review and prioritization.

11. **Question:** The "j" flag was "Construction/Demolition." The new "IE/RE" flag is demolition; can it also be used for construction?

    **Answer:** The "j" flag is obsolete and can no longer be used. The "IE/RE" flag should <u>not</u> be used for construction.

    Generally, construction activity is not considered to be exceptional. Reasonable and appropriate controls capable of preventing localized NAAQS exceedances should be available during most construction events. In some cases, however, construction activities

may involve very high-energy, emissions-generating physical processes, such as explosive excavation. Dust control measures may not be adequate to prevent exceedances / violations in the vicinity of this type of activity.

If an agency wishes to "flag" data related to exceedances caused by some construction activity, the agency should use the *Other* ("IL/RL") exceptional events flag. Air agencies should use the "IE/RE" flag only when an exceptional demolition event occurred and the air agency wishes to flag the data for exclusion as an exceptional event. Air agencies using either the "IE/RE" flag or the "IL/RL" flag to identify an exceptional event should show in a demonstration submittal that all reasonable and appropriate controls were in place during the construction / demolition activity, and that those controls proved inadequate to prevent NAAQS exceedances. The demonstration would also need to meet all other requirements of the Exceptional Events Rule.

11a. **Question:** What flags does AQS use to describe fires?

**Answer:** Land Management Agencies modified their fire-related definitions after the EPA promulgated the Exceptional Events Rule. The EPA has incorporated the fire-related terminology in the exceptional events guidance documents to ensure consistency (see also Question 20a). These definitional changes result in corresponding changes to fire-related flags in AQS. The EPA eliminated from AQS the Wildland Fire Use Fire – United States ("IU") and ("RU") flags and the Forest Fire ("E") flag. The EPA continues to use the following flags to describe fires:

- IF – Fire – Canadian (Informational Only)
- IG – Fire – Mexico/Central America (Informational Only)
- IM – Prescribed Fire (Informational Only)
- IP – Structural Fire (Informational Only)
- IT – Wildfire – US (Informational Only)
- RF – Fire – Canadian (Request Exclusion)
- RG – Fire – Mexico/Central America (Request Exclusion)
- RM – Prescribed Fire (Request Exclusion)
- RP – Structural Fire (Request Exclusion)
- RT – Wildfire – US (Request Exclusion)

The EPA believes it is appropriate to retain the Fire – Canadian ("IF/RF") and Fire – Mexico/Central America ("IG/RG") flags because these flags indicate the jurisdictional origin of the fire (i.e., outside of the submitting state/outside of the United States). Emissions from fires originating outside of the United States that affect air quality concentrations in the United States may qualify for regulatory treatment under the international transport provisions of 40 CFR part 179(b) of the Clean Air Act.

12. **Question:** The National Park Service operates ozone monitors in some locations that meet all requirements of 40 CFR part 58. Can an air agency request exclusion of data from such monitors under the EER, and exclusion of other data not collected by the air agency itself that may lead to a nonattainment finding?

**Answer:** Yes. However, air agencies should take special steps with regard to data handling within AQS. To maintain data integrity, AQS is generally designed so that only the agency updating a monitoring site may enter or alter data for that site. Under normal circumstances, an air agency will not have access rights to apply event flags to data from monitors operated by other entities, such as the National Park Service or other state, local, or tribal agencies. When an air agency believes that an exceptional event affected the concentration recorded by monitors operated by other agencies, the air agency should contact the agency operating the monitor and request that the operating agency flag the identified data range for exclusion. The affected air agency should also develop and forward to the operating agency an initial event description that the operating agency can enter in AQS as it enters the appropriate "R" series flags (see Question 10). If an air agency is unsuccessful in requesting that another agency apply the appropriate "R" series flags and initial event description, the air agency should contact the EPA regional office. If the EPA regional office is aware of the request, and if the request was prior to July 1st of the year following the datum year, the EPA will generally still consider the affected air agency's request. Air agencies should notify the EPA regional office of such an instance as soon as possible.

Regardless of whether the monitor operator flags the data in question or the air agency notifies the regional office that a flag is needed, it is the air agency's responsibility to develop an initial event description, prepare the demonstration, and submit it to the EPA under the applicable schedule. The agency operating the monitor may choose to assist in this process.

13. **Question:** Events can make an air concentration significantly higher than it would have been in the absence of the event contribution, and elevate the 3-year design value for a NAAQS pollutant. Depending on the magnitude of the effect and how the "normal" concentration compares to the NAAQS, the "but for" test may not be satisfied in that there may have been a violation with or without the event. Thus, it appears that data associated with the event cannot be handled as an exceptional event. However, retaining such data in the calculation of a design value for a nonattainment area can make it seem that the area needs more emissions reduction to attain the NAAQS than is actually the case. How will the EPA deal with such a situation when reviewing an attainment demonstration? How, if at all, should AQS be used to flag such data?

**Answer:** *(See also Question 19 for a related question regarding $PM_{10}$.)* The question reflects a proper understanding that not every natural or infrequent anthropogenic event that affects air quality is a true "exceptional event" under the definition of that term in the Exceptional Event Rule. Ambient data affected by an event that does not meet the "but for" criterion cannot be excluded under the authority of the Exceptional Events Rule even if in all other respects the event meets the definition of an exceptional event. When the available evidence indicates that there would have been an exceedance of a NAAQS even in the absence of the event, for example when a wildfire makes a summer-time ozone exceedance worse than it otherwise would have been, the event is not a true "exceptional event" under the EER. The Exceptional Events Rule does not address data handling

associated with events that are not considered "exceptional" under the EER, and does not provide the EPA with authority to exclude such data. Yet as the question points out, this event-related concentration could still impact design values. An air agency incorporating the event-related concentration in a design value used for a prospective attainment demonstration might seem to need more emission reductions to attain the NAAQS by its attainment deadline than is actually the case.

However, the EPA intends to achieve much the same effect as if such data were excludable under the Exceptional Events Rule, by addressing this topic in future guidance on the preparation of attainment demonstrations in required SIPs for areas designated as nonattainment. The first pollutant and NAAQS that the EPA will address this way will be the 2008 ozone NAAQS. The EPA plans to more formally describe its intention to develop such ozone guidance in the preamble of a soon-to-be-proposed rulemaking on SIP requirements for areas designated nonattainment for the 2008 ozone NAAQS. Until the planned guidance for a pollutant and NAAQS of interest is issued, air agencies should consult with their EPA regional office if they face this situation. To avoid confusion, air agencies should use AQS informational-only "I" flags on such data, rather than "R" flags.

In the remainder of this response to the question, the EPA describes in more detail the differences between the event scenario described in the question and a true "exceptional event" under the Exceptional Events Rule, for the purpose of clarifying why the planned guidance on attainment demonstrations and the SIP approval process, rather than the Exceptional Event Rule and the associated AQS data flagging, demonstration submittal, and review process, will apply to such an event scenario.

To illustrate an attainment demonstration scenario using the 2006 24-hour $PM_{2.5}$ NAAQS of 35 $\mu g/m^3$, assume that the three annual 98$^{th}$ percentile 24-hour $PM_{2.5}$ concentrations for a monitoring site for 2006-2008 are 44, 31, and 37 $\mu g/m^3$ for each respective year, with a resulting 3-year design value of 37 $\mu g/m^3$, which is a violation. Also, assume that the next highest concentration in 2006 below the 44 $\mu g/m^3$ was 40 $\mu g/m^3$. The 44 $\mu g/m^3$ concentration in 2006 was affected by a one-day wildfire, and the air agency was able to show that the concentration would have been 41 $\mu g/m^3$ without the fire. Because both 44 $\mu g/m^3$ and 41 $\mu g/m^3$ are exceedances, the event on that day does not meet the "but for" test when viewed from an "exceedance" perspective. Moreover, from a "violations" perspective, the 2006 value also would not meet the "but for" test, because the "no event" concentration value of 41 $\mu g/m^3$ for the event day in 2006 would still be the 98$^{th}$ percentile concentration and would still result in a 3-year design value of 36 $\mu g/m^3$ which is a violation. Thus, the 2006 wildfire does not meet the definition of an exceptional event.

## E. General Exceptional Events Rule Applicability and Implementation Issues

14. **Question:** The Preamble to the Exceptional Events Rule states that the EPA headquarters or the EPA regional office will make its decision on demonstrations public. See 72 FR 13574 ("The EPA regional offices will work with the States, Tribes, and local agencies to ensure that proper documentation is submitted to justify data exclusion. EPA

will make the response and associated explanation publicly available."). What method does the EPA plan to use to make the explanation "publicly available?"

**Answer:** The EPA posts example demonstration packages and decisions (consisting of air agency demonstration submittals, the EPA responses, and the EPA technical support documents) on the EPA regional office websites and/or the Technology Transfer Network website.[5] In certain instances, the EPA's concurrence or non-concurrence determination may be a factor in a rulemaking that includes a public comment period. In these cases, the same information that is posted on the EPA websites, and any additional supporting correspondence, will also be posted in the relevant rulemaking docket. Further, the EPA plans to make the demonstrations and the EPA's concurrence decisions available to interested parties upon request.

14a. **Question:** At what point in the exceptional event development and review process is public notice and opportunity for comment required? How does the EPA determine the need for public comment?

**Answer:** The EER requires that air agencies offer notice and opportunity for public comment as part of the demonstration development process (see 40 CFR 50.14(c)(3)(i) and 40 CFR 50.14(c)(3)(v)). The EPA must also provide notice and opportunity for public comment prior to taking a final Agency action, such as acting on an air agency's request for area redesignation, that may rely upon air quality monitoring data including exceptional event claims. In addition, an air agency may need to provide an additional opportunity for public comment if the EPA requests and/or if the air agency provides supplemental information not included in the original documentation made available for public comment. The EPA will make a case-by-case decision regarding supplemental opportunities for public comment during the demonstration preparation, submittal, and review process. As part of this decision, the EPA may consider potential impact and/or expressed public interest in the claimed event, data uncertainty, historical application of demonstration approach, etc.

When the EPA concurs based on the weight-of-evidence that the air agency has successfully made the demonstrations referred to in 40 CFR 50.14(a)(2) and (b)(1) to the EPA's satisfaction, the EPA generally will exclude the affected data from the following types of calculations and activities:

- The EPA's AQS will not count these days as exceedances when generating user reports, and will not include them in design values estimates, unless the AQS user specifically indicates that they should be included.[6]
- The EPA will accept the exclusion of these data for the purposes of selecting appropriate background concentrations for New Source Review (NSR) air quality analyses.[7]

[5] http://www.epa.gov/ttn/analysis/exevents.htm

[6]Due to the complexity of the AQS software, inadvertent errors may occur. The EPA asks that agencies provide the EPA with information if/when AQS outputs seem inconsistent with the EPA's intention to exclude concurred upon data.

- The EPA will accept the exclusion of these data for the purposes of selecting appropriate background concentrations for transportation conformity hot spot analyses.[8]
- The data will continue to be publically available, but the EPA's publications and public information statements on the status of air quality in the affected area generally will not reflect these data in any summary statistic of potential regulatory application, unless such inclusion is specifically noted.[9]

In addition, some proposed regulatory actions (e.g., proposed designation, classification, attainment demonstration, or finding as to whether the area has met the applicable NAAQS) will rely on design values that exclude data that the EPA has determined meet the exceptional event weight-of-evidence requirements. These regulatory actions require the EPA to provide an opportunity for public comment prior to taking a final Agency action. If the EPA pursues one of these actions for a given area, the EPA will open a new comment period during which the public may comment on the exceptional event submission and/or the EPA's determinations. The EPA must consider and respond to received comments before taking final regulatory action.

15. **Question:** It is possible for events to affect more than one state. Each state/air agency must then submit its own exceptional events demonstration package, which may result in redundant work. Could the EPA take on multi-state/agency demonstrations?

    **Answer:** The primary responsibility for developing demonstrations lies with state, local, and tribal air agencies. The EPA encourages states and air agencies to coordinate with each other in compiling demonstration packages, and these agencies may submit some of the same data and analyses when a single event affects multiple jurisdictions. Each NAAQS exceedance, however, will likely have some unique properties (e.g., unique monitoring locations, different surrounding and potentially contributing sources with varying levels of control, different historical concentration patterns, etc.). States/agencies need to address these unique characteristics in individual submittal packages. Similarly, where a single event results in exceedances of multiple NAAQS (e.g., annual and 24-hour PM), the submitting agency needs to address the unique features of each NAAQS exceedance or violation (e.g., potentially different monitoring locations, different historical concentration patterns). An air agency could submit a single demonstration package for a single event affecting multiple NAAQS provided the air agency clearly identifies the unique characteristics of each NAAQS.

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[7] If the EPA is the permitting authority, the EPA will propose permits on this basis. If the EPA is commenting on another permitting authority's proposed action, the EPA's comments will be consistent with the determinations in this guidance document and any applicable NSR permitting and/or modeling guidance.
[8] Applicable only to $PM_{10}$ and $PM_{2.5}$. See "Transportation Conformity Guidance for Quantitative Hot-spot Analyses in $PM_{2.5}$ and $PM_{10}$ Nonattainment and Maintenance Areas," EPA-420-B-10-040, US EPA Office of Transportation and Air Quality, December 2010, page 98.
[9] These data may be included in statistics intended to describe current status and trends in actual air quality in the area for public information purposes including reporting of the Air Quality Index.

For example, if multiple states or jurisdictions are affected by a Saharan dust plume, they could collaborate and submit a common demonstration component (e.g., the same or very similar information in multiple submittals) for the "not reasonably controllable or preventable" and "human activity unlikely to occur or natural event" elements. Because the actual event-related exceedance would have been measured by different monitors located in different regions with possibly different contributing factors (e.g., rural monitor affected by both dust from feedlots and Saharan dust and urban monitor affected by both nearby industrial sources and Saharan dust), the "clear causal relationship," "but for," and "historical fluctuations" elements are likely to differ from one submittal to another.

16. **Question:** Does the EER address scenarios in which temporary activities (e.g., multi-month or multi-year road construction / demolition projects) significantly influence measured concentrations at a long-sited monitor such that the nature of the monitor changes from "area-wide" to "unique"?

    **Answer:** Generally, all monitoring data, if meeting applicable CFR regulations, are comparable to the NAAQS. There are special provisions applicable only to the $PM_{2.5}$ NAAQS, which provide that monitors must be representative of area-wide air quality to be comparable to the annual NAAQS, and that monitors representative of unique micro- or middle-scale impact sites are comparable only to the 24-hour $PM_{2.5}$ NAAQS. *See* 40 CFR 58.30. In the provided example, the affected air agency may believe that site meets the criteria for data to be comparable only to the 24-hour $PM_{2.5}$ NAAQS for the period of the construction. The affected air agency could request this type of change through updates to its annual monitoring network plan or in a separate request, subject to review and approval by the EPA regional office.

    The EER does not specifically address temporary, but multi-day or multi-year, anthropogenic emission sources such as construction projects. However, neither does the EER explicitly place a limit on the duration of a single event. A submitting agency could make a showing that a claimed event (e.g., a multi-year road construction project) is not likely to recur at the location in question. If the remaining exceptional event criteria and demonstration criteria are met, including the requirement that the event (including the emissions from the project) is not reasonably controllable, the activity might qualify as being an exceptional event.

    Air agencies not wishing to develop exceptional event demonstration packages for the described scenario can request agreement from the EPA regional office to relocate a monitor that no longer meets monitoring objectives. This process is, however, time consuming and resource intensive, so air agencies usually "monitor through" the disruption or ask their regional offices to support a temporary shut-down. When the EPA regional office approves a temporary shut-down, the operating air agency should assign a Null Data Code in AQS for "construction/repairs in area" (AC) to identify and invalidate data associated with periods of local construction.

16a. **Question:** Are policy relevant background (PRB) ozone concentrations and exceptional events related?

**Answer:** PRB ozone concentrations and exceptional events can include partially overlapping concepts. The 2007 Staff Paper[10] defines policy relevant background ozone "as the distribution of [ozone] concentrations that would be observed in the U.S. in the absence of anthropogenic (man-made) emissions of precursor emissions (e.g., VOC, NOx, and CO) in the U.S., Canada, and Mexico." In the current ozone review process, the EPA has more broadly considered background ozone by assessing three separate definitions of background: natural, North American, and U.S. background.[11] As before, each background is defined as the ozone that would be observed in the absence of specific categories of emissions. For example, North American background (NAB) is equivalent to PRB. An exceptional event is a natural event (excluding stagnations, inversions, high temperatures, or precipitation) or an anthropogenic event that is unlikely to recur in the same location. Both exceptional events and North American background can involve emissions from natural events like forest wildfires or stratospheric ozone intrusions. However, exceedances due to natural emissions that occur every day and contribute to policy relevant background, such as biogenic emissions, do not meet the definition of an exceptional event and are thus not eligible for exclusion under the EER. Routine anthropogenic emissions outside of the U.S. contribute to policy relevant background, but are not exceptional events. Air agency preparation of a demonstration package and the EPA's subsequent review of the demonstration package is case-by-case based on a weight-of-evidence approach and does not explicitly consider whether the event type might contribute to North American background, or any other background definition. However, if a natural event that contributes to background ozone causes an observed concentration that meets the statutory definition of an exceptional event and fulfills all of the exceptional event criteria, the EPA would consider the event to be an exceptional event.

17. **Question:** Volcanoes on Hawaii are causing 1-hour and 24-hour $SO_2$ exceedances, which are clearly volcanic exceptional events. Section 319 of the Clean Air Act and CFR require the EPA to provide air agencies with a method to flag and petition the EPA for exclusion of exceptional events data. When will the EPA provide the method for $SO_2$?

**Answer:** AQS has been modified to allow flags on all criteria pollutant data. The specific schedule for exceptional event flagging and documentation submission for data to be used in designations decisions is identified in the final primary $SO_2$ NAAQS rule

[10] Environmental Protection Agency, Review of the national ambient air quality standards for ozone: assessment of scientific and technical information. OAQPS staff paper. (Updated Final) July 2007. Research Triangle Park, NC: Office of Air Quality Planning and Standards. EPA-452/R-07-007, available online at: http://epa.gov/ttn/naaqs/standards/ozone/s_o3_cr_sp.html.

[11] Environmental Protection Agency, Integrated Science Assessment for Ozone and Related Photochemical Oxidants. (Third External Review Draft) June 2012. Research Triangle Park, NC: National Center for Environmental Assessment – RTP Division, Office of Research and Development. EPA-600/R-10-076C, available online at: http://cfpub.epa.gov/ncea/isa/recordisplay.cfm?deid=242490#Download.

(see preamble at 75 FR 35585-35586 and regulatory text at 75 FR 35592). The correct flag to use for a volcanic eruption event is "RS."

17a. **Question:** The EPA acknowledges that extreme exceptional events may justify more limited demonstration packages. How might the EPA decide whether to consider a particular high wind dust event "extreme" when reviewing a limited demonstration package?

**Answer:** While many dust storms could qualify as exceptional events, the EPA believes that most events that are conventionally referred to as "dust storms" should not be considered "extreme" events for this purpose. The National Weather Service (NWS) defines a "dust storm" as a severe weather condition characterized by strong winds and dust-filled air over an extensive area, but does not include any quantified criteria for the spatial extent or the concentration of the dust. In contrast, a haboob is of the magnitude that could be considered an extreme event. Haboobs are often caused by severe weather (e.g., severe thunderstorm activity, cold frontal passages) and are typically characterized as "solid walls" of dust that can rise up to 2,000 meters and travel hundreds of miles.

Generally, the EPA would consider sustained wind speed, spatial extent, visibility, and PM concentrations in determining whether an event is an extreme event. An example of an event that could be considered an exceptional event but not an extreme event would be the Santa Ana winds blowing at 25-30 mph, creating an exceedance at one monitor, with maximum hourly $PM_{10}$ levels of less than 800 $\mu g/m^3$. In contrast, a haboob that occurred in Phoenix in 2011 had downburst winds of 70 mph, with a wall of dust moving at 30-40 mph for 150 miles; hourly $PM_{10}$ levels of 50,000 $\mu g/m^3$ were monitored during this event. Both of these events could be considered for exclusion under the EER. The South Coast Air Quality Management District prepared a 49-page demonstration package (plus an appendix with additional supporting information) for the Santa Ana winds event, parts of which have been used as examples in the High Winds guidance document. However, the EPA anticipates that much more limited documentation for an event like the haboob would be sufficient to convince the EPA (and all other parties) that the event meets the several criteria for data exclusion (clear causal connection, not reasonably controllable or preventable, etc.).

18. **Question:** Carbon monoxide (CO) flags are in AQS for exceedances caused by fires, but the CO NAAQS (40 CFR 50.8) does not reference the Exceptional Event Rule. What is the EPA's approach for the treatment of CO data affected by exceptional events?

**Answer:** CO flagging, including the option for the EPA's concurrence, has been enabled in AQS. CO flags from structural fires and wildfires that qualify as exceptional events have been allowed in historic EPA guidance. The EER Preamble (72 FR 13563) explains the EPA's position with respect to exceptional event flagging for pollutants for which the statement of the NAAQS in 40 CFR part 50 does not explicitly reference the Exceptional Events Rule: "In the interim, where exceptional events result in exceedances or violations of NAAQS that do not currently provide for special treatment of the data, we intend to use our discretion as outlined under section 107(d)(3) not to redesignate affected areas as

nonattainment based on these events." Therefore, air agencies may flag CO data in AQS and the EPA may apply the same process and approval criteria as in the Exceptional Events Rule.

On August 12, 2011, the EPA issued a decision to retain the current suite of CO standards without revision (see 76 FR 54294). Because the EPA made no revisions to the CO standards, it promulgated no related changes to the Exceptional Events Rule.

19. **Question:** The limited maintenance plan requirements for $PM_{10}$ require a demonstration that the area design value is less than or equal to 98 $\mu g/m^3$. Flagging of values between 98 $\mu g/m^3$ and the NAAQS are therefore relevant for this regulatory decision. Can air agencies flag and request/receive the EPA's concurrence on these values, which are not exceedances and do not contribute to violations?

**Answer:** Yes. The May 7, 2009, memorandum from William T. Harnett to Regional Air Division Directors states the following regarding the $PM_{10}$ limited maintenance plan option: "In determining eligibility for the limited maintenance plan option, the EPA will treat 24-hour average air quality data between 98 $\mu g/m^3$ and 155 $\mu g/m^3$ in a manner analogous to the treatment of exceedance data under the Exceptional Events Rule, provided the impacted data meet the general definition and criteria for exceptional events (natural event, or exceptional event that is not reasonable controllable or expected to recur)." This memorandum is posted on the EPA website at http://www.epa.gov/ttn/oarpg/t1/memoranda/lmp_final_harnett.pdf

19a. **Question:** What does the EPA mean when we say we will review exceptional event demonstration submittals using a "weight-of-evidence" approach?

**Answer:** In using the term "weight-of-evidence," the EPA believes we should consider all relevant evidence and qualitatively "weigh" this evidence based on its relevance to the EER criterion being addressed, the degree of certainty, its persuasiveness, and other considerations appropriate to the individual pollutant and the nature and type of event.

20. **Question:** Exactly which section(s) of the preamble to the final Exceptional Event Rule has been declared a "legal nullity" by the court, and what does that mean?

**Answer:** In *NRDC v. EPA,* No. 07-1151 (D.C. Cir. 3/20/09), the DC Circuit Court states that

> "In one section of the preamble, EPA refers to its 'final rule concerning high wind events', which 'states that ambient particulate concentrations due to dust being raised by unusually high winds will be treated as due to uncontrollable natural events' when certain conditions apply (72 Fed. Reg. 13576). There is no such final rule. The final rule [language in 40 CFR 50 and 40 CFR 51.930] does not mention high wind events or anything about 'ambient particulate matter concentrations.' EPA calls this a drafting error. In light of the error, the high wind events section of the preamble is a legal nullity."

The EPA considers the "high wind events section of the preamble" to which the court referred to be the section titled "*B. High Wind Events*" beginning on 72 FR 13576. This does not necessarily mean that these passages do not reflect the EPA's interpretation of what might be appropriate under the EER. Rather, it means that implementing air agencies and other stakeholders should rely on other parts of the preamble and other EPA guidance instead of statements in these passages of the final rule preamble, which should be treated as not having been published.

20a. **Question:** What fire-related definitions should air agencies use in their exceptional event documentation?

**Answer:** Land Management Agencies modified their fire-related definitions after the EPA promulgated the Exceptional Events Rule. The EPA is using the following fire-related terminology in the interim exceptional events guidance documents to ensure consistency:

Prescribed fire - Any fire intentionally ignited by management under an approved plan to meet specific objectives.

Wildfire – Any fire started by an unplanned ignition caused by lightning; volcanoes; unauthorized activity; accidental, human-caused actions; and escaped prescribed fires.

20b. **Question:** How should air agencies support a claim that emissions from wildfires are "not reasonably controllable or preventable"?

**Answer:** The Clean Air Act and the EER apply the "not reasonably controllable or preventable" requirement to any event that an air agency wishes to be treated as an exceptional event, and thus it applies to wildfires. The current United States Forest Service (USFS) definitions of "wildfire" and "prescribed fire" define these events in terms of purpose and deliberateness of ignition (See definitions in response to Question 20a). Based on the USFS definitions, a wildfire is a fire that has started from an unintentional ignition or an unintentional escape of a prescribed fire. The initiation of a wildfire is thus by definition unplanned, but the concepts of reasonable prevention and control should not be overlooked in an exceptional event demonstration. The EPA recognizes that wildfires and emissions from wildfires are generally not reasonable to prevent or control.

When documenting the "not reasonably controllable or preventable" criterion in their wildfire exceptional event demonstration submittal, air agencies should identify the origin and evolution of the wildfire, describe local efforts to prevent fires due to unauthorized activity or accidental human-caused actions (if relevant given the origin of the fire)[12], and explain how any efforts to limit the duration or extent (and thus the

[12] Prevention/control efforts could include posting High Fire Danger signs to make people more careful and prevent accidental fires, and/or taking reasonable action to contain a fire once it has started.

emissions) from the wildfire were reasonable. During wildfires, fire management resources deployed to the fire event give first priority to protecting life and property. Because wildfires are, by definition, unplanned and unwanted, fire management resources often have limited advance notice of ignition and location, which generally limits preparation time and reasonable efforts to limit the duration or extent of a wildfire. In light of these considerations, the EPA believes that it will generally be sufficient for air agencies to provide a statement such as the following to document the "not reasonably controllable or preventable" criterion for wildfires: "Based on the documentation provided in [section X] of this submittal, [lightning] caused the unplanned, unwanted wildfire event. The responsible agencies did their reasonable best to control the extent of and extinguish the fire by taking the following actions [insert list or description of actions taken]. Therefore, emissions from this wildfire were 'not reasonably controllable or preventable.'" For fires that could have been suppressed or contained but which fire management officials allowed to burn for resource management purposes, air agencies can generally reference or paraphrase a previously adopted resource management plan to support the "not reasonably controllable or preventable" criterion.

21. **Question:** The Exceptional Event Rule allows for exclusion of data affected by a prescribed fire if the usual requirements of the rule are satisfied and if the air agency has adopted and is implementing a Smoke Management Program (SMP) or if the air agency has ensured that the burner employed basic smoke management practices. Are there minimum requirements for a Smoke Management Program? What are "basic smoke management practices?"

    **Answer:** The preamble to the Exceptional Events Rule at 72 FR 13567 describes an SMP as establishing a basic framework of procedures and requirements for managing smoke from a prescribed fire managed for resource benefits. Further, the EPA's "Report to Congress on Black Carbon"[13]describes the intent of SMPs as "mitigat[ing] the public health and welfare impacts from prescribed fires and promot[ing] communication and coordination of prescribed burning among land owners." The Report to Congress also states that basic smoke management practices could "…include, among other practices, steps to minimize air pollutant emissions during and after the burn, evaluate dispersion conditions to minimize exposure of sensitive populations, and identify procedures to ensure that burners are using basic smoke management practices." The EPA intends to develop separate guidance to address this issue, which will be issued at a later date following an opportunity for stakeholder input.

22. **Question:** Is there a tie between the requirements of 40 CFR 51.930 Mitigation of Exceptional Events and the EPA's approval for exclusion of data affected by an exceptional event?

[13] Report to Congress on Black Carbon, EPA-450/R-12-001, US EPA, March 2012, page 230. Available at http://www.epa.gov/blackcarbon/.

**Answer:** The EPA encourages the submittal of mitigation measures with the demonstration package, particularly for those events likely to recur. The Exceptional Events Rule was promulgated pursuant to Section 319 of the Clean Air Act which contains a provision that each air agency "must take necessary measures to safeguard public health regardless of the source of the air pollution..." This provision was the basis for the mitigation requirements in 40 CFR §51.930 and the requirement in the EER at 40 CFR §50.14(c)(1)(i) that all air agencies must "notify the public promptly whenever an event occurs or is reasonably anticipated to occur which may result in the exceedance of an applicable air quality standard." The language at 40 CFR §51.930 requires that:

> "(a) A State requesting to exclude air quality data due to exceptional events must take appropriate and reasonable actions to protect public health from exceedances or violations of the national ambient air quality standards. At a minimum, the State must:
>
> (1) Provide for prompt public notification whenever air quality concentrations exceed or are expected to exceed an applicable ambient air quality standard;
>
> (2) Provide for public education concerning actions that individuals may take to reduce exposures to unhealthy levels of air quality during and following an exceptional event; and
>
> (3) Provide for the implementation of appropriate measures to protect public health from exceedances or violations of ambient air quality standards caused by exceptional events."

Although the language at 40 CFR §51.930 does not require air agencies to prepare or submit a mitigation plan, it does require that air agencies develop and implement processes and measures that could easily become the elements of a formal, written plan. The mitigation criteria focus on specific measures and actions to protect public health, rather than on measures that control or prevent emissions associated with a specific event. So, a mitigation plan may include measures that apply to emissions sources in general (e.g., dust suppression or covering techniques for mineral processing) rather than those measures or controls that might be discussed in the "not reasonably controllable or preventable" portion of an event demonstration (e.g., controls/measures X, Y, and Z were in place on sources A, B, and C during the time of the event). A mitigation plan may also include procedures and responsibilities for public alerts and sheltering advisories. Because having a mitigation plan in place will help air agencies meet the EER requirements at 40 CFR §50.14(c)(1)(i) related to public notification more systematically, the EPA encourages the development and submittal of a mitigation plan with the demonstration package if one has not already been adopted.

23. **Question:** Need a state (or tribe) make an argument or submit evidence about control measures for events that took place in other states or countries, on federally-owned and managed land, or on tribal (or state) lands not subject to state (or tribal) regulation?

**Answer:** Under the Clean Air Act, the EPA generally considers a state (not including areas of Indian country) to be a single responsible actor. Accordingly, neither the EPA nor the Exceptional Events Rule provides special considerations for intrastate scenarios when an event in one county affects air quality in another county in the same state, assuming that the event occurs on land subject to state authority (versus tribal government authority). For cases involving intrastate transport, the state or local air agency should evaluate whether emissions from neighboring (or contributing) counties are not reasonably controllable or preventable. As discussed in greater detail in the overview guidance document and the interim High Winds Guidance document, the assessment of "not reasonably controllable or preventable" is based on the existing level of required control, attainment status, and, for high wind dust events, wind speed and other factors. States and tribes should consult with their EPA regional office early in the development of an exceptional event demonstration package if they believe that emissions from sources on federally-owned and managed land (e.g., national parks within the state) have been affected by an event in a way that raises issues of reasonable control.

Interstate and international transport events are different than intrastate events. The EPA believes that generally it is not reasonable to expect the downwind state (i.e., the state submitting the demonstration) to require the upwind country or state to have implemented controls on sources sufficient to limit event-related air concentrations in the downwind state. As with any demonstration submittal, the submitting (downwind) state should sufficiently identify all natural and anthropogenic contributing sources of emissions (both in-state and out-of-state) to show the causal connection between an event and the affected air concentration values. A submitting state may provide a less detailed characterization of sources in the upwind state or country than of sources within its jurisdiction. After completing the source characterization, the submitting state should assess whether emissions from sources within its jurisdiction (i.e., in-state sources) were not reasonably controllable or preventable. Although the submitting state should also provide available information on the status of control measures for emissions from out-of-state sources, the submitting state may determine based on available information that the "not reasonably controllable or preventable" criterion is satisfied in light of the state's inability to require controls of the upwind state. When assessing emissions transported from other states or countries, the submitting state can say that it characterized the out of state sources, determined that these sources contributed to the noted exceedance or violation, and determined, based on jurisdictional boundaries and other available information, that contributing emissions from the upwind state or country were not reasonably controllable or preventable. Submitting states are further required to submit evidence/statements supporting the other exceptional event criteria (i.e., clear causal relationship, but for, human activity unlikely to recur or a natural event, affects air quality, and historical fluctuations).

The EPA recommends a similar approach to significant out-of-state anthropogenic sources in the case of a mixed natural/anthropogenic event that the submitting state wishes to consider a natural event of the grounds that all significant anthropogenic sources were reasonably controlled.

As with all exceptional event demonstrations, the EPA will evaluate the information on a case-by-case basis based on the facts of a particular exceptional event including any information and arguments presented in public comments received by the state in its public comment process or by the EPA in a notice-and-comment regulatory action that depends on the data exclusion. This response is not intended to discourage states from working cooperatively to plan and apply controls on both sides of a state boundary for their mutual benefit.

In addition to the provisions in the EER, the Clean Air Act provides mechanisms in sections 110(a)(2)(D) and 126 to address interstate transport issues and mechanisms in section 179(b) to address international transport issues.

24. **Question:** Need an air agency make an argument or submit evidence about control measures for air quality impacts from wind-blown dust from desert land in its natural state?

    **Answer:** While the EPA's position is generally that impacts from wind-blown dust from undisturbed natural deserts are inherently not reasonable to control, the air agency would need to state this and provide appropriate supporting documentation in its demonstration package. The supporting documentation could include descriptions of the geographic area (with maps or available visuals) and a discussion of the historical land use, including prior disturbances, water diversions and other historical practices which may have occurred on the land, even if the land seems or is considered to be "undisturbed" at present. Submitting agencies should also identify all sources contributing to an event and identify appropriate control strategies for each anthropogenic source.

25. **Question:** Is there a template or example for preparing a demonstration document?

    **Answer:** The guidance document, "Interim Guidance on the Preparation of Demonstrations in Support of Requests to Exclude Ambient Air Quality Data Affected by High Winds Under the Exceptional Event Rule" (the High Winds guidance document) provides this type of advice for demonstrations for high wind dust events. While the High Winds guidance document speaks specifically to high wind dust events, the EPA believes that many of the principles discussed therein to extend to all types of exceptional events. The EPA has also developed a presentation entitled, "Presenting Evidence to Justify Data Exclusion as an Exceptional Event: Ideas based on how the EPA has recently documented events to support regulatory decisions." Interested parties can download this presentation from the following site: http://www.epa.gov/ttn/analysis/docs/IdeasforShowingEEEvidence.ppt. Additionally, the EPA is currently developing separate guidance to address the preparation of demonstrations to support wildfire-related ozone event claims.

26. **Question:** Where can an air agency find examples of demonstrations from other air agencies that have been approved by the EPA?

**Answer:** The EPA has posted examples of approved demonstrations at http://www.epa.gov/ttn/analysis/exevents.htm.

27. **Question:** How quickly will the EPA review the demonstration document and provide feedback to the air agency on the approval, or on any suggested improvements?

**Answer:** The EPA generally intends to conduct its initial review of a submitted exceptional event demonstration package within 120 days of receipt. Following this initial review, the EPA will generally send a letter to the submitting agency that includes a completeness determination and/or a request for additional information, a date by which the supplemental information should be submitted (if applicable)[14], and an indicator of the timing of the EPA's final review. The EPA will generally prioritize exceptional event determinations that affect near-term regulatory decisions.[15]

To promote early communication, the EPA suggests that air agencies provide a letter of intent to submit a demonstration package for flagged data in AQS as soon as possible, if possible within 12 months from the event occurrence, after the agency identifies the event(s) as being significant. A letter of intent is an *option* for the air agency to use in situations where it may help communication and prioritization.[16] This initial notification can assist both the air agency and the EPA in the planning and prioritization process. The EPA intends to respond to such a letter within 60 days of receipt. The EPA response will provide the regional office's best assessment of the priority that can be given to the submission once received and any case-specific advice the EPA may have to offer for the preparation of the demonstration.

The EPA intends to make a decision regarding concurrence with an air agency's flag as expeditiously as necessary if required by a near-term regulatory action, but no later than 18 months following submittal of a complete package. The EPA intends to communicate with the submitting agency, as needed, during the demonstration review period.

Submitting air agencies that believe their demonstration packages are tied to near-term regulatory actions should submit their demonstration packages well in advance of the regulatory deadline. Air agencies should also identify the relationship between the exceptional event-related flagged data and the anticipated regulatory action in the cover letter that accompanies their initial submittal package to the reviewing EPA regional office.

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[14] The EPA will generally ask that air agencies provide supplemental information within 60 days from receipt of the letter from the EPA. The EPA recognizes that air agencies may need more than 60 days to prepare and submit some types of supplemental information. The EPA is willing to work with agencies on supplemental timeframes; however, the mandatory timing of the EPA's actions may limit the response time the EPA allows.
[15] "Regulatory decisions" include findings as to whether the area has met the applicable NAAQS, classification determinations, attainment demonstrations, the development of Limited Maintenance Plans, clean data findings.
[16] The Letter of Intent is an optional step and the EPA recognizes that air agencies may need additional time to prepare and submit demonstration packages particularly where the basis of the exclusion is violating an annual standard or a 3-year design value. Similarly, an air agency could consider submitting an annual letter of intent if annual submittal makes sense for resource planning or for historically seasonal events.

28. **Question:** Will the EPA ever perform and consider additional data analysis itself before deciding whether to approve an air agency-submitted demonstration in support of data exclusion?

**Answer:** In general, the EPA does not prepare analyses or additional arguments for inclusion in a submitted demonstration package or to support the EPA's concurrence on a demonstration package. Rather, the EPA will recommend demonstration package improvements to the submitting agency. However, if a demonstration package is associated with an imminent regulatory action and the public interest will be best served by the EPA's preparing and/or considering additional analyses, the EPA may either assist with or independently prepare supporting analyses that could become part of the submission package or an EPA-prepared technical support document. Analyses prepared by the EPA could support either approval or disapproval of an air agency's request for concurrence on flagged data.

28a. **Question:** Does the Exceptional Events Rule contain a dispute resolution process that air agencies can use to resolve disagreements regarding non-concurrence on submittal packages?

**Answer:** Several mechanisms currently exist that air agencies can use at various points in the exceptional events process:

- Engage in early dialogue with the appropriate EPA regional office.
- Submit requests for reconsideration to the official who made the determination if a request identifies a clear error or if information submitted by the agency was overlooked
- Elevate the concern within the EPA's chain of command.
- Participate in the public notice and comment process (see Question 14a).
- Challenge in an appropriate court the regulatory decision subsequently made that is based on the EPA's exceptional event determination.

In addition, for complex exceptional events claims or those with significant regulatory or other impacts (e.g., those claims that directly influence proposed designation or redesignation, classifications, and attainment determinations), the EPA regional office staff will generally seek input from other EPA regional offices and/or the EPA headquarters staff.

28b. **Question:** Can air agencies use data from non-regulatory monitors in exceptional events analyses?

**Answer:** Yes, air agencies can use data from non-regulatory monitors to support their exceptional event demonstrations. Generally, monitoring data used for NAAQS regulatory purposes are collected from Federal Reference Method (FRM), Federal Equivalent Method (FEM), and/or Approved Regional Method (ARM) monitors that are sited and operated in accordance with 40 CFR Part 58. Exceedances or violations

identified as exceptional events originate from these same data from FRM/FEM/ARM monitors. The AQS, the EPA's repository of ambient air quality data, stores data from more than 10,000 monitors, about 5,000 of which are currently active. Although not all of these monitors are FRM/FEM/ARM-approved, data from non-FRM/FEM/ARM monitors can be used in exceptional event analyses. For example, air quality data summaries from non-FRM/ FEM/ARM monitors may be helpful in defining the duration and geographic extent of the event, including the area of exceedance/violation and the area containing sources that contribute to the exceedances/violations. Similarly, chemical speciation data from monitor samples can help characterize the nature of the violation and identify contributing emissions sources.

## F. Exceptional Event Data Flagging for Air Quality Concentrations that Could Contribute to an Exceedance or Violation of the National Ambient Air Quality Standards

29. **Question:** Each criteria pollutant except $PM_{10}$ now has multiple NAAQS in effect that differ by averaging period, and/or there is an "original" and a lower "revised" NAAQS level each of which has regulatory significance. If the EPA approves a measurement value for exclusion for one particular NAAQS averaging period and level, does the EPA automatically exclude the same value for all the other NAAQS for that pollutant?

    **Answer:** No. Air agencies should request and support the exclusion of a measured air concentration separately for each NAAQS that applies to the pollutant. The EPA will similarly provide separate concurrences.

    When initially flagging data, an air agency does not need to identify the specific NAAQS for which it seeks to exclude a measured concentration. The EPA's ambient air quality database, AQS, is designed to allow an air agency to apply a single flag to a measured concentration value, which merely indicates the agency's interest in excluding that value with respect to one or more of the applicable NAAQS. Later, in the request for data exclusion (i.e., the demonstration), the air agency can indicate the specific NAAQS for which it seeks exclusion and for which the demonstration addresses the Exceptional Events Rule criteria. When the EPA makes a decision regarding concurrence with an air agency's flag, it will generally identify in its approval/disapproval letter (or other official notice) all of the NAAQS for which the EPA has concurred on the flag. The EPA will also generally set a flag in AQS indicating concurrence with respect to a specific single NAAQS or a specific combination of NAAQS for that pollutant (e.g., in the case of $PM_{2.5}$, the 24-hour NAAQS only, the annual NAAQS only, or both the 24-hour and the annual average NAAQS). The EPA does this by associating one or more "pollutant standard ID" value with the concurrence.

    Air agencies preparing demonstrations to support requests to exclude 24-hour average values for $PM_{2.5}$ and $PM_{10}$ should flag all 24 1-hour values within a given day. If concurred upon, flagging all 1-hour values will ultimately result in the same available remaining data for regulatory analysis and calculation regardless of whether the 24-hour $PM_{2.5}$ or $PM_{10}$ measurement data are collected from filter-based or continuous monitoring

instruments.[17] The EPA believes flagging all 24 hourly values is appropriate because flagging only peak or selected hours could result in the remaining hourly values still meeting the data completeness requirements. Exclusion of only the high hourly concentrations could result in AQS calculating a valid low (or, potentially high) biased 24-hour concentration under the rules for data interpretation.[18]

The EPA concurrence flags entered into AQS prior to the March 2010 re-engineering of AQS to accommodate the Exceptional Events Rule did not indicate the specific single NAAQS or the specific combination of NAAQS for which the exclusion was approved. These "legacy" concurrence flags have been converted to the new approach using the following defaulting scheme:

- For ozone, all legacy flags were treated as applying to both the 0.08 ppm 8-hour NAAQS and the 0.12 ppm 1-hour NAAQS. This default was chosen because as of March 2010, designations under the 2008 NAAQS of 0.075 ppm had been suspended pending reconsideration of that NAAQS, and AQS staff were not aware of any concurrences already granted with respect to the 0.075 ppm NAAQS.
- For $PM_{2.5}$, all concurrences on events with dates prior to January 1, 2005 (meaning the date of the concentration, not the date of the EPA's concurrence) were presumed to be applicable only to the annual $PM_{2.5}$ NAAQS. This default was chosen because prior to the revision of the 24-hour $PM_{2.5}$ NAAQS in 2006, violations of the 1997 24-hour NAAQS were extremely rare.
- For $PM_{2.5}$, all concurrences on events with dates of January 1, 2005 through March 2010 were presumed to be applicable only to the 24-hour NAAQS because there were no revisions to the annual $PM_{2.5}$ NAAQS during this timeframe, so designations to nonattainment for the annual $PM_{2.5}$ standard were extremely rare. This 24-hour $PM_{2.5}$ NAAQS default was chosen because it was possible for designations under the 2008 24-hour NAAQS to be based on data as early as 2005.
- For $PM_{10}$, all concurrences were presumed to apply to the 24-hour NAAQS, as the annual $PM_{10}$ NAAQS was revoked in 2006.[19]

[17] Filter based instruments typically record a single value within a 24-hour period while continuous monitors typically collect 24 1-hour measurements. Because AQS can calculate a valid 24-hour average concentration with as few as 18 hours, it may be necessary to exclude hours not actually affected by the event to ensure the same data exclusion outcome as if the measurement had been made with a 24-hour filter.

[18] The form of the 24-hour $PM_{2.5}$ NAAQS of 35 $\mu g/m^3$ is $98^{th}$ percentile averaged over 3 years. The form of the primary annual $PM_{2.5}$ NAAQS of 12 $\mu g/m^3$ is an annual mean averaged over 3 years. The form of the 24-hour $PM_{10}$ NAAQS of 150 $\mu g/m^3$ is not to be exceeded more than once per year on average over 3 years. Biased concentrations can potentially skew the determination of the $98^{th}$ percentile and/or the annual mean for $PM_{2.5}$ and the averages for $PM_{2.5}$ or $PM_{10}$ calculated to determine compliance with the relevant NAAQS.

[19] The EPA realizes that many of the defaulted EPA concurrences for pre-2006 $PM_{10}$ concentrations that were below the level of the 24-hour $PM_{10}$ NAAQS actually were applicable to the annual $PM_{10}$ NAAQS, but this approach was the most practical way to ensure that all other concurrences originally intended to be applicable to the 24-hour NAAQS were preserved. Because concentrations below the level of the 24-hour NAAQS have no effect on attainment determinations for the 24-hour NAAQS, no error can come from treating such values as

- For CO, all concurrences were presumed to apply to both the 1-hour and the 8-hour NAAQS. This default was chosen to ensure that the concurrence applied to whichever NAAQS had been exceeded and was the basis for the exclusion request.
- For $SO_2$, all concurrences were presumed to apply to both the 24-hour and the annual NAAQS. This default was chosen to ensure that the concurrence applied to whichever NAAQS had been exceeded and was the basis for the exclusion request. No flags were assumed to apply to the 1-hour NAAQS because the 1-hour $SO_2$ standard was not promulgated until June of 2010, after the AQS re-engineering.
- For Pb, all concurrences (if any existed) were presumed to apply to the quarterly average NAAQS of 1.5 $\mu g/m^3$. This default was chosen because March 2010 was prior to the EPA issuing final designations under the 2008 Pb NAAQS of 0.15 $\mu g/m^3$.
- For $NO_2$, all concurrences were presumed to apply to the annual NAAQS because the 1-hour NO2 standard was not promulgated until February of 2010.

For concurrences on events with dates after the March 2010 re-engineering of AQS, the EPA will specify the NAAQS to which the concurrence applies. If this defaulting scheme does not properly represent the actual concurrence action that was taken by the EPA regional office, the regional office should revise and correct the concurrence flags, if it has not already done so.

Air agencies can find detailed information on the use of events flags in AQS in a tutorial posted at http://www.epa.gov/ttn/airs/airsaqs/manuals/ExceptionalEventTutorial.pdf. The tutorial discusses concurrence flags on page 20.

30. **Question:** For a NAAQS that is defined for a multi-hour or multi-day averaging time, but for which concentrations are measured, reported, and flagged on the basis of a shorter time period, what comparisons between measurements and the NAAQS level should air agencies prepare to satisfy the "but for" test?

**Answer:** One requirement for data exclusion under the Exceptional Events Rule is that there would have been no exceedance or violation of the NAAQS "but for" the event. In AQS, flagging and concurrence are done for each individual reported measurement. When the averaging period for the NAAQS is the same as the measurement duration period, individual measurements that have event flags attached can be compared directly to the level of the NAAQS. This is the case for the 1-hour ozone, 1-hour CO, 1-hour $SO_2$, and 1-hour $NO_2$ NAAQS. This is also the case when 24-hour filter-based $PM_{10}$ or $PM_{2.5}$ concentrations are compared to the respective 24-hour NAAQS.[20] However, a difference

having been concurred. Nevertheless, the EPA regional office may choose to update these concurrence flags as time permits.

[20] Air agencies have for many years reported $SO_2$ concentrations as hourly averages. While some air agencies have also voluntarily reported 5-minute average concentrations also, either for each of the 12 5-minute blocks in an hour or for the maximum 5-minute average concentrations (block or running) during an hour, it is the hourly concentration averages that should be compared to the 1-hour $SO_2$ NAAQS. Under a change in $SO_2$ monitoring

exists for the following NAAQS between the time period for reporting concentrations and the averaging period to which the level of a NAAQS applies.

- Ozone, CO, $NO_2$, and $SO_2$ are reported to AQS as 1-hour measurements, but all three have NAAQS defined for longer averaging periods (3-hours, 8-hours, 24-hours, and/or annual). The longer-period concentration values that are compared to these NAAQS are calculated from the submitted hourly values within AQS and cannot have event flags attached to them.
- Pb is reported as 24-hour measurements, but the old and new NAAQS are both for three-month averages (quarterly averages and 3-month rolling averages, respectively). The quarterly and 3-month concentration values that are compared to these NAAQS are calculated from the submitted 24-hour measurements within AQS and cannot have event flags attached to them.
- When using automated/continuous monitoring equipment, $PM_{2.5}$ and $PM_{10}$ data are reported as 1-hour measurements but there are $PM_{2.5}$ and $PM_{10}$ NAAQS with 24-hour averaging periods and a $PM_{2.5}$ NAAQS with an annual averaging period. The 24-hour and annual values compared to the NAAQS are calculated within AQS and cannot have event flags attached to them. As described in more detail in the response to Question 29, to ensure the same data exclusion outcome regardless of whether $PM_{2.5}$ and $PM_{10}$ measurements are made with filter-based or continuous monitoring equipment, the EPA intends to exclude all 24 1-hour measurements in a given day whenever the "but for" criterion (and other exceptional event criterion) are satisfied for that day even if an event only affected discrete hours of the day. The EPA will be able to do this only if the air agency has applied "R" flags to each of those hours.[21]
- When using filter-based monitoring equipment, $PM_{2.5}$ and $PM_{10}$ are reported as 24-hour measurements but there is a $PM_{2.5}$ NAAQS with an annual averaging period. The annual values used in comparisons the NAAQS are calculated within AQS and cannot have event flags attached to them.

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requirements that accompanied the promulgation of the 1-hour $SO_2$ NAAQS, the EPA now requires that air agencies report the maximum 5-minute block average concentration, as well as the hourly concentration (see 40 CFR § 58.12(g)). Air agencies may satisfy the 5-minute reporting requirement by submitting all twelve 5-minute block averages or by reporting only the maximum 5-minute block average concentration. The EPA's AQS retains the hourly concentration as submitted; AQS does not use 5-minute data to replace the submitted hourly concentration. While 5-minute concentrations may play a role in evaluating whether Exceptional Event criteria are satisfied for a given hour and event, for example to establish a clear causal connection, they are not to be compared to the level of the 1-hour (or any other) NAAQS for $SO_2$ as part of a "but for" demonstration and should not be flagged for exclusion under the EER. Air agencies may, however, use "I" series flags (Information only) with 5-minute $SO_2$ data.

[21] Because AQS can calculate a valid 24-hour average concentration with as few as 18 hours, it may be necessary to exclude hours not actually affected by the event to ensure the same data exclusion outcome as if the measurement had been made with a 24-hour filter. Exclusion of only the high hourly concentrations could result in AQS calculating a valid low (or, potentially high) biased 24-hour concentration under the rules for data interpretation.

The mismatches of time periods make this a question with a complex answer. The following paragraphs, summarized in Table Q30-1, explain the general rationale behind the pollutant and NAAQS-specific entries in Table Q30-2.

To satisfy the "but for" criterion, there must have actually been an exceedance or violation of the NAAQS in a time period overlapping with the event and its effects on air quality, and which would not have occurred "but for" the effects of the event.[22] By definition, an exceedance necessarily involves a comparison between an air concentration, averaged over a time period equal in length to the averaging time of the NAAQS, and the level of the NAAQS. For example, it does not make sense to compare an individual 1-hour ozone concentration to the level of the 8-hour NAAQS as part of a test of whether the "but for" criterion is met, because the outcome of the comparison for a single hour does not indicate whether an exceedance or violation of the 8-hour NAAQS occurred, or whether it would not have occurred "but for" the event. Instead, air agencies should consider whether the event made a "but for" difference in the average concentration over the period that is the same as the averaging period for the NAAQS. That is, air agencies making a "but for" argument should compare the average concentration, rather than the individual concentrations comprising the average, to the identified NAAQS.[23] Air agencies should, however, identify in their exceptional event submission those particular measurements that caused the elevated average.

The preamble to the Exceptional Events Rule provides one exception from this formal definitional approach. The preamble states that in the particular case of $PM_{2.5}$, the direct comparison of a single 24-hour average concentration (determined from a single filter-based measurement or by averaging 24 1-hour measurements from a continuous equivalent instrument) to the level of the annual NAAQS can be the basis for meeting the

[22] The EPA interprets the Exceptional Event Rule and its preamble to mean "exceedance or violation" each time that "exceedance" or "violation" occurs in the text, consistent with the obvious intent of the Clean Air Act amendment requiring the EPA to promulgate the Rule. An "exceedance" occurs each time the concentration in the air for the averaging period applicable to the NAAQS is higher than the level of the NAAQS. Most NAAQS allow some such occurrences in a 1-year or 3-year time period (depending on the NAAQS). A "violation" of the NAAQS occurs when there have been enough high-concentration episodes that the statistical form of the particular NAAQS indicates a failure to meet the NAAQS.

[23] A scenario could exist in which the effect of an event on one or more 24-hour $PM_{2.5}$ concentration creates a "but for" difference on the annual concentration even though the actual 24-hour concentration(s) on the day(s) of the event was below the level of the annual NAAQS. This implies that the EPA could concur with the exclusion request for the 24-hour concentration value. However, the Exceptional Events Rule preamble makes clear that only 24-hour $PM_{2.5}$ concentrations that are above the level of the annual NAAQS maybe excluded. Similarly, the EPA generally does not intend to concur with respect to any NAAQS on a flag for a 1-hour $NO_2$ and $SO_2$ concentration that is below the level of the respective annual NAAQS, regardless of the outcome of "but for" tests based on comparison of 24-hour or annual average concentrations to their same-period NAAQS. Also, the EPA generally does not intend to concur on flags for a 24-hour Pb measurement below the level of the old (fixed quarterly average) Pb NAAQS or the new (rolling 3-month average) Pb NAAQS. The EPA believes that it is generally appropriate to use the similar restriction for $PM_{2.5}$ stated and explained in the preamble to the Exceptional Event Rule. Moreover, it is highly unlikely that even several hourly concentrations below the level of the annual $NO_2$ NAAQS of 53 ppb could include an event contribution that when summed with all other hourly concentrations and then divided by 8760 (24 hours times 365 days), could result in the annual average $NO_2$ concentration crossing from below the level of the annual NAAQS to above the level of the annual NAAQS.

"but for" criterion for exceedances or violations of the annual NAAQS.[24] In context, it is clear that based on this comparison, a 24-hour concentration can be excluded from the calculation of the annual $PM_{2.5}$ NAAQS design value, if other rule criteria are also met. It is therefore not necessary to show that the annual average $PM_{2.5}$ concentration was above 12 or 15 $\mu g/m^3$ with the event and would have been below 12 or 15 $\mu g/m^3$ "but for" the single event at issue. Such a concentration can also be excluded from the calculation of the design value for the 24-hour $PM_{2.5}$ NAAQS, although this is likely to make a difference to meeting the NAAQS only if the actual measured concentration were close to or above 35 $\mu g/m^3$. This special case is reflected in Table Q30-2.

In light of this departure in the preamble from a formal definitional approach in the case of a 24-hour $PM_{2.5}$ measurement and the annual $PM_{2.5}$ NAAQS, Table Q30-2 also provides a parallel special approach for similar comparisons involving Pb, $NO_2$ and $SO_2$ that the EPA generally intends to apply. The EPA believes applying this interpretation for Pb, $NO_2$, and $SO_2$ is consistent with the interpretation in the preamble for $PM_{2.5}$ and is consistent with the EPA's intent in drafting the Exceptional Events Rule. That is, a 24-hour average concentration of Pb, $NO_2$, or $SO_2$ can be compared to the NAAQS level defined for a longer period, for purposes of meeting "but for" with respect to both the 24-hour NAAQS, if applicable, and the NAAQS with the longer averaging period.

**Table Q30-1. Principles for General Approach to Satisfying the "But For" Test**
Note: The principles identified in this table are presented from the more general and/or self-evident to the more specialized and/or derivative.

| | Principle | Application to Specific NAAQS | Exceptions |
|---|---|---|---|
| 1 | A single measurement may be compared directly to the level of the NAAQS if the averaging times are the same. | • 1-hour NAAQS for CO, $SO_2$, $NO_2$, and ozone.<br>• 24-hour filter-based $PM_{2.5}$ or $PM_{10}$ measurements vs. 24-hour NAAQS. | |

[24] When the EPA promulgated the Exceptional Events Rule in 2007, the level of the annual $PM_{2.5}$ NAAQS was 15 $\mu g/m^3$. On December 14, 2012, the EPA promulgated a revised annual $PM_{2.5}$ NAAQS of 12 $\mu g/m^3$ (78 FR 3086). Because both standards apply, an air agency can choose the appropriate level of the annual NAAQS (i.e., either 12 $\mu g/m^3$ or 15 $\mu g/m^3$) as the basis for meeting the "but for" criterion. For example, an air agency developing an exceptional events demonstration package that may influence an attainment demonstration for the annual $PM_{2.5}$ NAAQS of 15 $\mu g/m^3$ would likely use 15 $\mu g/m^3$ as the basis for meeting the "but for" criterion while an air agency preparing a demonstration package that may influence initial area designation status for the 2012 annual $PM_{2.5}$ NAAQS of 12 $\mu g/m^3$ would likely use 12 $\mu g/m^3$ as the basis for meeting the "but for" criterion.

| | Principle | Application to Specific NAAQS | Exceptions |
|---|---|---|---|
| 2 | When the measurement time is shorter than the averaging time of the NAAQS (e.g., 1-hour $O_3$ measurements and the 8-hour $O_3$ NAAQS), air agencies can compare the average of the multiple measurements within the averaging period of the NAAQS to the level of the NAAQS (e.g., compare the average of eight 1-hour measurements to the 8-hour NAAQS). If this comparison shows that the average is more than the NAAQS but would have been below the NAAQS in the absence of the event, then the "but for" test will have been met for those individual measurements in the longer averaging period that were affected by the event. Air agencies should, however, identify in their exceptional event submission those particular measurements that caused the elevated average. | • 1-hour ozone measurements vs. 8-hour NAAQS.<br>• 1-hour CO measurements vs. 8-hour NAAQS.<br>• 1-hour $SO_2$ measurements vs. 3-hour, 24-hour, and annual NAAQS.<br>• 1-hour $NO_2$ measurements vs. annual average .NAAQS.<br>• 1-hour $PM_{2.5}$ measurements vs. 24-hour and annual average NAAQS.<br>• 1-hour $PM_{10}$ measurements vs. 24-hour average NAAQS.<br>• 24-hour $PM_{2.5}$ measurements vs. annual average NAAQS.<br>• 24-hour Pb measurements vs. quarterly average NAAQS.<br>• 24-hour Pb measurements vs. rolling 3-month average NAAQS. | If a measurement value is below the level of the quarterly, rolling 3-month, or annual average NAAQS, it generally will not be considered for exclusion regardless of the outcome of comparing the longer period average to the NAAQS level. |
| 3 | When the $PM_{2.5}$ or Pb measurement time is 24 hours (and when hourly $PM_{2.5}$ measurements are used to calculate a 24-hour concentration), it is also permitted to compare the 24-hour concentration to the annual average $PM_{2.5}$ NAAQS or the quarterly or rolling 3-month Pb NAAQS. | • 24-hour $PM_{2.5}$ concentrations vs. the annual average NAAQS (expressly permitted in the preamble to the Exceptional Events Rule).<br>• 24-hour Pb filter measurements vs. the quarterly average and rolling 3-month average NAAQS (suggested by this guidance as a consistent with the intent of the $PM_{2.5}$ provision in the preamble). | |
| 4 | 1-hour $SO_2$ measurements may be averaged to 24-hour periods and then compared to the annual average NAAQS. If the "but for" test is supported by this comparison, the showing supports a "but for" finding with respect to the 24-hour NAAQS for those individual 1-hour measurements in the 24-hour averaging period that were affected by the event. | • A comparison of 1-hour $SO_2$ measurements vs. the annual average NAAQS (where the 30 ppb annual $SO_2$ NAAQS still applies) is recommended in this guidance to create a reasonable benchmark for judging the excludability of 1-hour $SO_2$ measurements for the purpose of the annual NAAQS, for cases when the event did not affect the annual average enough to make a "but for" difference relative to the annual average NAAQS. | |
| 5 | When there is no NAAQS for the 24-hour averaging period, 1-hour measurements may be compared directly to the annual NAAQS. | • A comparison of 1-hour $NO_2$ measurements vs. annual average NAAQS is recommended in this guidance to create a reasonable | |

| | Principle | Application to Specific NAAQS | Exceptions |
|---|---|---|---|
| | | benchmark for judging the excludability of 1-hour $NO_2$ measurements for the purpose of the annual NAAQS, for cases when the event did not affect the annual average enough to make a "but for" difference relative to the annual average NAAQS. | |
| 6 | Otherwise, single 1-hour measurements generally may not be compared to the level of the annual average NAAQS. | • Single 1-hour $SO_2$ measurements generally may not be compared the annual average NAAQS (because there is a 24-hour NAAQS for $SO_2$ with a defined averaging methodology).<br>• Single 1-hour $PM_{2.5}$ measurements generally may not be compared to the annual average NAAQS (because there is a 24-hour NAAQS for $PM_{2.5}$ with a defined averaging methodology). | |

Table Q30-2 identifies the comparisons and conclusions that generally would help satisfy the "no exceedance but for" test for each pollutant, for each current NAAQS. Note that for completeness Table Q30-2 addresses some situations that may be very unlikely to actually occur – for example, that a single event might cause an exceedance of the annual average $NO_2$ NAAQS. Also, note that Table Q30-2 addresses only the "no exceedance but for" question. As indicated in the answer to Question 31, even if an event cannot be demonstrated to make a "but for" difference in whether an exceedance occurred, it is possible that it makes a "but for" difference in whether a 3-year violation of the NAAQS occurred, for the NAAQS that are defined based on a 3-year average design value concentration. The logic behind Table Q30-2 applies to a "no violation but for" test also. Air agencies may request assistance from the EPA regional office on applying this logic when performing a "no violation but for" test.

**Table Q30-2. General Approaches for Satisfying the "No Exceedance But For" Test**

| | Pollutant | Specific Case:<br>NAAQS level<br>NAAQS averaging period<br>Measurement period | General Approach |
|---|---|---|---|
| 1 | Ozone | 0.12 ppm<br>1-hour averaging period<br>1-hour measurement | • If a 1-hour measured concentration was above 0.124 ppm but would have been 0.124 ppm or less in the absence of the event, the 1-hour ozone concentration value meets the "but for" test for purposes of comparison to the 1-hour NAAQS. If other criteria are also met for that hour (e.g., there was a clear causal relationship between the event and that hour's ozone level, among other criteria), then the hour can be flagged and concurred for exclusion. |
| 2 | Ozone | 0.08 ppm<br>8-hour averaging period<br>1-hour measurement | • If the daily maximum 8-hour average of measured concentrations was above 0.084 ppm but would have been 0.084 ppm or less in the absence of the event, those 1-hour concentration values that were affected by the single event meet the "but for" test for purposes of comparison to the 0.08 ppm 8-hour ozone NAAQS.<br><br>The exclusion of some or all hours of the 8-hour period that was originally the daily maximum 8-hour period may cause another 8-hour period to become the daily maximum. The "but for" comparison can be repeated for this new 8-hour period, which may result in flagging and concurrence for more 1-hour values. It is also possible for additional hourly concentrations that were not included in the original 8-hour block to be excluded as part of a second 8-hour block. |
| 3 | Ozone | 0.075 ppm<br>8-hour averaging period<br>1-hour measurement | • If the daily maximum 8-hour average of measured concentrations was above 0.075 ppm but would have been 0.075 ppm or less in the absence of the event, those 1-hour concentration values that were affected by the single event meet the "but for" test for purposes of comparison to the 0.075 ppm 8-hour ozone NAAQS.<br><br>The exclusion of some or all hours of the 8-hour period that was originally the daily maximum 8-hour period may cause another 8-hour period to become the daily maximum. The "but for" comparison can be repeated for this new 8-hour period, which may result in flagging and concurrence for more 1-hour values. It is also possible for additional hourly concentrations that were not included in the original 8-hour block to be excluded as part of a second 8-hour block. |

**Table Q30-2. General Approaches for Satisfying the "No Exceedance But For" Test**

| | Pollutant | Specific Case:<br>NAAQS level<br>NAAQS averaging period<br>Measurement period | General Approach |
|---|---|---|---|
| 4 | $PM_{2.5}$ | 35 µg/m$^3$<br>24-hour averaging period<br>1-hour measurement<br><br>(Note: Air agencies can use either 15.0 µg/m$^3$ or 12.0 µg/m$^3$ as a basis for comparison.) | • If the 24-hour average concentration based on 1-hour measurements was above 35.4 µg/m$^3$ (after truncating after the first decimal digit, per 40 CFR 50 Appendix N section 3.0(c)) but would have been 35.4 µg/m$^3$ or less in the absence of the event, those 1-hour concentration values that were affected by the single event meet the "but for" test for purposes of comparison to the 35 µg/m$^3$ 24-hour $PM_{2.5}$ NAAQS.<br>• Also, if the 24-hour average concentration based on 1-hour measurements was above 12.0 / 15.0 µg/m$^3$ (after truncation after the first decimal digit) but would have been 12.0 / 15.0 µg/m$^3$ or less in the absence of the event, those 1-hour concentration values that were affected by the single event are eligible to be considered for exclusion for purposes of comparison to the 35 µg/m$^3$ 24-hour $PM_{2.5}$ NAAQS. |
| 5 | $PM_{2.5}$ | 12.0 µg/m$^3$<br>Annual averaging period<br>1-hour measurement<br><br>(Note: Air agencies preparing demonstrations involving PM concentrations for comparison against the 1997 annual $PM_{2.5}$ standard of 15.0 µg/m$^3$ should substitute 12.0 µg/m$^3$ with 15.0 µg/m$^3$ in the "General Approach" steps in the next column.) | • If the annual average $PM_{2.5}$ concentration was above 12.0 µg/m$^3$ but would have been equal to or less than 12.0 µg/m$^3$ (after rounding to one decimal digit) in the absence of the single event's effect on one or more hours, those 1-hour concentration values that were affected by the single event meet the "but for" test for purposes of comparison to 12 µg/m$^3$ annual $PM_{2.5}$ NAAQS.<br>• Also, if the 24-hour average concentration based on 1-hour measurements was above 12.0 µg/m$^3$ (after rounding to one decimal digit, per 40 CFR 50 Appendix N section 4.3(a)) but would have been equal to or less than 12.0 µg/m$^3$in the absence of the event, those 1-hour concentration values that were affected by the single event meet the "but for" test for purposes of comparison to 12 µg/m$^3$ annual $PM_{2.5}$ NAAQS.<br><br>However, an hourly value must be part of a 24-hour average concentration that is above 12 µg/m$^3$ (after rounding to one decimal digit) to be excluded from an annual NAAQS calculation. |

**Table Q30-2. General Approaches for Satisfying the "No Exceedance But For" Test**

| | Pollutant | Specific Case:<br>NAAQS level<br>NAAQS averaging period<br>Measurement period | General Approach |
|---|---|---|---|
| 6 | $PM_{2.5}$ | 35 $\mu g/m^3$<br>24-hour averaging period<br>24-hour measurement<br><br>(Note: Air agencies can use either 15.0 $\mu g/m^3$ or 12.0 $\mu g/m^3$ as a basis for comparison.) | • If the 24-hour average concentration was above 35.4 $\mu g/m^3$ (after truncating after the first decimal digit, per 40 CFR 50 Appendix N section 3.0(b)) but would have been 35.4 $\mu g/m^3$ or less in the absence of the event, the 24-hr concentration value meets the "but for" test for purposes of comparison to 35 $\mu g/m^3$ 24-hour $PM_{2.5}$ NAAQS.<br>• Also, if the 24-hour average concentration was above 12.0 / 15.0 $\mu g/m^3$ (after truncating after the first decimal digit, per 40 CFR 50 Appendix N section 3.0(b)) but would have been 12.0 / 15.0 $\mu g/m^3$ or less in the absence of the event, the 24 average concentration meets the "but for" test for purposes of comparison to 35 $\mu g/m^3$ 24-hour $PM_{2.5}$ NAAQS. |
| 7 | $PM_{2.5}$ | 12 $\mu g/m^3$<br>Annual averaging period<br>24-hour measurement<br><br>(Note: Air agencies preparing demonstrations involving PM concentrations for comparison against the 1997 annual $PM_{2.5}$ standard of 15.0 $\mu g/m^3$ should substitute 12.0 $\mu g/m^3$ with 15.0 $\mu g/m^3$ in the "General Approach" steps in the next column.) | • If the annual average $PM_{2.5}$ concentration was above 12.0 $\mu g/m^3$ (after rounding to one decimal digit per 40 CFR 50 Appendix N section 4.2(a)) but would have been equal to or less than 12.0 $\mu g/m^3$ in the absence of the single event's effect on one or more days, those 24-hour concentration values that were affected by the single event meet the "but for" test for purposes of comparison to 12 $\mu g/m^3$ annual $PM_{2.5}$ NAAQS.<br>• Also, if the 24-hour average concentration from the filter-based sampler was above 12.0 $\mu g/m^3$ (after truncating after the first decimal digit, per 40 CFR 50 Appendix N section 3.0(b)) but would have been equal to or less than 12.0 $\mu g/m^3$ in the absence of the event, the 24-hour value meets the "but for" test for purposes of comparison to 12 $\mu g/m^3$ annual $PM_{2.5}$ NAAQS. |
| 8 | $PM_{10}$ | 150 $\mu g/m^3$<br>24-hour averaging period<br>1-hour measurement | • If the 24-hour average concentration based on 1-hour measurements was above 150 $\mu g/m^3$ (after rounding to the nearest 10 $\mu g/m^3$, per 40 CFR 50 Appendix K section 1.0(b)) but would have been equal to or less than 150 $\mu g/m^3$ in the absence of the event, those 1-hour concentration values that were affected by the single event meet the "but for" test for purposes of comparison to the 150 $\mu g/m^3$ 24-hour $PM_{10}$ NAAQS. |

**Table Q30-2. General Approaches for Satisfying the "No Exceedance But For" Test**

| | Pollutant | Specific Case:<br>NAAQS level<br>NAAQS averaging period<br>Measurement period | General Approach |
|---|---|---|---|
| 9 | $PM_{10}$ | 150 μg/$m^3$<br>24-hour averaging period<br>24-hour measurement | • If the 24-hour average concentration from the filter-based sampler was above 150 μg/$m^3$ (after rounding to the nearest 10 μg/$m^3$, per 40 CFR 50 Appendix K section 1.0(b)) but would have been equal to or less than 150 μg/$m^3$ in the absence of the event, the 24-hour value meets the "but for" test for purposes of comparison to the 150 μg/$m^3$ 24-hour $PM_{10}$ NAAQS. |
| 10 | CO | 35 ppm<br>1-hour averaging period<br>1-hour measurement | • If a 1-hour measured concentration was above 35.0 ppm (after rounding to one decimal digit per 40 CFR 50.8(d)) but would have been 35.0 ppm or less in the absence of the event, the 1-hour CO concentration value meets the "but for" test for purposes of comparison to the 1-hour NAAQS. |
| 11 | CO | 9 ppm<br>8-hour averaging period<br>1-hour measurement | • If an 8-hour average of measured concentrations is one of the two highest non-overlapping 8-hour periods of the year and was above 9.0 ppm (after rounding to one decimal digit per 40 CFR 50.8(d)) but would have been equal to or less than 9.0 ppm in the absence of the event, those 1-hour concentration values that were affected by the single event meet the "but for" test for purposes of comparison to the 9 ppm 8-hour CO NAAQS.<br><br>The exclusion of some or all hours of the 8-hour period that was originally one of the two highest non-overlapping 8-hour periods of the year may cause another 8-hour period to become one of two highest non-overlapping 8-hour periods of the year. The "but for" comparison can be repeated for this new 8-hour period, which may result in flagging and concurrence for more 1-hour values. It is also possible for additional hourly concentrations that were not included in the original 8-hour block to be excluded as part of a second 8-hour block. |

**Table Q30-2. General Approaches for Satisfying the "No Exceedance But For" Test**

| | Pollutant | Specific Case:<br>NAAQS level<br>NAAQS averaging period<br>Measurement period | General Approach |
|---|---|---|---|
| 12 | Pb | 1.5 μg/$m^3$<br>Quarterly averaging period<br>24-hour measurement | • If the quarterly mean was above 1.5 μg/$m^3$ (after rounding to one decimal digit) but would have been equal to or less than 1.5 μg/$m^3$ in the absence of the single event's effect on some day(s), the 24-hour value(s) affected by the single event meets the "but for" test for purposes of comparison to the 1.5 μg/$m^3$ quarterly average Pb NAAQS. (Note that given the 1-in-6 sampling schedule for Pb, it will be unusual for a single event to affect multiple sampling days.)<br>• Also, if the 24-hour average concentration from the filter-based sampler was above 1.5 μg/$m^3$ (after rounding to one decimal digit) but would have been equal to or less than 1.5 μg/$m^3$in the absence of the event, the 24-hour value meets the "but for" test for purposes of comparison to 1.5 μg/$m^3$ quarterly average Pb NAAQS.<br><br>A 24-hour Pb concentration that is equal to or less than 1.5 μg/$m^3$ will generally not be considered for exclusion. |
| 13 | Pb | 0.15 μg/$m^3$<br>Rolling 3-month averaging period<br>24-hour measurement | • If a 3-month mean was above 0.15 μg/$m^3$ (after rounding to two decimal digits) but would have been equal to or less than 0.15 μg/$m^3$ in the absence of the single event's effect on some day(s), the 24-hour value affected by the single event meets the "but for" test for purposes of comparison to the 0.15 μg/$m^3$ quarterly average Pb NAAQS. (Note that given the 1-in-6 sampling schedule for Pb, it will be unusual for a single event to affect multiple sampling days.)<br>• Also, if the 24-hour average concentration from the filter-based sampler was above 0.15 μg/$m^3$ (after rounding to two decimal digits per 40 CFR 50 Appendix R section 5(b)) but would have been equal to or less than 0.15 μg/$m^3$ in the absence of the event, the 24-hour value meets the "but for" test for purposes of comparison to the 0.15 μg/$m^3$ quarterly average Pb NAAQS.<br><br>A 24-hour Pb concentration that is equal to or less than 0.15 μg/$m^3$ will generally not be considered for exclusion. |

**Table Q30-2. General Approaches for Satisfying the "No Exceedance But For" Test**

| | Pollutant | Specific Case:<br>NAAQS level<br>NAAQS averaging period<br>Measurement period | General Approach |
|---|---|---|---|
| 14 | $NO_2$ | 100 ppb<br>1-hour averaging period<br>1-hour measurement | • If a 1-hour measured concentration was above 100 ppb (after truncating to a whole number per 40 CFR 50 Appendix S section 4.2(c)) but would have been equal to or less than 100 ppb in the absence of the event, the 1-hour $NO_2$ concentration value meets the "but for" test for purposes of comparison to the 1-hour NAAQS. |
| 15 | $NO_2$ | 53 ppb<br>Annual averaging period<br>1-hour measurement | • If the annual average of all the measured 1-hour concentrations in a year was above 53 ppb (after rounding to a whole number per 40 CFR 50 Appendix S section 4.1(b)) but would have been 53 ppb or less in the absence of the event, those 1-hour values that were affected by the single event meet the "but for" test for purposes of comparison to the 53 ppb annual average $NO_2$ NAAQS.<br>• If the 1-hour concentration was above 53 ppb (after truncating to a whole number per 40 CFR 50 Appendix S section 4.2(c)) but would have been equal to or less than 53 ppb in the absence of the event meets the "but for" test for purposes of comparison to annual NAAQS.<br><br>However, a 1-hour $NO_2$ concentration that is below 53 ppb (after rounding to a whole number) will generally not be considered for exclusion. |
| 16 | $SO_2$ | 75 ppb<br>1-hour averaging period<br>1-hour measurement | • If a 1-hour measured concentration was above 75 ppb (after rounding to a whole number per 40 CFR 50 Appendix T section 4(c)) but would have been equal to or less than 75 ppb in the absence of the event, the 1-hour $SO_2$ concentration value meets the "but for" test for purposes of comparison to the 1-hour $SO_2$ NAAQS. |

**Table Q30-2. General Approaches for Satisfying the "No Exceedance But For" Test**

| | Pollutant | Specific Case:<br>NAAQS level<br>NAAQS averaging period<br>Measurement period | General Approach |
|---|---|---|---|
| 17 | $SO_2$ | 140 ppb<br>24-hour averaging period<br>1-hour measurement | • If the 24-hour average concentration based on 1-hour measurements was above 140 ppb (after rounding to the nearest 10 ppb per 40 CFR 50.4(b)) but would have been equal to or less than 140 ppb in the absence of the event, those 1-hour concentration values that were affected by the single event meet the "but for" test for purposes of comparison to 140 ppb 24-hour $SO_2$ NAAQS.<br>• Also, if the 24-hour average concentration based on 1-hour measurements was above 30 ppb (after rounding to the nearest 10 ppb per 40 CFR 50.4(b)) but would have been equal to or less than 30 ppb in the absence of the event, those 1-hour concentration values that were affected by the event meet the "but for" test for purposes of comparison to the 140 ppb 24-hour $SO_2$ NAAQS. |
| 18 | $SO_2$ | 30 ppb<br>Annual averaging period<br>1-hour measurement | • If the annual average of measured 1-hour concentrations was above 30 ppb (after rounding to a whole number per 40 CFR 50.4(a))) but would have been 30 ppb or less in the absence of the event, those 1-hour values that were affected by the single event meet the "but for" test for purposes of comparison to the 30 ppb annual average $SO_2$ NAAQS.<br><br>If the 30 ppb annual $SO_2$ NAAQS still applies in the affected area, a 1-hour concentration equal to or below 30 ppb (after rounding to a whole number per 40 CFR 50.4(a)) will generally not be considered for exclusion. |
| 19 | $SO_2$ (secondary) | 500 ppb<br>3-hour averaging period<br>1-hour measurement | • If the 3-hour average of measured 1-hour concentrations was above 500 ppb (rounded to the nearest 100 ppb per 40 CFR 50.5(a)) but would have been equal to or less than 500 ppb in the absence of the event, those 1-hour values that were affected by the single event meet the "but for" test for purposes of comparison to the 3-hour average secondary $SO_2$ NAAQS. |

31. **Question:** When is it appropriate for air agencies to flag concentration values that are less than the level of the relevant NAAQS? Under what circumstances will the EPA concur on such flags?

**Answer: (**Please read Q30 before reading this response.)

AQS currently allows an air agency to flag any measured concentration values it chooses, including values below the level of the relevant NAAQS. The EPA does not plan to implement any new technical restrictions through the AQS software. Also, the Exceptional Events Rule does not prohibit air agencies from flagging values below the level of the NAAQS. However, the EPA does not intend to review data flags in AQS for concurrence until the air agency submits its evidence/analysis package demonstrating that exclusion of the flagged values is consistent with the criteria in the Exceptional Events Rule, including the "but for" analysis at 40 CFR 50.14(c)(3)(iv)(D). Air agencies wishing to flag values for informational purposes should use the "I" series flags in AQS.

Air agencies may see an advantage in flagging all values they believe were affected by an event (and contribute to a violation of the NAAQS), for purposes of being able to later identify historical data that have not been affected so that "normal" concentration patterns can be presented as part of meeting the "in excess of historical fluctuations" prong of the exclusion criteria. AQS does not prevent such flagging, but air agencies should be aware that agency flagging by itself does not establish that the concentrations were in fact affected by an event and should be excluded from the "normal" baseline.

Of the flagged cases that appear in both AQS and in demonstration packages, the EPA may find it appropriate to concur with flags for concentrations that are below the NAAQS only in five very narrow conditions described below. If the EPA determines that a flag on a value less than the level of the NAAQS cannot meet the "but for" test, it is likely the EPA would nonconcur or leave the default/null value of the AQS concurrence flag (indicating no EPA action) in place.

Except in cases involving $PM_{10}$ limited maintenance plans[25], the EPA intends to prioritize events that result in a violation or exceedance of a NAAQS or those that otherwise impact a regulatory decision. As described below and in the response to Question 30, there may be specific instances where individual measurements fall below a NAAQS but still contribute to a violating design value. There may also be instances where a shorter averaging time measurement (e.g., 1-hour $O_3$ measurement of 100 ppb) is not above the level of that averaging time NAAQS (e.g., 1-hour $O_3$ NAAQS of 120 ppb), but is above a longer averaging time NAAQS (e.g., 8-hour $O_3$ NAAQS of 80 ppb) and contributes to a violation of the longer averaging time NAAQS. In such cases, although the individual measurement may not exceed the level of the shorter-term NAAQS, it may be possible for air agencies to present sufficient evidence to satisfy the "but-for" criterion for a longer-term NAAQS.

*(See Questions 8, 9, 13, and 19 for additional information.)*

[25] See May 7, 2009 policy memorandum from William T. Harnett to Regional Air Division Directors at http://www.epa.gov/ttn/oarpg/t1/memoranda/lmp_final_harnett.pdf that allows $PM_{10}$ values between 98 and 154 $\mu g/m^3$ (inclusive) to be flagged, concurred, and excluded for purposes of qualifying an area for reliance on only a limited maintenance plan.

First, $PM_{10}$ values between 98 and 154 $\mu g/m^3$ (inclusive) may be flagged, concurred, and excluded for purposes of qualifying an area for reliance on only a limited maintenance plan (see footnote 24). Because of the expected exceedance form of the $PM_{10}$ NAAQS, concentrations in this range cannot possibly affect whether a site actually meets the NAAQS, so there is no reason for flagging them except when the acceptability of a limited maintenance plan is an issue. The normal AQS flagging and concurrence procedures may be used in this situation.[26]

A second scenario in which the EPA may find it appropriate to concur with flags for concentrations that are below the NAAQS is indicated at 72 FR 13570. If (i) an event has affected air quality on multiple consecutive days, (ii) at least one measured concentration during the episode can be found to meet the "but for" test using the relevant comparison specified in Table Q30-2, and (iii) the air quality impact on each day is "exceptional," measurements for the entire period are eligible for data exclusion regardless of how they compare to the level of the NAAQS. In the context of this provision, "exceptional" encompasses all the requirements of the Exceptional Events Rule other than the "but for" test (e.g., clear causal connection, "in excess of normal historical fluctuations, including background," not reasonably controllable or preventable).

Scenarios in which the measured concentration is greater than a NAAQS with a longer averaging time but less than the level of a NAAQS with a shorter averaging time

Third, applying Table Q30-2 may result in qualifying a 24-hour $PM_{2.5}$ measurement that is greater than the 12 or 15 $\mu g/m^3$ annual $PM_{2.5}$ NAAQS but not greater than the 35 $\mu g/m^3$ 24-hour $PM_{2.5}$ NAAQS for exclusion for the purposes of the 24-hour $PM_{2.5}$ NAAQS. This is the result if the actual 24-hour concentration was between 12 or 15 and 35 $\mu g/m^3$ but would have been below 12 or 15 $\mu g/m^3$ but for the effect of the event. It should be noted that an exclusion made under this very specific provision for the 24-hour $PM_{2.5}$ NAAQS will only affect the outcome of an attainment determination for the 24-hour NAAQS if the concentration value in question is one of the few highest daily concentrations during the year, because only then could it have affected the 3-year design value. When a 24-hour value below the level of the 24-hour NAAQS does affect the 3-year design value, the application of the guidance for the fourth situation (below), which is applicable to all four NAAQS pollutants with multi-year design values, would get to the same result as application of this paragraph.

Fourth, assuming that all other Exceptional Events Rule requirements and conditions are met, the EPA may concur with flags for ozone, $PM_{2.5}$, 1-hour $NO_2$, and 1-hour $SO_2$ that are "less than the level of the NAAQS" if adjusting the flagged concentrations for the estimated contribution from the event would change the 3-year design value from being

[26] Values in this range can potentially affect the design value for $PM_{10}$, but these design values are primarily informational and are not likely to influence designations or regulatory determinations of attainment. The procedure for determining a $PM_{10}$ design value in units of $\mu g/m^3$ is given in section 6.3 of the EPA guidance document "$PM_{10}$ SIP Development Guideline," June 1987, posted at http://www.epa.gov/ttn/oarpg/t1/memoranda/pm10sip_dev_guide.pdf.

above the NAAQS to being equal to or below the NAAQS. However, as indicated in footnote 21, concentrations below certain values generally will not be excluded.

Fifth, a 1-hour measurement of a pollutant that is below the level of the 8-hour, 3-hour, 24-hour, or quarterly NAAQS for that pollutant can be excluded if (1) the event affected the 1-hour measurement, and (2) taking into account the event's effect on all the hours in the longer period the effect of the event on the longer averaging period's concentrations satisfies the "but for" criterion. These situations are described in Table Q30-2 (rows 3, 4, 8, 11, 12, 13, 17, and 19). However, as indicated in Table Q30-2, concentrations below certain values generally will not be excluded.

The following NAAQS-specific discussions provide further explanations regarding some of the situations in which a concentration less than the level of the NAAQS may qualify for exclusion. These discussions are not exhaustive and do not obviate the need to refer to Table Q30-2.

*24-hour $PM_{2.5}$*

Assume for illustration that the three annual 98$^{th}$ percentile 24-hour $PM_{2.5}$ concentrations for a monitoring site for 2006-2008 are 41, 31, and 37 μg/m$^3$ for each respective year with a resulting 3-year design value of 36 μg/m$^3$ which is a violation of the 24-hour $PM_{2.5}$ NAAQS of 35 μg/m$^3$. Also, assume that the next highest concentration in 2007 below the 31 μg/m$^3$ was only 20 μg/m$^3$. The 31 μg/m$^3$ concentration in 2007 was affected by a one-day wildfire. The air agency has been able to show that the concentration would have been 17 μg/m$^3$ without the fire. Because neither 20 μg/m$^3$ nor 31 μg/m$^3$ exceed the NAAQS, the event on that day does not meet the "but for" test when viewed from an "exceedance" perspective. However, the effect of the fire on the 2007 value determines whether the 3-year design value passes the 24-hour NAAQS. Had there been no fire, the 98$^{th}$ percentile concentration in 2007 would have been 20 μg/m$^3$ which would result in a 3-year design value of 33 μg/m$^3$ (i.e., less than the 24-hour $PM_{2.5}$ NAAQS of 35 μg/m$^3$). Therefore, the 2007 value of 31 μg/m$^3$ meets the "but for" test when the focus in on NAAQS violations rather than individual exceedances. Assuming other requirements are met, the 31 μg/m$^3$ concentration would be approved by the EPA for exclusion from the 2006-2008 design value. Note that in doing a "violations-based" "but for" analysis, one does not simply substitute the "no event" concentration for the original 98$^{th}$ percentile day into the design value calculation. Rather, one must re-select the 98$^{th}$ percentile day, which sometimes will result in a different day's actual measured value being used in the design value calculation.[27]

It is conceivable that the effect of an event on a given day is not enough to satisfy the "but for" test with regard to the "violation" perspective explained in the preceding

[27] Note that exclusion of this 24-hour value from design values for the annual average NAAQS is a separate question, the likely answer to which is that the value is not excludable. If the event did not make the 24-hour concentration change from below 12 or 15 to above 12 or 15 μg/m$^3$ the event does not meet the first condition specified in row 7 of Table Q30-2. It is also very improbable that an event affecting a single day would meet the second condition in row 7 of Table Q30-2.

paragraph for one three-year period, but that it does satisfy it for an earlier or later 3-year period when it is combined with one or two different concentrations to calculate a 3-year design values, since the outcome of the "violations" analysis may change. After the EPA has approved the exclusion of a concentration based on a "violations" analysis for one 3-year period, the EPA will also exclude that concentration when calculating design values and attainment for the other two 3-year periods that include that same year.

For the 24-hour $PM_{2.5}$ NAAQS, it is possible that multiple days with concentrations below the NAAQS within one year are flagged. Excluding just one of these concentrations may not change the annual 98$^{th}$ percentile concentration enough to cause the 3-year design value to change from "violating" to "complying," but excluding several of them may. The outcome for the design value may also depend in part on whether exclusion is granted for some other concentrations that are above the level of the NAAQS. In such cases, the exclusion decisions should first be made for each of the flagged concentrations that are above the NAAQS. All remaining flagged concentrations (those meeting all other requirements and conditions of the Exceptional Events Rule) should then be considered in progressively larger groups ranked by concentration. That is, if excluding the highest one of the flagged concentrations below the level of the NAAQS would cause a switch in whether the 3-year design value violates the NAAQS then if the EPA determines that value is to be excluded then there is no impact to retaining all others and, thus, no need to make determinations for those others. If excluding the two highest such concentrations causes a switch, then there is no impact to determining whether others beyond those two should be retained.

However, the preamble to the Exceptional Events Rule explicitly states that $PM_{2.5}$ concentrations below the level of the annual NAAQS cannot be excluded for purposes of comparisons to the annual NAAQS. (72 FR 13570, bottom of middle column) Even if the conditions described in the preceding paragraph are met, values below 12 or 15 $\mu g/m^3$ cannot be excluded.

*Annual $PM_{2.5}$*

The preamble to the Exceptional Events Rule explicitly states that $PM_{2.5}$ concentrations below the level of the annual NAAQS cannot be excluded for purposes of comparisons to the annual NAAQS. (72 FR 13570, bottom of middle column)

*Ozone (0.075 ppm 8-hour NAAQS)*

Assume for illustration that the three annual 4$^{th}$ highest daily 8-hour ozone values in 2006-2008 are 0.077, 0.076, and 0.075 ppm respectively. The 0.075 ppm value in 2008 was affected by an exceptional event. The 3-year average would be 0.076 ppm, a NAAQS violation. If the 0.075 ppm value for 2008 were to be excluded and if, as a result, 2008's new 4$^{th}$ highest value was 0.074 ppm or less, the 3-year average (after Appendix P truncation) would be 0.075 ppm, which is not a NAAQS violation. The 0.075 ppm value may be excluded under these circumstances even though it is not itself an exceedance. Furthermore, the exclusion also applies to the use of this value when

calculating the 2007-2009 and 2008-2010 design values, regardless of whether such exclusion causes those design values to switch from violating to complying with the NAAQS.

For ozone, as for 24-hour $PM_{2.5}$, it is possible that an air agency could flag multiple days within one year with concentrations below the NAAQS. Excluding just one of these concentrations may not change the annual 4$^{th}$ highest concentration enough to cause the 3-year design value to change from "violating" to "complying," but excluding several of them may. Also, the outcome for the design value may depend, in part, on whether exclusion is granted for some other concentrations that are above the level of the NAAQS. In such cases, the exclusion decisions should first be made for each of the flagged concentrations that are above the NAAQS. All remaining flagged concentrations (those meeting all other requirements and conditions of the Exceptional Events Rule) should then be considered in progressively larger groups ranked by concentration. That is, if excluding the highest one of the flagged concentrations below the level of the NAAQS would cause a switch in whether the 3-year design value violates the NAAQS then if the EPA determines that value is to be excluded, all others can be retained without impact. If exclusion of the two highest such concentrations causes a switch, then the EPA may focus first on whether only those are to be excluded.

*$PM_{10}$*

The only current $PM_{10}$ NAAQS is the 24-hour NAAQS based on the expected number of exceedances over a 3-year period. Since a concentration below the level of the NAAQS would not be an exceedance and cannot affect compliance with the NAAQS in any way, a concentration below the level of the NAAQS usually cannot be excluded. However, under an EPA policy memo, for the purpose of the EPA approval of a limited maintenance plan $PM_{10}$ values as low as 98 $\mu g/m^3$ can be concurred for exclusion when determining whether an area is eligible for a limited maintenance plan. (See May 7, 2009 memorandum from William T. Harnett to Regional Air Division Directors, http://www.epa.gov/ttn/oarpg/t1/memoranda/lmp_final_harnett.pdf). Because concentrations less than 98 $\mu g/m^3$ would appear to have little regulatory significance, the EPA discourages the flagging of such data.

*Pb*

The legacy 1.5 $\mu g/m^3$ and current 0.15 $\mu g/m^3$ NAAQS for lead are both based on a maximum three-month average concentration. The 1.5 $\mu g/m^3$ standard is based on the maximum quarterly average, while the 0.15 $\mu g/m^3$ NAAQS is based on the highest rolling 3-month average during a 3-year period. As previously explained, the EPA is not likely to concur on the exclusion of a 24-hour concentration value that is below the level of the NAAQS, and we discourage air agencies from flagging such values.

*$NO_2$*

As previously explained, the EPA is not likely to concur on the exclusion of a 1-hour $NO_2$ concentration that is below the level of the annual $NO_2$ NAAQS, and we discourage air agencies from flagging such values.

*$SO_2$*

As previously explained, the EPA is not likely to concur on the exclusion of a 1-hour SO2 concentration that is below the level of the annual $SO_2$ NAAQS, and we discourage air agencies from flagging such values.

# Interim Guidance on the Preparation of Demonstrations in Support of Requests to Exclude Ambient Air Quality Data Affected by High Winds Under the Exceptional Events Rule

**United States Environmental Protection Agency**

**May 2013**

# Table of Contents

## Acronyms

| | |
|---|---|
| AAQ | Affects Air Quality |
| ADEQ | Arizona Department of Environmental Quality |
| AQS | Air Quality System |
| BACM | Best Available Control Measures |
| BMP | Best Management Practice |
| CAA | Clean Air Act |
| CCR | Clear Causal Relationship |
| CFR | Code of Federal Regulation |
| CLASS | Clean Air Support System |
| DAQEM | Department of Air Quality and Environmental Management (Clark County, NV) |
| DRI | Desert Research Institute |
| EER | Exceptional Events Rule |
| EPA | Environmental Protection Agency |
| FEM | Federal Equivalent Method |
| FRM | Federal Reference Method |
| GIS | Geographic Information System |
| HAURL | Human Activity Unlikely to Recur at a particular Location |
| HF | Historical Fluctuations |
| MAG | Maricopa Association of Governments (Arizona) |
| MODIS | Moderate Resolution Imaging Spectroradiometer |
| MSM | Most Stringent Measure |
| nRCP | not Reasonably Controllable or Preventable |
| NAAQS | National Ambient Air Quality Standards |
| NEBF | No Exceedance But For the event |
| NSR | New Source Review |
| NWS | National Weather Service |
| RACM | Reasonably Available Control Measures |
| PM | Particulate Matter |
| SCAQMD | South Coast Air Quality Management District (California) |
| SIL | Significant Impact Level |
| SJV | San Joaquin Valley |
| SIP | State Implementation Plan |
| TOEM | Tapered Element Oscillating Microbalance |
| UNLV | University of Nevada, Las Vegas |
| WEG | Wind Erodibility Group |
| WGA | Western Governors' Association |
| WRAP | Western Regional Air Partnership |

# 1. Highlights

The EPA developed this document to assist air agencies[1] in meeting the requirements of the Exceptional Events Rule[2] (EER) for high wind dust (i.e., particulate matter) events[3] and to provide example recommended elements for exceptional event demonstrations. High winds can entrain and transport particulate matter (PM) to a monitoring site. These particles can consist of both $PM_{10}$ (i.e., particles less than or equal to 10 micrometers (μm) in diameter) and $PM_{2.5}$ (i.e., particles less than 2.5 μm in diameter). High wind dust events can include both $PM_{10}$ and $PM_{2.5}$.

Purpose of this Document

The purpose of this document is to provide assistance and illustration to air agencies implementing the EER for high wind dust events.[4] This interim document provides guidance and interpretation of the EER rather than imposing any new requirements and shall not be considered binding on any party. If and when the EPA takes a regulatory action that relies on a decision to exclude data under the EER, the EPA will consider and appropriately respond to public comments received on any aspect of a supporting exceptional events demonstration submittal.

The EPA recognizes the limited resources of the air agencies that prepare and submit exceptional event demonstration packages and of the EPA regional offices that review these demonstration packages. One of the EPA's goals in developing this document and the other exceptional event implementation guidance[5] is to establish clear expectations to enable affected agencies to better manage resources as they prepare the documentation required under the EER. Submitters should prepare and submit the appropriate level of supporting documentation, which will vary on a case-by-case basis using the weight-of-evidence approach. The EPA anticipates that the resources needed to prepare (and review) high wind dust exceptional event packages, and demonstrations for other event types, will decrease as we continue to identify ways to streamline the process and continue to build our database of example demonstrations and analyses. The EPA acknowledges that extreme exceptional events may justify more limited demonstration packages.

To Whom Does this Document Apply?

High wind dust events are typically a phenomenon experienced in the western United States where rainfall is seasonal, creating dry and dusty landscapes. Therefore, this document may be of most use to the states from the Great Plains (North Dakota, South Dakota, Nebraska, Kansas,

[1] References to "air agencies" are meant to include state, local, and tribal air agencies responsible for implementing the EER.
[2] "Treatment of Data Influenced by Exceptional Events; Final Rule", 72 FR 13560, March 22, 2007.
[3] The term "high wind dust event" is used in this document to refer to the same type of event that was discussed as a "high wind event" in the EER. The EPA believes the term "high wind dust event" more clearly describes the referred-to event.
[4] This interim guidance document presents examples to illustrate specific points. These examples are not necessarily required for all demonstrations.
[5] Other interim exceptional event guidance materials include the following: "Interim Guidance to Implement Requirements for the Treatment of Air Quality Monitoring Data Influenced by Exceptional Events" memorandum from Stephen D. Page, EPA Office of Air Quality Planning and Standards to Regional Air Directors, March 29, 2013, and the "Interim Exceptional Events Rule Frequently Asked Questions." Air agencies can find additional information and examples of exceptional event submissions and best practice components at the EPA's Exceptional Events website located at http://www.epa.gov/ttn/analysis/exevents.htm.

Oklahoma, and Texas) and west. Generally, this includes the states that comprise the Western Regional Air Partnership, which is most of EPA Regions 6, 7, 8, 9, and 10.

Guiding Principles for the Development of this Document

1. Air agencies should not be held accountable for exceedances due to exceptional events that were beyond their control at the time of the event.
2. It is desirable to implement reasonable controls to protect public health.[6]
3. Clear expectations will enable the EPA and other air agencies to better manage resources related to the exceptional events process.

Definition of a High Wind Dust Event

A high wind dust event includes both the high wind and the dust that the wind entrains and transports to a monitoring site. The event is not merely the occurrence of the high wind.

Elements for the Technical Demonstration of High Wind Dust Events

- Air agencies' demonstrations must address the following six technical elements under the EER before the EPA can concur on a high wind dust event demonstration:

1. whether the event was not reasonably controllable or preventable (nRCP)
2. whether there was a clear causal relationship (CCR)
3. whether there would have been no exceedance or violation but for the event (NEBF)
4. whether the event affects air quality (AAQ)
5. whether the event was caused by human activity unlikely to recur or was a natural event (HAURL / Natural Event)
6. whether the event was in excess of normal historical fluctuations (HF)

If a demonstration does not sufficiently address any one of the above, the EPA will not be able to concur with the request to exclude data under the EER.

- During the EPA's review of several high wind dust events flagged by air agencies as exceptional events, the EPA has found that the following EER elements play a significant role in air agencies' supporting documentation: nRCP, CCR, and NEBF.

- The EPA has also found for a high wind dust event that satisfying the requirements for nRCP, CCR, and HF criteria also generally satisfies the requirements for two elements identified by statute: AAQ and Natural Event.

- The EPA has not set pass/fail statistical criteria for the HF element, but will use a weight-of-evidence approach to assess each demonstration on a case-by-case basis. The air agency's role in satisfying this element is to provide analyses and statistics and conclude that the provided data show that the event was in excess of normal historical fluctuations. The EPA

[6] With respect to exceptional events, Section 319 of the Clean Air Act states the following guiding principles (among others);

(i) the principle that protection of public health is the highest priority

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(iv) the principle that each State must take necessary measures to safeguard public health regardless of the source of the air pollution

will review the information provided by the air agency. Events do not necessarily have to be rare to satisfy this element.

- While not listed as a technical element required by the EER, wind data (e.g., wind speed and direction) will generally play a vital role in informing the EPA's decision on elements such as whether the event was not reasonably controllable or preventable and establishing a clear causal relationship.

Not Reasonably Controllable or Preventable

- Exceedances caused in whole or in part by anthropogenic dust sources within the air agency's control are unlikely to be eligible for treatment as exceptional events under the EER, even under conditions of elevated winds, unless the air agency shows that the event, including the emissions from the anthropogenic dust sources, was not reasonably controllable or preventable. The EPA intends to evaluate whether an event was not reasonably controllable or preventable at the time of the event by taking into account the wind speed; the controls in place; the controls required in the State Implementation Plan (SIP), which depends on an area's attainment status; the frequency and severity of exceedances; contributing sources; benefits of the controls; costs of controls; and other factors.

- The EPA also judges the reasonableness of controls based on the technical information that was available to the air agency at the time the event occurred. The EPA generally expects air agencies to already have the technical information needed to reasonably control sources within nonattainment areas.

- The degree of event-specific information and data necessary for demonstrating "not reasonably controllable or preventable" will generally be less for sustained wind speeds at or above the high wind threshold and greater for speeds below that the threshold. The high wind threshold is the minimum threshold wind speed capable of overwhelming reasonable controls on anthropogenic sources (i.e., significant emissions from controlled sources) or causing emissions from natural undisturbed areas. The EPA recommends that air agencies establish area-specific high wind thresholds based on local or applicable conditions and information. If an agency is unable to develop an area-specific high wind threshold, the EPA will generally accept a threshold of a sustained wind of 25 mph for areas in the West provided the agencies submit evidence of this as the level at which they expect stable surfaces (i.e., controlled anthropogenic and undisturbed natural surfaces) to be overwhelmed. In identifying a high wind threshold, the EPA does NOT intend to set a bright line as to what speed constitutes a high wind dust event or to categorically concur with all events with sustained winds above a given threshold.

- An air agency has the option of submitting a prospective controls analysis in advance or with a demonstration package. Described in more detail in Section 3.7.1, a prospective controls analysis is a generic[7] review of an area's *existing* windblown dust controls and high wind threshold. In the prospective controls analysis, the air agency would provide information on attainment status, identify natural and anthropogenic windblown dust sources and emissions, provide the status of SIP submittals (if applicable), and identify the high wind threshold up to

[7] "Generic" means a general review rather than a review specific to an identified event.

which the collective windblown dust controls are expected to be effective. If the EPA approves the prospective controls analysis, an air agency's subsequent high wind exceptional event packages could reference the approved set of controls in the prospective controls analysis and show that the wind speed for the event in question is at or above the high wind threshold established in the prospective controls analysis. Air agencies would also include in their demonstration some positive showing that control requirements were being met on the day in question. In this manner, the prospective controls analysis could facilitate the EPA's review and evaluation of the not reasonably controllable and preventable criterion. An EPA-approved prospective controls analysis would generally be effective to serve this purpose for a minimum of three years.

- The EPA and the submitting air agency may also consider developing a *voluntary* High Wind Action Plan. Air agencies can develop High Wind Action Plans to document their plans to implement needed controls on newly-identified sources that could emit dust during subsequent high wind events. A High Wind Action Plan is an optional mechanism to implement necessary controls more expeditiously than with the normal regulatory planning process. Preparation of such a plan and its approval by the EPA could promote a common understanding between the air agency and the EPA about whether subsequent high wind dust events are not reasonably controllable or preventable.

Clear Causal Relationship

As described in Section 3.3, air agencies can use the following example analyses to establish a clear causal relationship:

- analyses showing that the event in fact occurred and that emissions were transported in the direction of the monitors where measurements were recorded
- the size of the area affected by the emissions
- comparison to non-event days
- the spatial and temporal relationship between the event, transport of emissions, and recorded concentrations

No Exceedance But For the Event

The NEBF demonstration may be relatively straightforward for areas with typical concentrations on non-event days well below the applicable National Ambient Air Quality Standards (NAAQS). However, demonstrating NEBF becomes increasingly difficult if concentrations on non-event days during the same season exceed the standard and/or if the contribution of non-event pollution sources produce concentrations near the applicable NAAQS.

**Disclaimer**

The Exceptional Events Rule is the source of the regulatory requirements for exceptional events and exceptional event demonstrations. This document provides guidance and interpretation of the Exceptional Events Rule rather than imposing any new requirements and shall not be considered binding on any party. Any determination that an event is exceptional made on the basis of this guidance will need documentation to support the decision. If and when the EPA takes a regulatory action that relies on a decision to exclude data under the Exceptional Events Rule, the EPA will consider and appropriately respond to any public comments received on any aspect of a supporting exceptional events demonstration submittal.

# 2. Overview of Exceptional Events Rule

The EER and the preamble describe specific criteria for an event to be considered an "exceptional event" for purposes of exclusion of air quality data from regulatory decisions and acknowledge that "natural events" can be recurring.

## 2.1 Definition of the "Event" for High Wind Dust Events

In high wind dust events, the meteorological phenomenon (i.e., wind) is purely natural and thus can be classified as a natural event, but the pollution from the event may be a mixture of natural sources (e.g., undisturbed soil) and anthropogenic sources (e.g., soil disturbed by human activity, emissions from sand and gravel facilities, etc.). The EPA generally classifies high wind dust events as "natural events" in cases where windblown dust is entirely from natural sources or where all significant anthropogenic sources of windblown dust have been reasonably controlled.[8] This long-standing policy was established in the Natural Events Policy which provided that:

> "Ambient PM-10 concentrations due to dust raised by unusually high winds will be treated as due to uncontrollable natural events under the following conditions: (1) the dust originated from nonanthropogenic sources, or (2) the dust originated from anthropogenic sources controlled with best available control measures (BACM)."[9]

For the purposes of this guidance, we are defining a high wind dust event as the combination of high wind and the dust that the wind entrains and transports to a monitoring site. Uncontrollable windblown dust emissions only occur in the presence of high wind. Therefore, for exceptional events purposes, it is appropriate to consider both the emissions and the corresponding high wind as the "event."

## 2.2 Evidence Necessary to Support Exceptional Events Requests

The EPA promulgated the Exceptional Events Rule in 2007, pursuant to the 2005 amendment[10] 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. These sections contain definitions, criteria for EPA approval, procedural requirements, and requirements for air agency demonstrations, all of which

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[8] The EPA will generally consider human activity to have played little or no *direct* role in causing emissions of the dust generated by high wind for purposes of the regulatory definition of "natural event" if contributing anthropogenic sources of the dust are reasonably controlled, regardless of the amount of dust coming from these reasonably controlled anthropogenic sources, and thus the event could be considered a natural event. In such cases, the EPA believes that it would generally be a reasonable interpretation of its regulations to find that the anthropogenic source had "little" direct causal role. If anthropogenic sources of windblown dust that are reasonably controllable but that did not have those reasonable controls applied at the time of the high wind event have contributed significantly to a measured concentration, the event would not be considered a natural event. See preamble to the EER at 72 FR 13566, f.n. 11.

[9] "Areas Affected by PM10 Natural Events" (the PM10 Natural Events Policy), memorandum from Mary D. Nichols, Assistant Administrator for Air and Radiation, to EPA Regional Offices, May 30, 1996. EPA's position that windblown emissions from controlled anthropogenic sources would be considered natural is reflected in the preamble to the EER at 72 FR 13566, f.n. 11.

[10] Safe, Accountable, Flexible, Efficient Transportation Equity Act: a Legacy for Users (SAFETEA-LU), section 6013 amending CAA §319, became law August 10, 2005; available at http://thomas.loc.gov/cgi-bin/query/z?c109:H.R.3:

must be met before the EPA can concur under the EER on the exclusion of air quality data from regulatory decisions.

The definition of an exceptional event given in 40 CFR §50.1(j) parallels the statutory definition of Section 319 of the CAA and itself contains certain criteria for approval by the EPA:

- 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."[11]

Additional criteria for the EPA approval to exclude data affected by a high wind dust event are given (with some repetition of key phrases) in 40 CFR §50.14(a) and (b)(1).[12] Under these provisions the air agency must:

- "demonstrat[e] to EPA's satisfaction that such event caused a specific air pollution concentration at a particular air quality monitoring location."
- "demonstrate a clear causal relationship between the measured exceedance or violation of such standard and the event …"
- "demonstrat[e] to EPA's satisfaction that an exceptional event caused a specific air pollution concentration in excess of one or more national ambient air quality standards at a particular air quality monitoring location and otherwise satisfies the requirements of this section [regarding schedules, procedures and submission of demonstrations]."

Under 40 CFR §50.14(c)(3)(iv),[13] 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 (see above);

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".

The definition of an exceptional event provided in 40 CFR § 50.1(j) explicitly excludes "stagnation of air masses or meteorological inversions, a meteorological event involving high temperatures or lack of precipitation, or pollution relating to source noncompliance."[14] Exceedances due to these events would not be eligible for exclusion under the EER. For

[11] 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."
[12] §50.14 (b)(2) and (b)(3) contain criteria relevant only to firework events and prescribed fire events.
[13] Prior to the publishing of the 2010 CFR the citation was §50.14(c)(3)(iii)
[14] For further explanation see "Treatment of Data Influenced by Exceptional Events; Final Rule," 72 FR 13577, (March 22, 2007).

example, if sources out of compliance with fugitive dust or other rules contributed significantly to an exceedance, then the exceedance would not be excluded as due to an exceptional event.

## 2.3 Mitigation Requirement

40 CFR §51 Subpart Y includes mitigation requirements at 51.930. While the EER does not require that air agencies submit mitigation measures to the EPA as part of the demonstration package (or otherwise), Subpart Y requires that "[a] State requesting to exclude air quality data due to exceptional events must take appropriate and reasonable actions to protect public health from exceedances or violations of the national ambient air quality standards." Section 4 of this document addresses the mitigation requirement.

## 2.4 Process Requirements per EER

In addition to identifying technical demonstration requirements, the EER specifies the process an air agency must follow to request data exclusion:

- "A State shall notify EPA of its intent to exclude one or more measured exceedances of an applicable ambient air quality standard as being due to an exceptional event by placing a flag in the appropriate field for the data record of concern which has been submitted to the AQS database..." 40 CFR § 50.14(c)(2)(i).

- The placement of the flags and the submittal of an initial event description must be done "not later than July 1st of the calendar year following the year in which the flagged measurement occurred."[15] 40 CFR § 50.14(c)(2)(iii).

- "A State that has flagged data as being due to an exceptional event and is requesting exclusion of the affected measurement data shall, after notice and opportunity for public comment, submit a demonstration to justify data exclusion to EPA not later than the lesser of, 3 years following the end of the calendar quarter in which the flagged concentration was recorded or, 12 months prior to the date that a regulatory decision must be made by EPA. A State must submit the public comments it received along with its demonstration to EPA." 40 CFR § (50.14(c)(3)(i)).

- With the submission of the demonstration, the air agency "must document that the public comment process was followed." 40 CFR § (50.14(c)(3)(iv)).

[15] This language references the general schedule in the EER. When the EPA promulgates a new or revised NAAQS, we may also promulgate changes to this schedule to allow air agencies to flag and submit documentation for data relevant to the new/revised NAAQS.

# 3. Evidence to be Included in a High Wind Dust Event Demonstration Package

As discussed in Section 2.2, the EER identifies technical elements (i.e., criteria or evidence) that an air agency must address and demonstrate before the EPA can concur that an exceedance is due to an exceptional event. Table 1 shows the complete list of technical elements air agencies must submit and satisfy as part of a demonstration for high wind dust events. The EPA cannot concur on an air agency's request to exclude data under the EER if the air agency has not met these criteria.

**Table 1. EER Technical Demonstration Elements Required by the EER for High Wind Dust Events**

| Element | Abbreviation | Section of this Document Containing Additional Explanation |
|---|---|---|
| affects air quality* | AAQ | 3.4 |
| not reasonably controllable or preventable | nRCP | 3.1 |
| caused by human activity unlikely to recur at a particular location OR a natural event[16]* | HAURL / Natural Event | 3.5 |
| clear causal relationship between the measurement and the event | CCR | 3.3 |
| no exceedance or violation but for the event | NEBF | 3.6 |
| the event is associated with a measured concentration in excess of normal historical fluctuations, including background | HF | 3.2 |

*These elements are typically met when the other elements have been satisfied.

The EPA uses a "weight-of-evidence" approach in reviewing air agency requests for data exclusion under the EER. Evidence and narrative that constitute a strong demonstration for one element can also be part of the demonstration for another element, but cannot make up for the absence of or insufficient explanation supporting another element. A strong demonstration for one requirement could, however, influence the persuasiveness of the demonstration for another.

In reviewing the supporting documentation in several high wind dust event demonstrations, the EPA has found the following EER elements play a significant role: nRCP, CCR, and NEBF. The criterion that the event be in excess of normal historical fluctuations (HF) is a technical element that the EPA expects to be satisfied by the submittal of data as outlined in Section 3.2. In addition to satisfying the HF criterion, these data are expected to inform the CCR and NEBF demonstrations.

[16] High wind dust events are considered natural events if sources are entirely natural or if contributing anthropogenic sources are reasonably controlled and therefore it is not relevant to consider whether the event was caused by human activity unlikely to recur.

The EPA has generally found that for high wind dust events, air agencies can meet the requirements of two elements identified by statute, AAQ[17] and Natural Event, by satisfying the requirements for nRCP, CCR, and HF. While not identified as a separate demonstration element in Table 1, wind data (e.g., wind speed and direction) is vital in informing the EPA's decision regarding "not reasonably controllable or preventable" and "clear causal relationship."

Finally, the EPA recommends that air agencies begin their technical demonstration for a high wind dust event with a conceptual model of how the event occurred. An air agency's conceptual model can use text and/or schematics to identify and describe the relationship between various phenomena (e.g., weather and dust emissions) that caused an exceedance. In its simplest form, the conceptual model could be a narrative description of how the event unfolded and resulted in the exceedance(s). The conceptual model may be similar to a report abstract and should help tie the various rule criteria together into a cohesive explanation of the event.

Sections 3.1-3.6 of this document describe and clarify each element identified in Table 1. Section 6 provides example analyses and a recommended structure for the preparation of demonstration packages for high wind dust events.

In summary, the technical demonstration for a high wind dust event package should include the following technical elements:

- Not Reasonably Controllable or Preventable - Analyses and descriptions should show that the event was not reasonably controllable or preventable. ***Required by EER.***

- Clear Causal Relationship - Analyses and descriptions should show that there was a clear causal relationship between the ambient concentration measurement under consideration and the event that is claimed to have affected the air quality in the area. ***Required by EER***.

- No Exceedance But For the Event - Analyses and descriptions should show that there would have been no exceedance or violation but for the event. ***Required by EER***.

- Affects Air Quality - Statutory technical element that is generally satisfied once the submitter provides historical fluctuations analyses (HF), establishes a clear causal relationship (CCR), and provides explicit information indicating satisfaction of requirement through clear causal and historical fluctuations showings. ***Required by EER.***

- Natural Event - Statutory technical element that is generally satisfied once the submitter shows the event to be not reasonably controllable or preventable (nRCP), establishes a clear causal relationship (CCR), and provides information demonstrating these requirements have been met. ***Required by EER***.

[17] The preamble to the EER clarifies the AAQ criteria in section V.B. (p. 13569) by stating that the following criteria establish that the event affected air quality: "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" and "the event is associated with an unusual measured concentration beyond typical fluctuations including background." On this basis AAQ is satisfied once CCR has been demonstrated and evidence for HF has been provided.

- Historical Fluctuations – Air agencies should provide analyses and descriptions in the format suggested in this document. The EPA will review this information in a weight-of-evidence showing. *Required by EER.*

- Wind Data - Data on wind speed and direction support the technical elements required by the EER such as CCR and nRCP. *Recommended, but not required by EER.*

- Conceptual Model - Narrative summary at the beginning of a demonstration package describing how the event unfolded to produce elevated PM at the monitor(s) that recorded the exceedance(s) and providing context for the supporting elements. *Recommended, but not required by EER.*

## 3.1 Not Reasonably Controllable or Preventable (nRCP)

Exceedances caused in whole or in part by anthropogenic dust sources within the air agency's control are unlikely to be eligible for treatment as exceptional events under the EER, even under conditions of high winds, unless the air agency shows that the event (i.e., dust entrained by high winds) was not reasonably controllable or preventable. The 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.[18] The factors and approach identified in this section should assist air agencies in developing adequate high wind dust exceptional event demonstration packages and promote consistency. The EPA will consider each package on a case-by-case basis per the EER. If and when the EPA takes a regulatory action that relies on a decision to exclude data under the Exceptional Events Rule, the EPA will consider and appropriately respond to any public comments received on whether the event was "not reasonably controllable or preventable."

### 3.1.1 Controls on Natural versus Anthropogenic Sources

According to the definition of an exceptional event, the event must be "not reasonably controllable or preventable" (40 CFR § 50.1(j)). For *natural* sources of dust, a high wind dust event can generally be considered to be not reasonably controllable or preventable[19], if winds are high enough to cause emissions from natural undisturbed areas. For *anthropogenic* sources of dust, a high wind dust event may also 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.
3. The wind speed was high enough to overwhelm the reasonable controls.

Reasonable controls on anthropogenic sources (item 1 on the list above) are generally fundamental to the event being not reasonably controllable or preventable. An event with both anthropogenic and natural components can be considered a "natural" event if the anthropogenic

[18]See SJV Attainment Affirmation, 73 FR 14687, for a prior high wind dust event in which the EPA considered controls and wind speed, along with other factors.
[19] The EPA expects that in most cases it would not be reasonable to have controls on natural sources, but this will be evaluated for each event.

component is reasonably controlled. Air agencies should demonstrate that natural events are reasonably controlled by showing that no additional controls are reasonable for the event. Additionally, "reasonable controls" refers to a collection of reasonably controlled sources. The term "not reasonably controllable or preventable" refers to the *event* (i.e., dust entrained by high winds), rather than to any particular source. Further, in determining whether the event is not reasonably controllable or preventable, the EPA will consider whether the **collection** of anthropogenic sources has been reasonably controlled. For anthropogenic sources, it is the high wind overwhelming the collection of reasonable controls, that have been effectively implemented and enforced, that may support a determination that the event is not reasonably controllable or preventable.

For purposes of evaluating high wind dust exceptional events in the West, the EPA will generally use the definitions of natural and anthropogenic windblown dust emissions that have been developed in the *Western Regional Air Partnership (WRAP) Fugitive Dust Handbook*.[20] According to the *WRAP Fugitive Dust Handbook*, all mechanically suspended dust from human activities should be considered anthropogenic emissions, while windblown dust from lands not disturbed or altered by human activity should be considered natural emissions. Furthermore, windblown dust from surfaces that have been significantly disturbed or altered by humans should be categorized as anthropogenic emissions. Such surfaces may include: undeveloped lands[21], construction and mining sites, material storage piles, landfills, vacant lots, agricultural lands, roadways, parking lots, artificially exposed beds of natural lakes and rivers, exposed beds of artificial water bodies, areas subject to off-road vehicle activity, and areas burned by prescribed fires. Natural sources may include: naturally-dry river and lake beds; barren lands; sand dunes; exposed rock; sea spray from natural water bodies; non-agricultural grass, range, and forest lands; areas burned by wildfires; and glacial silt.

The EPA generally considers dust entrained by high wind from undisturbed land (e.g., undisturbed desert) to be not reasonably controllable or preventable, because of the likely disturbance to natural ecosystems and the cost of treating large land areas. The EPA also generally considers that windblown dust from previously disturbed land that is being allowed to fully return to natural conditions by effective prevention of any new disturbance is also not reasonably controllable or preventable, provided that there are no reasonable active measures that air agencies can take to control dust during the transition back to natural conditions.[22] While emissions from most other natural sources of windblown dust could be similarly not reasonably controllable, the EPA will consider those on a case-by-case basis. In areas where events recur, the EPA may request increased characterization of the natural sources (e.g., historical surface disturbance, water diversions, vegetation changes, etc.).

While the EPA generally does not expect controls on emissions from natural sources (e.g., undisturbed land) for an event to be not reasonably controllable or preventable, the EPA generally does expect reasonable controls to be in place on the windblown anthropogenic

[20] *WRAP Fugitive Dust Handbook*, Prepared for Western Governors' Association, Countess Environmental (WGA Contract No. 30204-111), September 7, 2006. Available at http://www.wrapair.org/forums/dejf/fdh/index.html
[21] Undeveloped lands refer to those that are disturbed for purposes of development but not yet developed.
[22] An example of such a measure might be the restoration of all or part of natural surface water flows.

contribution to the concentration measured during the event.[23] Experience in several areas in the western United States has shown that it may be practical and reasonable to apply dust-suppression controls to some disturbed lands and other anthropogenic dust sources, and that these controls may help limit ambient concentrations of PM during high wind dust events, up to certain wind speeds. For example, some areas in the west have successfully controlled dust with measures such as water or chemical stabilization of disturbed areas such as construction zones, or limiting disturbance activities on windy days. If reasonable controls on windblown anthropogenic sources were in place, then the event would be considered "not reasonably controllable or preventable" and would satisfy the nRCP element of the definition of an exceptional event. That is, an air agency can generally meet the nRCP element for high wind events by identifying the contributing anthropogenic sources of windblown dust for a particular event and showing that reasonable controls were in place, effectively implemented, and enforced (as appropriate). The prior preparation of and the EPA's approval of a prospective controls analysis or high wind action plan (see Sections 3.7.1 and 3.7.2) addressing all the anthropogenic sources that might contribute during wind events can alleviate the need for this showing in each event case. For each event with windblown anthropogenic contributions, it is important that an air agency show that the exceedance occurred despite the implementation of those reasonable controls (i.e., to show that wind speeds were high enough to overwhelm the reasonable controls). The prior establishment of a high wind threshold (see Section 3.1.4 below) can make this showing less resource intensive per event. The EPA will evaluate the reasonableness of controls based on the controls that should have been in place given the information the air agency had when the event occurred (see Section 3.1.2 for factors that the EPA will consider in determining the reasonableness of the controls). The level of detail required to demonstrate that reasonable controls were in place, implemented/enforced, and overwhelmed by high winds, will depend upon the wind speed of the event relative to the high wind threshold if one has been established (see Section 3.1.4 and 3.1.5).

Typically, measured ambient air concentrations during an event will include some contribution from natural or anthropogenic sources whose emissions are not affected by high wind, for example transportation and industrial point sources: these are considered non-event sources. Non-event sources are not subject to the nRCP requirement of the EER, but an air agency may apply full-time or event-dependent controls on such sources as part of its attainment/maintenance SIP or as part of meeting the mitigation requirement under 40 CFR §51.930.

### 3.1.2 Factors Considered in Determining the Reasonableness of Controls

This section describes an approach for determining the reasonableness of the controls in place. Among other factors to consider, reasonableness needs to be judged in light of the technical information available to the air agency at the time the event occurred. The EPA would generally consider air agencies experiencing the following scenarios and/or with the following technical information to have had technical information indicating the need for high wind dust controls:

- More than one expected exceedance per year from high wind dust

[23] See the "Jurisdiction Reasonableness Factor" in Table 2. *Example Factors Considered in Determining the Reasonableness of Controls* for additional clarification of reasonable controls for emissions from out-of-state sources.

- Exceedances due to windblown dust when the sustained wind speed is less than the high wind threshold (or default) for the area
- Requirement for high wind dust BACM resulting from either nonattainment status or previous Natural Events Action Plan (NEAP)[24]
- Formal communication from the EPA indicating the need for high wind dust controls
- Promulgation of new/revised Federal rules that would require controls on particular sources

The EPA would not generally expect high wind dust controls in areas with no history of high wind dust exceedances.

The set of control requirements mandated by the area's designation status is an important factor used in evaluating reasonableness (see Section 3.1.2.2 for additional detail). Table 2 shows example factors that the submitter and the EPA may consider when assessing the reasonableness of controls as part of the nRCP criterion. Table 2 is not intended to be all-inclusive or quantitative.

**Table 2. Example Factors Considered In Determining the Reasonableness of Controls.**

| **"Reasonableness" Factor** | **Description of "Reasonableness" Factor** |
|---|---|
| 1. Control requirements based on area attainment status | The reasonableness of the controls depends upon historical concentrations and designation status. |
| 2. Frequency and severity of past exceedances | More stringent controls may be reasonable if an area experiences frequent[25] and/or severe[26] exceptional event exceedances due to high winds than if the area has experienced only non-recurring[27] and/or mild isolated exceedances.[28] |
| 3. Ease and effectiveness of control implementation | The EPA may consider cost-effective and readily deployable controls more reasonable. |
| 4. Use of measures that are in widespread use | Controls that are considered "standard practices" and/or measures in widespread use for dust control in other areas would be considered more reasonable. |

[24] On May 30, 1996, Mary D. Nichols, Assistant Administrator for Air and Radiation issued a memorandum to EPA regional offices entitled, "Areas Affected by $PM_{10}$ Natural Events." The policy, known as the $PM_{10}$ Natural Events Policy, or simply the Natural Events Policy, set forth procedures for protecting public health through the development of a Natural Events Action Plan, which implements Best Available Control Measures (BACM) for human-generated particulate emissions in areas that could violate the $PM_{10}$ NAAQS due to natural events. Promulgation of the Exceptional Events Rule superseded the Natural Events Policy.

[25] Frequent is enough exceedances from high wind dust events to cause of violation of the NAAQS.

[26] A severe exceedance could be a 24-hour average $PM_{10}$ concentration > 250 $\mu g/m^3$.

[27] Non-recurring is less than one high wind dust event per year.

[28] A mild isolated exceedance could be, for example, an exceedance close to the standard at one monitoring site.

**Table 2. Example Factors Considered In Determining the Reasonableness of Controls.**

| **"Reasonableness" Factor** | **Description of "Reasonableness" Factor** |
|---|---|
| 5. Jurisdiction | Air agency demonstration submittals should address the status of control measures for interstate and international transport. However, the EPA also anticipates that air agency demonstrations can generally satisfy the "not reasonably controllable or preventable" criterion with less detailed characterization of sources in the upwind state or country than of sources in the same state as the affected monitor.[29] |
| 6. Controls on primary sources expected to have contributed to the event | Were primary sources of anthropogenic windblown dust controlled during the event? |
| 7. Significant contribution of sources to the exceedance | There is no defined *de minimis* emission rate or ambient contribution that limits which sources should be considered for control, and the EPA will review this on a case-by-case basis. However, as a starting point, we believe it is generally reasonable to consider source categories that may contribute 5 μg/$m^3$ or more to an exceedance of the 150 μg 24-hour $PM_{10}$ standard.[30] In some cases (i.e., wind speeds above the high wind threshold) it may not be necessary to consider sources down to 5 μg, while in other situations it may be appropriate to consider sources below 5 μg. This starting point may be revisited should the $PM_{10}$ NAAQS be revised. *De minimis* levels for $PM_{2.5}$ have not been clearly established. |

[29] Considering the sovereignty issues associated with interstate and international transport, the EPA believes that "reasonable control" showings generally can rely on the concept that it is not reasonable to expect the downwind state (i.e., the state submitting the demonstration) to require the upwind country or state to have implemented controls on sources sufficient to limit event-related air concentrations in the downwind state. As with any demonstration submittal, the submitting (downwind) state should sufficiently identify all natural and anthropogenic contributing sources of emissions (both in-state and out-of-state) to show the causal connection between an event and the affected air concentration values. A submitting state may provide a less detailed characterization of sources in the upwind state or country than of sources within its jurisdiction. After completing the source characterization, the submitting state should assess whether emissions from sources within its jurisdiction (i.e., in-state sources) were not reasonably controllable or preventable. Although the submitting state should also provide available information on the status of control measures for emissions from out-of-state sources, the submitting state may determine based on available information that the "not reasonably controllable or preventable" criterion is satisfied in light of the state's inability to require controls of the upwind state. When assessing emissions transported from other states or countries, the submitting state can say that it characterized the out of state sources, determined that these sources contributed to the noted exceedance or violation, and determined, based on jurisdictional boundaries and other available information, that contributing emissions from the upwind state or country were not reasonably controllable or preventable. Submitting states are further required to submit evidence/statements supporting the other exceptional event criteria (i.e., clear causal relationship, but for, human activity unlikely to recur or a natural event, affects air quality, and historical fluctuations). The EPA refers the reader to Question 23 in the "Interim Exceptional Events Rule Frequently Asked Questions" for additional information on this topic.

[30] 5μg is the "significant impact level" (SIL) used in NSR permitting to decide whether an individual source has a significant contribution to a 24-hr $PM_{10}$ NAAQS violation, based on 40 CFR 51.165(b)(2), and so is used here for a similar use.

**Table 2. Example Factors Considered In Determining the Reasonableness of Controls.**

| "Reasonableness" Factor | Description of "Reasonableness" Factor |
|---|---|
| 8. Overall benefit of controls | There may be benefits to controlling even small anthropogenic sources. Reducing ambient concentrations may have a public health benefit. |

*3.1.2.2 Consideration of attainment status in judging reasonableness*

For the anthropogenic sources to be considered to be reasonably controlled, the EPA anticipates that it is reasonable for an air agency to have the controls required for an area's attainment status. Generally, the EPA does not expect areas classified as attainment, unclassifiable, or maintenance for a NAAQS to have the same level of controls as areas that are nonattainment for the same NAAQS. Also, if an area has been recently designated to nonattainment but has not yet been required to implement controls, the EPA will expect the level of controls that is appropriate for the planning stage.

*3.1.2.3 Consideration of BACM/RACM*

Although Reasonably Available Control Measures (RACM) and Best Available Control Measures (BACM) for windblown dust are not necessarily required to have been in place at the time of the event for all areas, they are measures that the EPA and affected agencies have identified as being reasonable. The CAA requires BACM for serious $PM_{10}$ nonattainment areas and RACM in moderate $PM_{10}$ nonattainment areas. Therefore, for such areas, the EPA will use the local list of BACM or RACM measures (as applicable) as a reference point to review the reasonableness of controls. The control measures evaluated should be related to windblown dust. Having BACM/RACM in place during the time of the event is an important consideration, but may not be sufficient on its own. For example, BACM/RACM measures may be insufficient if they are not related to windblown dust, if the SIP has not been recently reviewed or revised, or if they focus on air quality issues during specific periods without high winds, such as winter stagnation events. Generally, the EPA will consider windblown dust BACM to constitute reasonable controls if these measures have been reviewed and approved in the context of a SIP revision for the emission source area within the past three years. In some cases, a lower level of control could be reasonable, while in other cases it could be reasonable to require controls more stringent than current BACM or RACM (e.g., upon start-up or identification of a significant new source of emissions). Other areas (i.e., attainment, maintenance, or unclassifiable areas) are not required to have put BACM in place and also may not have implemented RACM. In these cases, the EPA may use local RACM measures, where available, along with other RACM measures that may be appropriate for the location and source categories, as the reference point. RACM/BACM lists may be *a reference point, but not the sole means,* by which the EPA assesses the reasonableness of controls. If an air agency believes that the EPA should not use RACM/BACM as the reference point for reasonable controls, the air agency should provide supporting rationale and an alternative reference point in the demonstration package.

If an air agency has identified agricultural activities as contributing to event-related windblown dust emissions, the air agency may also identify applied U.S. Department of Agriculture / Natural Resources Conservation Service-approved conservation management practices designed to effectively reduce fugitive dust air emissions and prevent loss of soil during high winds.

### 3.1.3 Implementation and Enforcement of High Wind Dust Control Measures

As stated in Section 3.1.1, the second criterion that the EPA generally will consider in its determination of whether the event meets the nRCP criterion is implementation and enforcement (where appropriate) of control measures on contributing sources of dust. In their demonstration submittals, air agencies should submit available inspection reports and/or notices of violations (NOVs) in upwind areas to show that all reasonable controls were implemented and functioning properly at the time of the event.[31] The EPA recognizes that records may not be available for all events. Cases where relevant control measures were not being fully implemented or properly enforced, but reasonably could and should have been, are unlikely be eligible for data exclusion under the Exceptional Events Rule.

### 3.1.4 Consideration of Wind Speed

The third condition stated in Section 3.1.1 for the EPA to consider for the nRCP criteria for an event with anthropogenic sources is whether the wind speed was high enough to overcome reasonable controls. In all cases (i.e., those including natural and/or anthropogenic sources) wind speed informs the rigor of the nRCP analysis. It is important to note that the EPA is not setting a bright line as to what speed constitutes a high wind dust event or to categorically concur with all events with sustained winds above a given level. This section describes how the EPA will generally use wind speed in its evaluation of the nRCP criterion.

Typically, undisturbed desert landscapes in the west have a natural crust that protects the surface and tends to prevent windblown dust emissions. Similarly, many reasonably-controlled anthropogenic sources (e.g., disturbed surfaces) employ techniques that stabilize surfaces to reduce or prevent emissions since disturbed surfaces are a primary source of anthropogenic dust. Numerous studies have been conducted to determine the minimum wind speed capable of overwhelming reasonable controls on anthropogenic sources or causing emissions from natural undisturbed areas. The speed at which this occurs varies by location, depending on characteristics of the local landscape (e.g., soil type and characteristics, vegetation) and controls (See Appendix A). The EPA recommends that agencies develop a high wind threshold for each area experiencing high wind dust events (see Appendix A3 for additional information on the development of a high wind threshold). Appropriate area-specific thresholds should consider local conditions and the variation in control strategies and specify a minimum wind speed above which these controls would be overwhelmed. If nonanthropogenic sources are a significant source of emissions for a particular area, a high wind threshold may also be based on the level of wind speed capable of causing emissions from those specific natural undisturbed areas. This approach is consistent with the Natural Events Policy where the EPA recommended that the air agencies define the conditions in which BACM level controls were overwhelmed. The area-specific high wind threshold should be representative of conditions (i.e., sustained wind

[31] The EPA recognizes that agencies have varied methods of permitting and enforcement and does not expect all agencies to have these records for all events. Agencies should, however, make a general showing that they are enforcing controls to a reasonable degree (not necessarily on the particular day of the event). If an air agency identifies several categories of anthropogenic sources as significant or likely contributors to an event, the air agency should also describe in the demonstration the means used to determine compliance with reasonable control requirements for each category.

speeds[32]) that are capable of overwhelming reasonable controls (whether BACM, RACM, or other) on anthropogenic sources and/or causing emissions from natural undisturbed areas. The threshold is not intended to represent the minimum wind speed at which *any* level of emissions could occur (e.g., aerodynamic entrainment), but rather when significant emissions begin due to reasonable controls or natural undisturbed areas becoming overwhelmed. Air agencies can develop/identify and submit their high wind threshold in advance of submittal of the demonstration package, with a letter of intent, with a demonstration package, as part of a prospective controls analysis, or as part of a High Wind Action Plan. If an agency is unable to develop an area-specific high wind threshold, the EPA generally will accept a threshold of a sustained wind of 25 mph for areas in the west provided the agencies support this as the level at which they expect stable surfaces (i.e., controlled anthropogenic and undisturbed natural surfaces) to be overwhelmed.[33] If the EPA has specific information based on relevant studies to choose an alternative high wind threshold, the EPA will notify the air agency once this information has been submitted. Throughout this document, the term "high wind threshold" will be used to define the minimum threshold wind speed capable of overwhelming reasonable controls on anthropogenic sources (i.e., significant emissions from controlled sources) or causing emissions from natural undisturbed areas.

Generally, if a demonstration can show that the sustained wind speed was at or above the high wind threshold at or proximately upwind of the location of the exceedance, then two streamlined approaches are available to meet the nRCP criterion:

1. Rely on an already-approved prospective controls analysis. A set of controls for an area could be approved with the high wind threshold in advance of submittal of a package for a specific event (see Section 3.7.1). Once the prospective controls analysis was approved, additional information on controls for specific packages would typically be limited to information on enforcement and implementation.
2. Conduct a basic controls analysis. Minimal amounts of information on sources and controls would be required for each event (see Section 3.1.5 and 3.1.5.1).

If the sustained wind speed for an event was below the high wind threshold, the EPA will still consider the package and possibly concur but will generally require that the air agency submit additional controls information as described in the comprehensive controls analysis (See section 3.1.5 and 3.1.5.2).

The EPA believes that streamlined information (i.e., a pre-approved prospective controls analysis or a basic controls analysis) is generally sufficient when wind speeds are at or above the high wind threshold because, in this situation, controls to prevent windblown dust are likely to become overwhelmed. Thus, the event is more likely to be not reasonably controllable or preventable. If most controls on wind-blown dust become overwhelmed at or above the high wind threshold, air agencies would likely find it difficult to identify additional reasonable controls that could be put into place to reduce windblown dust.

In contrast, if the wind speeds associated with the event are below the threshold levels required to initiate dust emissions from natural or stable (i.e., reasonably-controlled) sources, the EPA

[32] See Section 6.2.2.2 for details on the calculation of sustained wind speed.
[33] The 25 mph threshold is based on studies conducted on natural surfaces.

may ask air agencies to submit more detailed information (i.e., a comprehensive controls analysis) to satisfy the nRCP requirement. The EPA believes air agencies should submit a comprehensive controls analysis when wind speeds are below the high wind threshold because events with wind speeds below this threshold should entrain very little dust from natural and reasonably-controlled disturbed surfaces. Further, the EPA anticipates that windblown emissions would include significant contributions from sources that are neither natural nor reasonably-controlled. Thus, the event is less likely to be not reasonably controllable or preventable. In these cases, air agencies should identify the various land areas contributing to the event, discuss the controls in place on those land areas, and determine whether those controls were reasonable based on those factors identified in Section 3.1.2.

### 3.1.5 Controls Analysis for Individual Events

Air agency demonstration submittals should include a controls analysis for each specific high wind dust event. The extent of the controls analysis should primarily depend upon the level of the wind speed relative to that of the high wind threshold for the area. A basic controls analysis may be sufficient for cases when the sustained wind speed at the source area[34] is greater than or equal to the high wind threshold, while a comprehensive controls analysis may be necessary when sustained wind speeds are below the high wind threshold (Table 3). If an air agency has not prospectively determined the high wind threshold for the area, then this determination, or establishing that the default threshold of 25 mph applies, should be the first step in the controls analysis.[35] Next, the EPA recommends that air agencies develop their nRCP analysis to evaluate the sustained wind speed during the event. This process may indicate that only the streamlined basic controls analysis is needed. See Section 6.3.2.2 for wind speed considerations for nRCP.

**Table 3. Summary of Recommended Controls Analysis Elements for not Reasonably Controllable or Preventable Demonstration**

| Control Analysis Elements | Basic Controls Analysis | Comprehensive Controls Analysis |
|---|---|---|
| Description of anthropogenic sources within the area and existing controls | X | X |
| Description of natural sources within the area and existing controls | X | X |
| Statement regarding reasonableness of controls | X | X |
| Explanation that emissions occurred despite controls | X | X |
| Identification and implementation status of controls previously recommended by the EPA as reasonable, if applicable | X | X |
| Evidence of effective implementation and | X | X |

[34] Cases where dust was entrained by sustained winds at or above the high wind threshold upwind of the monitor and subsequently transported at lower wind speeds to the monitor could still qualify for the basic controls analysis category, but in such cases, the state should show that sustained winds were at or above the high wind threshold in the expected source area. Cases of long-range transport (e.g., >50 miles) could still qualify for a basic controls analysis but air agencies may need to include supplementary analyses such as a trajectory analysis (and/or satellite plume imagery) as part of the nRCP or CCR demonstration.

[35] See Appendix A3 for additional discussion related to establishing area-specific high wind thresholds.

**Table 3. Summary of Recommended Controls Analysis Elements for not Reasonably Controllable or Preventable Demonstration**

| Control Analysis Elements | Basic Controls Analysis | Comprehensive Controls Analysis |
|---|---|---|
| enforcement of reasonable controls, if applicable | | |
| Back trajectories of source area | | X |
| Source apportionment | | X |
| Source-specific emissions inventories | | X |

*3.1.5.1 Basic controls analysis*

The most basic controls analysis should include a brief description of local/upwind sources that were suspected to significantly contribute to the event and a description of the controls on the anthropogenic sources in place at the time of the event (e.g., local BACM measures). The EPA also generally expects evidence that the controls determined to be reasonable, if any, were effectively implemented and appropriately enforced. For the sources identified, the analysis should explain how significant dust emissions occurred despite having reasonable controls in place (e.g., that controls were overwhelmed by high wind). In addition to identifying controls on anthropogenic sources, it is important that the analysis indicate whether the natural sources could have been reasonably-controlled. If the EPA recommended controls improvements as part of a previous high wind dust exceptional event review then the controls analysis should address the reasonableness and potential impact of these control improvements. See Section 6.3.2.3 for examples of a basic control analysis.

Even if a prospective controls analysis has been approved and included as part of the basic controls analysis, the air agency should identify likely contributing sources in the upwind source area and discuss appropriate controls if these were not discussed in the prospective controls analysis.

*3.1.5.2 Comprehensive controls analysis*

When events occur under conditions with sustained wind speeds below the high wind threshold, the EPA and the air agency should further consider the appropriateness, implementation, and enforcement of controls. For example, exceedances can occur when reasonable controls are in place but not properly enforced. Or, new or newly recognized uncontrolled sources may be contributing to the exceedance. In these cases, the demonstration generally would need to be more detailed and compelling for the EPA to concur. Examples of more detailed analyses include: back-trajectories of source area, source apportionment, day specific emissions inventories of specific sources in source area, and evidence of effective implementation and enforcement, where appropriate, of controls. In addition to identifying controls on anthropogenic sources, it is important that a submitting agency indicate whether any natural sources could have been reasonably-controlled. As with the basic controls analysis, if the EPA recommended controls improvements as part of a previous high wind dust exceptional event review, then the controls analysis should address how these controls improvements have been addressed. See Section 6.3.2.4 for an example of a comprehensive controls analysis.

3.1.6 Consideration of Controls on Tribal Lands

When reviewing the "reasonableness of controls" element within tribal exceptional event demonstration submittals, the EPA will consider both controls on tribal sources and cultural factors for tribal lands. For example, the EPA could consider tribal cultural factors and subsequently identify "reasonable" controls. It might have been reasonable for the tribal government to encourage the use of certain practices, but not to have required them as a matter of tribal law.

## 3.2 Historical Fluctuations (HF)

Air agencies should include data showing historical fluctuations of concentration in the area in their demonstration package and make a conclusion as to whether the agency considers the data to be outside the normal historical fluctuations. This information satisfies the HF criterion and serves as an important basis for the CCR, NEBF, and AAQ criteria (see Table 2). The more a concentration stands out from historical concentrations, the more plausible it is that the event was the cause of the exceedance. The objective of the HF analysis is to give a full and accurate portrayal of the historical context for the claimed event day. The EPA suggests the following analyses:

1. comparison of concentrations on the claimed event day with past historical data (3-5 years), with previous high wind dust events identified
2. percentile rank of concentration relative to annual data with and without high wind dust events
3. percentile rank of concentration relative to seasonal data with and without high wind dust events
4. comparison of concentrations on the claimed event day with a narrower set of similar days

Because the methods of analyses influence the conclusions that can properly be drawn from the historical fluctuation statistics (e.g., percentile calculations are dependent on the number of data points included), the EPA recommends specific analyses, statistics, and calculations as described in Section 6.3.3 of this document.

It is important to note, however, that there is no outcome of the "historical fluctuation" statistical comparison that, by itself, can guarantee that the CCR and NEBF elements will also be successfully demonstrated. The EPA will use a weight-of-evidence approach to assess each demonstration and comparison of the concentrations during event(s) in question with historical concentration data on a case-by-case basis. The EPA acknowledges that natural events, such as high wind dust events, can recur and still be eligible for exclusion under the EER. Therefore, events do not necessarily have to be rare to satisfy this element.

### 3.3 Clear Causal Relationship (CCR)

40 CFR §50.14(c)(3)(iv) requires demonstration of a clear causal relationship between the ambient concentration measurement under consideration and the event that is claimed to have affected the air quality in the area. The CCR demonstration must show that dust from high wind caused an exceedance of the NAAQS. The CCR demonstration establishes causality between the event and a portion of the ambient concentration. Simply showing that high wind was coincident with high concentrations may not establish causality. A correlation between high wind and high concentrations is important, but does not independently demonstrate that windblown dust from the natural undisturbed and/or reasonably controlled anthropogenic sources caused the high concentrations. CCR demonstrations should include analyses showing that the event in fact occurred and that emissions were transported in the direction of the monitors recording the elevated concentration measurements. CCR analyses should support the conceptual model and address the concepts identified in Table 4. Section 6.3.4 provides examples of the quantitative analyses that air agencies can perform.

**Table 4. Example Evidence and Analyses for CCR Demonstration**

| Example CCR Evidence | Types of Analyses/Information to Support Evidence |
|---|---|
| 1. Occurrence and geographic extent of the event | Special weather statements, advisories, news reports, nearby visibility readings, measurements from monitoring stations, satellite imagery |
| 2. Transport of emissions related to the event in the direction of the monitor(s) where measurements were recorded | Wind direction data showing that emissions from sources identified as part of the nRCP demonstration were upwind of the monitor(s) in question, satellite imagery |
| 3. Spatial relationship between the event, sources, transport of emissions, and recorded concentrations | Map showing likely source area, wind speeds, wind direction, and PM concentrations for affected area during the time of the event, trajectory analyses |
| 4. Temporal relationship between the high wind and elevated PM concentrations at the monitor in question | 24-hour time series showing PM concentrations at the monitor in question in combination with sustained and maximum wind speed data at area where dust was entrained |
| 5. Chemical composition and/or size distribution of measured pollution that links the pollution at the monitor(s) with particular sources or phenomenon | Chemical speciation data from the monitored exceedance(s) and sources; size distribution data |
| 6. Comparison of event-affected day(s) to specific non-event days | Comparison of concentration and wind speed to days preceding and following the event;; comparison to high concentration days in the same season (if any) without high wind; comparison to other high wind days without elevated concentrations (if any); comparison of chemical speciation data |

| Example CCR Evidence | Types of Analyses/Information to Support Evidence |
|---|---|
| 7. Historical comparison of PM concentration and wind speed (e.g., 3-5 years) data | Identification of historical trends or relationships between wind speed and PM concentrations. |

A demonstration may be less compelling if there is evidence that is inconsistent with the conceptual model of how the event caused the exceedance. For example, if the agency describes the event as a *regional* dust storm, then the EPA anticipates that monitors within the same *regional scale* to be similarly affected by the dust storm. Comparison of concentrations and conditions at other monitors could thus be very important for the demonstration of a clear causal relationship. Alternatively, eliminating plausible non-event causes may also support a causal relationship to the high wind dust event. (See Section 6.3.4.7 for an example of eliminating alternative hypotheses.)

## 3.4 Affects Air Quality (AAQ)

The AAQ element is generally supported by historical fluctuations in concentration data (HF) and demonstrated as part of the clear causal relationship (CCR).[36] Submitting agencies that provide HF analyses and conclusions and that demonstrate the CCR element will, generally, have also satisfied the "affects air quality" (AAQ) part of the definition of an exceptional event. The demonstration should nevertheless identify this element and describe how meeting the HF and the CCR criteria also satisfies the AAQ element.

## 3.5 Caused by Human Activity Unlikely to Recur at a Particular Location (HAURL) or a Natural Event (Natural Event)

According to both the regulatory and statutory definition, an exceptional event must be "an event caused by human activity that is unlikely to recur at a particular location *or* a natural event." High wind dust events that meet the criteria established in this guidance document would be considered natural events, thus an analysis of whether the event is a HAURL will not generally be relevant. A natural event is defined as "an event in which human activity plays little or no direct causal role" (40 CFR §50.1(k)). An event involving windblown dust solely from undisturbed natural sources is clearly a natural event. However, many high wind dust events affecting the ambient monitoring network include significant contributions from anthropogenic

[36] In the definition of "exceptional event", 40 CFR §50.1(j) begins: "Exceptional event means an event that affects air quality…" The preamble clarifies this in section V.B. *What Does It Mean for an Event To "Affect Air Quality"?* (p. 13569) :

> Under the Final Rule, the demonstration to justify data exclusion must provide a justification that: (a) The event qualifies in accordance with section IV.D. and if applicable, with the EPA policies and guidance for certain events as described in section IV.E, (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 an unusual measured concentration beyond typical fluctuations including background, and (d) there would have been no exceedance or violation but for the event (discussed in section V.C). *The second and third criteria establish that the event affected air quality.* [emphasis added]

In this passage, the second criterion is (b) "clear causal relationship", and the third is (c) "concentration beyond typical fluctuations". These are the same as the EER requirements for CCR ("clear causal relationship") and HF ("in excess of normal historical fluctuations") at 40 CFR §50.14(c)(3)(iii)(B) and (C).

sources of dust, and their treatment under the EER is more complicated. In these cases, the EPA generally treats a high wind dust event as a natural event when the anthropogenic component of the wind-driven emissions was not reasonably controllable or preventable (see footnote 8).

The EPA is unlikely to consider as "natural" high wind dust event exceedances that include a significant contribution of windblown dust from anthropogenic sources that were not reasonably-controlled. In addition, the EPA is not likely to consider high dust concentrations outside the period of high wind as due to a natural event or as part of the high wind dust event that immediately precedes or follows the high dust concentration (e.g., dust from rock-crushing or tilling that precedes or follows period of high wind is not likely part of the high wind dust event). In both of the above cases, the EPA would assume that human activity played a direct causal role and therefore these exceptional events claims could only be considered under the criterion of "human activity unlikely to recur."[37] For the case in which high dust concentrations occur outside the period of high wind, if continuous monitoring data are available, an air agency may be able to narrow or specify the timeframe for the exceptional event and submit a demonstration for the identified data and not for the entire period of elevated concentration.

Since anthropogenic sources of windblown dust must be reasonably-controlled for the event to be considered a natural event under the EER, the air agency must demonstrate that the criterion for nRCP is met (see Section 3.1). Further, to satisfy the EER, air agencies must also demonstrate that the windblown dust generated by high wind has a clear causal relationship (CCR) to the measured exceedance. In summary, the EPA will generally consider a high wind dust event to be a natural event if the air agency successfully demonstrates both the nRCP and CCR elements.

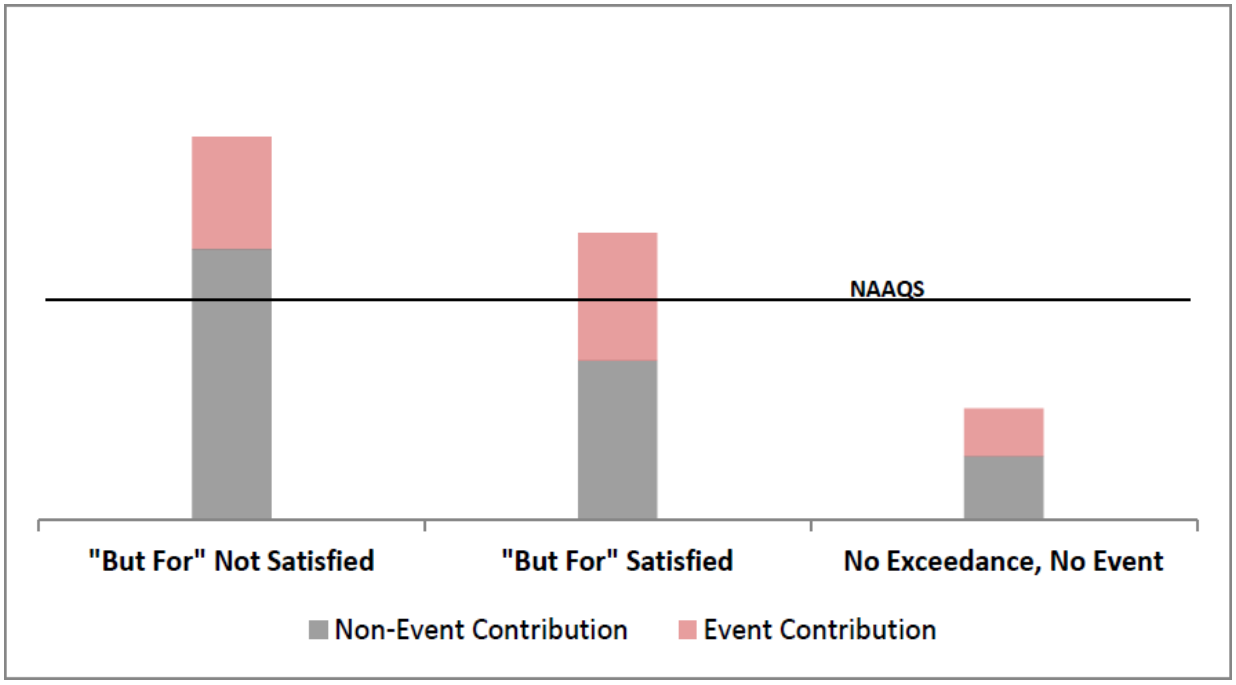
### 3.6 No Exceedance or Violation But For the Event (NEBF)

40 CFR 50.14(b)(1) directs the EPA to exclude data only where an air agency demonstrates that an event caused a concentration in excess of a NAAQS. This means that there was a concentration in excess of the NAAQS when the event occurred that would have been below the NAAQS if the event had not occurred. §50.14(c)(3)(iv)(D) requires the air agency to submit evidence that "[t]here would have been no exceedance or violation but for the event."[38] Figure 1 depicts the NEBF concept.

[37] In theory, a high wind dust event for which anthropogenic sources were not reasonably controlled could be considered an HAURL exceptional event if the event satisfies certain criteria, including being unlikely to recur. However, if the event (which includes the dust from both natural and anthropogenic sources) was not "not reasonably controllable or preventable" then the event does not meet the definition of an exceptional event. For this reason, the EPA does not believe it is useful to pursue a line of reasoning that would consider a high wind dust event to be an HAURL exceptional event. If the very unlikelihood of recurrence of similarly high winds means that controls in addition to those that were in place would not have been reasonable, the event can be considered for treatment as a natural event and must then meet the criteria laid forth in the EER and explained in this document.

[38] In addition, Section 319 of the Clean Air Act requires that a clear causal relationship must exist between the measured exceedances and the exceptional event, meaning that exceptional events dealt with in the EER must be exceedances.

**Figure 1. Depiction of the Concept of No Exceedance But For the Exceptional Event.**




This analysis generally does not need a single or precise approximation of the estimated air quality impact from the event. The EPA is not prescribing the type of analysis that air agencies should perform to satisfy this regulatory requirement, but air agencies should show that the measured concentration would have been below the applicable NAAQS without the influence of the high wind dust event. For most cases, the EPA expects a *quantitative* NEBF analysis. For events where the typical concentrations on non-event days are well below the applicable NAAQS, the NEBF demonstration may be relatively straightforward and a qualitative NEBF demonstration may be acceptable. However, demonstrating NEBF becomes increasingly complex if concentrations on non-event days during the same season exceed the standard and/or if the contribution of non-event pollution sources produce concentrations near the applicable NAAQS. For example, if days without high winds that neighbor the claimed event day were near the standard (e.g., 150 $\mu g/m^3$ for $PM_{10}$), the NEBF analysis would generally need to be very detailed to show that the exceedance would not have happened but for the high wind dust event. Examples of how to conduct the NEBF analysis are provided in Section 6.3.7.

The NEBF demonstration builds upon and will be informed by the nRCP and CCR analyses and further supported by information provided for HF. To illustrate the NEBF and CCR relationship, if there is no CCR, then NEBF becomes moot since there is no portion of the exceedance that can clearly be attributed to the event. For these reasons, the EPA recommends that the air agency complete the NEBF analyses after it completes all other analyses.

## 3.7 Optional Analyses for nRCP Requirement

### 3.7.1 Prospective Controls Analysis

As stated in Section 3.1.1, a high wind dust event that includes anthropogenic sources can generally meet the nRCP criterion if:

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

A prospective controls analysis is an optional, generic[39] review of the current windblown dust controls (item 1 above) and the high wind threshold (item 3 above) for an area. This optional step would likely occur in advance of the EPA's review of any particular event. In the prospective controls analysis, the air agency would provide information on attainment status, identify natural and anthropogenic windblown dust sources and emissions, provide the status of SIP submittals (if applicable), and identify the wind speed up to which the collective windblown dust controls are expected to be effective (see Section 6.2 for details on how to prepare a prospective controls analysis). Air agencies could submit their prospective controls analysis in advance of an agency submittal and the EPA review of any specific demonstration submittal, with the letter of intent, or with their demonstration package submittal. Once the EPA approves a prospective controls analysis, air agencies could reference this pre-approved analysis in subsequent packages for events with winds above the established/approved high wind threshold to satisfy items 1 and 3 above and provide information on implementation and enforcement of controls (item 2 above). In this manner, the prospective controls analysis could streamline the evaluation of the not reasonably controllable and preventable criterion.

The EPA review and approval of controls identified in the prospective controls analysis would typically be effective for a minimum of three years. After the three-year time period, the EPA will notify the agency if the EPA intends to re-review the controls. In some limited cases, the EPA may re-review the controls within the three-year timeframe if information on sources or enforcement suggests that controls may be inadequate or not implemented/enforced. The EPA may also re-evaluate the controls identified in the prospective controls analysis when an area that does not typically have recurring high wind dust events experiences unexpected recurrent events.

If the EPA has approved a SIP revision to windblown dust controls within the past three years of the event, then the submitting agency can use the SIP-approved controls to satisfy item 1 of a prospective controls analysis.

### 3.7.2 High Wind Action Plan

#### *3.7.2.1 Purpose*

Air agencies can develop High Wind Action Plans to document their plans to implement needed controls on newly-identified anthropogenic sources that could emit dust during subsequent high wind events (similar to the process used in a Natural Events Action Plan). Preparation of such a

[39] "Generic" means a general review rather than a review specific to an identified event.

plan and its approval by the EPA could promote a common understanding between the air agency and the EPA about whether subsequent high wind dust events are not reasonably controllable or preventable. In addition, the High Wind Action Plan could document current windblown dust controls and current and/or planned mitigation measures as part of 40 CFR 51.930.

*3.7.2.2 How Does the High Wind Action Plan Option Work?*

The EPA will judge the reasonableness of controls based on information that was available to the air agency at the time of the event (see Section 3.1.2). However, in the course of preparing or reviewing a high wind dust exceptional event demonstration submittal, the air agency or the EPA may identify previously unknown sources that should be subject to reasonable controls as these additional controls could minimize the likelihood or the health impact of future events. If all other contributing known sources meet the "not reasonably controllable or preventable" criterion, the EPA may determine that an unknown or unidentified source at the time of the event meets the "not reasonably controllable or preventable" criterion based on the rationale that a source was not reasonably controllable if its existence was not known. However, the EPA will generally not consider the nRCP criteria to have been met if the previously unknown source continues to contribute to future events unless the agency has promptly taken all reasonable steps to control the source after its discovery. Air agencies that believe they have a previously unknown or unidentified source contributing to an exceedance or violation should clearly identify this situation in their exceptional events demonstration submittal.

The High Wind Action Plan provides an *optional* mechanism that may facilitate a mutual understanding between the affected air agency and the EPA regarding the control expectations for future events in which the previously unidentified source contributed. This optional plan may also facilitate the EPA's concurrence on an air agency's request to exclude data associated with future events while the air agency implements controls on previously unidentified sources. A High Wind Action Plan does not, however, replace the planning actions required under the Clean Air Act based on an area's attainment status. For example, a $PM_{10}$ serious nonattainment area is still required to implement BACM. In this type of case the High Wind Action Plan can address sources identified after an air agency has implemented BACM.

An air agency can submit a High Wind Action Plan with the exceptional events demonstration package or as a separate submittal.[40] Establishing a High Wind Action Plan to address additional reasonable controls should consist of the following steps:

1. Air agency identifies and initiates actions to implement reasonable control measures.
2. Air agency develops and provides an opportunity for public comment on draft High Wind Action Plan incorporating planned and completed actions to implement reasonable controls on previously unidentified sources.
3. Air agency submits and the EPA approves the High Wind Action Plan
4. Air agency completes implementation of, or makes needed adjustments to, reasonable control measures as identified through public comment and the EPA review process.

[40] If an air agency submits the High Wind Action Plan separately from the exceptional event demonstration package, the air agency should provide an opportunity for public comment as the High Wind Action Plan would be part of the basis for the EPA's decision on subsequent events.

The EPA recognizes that the process by which previously unidentified sources needing reasonable controls are subsequently controlled could involve some period of time, such as the timeframe associated with the defined steps in issuing or revising construction or operating permits or in making adjustments to local ordinances. The EPA believes that a High Wind Action Plan could identify the previously unknown contributing source (e.g., newly cleared, previously vegetated property), identify the desired reasonable controls (e.g., erosion control fencing and surface stabilization), and identify the process by which the air agency intends to pursue implementing these controls (e.g., residential construction permit). The EPA further believes that this process could be informed by public comment and the EPA's review. Air agencies choosing to develop a High Wind Action Plan will generally have six months from the time the EPA notifies the agency of the need for reasonable controls on newly-identified sources to submit an adequate (i.e., approvable) plan that identifies reasonable control measures.[41] If the air agency meets this timeframe for submittal of a plan and the air agency has promptly taken all reasonable steps to control the source after its discovery, then the EPA will generally consider anthropogenic sources contributing to high wind dust events that occur within the six-month timeframe to be reasonably-controlled (assuming wind speeds are high enough to overwhelm those reasonable controls).

If an air agency does not undertake measures to implement agreed-upon reasonable controls on the newly identified source, the EPA would generally not be able to concur on future high wind exceptional events in which the newly-identified source contributes to exceedances or violations of a NAAQS. Under this scenario, the EPA and the air agency would include associated event data in planning decisions.

Once approved and implemented, an air agency's High Wind Action Plan is effective for three years and would generally facilitate the EPA's ability to determine that identified sources have reasonable controls for events where wind speeds exceed the high wind threshold. As with any exceptional event, the nRCP evaluation for future events that occur under an approved High Wind Action Plan would consider whether controls were implemented effectively according to the High Wind Action Plan. While the High Wind Action Plan is not in itself enforceable, the EPA's concurrence of exceptional events would generally be contingent on implementation of the plan (i.e., the newly-identified sources generally would not be considered to meet the nRCP criterion if the High Wind Action Plan is not implemented).[42]

#### *3.7.2.3 Content of a High Wind Action Plan*

At a minimum, a High Wind Action Plan to address new sources should include the following:

- identification of sources and proposed controls

[41] The specific timeframe for plan development (i.e., six months or an alternate period) may vary by area and on a case-by-case basis. A plan to implement some reasonable controls (e.g., tarps on new gravel piles) may be developed in less than six months while a plan to implement more complex reasonable controls (e.g., installation of water sprays) may take a longer. Similarly, the determination of whether implementation of controls was prompt and reasonable will depend on the circumstances.

[42] Note that if and when the EPA takes a regulatory action that relies on a decision to exclude data under the Exceptional Events Rule, the EPA will consider and appropriately respond to any public comments on whether the event was "not reasonably controllable or preventable."

- an assessment of reasonableness
- timeframes for implementation
- a plan for enforcement, if appropriate

The High Wind Action Plan should also identify the current high wind threshold and whether this threshold should be revised as a result of the newly identified controls. As mentioned previously, a High Wind Action Plan could also document mitigation measures and current controls, especially if these were not included in a previous demonstration package.

*3.7.2.4 Comparison of a Natural Events Action Plan and High Wind Action Plan*

The concept of a High Wind Action Plan originated from the Natural Events Action Plan (NEAP) concept established by the Natural Events Policy. Table 5 presents a comparison of the two plans.

**Table 5. Comparison of Natural Events Action Plan and High Wind Action Plan.**

| Element | Natural Events Action Plan | High Wind Action Plan |
|---|---|---|
| Establish public notification and education programs | Required component of plan. | Optional component of plan to address mitigation requirement for EER (40 CFR 51.930). |
| Minimize public exposure to high levels of windblown dust | Required component of plan. | Optional component of plan to address mitigation requirement for EER (40 CFR 51.930). |
| Current reasonable controls on known contributing controllable sources | Required component of plan (BACM). | Required component of plan (but not necessarily BACM). |
| Identify and begin implementing reasonable controls in place on newly-identified contributing controllable sources | Required component of plan. | Required component of plan. |
| Re-evaluate the controls | Every five years. | ≥ 3 years or if high wind dust patterns change and suggest new sources. |
| Timeframe for plan submittal | Within 18 months of violation. | Within 6 months from the EPA's notification of newly-identified uncontrolled source(s). |
| Timing of EE decision on concurrence | Prior to NEAP submittal.[43] | Per schedule discussed in Section 5.2. |
| High wind threshold | Required part of Natural Events Policy[44] but not | Required component of optional plan. |

[43] Unless the NEAP was not adhered to (e.g., BACM never implemented for previous events).

| Element | Natural Events Action Plan | High Wind Action Plan |
|---|---|---|
| | specifically required to be included in NEAP. | |

*3.7.2.5 Attainment status and the role of High Wind Action Plan*

The High Wind Action Plan can be a useful tool for any area that has newly identified sources requiring reasonable controls. An area's attainment status may, however, partially determine when an air agency might develop a High Wind Action Plan.

Attainment/Unclassifiable/Maintenance Areas. The EPA agrees that generally controls are not expected for the *first* high wind dust exceptional event in a PM *attainment* area because it is generally not reasonable to expect air agencies to undertake control efforts that have not been required to meet a NAAQS. However, if an area has a second high wind dust event in a 3-year period, then the EPA generally will consider the area to "have a history" of high wind dust events. Considering this "history," the EPA would not likely concur on an air agency's subsequent (e.g., after the second event) request to exclude data if emissions from uncontrolled sources result in an exceedance or violation. If an attainment area experiences a second high wind dust event in a 3-year period and the EPA determines that the concentrations are attributable to sources that could be reasonably controlled going forward, the EPA may ask the submitting agency to develop and implement an adequate High Wind Action Plan. The EPA would then determine whether to concur with the air agency's request to exclude data if all other EER criteria have been met. The EPA would also consider the HWAP going forward.

Nonattainment Areas. A PM nonattainment area is expected to have reasonable controls in place, but there may be new sources or improved controls that are identified after the original implementation of the reasonable controls. Additionally, during high wind conditions, sources outside the designated nonattainment area may contribute to violations in the nonattainment area. The EPA will consider the wind speeds in the event(s) in question relative to the high wind threshold in determining if additional controls are reasonable. In cases where additional reasonable controls are needed, the EPA may do one of the following:

1. Request that the submitting agency develop and implement an adequate High Wind Action Plan. Determine whether to concur with an air agency's request to exclude data if all other EER criteria have been met. Consider the HWAP going forward. Subsequent events with wind speeds above the high wind threshold could similarly be concurred upon.

2. Nonconcur in the absence of additional actions beyond what is required by the SIP and its associated deadlines. In these cases, the EPA would not remove the events from regulatory decisions. As a result, the event-related concentrations may play a role in regulatory actions such as a clean data finding or a failure to attain decision. For example,

[44] "Areas Affected by PM10 Natural Events" (the PM10 Natural Events Policy), memorandum from Mary D. Nichols, Assistant Administrator for Air and Radiation, to EPA Regional Offices, May 30, 1996, page 7, "The conditions that create high wind events vary from area to area with soil type, precipitation and the speed of wind gusts. Therefore, the State must determine the unusually high wind conditions that will overcome BACM in each region or subregion of the State."

this option may be most sensible to all parties early in a planning cycle when an agency is working on implementing controls that are expected to result in significant improvements in an area's dust control.

3. Nonconcur and conduct a SIP call. If the EPA identifies a major deficiency in the SIP controls, then the EPA may choose to nonconcur and issue a SIP call to expedite implementation of reasonable controls on particular sources.

The EPA intends to work with the air agency to determine which approach listed above, or other approach, will get reasonable controls in place most effectively and efficiently.

## 4. Mitigation

The EER was promulgated pursuant to Section 319 of the Clean Air Act which contains a provision providing that in promulgating regulations, the EPA shall follow the principle that each air agency "must take necessary measures to safeguard public health regardless of the source of the air pollution..." This provision was the basis for the mitigation requirements in 40 CFR §51.930 and the requirement in the EER at 40 CFR §50.14(c)(1)(i) that all air agencies must "notify the public promptly whenever an event occurs or is reasonably anticipated to occur which may result in the exceedance of an applicable air quality standard." The language at 40 CFR §51.930 requires that:

"(a) A State requesting to exclude air quality data due to exceptional events must take appropriate and reasonable actions to protect public health from exceedances or violations of the national ambient air quality standards. At a minimum, the State must:

(1) Provide for prompt public notification whenever air quality concentrations exceed or are expected to exceed an applicable ambient air quality standard;

(2) Provide for public education concerning actions that individuals may take to reduce exposures to unhealthy levels of air quality during and following an exceptional event; and

(3) Provide for the implementation of appropriate measures to protect public health from exceedances or violations of ambient air quality standards caused by exceptional events."

Although the language at 40 CFR §51.930 does not require the preparation or submittal of a mitigation plan, it does require that the air agency develop and implement processes and measures that could easily become the elements of a formal, written plan. The mitigation criteria focus on specific measures and actions to protect public health, rather than on measures that control or prevent emissions associated with a specific event. So, a mitigation plan may include measures that apply to emissions sources in general (e.g., dust suppression or covering techniques for mineral processing) rather than those measures or controls that might be discussed in the "not reasonably controllable or preventable" portion of an event demonstration (e.g., controls/measures X, Y, and Z were in place on sources A, B, and C during the time of the event). A mitigation plan may also include procedures and responsibilities for public alerts and sheltering advisories. Because having a mitigation plan in place will help air agencies meet the EER requirements at 40 CFR §50.14(c)(1)(i) related to public notification more systematically, the EPA encourages the development and submittal of a mitigation plan with the demonstration package if one has not already been adopted.

# 5. Process Issues for Exceptional Events Including High Wind Dust Events

## 5.1 Demonstrations Package Submittal and Review

The EPA encourages air agencies to engage in regular communication with the EPA to prepare complete demonstration packages that meet the requirements of the EER as interpreted by this document, but that also avoid unnecessary detail and the associated preparation effort. The EPA will make its concurrence decision based on information presented by the air agency, possibly with other information that the EPA may have or generate. Determinations on Exceptional Event demonstrations do not constitute final agency action until they are relied upon in a regulatory decision such as a finding of attainment or nonattainment which will be made through notice-and-comment rulemaking process.

## 5.2 Timeframes

The EPA recommends the following timeframes for exceptional events processes as outlined in Table 6 below.

**Table 6. Timeframe for Exceptional Event Processes.**

| Exceptional Event Demonstration Action | Timing | Timing Specified by EER? |
|---|---|---|
| Air agency submits a prospective controls analysis | Any time in advance of the EPA's review of a particular event or set of events. | No |
| 1. Air agency places flags in AQS | Flags and an initial event description should be placed in AQS either in accordance with the special schedules promulgated with new or revised NAAQS or in accordance with the general schedules for submission of data to the AQS database (i.e., within 90 days of the end of the previous quarter) but not later than July 1st of the calendar year following the event in which the flagged measurement occurred | Yes |
| 2. Air agency submits letter of intent to submit a package *(optional)* | To promote early communication, the EPA suggests that air agencies provide a letter of intent to submit a demonstration package for flagged data in AQS as soon as possible after the agency identifies the significance of the event, if possible within 12 months from the event occurrence.[45]<br>This is an optional step that would alert the EPA of an air agency state's intention to submit a package for | No |

[45] The Letter of Intent is an optional step and the EPA recognizes that states may need additional time to prepare and submit demonstration packages particularly where the basis of the exclusion is violating an annual standard or a 3-year design value. Similarly, a state could consider submitting an annual letter of intent if annual submittal makes sense for resource planning or for historically seasonal events. If a state decides to submit a letter of intent, the EPA recommends that it be submitted as expeditiously as possible following the state identifying the event or events as having significance.

| Exceptional Event Demonstration Action | Timing | Timing Specified by EER? |
|---|---|---|
| | a flag. See Appendix C for an example letter of intent. | |
| 3. The EPA responds to an air agency's notice of intent and informs the air agency of the EPA's review plans. | Anticipated to be within 60 days of receipt of letter of intent to submit a package from air agency. The EPA response will provide the regional office's best assessment of the priority that can be given to the submission once received and any case-specific advice the EPA may have to offer for the preparation of the demonstration.<br><br>The EPA will generally give priority to exceptional event decisions that affect near-term regulatory decisions. | No |
| 4. Air agency submits exceptional event package to the EPA | The EER allows air agencies to submit packages up to 3 years following the end of the calendar quarter in which the event occurred, or 12 months prior to the date that a regulatory decision must be made by the EPA, whichever is sooner. Schedules are generally tailored in 40 CFR Part 50 when NAAQS revisions result in initial designations for new NAAQS. | Yes |
| 5. Air agency submits High Wind Action Plan (optional) | Submit with EE package or within 6 months from the EPA's notification of newly-identified uncontrolled source(s). | No |
| 6. The EPA completes initial review of exceptional event package & sends letter to air agency outlining preliminary assessment of completeness of package/need for additional information[46] | Anticipated within 120 days of receipt by the EPA. | No |
| 7. Air agency provides supplemental information requested by the EPA, if needed | Requested within timeframe identified by the EPA in the initial review letter (step 4). This will typically be 60 days from receipt of the letter from the EPA. The EPA recognizes that air agencies may need more than 60 days to prepare and submit some types of supplemental information. The EPA is willing to work with agencies on supplemental timeframes; however, the mandatory timing of EPA actions may | No |

[46] The EPA may also ask for additional information during later steps (e.g., as part of the final review (step 8)).

| Exceptional Event Demonstration Action | Timing | Timing Specified by EER? |
|---|---|---|
| | limit the response time the EPA allows. | |
| 8. The EPA final review of EE package | The EPA intends to make a decision regarding event concurrence as expeditiously as necessary if required by a near-term regulatory action, but no later than 18 months following submittal of a complete package. | No |

### 5.3 Public Comment

If an air agency submits substantial supplemental information to the EPA after the air agency's initial opportunity for public comment, the air agency may need to provide an additional opportunity for public comment. The EPA will make a case-by-case decision regarding supplemental opportunities for public comment during the demonstration preparation, submittal, and review process and will inform the air agency of this decision. As part of this decision, the EPA may consider potential impact and/or expressed public interest in the claimed event, data uncertainty, historical application of demonstration approach, etc. Additionally, certain regulatory actions that may rely on exceptional event data exclusions (e.g., proposed designation or redesignation classifications and attainment determinations) require the EPA to provide an opportunity for public comment prior to the EPA's taking final Agency action.

If an additional opportunity for public comment is needed, the air agency should submit the additional information to the EPA within the timeframe outlined in step 7 above and then make the information available for public comment. Once the opportunity for public comment has closed, the air agency should submit the public comments, if any, along with the air agency's responses, to the EPA within 30 days of the close of the public comment period. If air agencies do not submit High Wind Action Plans as part of the exceptional event demonstration package, air agencies should also provide opportunity for public comment for the Plan.

# 6. Recommendations for Preparing High Wind Dust Exceptional Event Demonstrations

Section 6 provides practical information on preparing and evaluating exceptional events demonstrations for high wind dust events based on the guidance in this document and the EPA's experience from demonstrations that the EPA has reviewed since the promulgation of the EER. Section 6.1 provides the general, suggested framework to prepare a high wind dust event demonstration. Section 6.2 outlines the suggested steps to creating a prospective controls analysis. Section 6.3 provides details and examples for the technical elements. The EPA encourages air agencies to include a description of mitigation strategies as part of the demonstration although submission of a mitigation plan is not a regulatory requirement.

## 6.1 Framework for Preparing Evidence to Support a High Wind Dust Exceptional Event

While the technical elements outlined in the EER suggest that each element can be demonstrated independently, many of the elements are linked. The EPA suggests the following approach to a demonstration, as depicted in Figure 2.

Optional Pre-Step. Provide a prospective controls analysis to the EPA for approval, which can subsequently be used to supplement the evidence in step 2.

Step 1. Develop a conceptual model of how the event unfolded and resulted in the exceedance(s).

Step 2. Address not Reasonably Controllable or Preventable (nRCP).

- Identify high wind threshold (see Appendix A)
- Calculate sustained wind speed: wind speed will inform whether a basic or comprehensive controls analysis is recommended.
- Assess general wind direction and identify potential sources
- Develop controls analysis

Step 3. Present Historical Fluctuations analyses and a conclusion for the EPA's review of whether the event was in excess of normal historical fluctuations (HF).

Step 4. Address Clear Causal Relationship (CCR).

- Conduct CCR analyses
  - Consider whether CCR identified sources not addressed in nRCP.

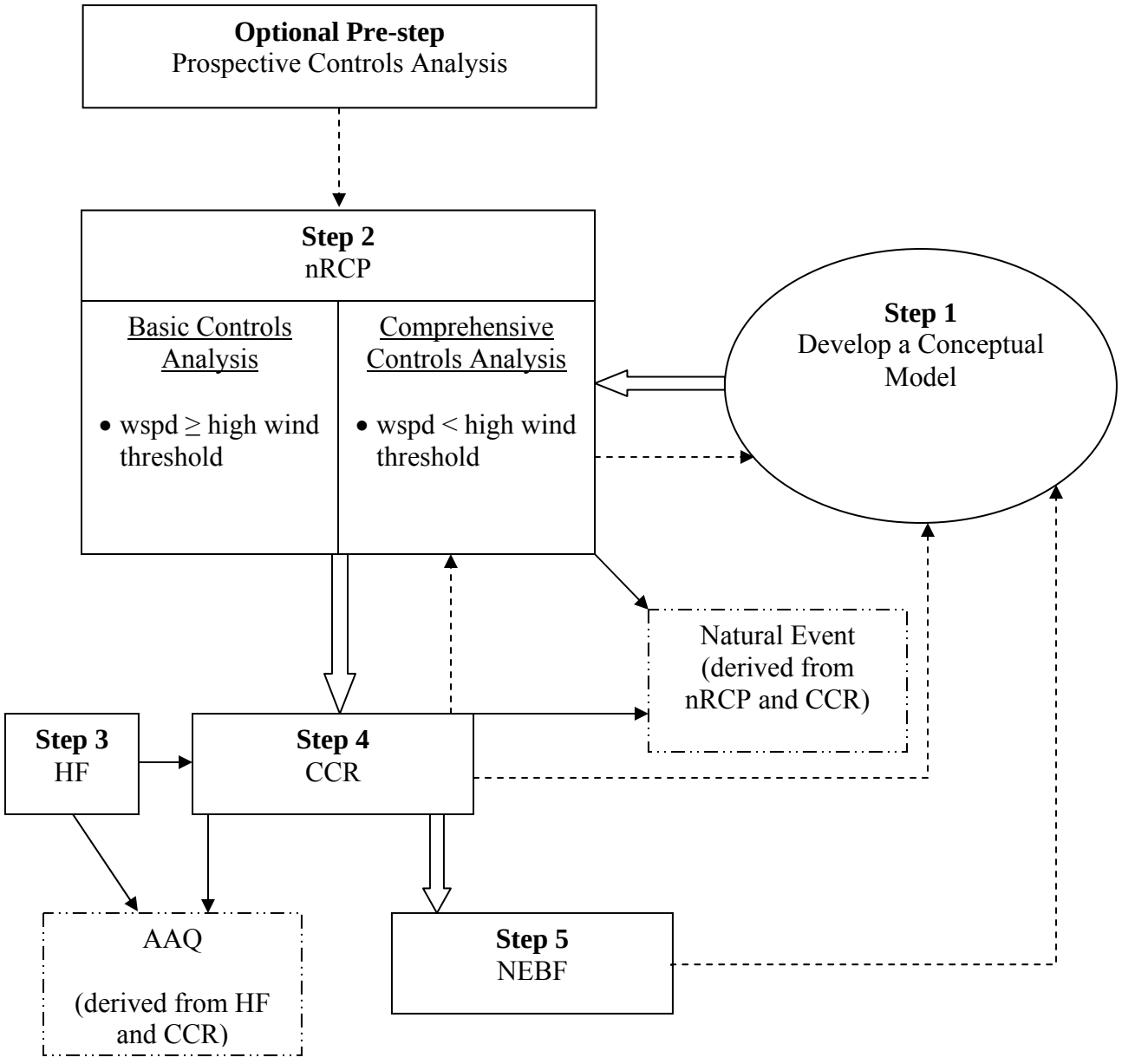
Step 5. Provide information that AAQ has been met by providing HF analyses and demonstrating CCR. Once an air agency completes the HF and CCR analyses, then it will generally also have satisfied the Affects Air Quality (AAQ) element.

Step 6. Provide information that Natural Event has been satisfied by demonstrating nRCP and CCR. Once an air agency completes the nRCP and CCR analyses, then it will generally also have satisfied the Natural Event element.

Step 7. Address No Exceedance But For the event (NEBF) only after all previous criteria have been satisfied.

The EPA recommends reviewing and revising the conceptual model, if necessary, after the air agency completes each identified step.

**Figure 2. Suggested order for preparing technical elements for demonstration packages for high wind dust events.**



## 6.2 Preparing a Prospective Controls Analysis (Optional)

An air agency's request for a prospective determination of reasonable controls, independent of a specific exceptional event request, should include the following elements:

1. Statement of which NAAQS (i.e., pollutant, date of relevant NAAQS, averaging time), area (e.g., Ventura County, California) and time period (e.g., January 1, 2012 – December 31, 2015) are to be covered by the prospective determination.

2. Statement of the area's attainment status for the pollutants (e.g., serious nonattainment with an extended attainment date for the 2006 24-hour $PM_{2.5}$ standard) and resultant required CAA control level (e.g., nothing, RACT, RACM, BACT, BACM and/or Most Stringent Measures (MSM)).

3. Current emissions inventory quantifying natural (if available) and anthropogenic sources of the pollutants and identifying all those the air agency considers significant.

4. Information on whether sources are reasonably controlled.

5. Chronology of agency SIP (and NEAP) submittals to address the required CAA control level and the EPA's actions on these submittals. This should identify whether the submittals relied on any commitment for subsequent action and whether the EPA actions were less than full approval. *The air agency's request for a prospective determination should summarize the status of SIP submittals and the EPA's action for each significant source category. The EPA will consider this in its review.*

6. Summary of all exceptional event requests and other exceedances for the pollutants in the area over the last 10 years. This should include the number, location, cause (sources) and the EPA's action for all requests.

7. Discussion of any and changes to presence/understanding/requirements for controls and/or emission sources since the EPA's approval in #5 including:
    a. Significant evolution in understanding of control levels in #2 (e.g., while 15 ppm was approved as BACM in 2001, 4 ppm is now widely accepted as BACM).
    b. Significant changes in the emissions inventory since #5 suggests possible additional significant sources (e.g., past planning efforts focused on wood-smoke, but recent information suggests significant wind-blown dust sources as well).
    c. Exceptional event requests and other exceedances discussed in #6 (e.g., newly recurring exceptional event requests might suggest a new source that lacks reasonable controls despite previous EPA approval of controls and an attainment demonstration).

8. A wind speed threshold up to which controls are expected to be effective (i.e., high wind threshold (See Section 3.1.4 and Appendix A)). Should address controlled anthropogenic sources as well as undisturbed natural surfaces.

Upon review of the prospective controls analysis, the EPA will approve, disapprove, or request additional information. The EPA generally anticipates approving prospective controls determinations when all of the following occur:

- The air agency provides all the above items.
- The EPA has fully approved the required CAA control level in #5.
- The EPA has confirmed fulfillment of all underlying commitments in #5.
- The air agency certifies there are no additional considerations in #7 and the EPA agrees.
- The EPA agrees with the wind threshold (#8).

The EPA is not likely to approve prospective determinations if any of the following occur:

- The air agency's request does not include all the items listed above.
- The air agency has not demonstrated the required CAA control level in #5.
- The air agency has not confirmed fulfillment of commitments in #5.
- Considerations in #7 indicate that some significant sources are lacking reasonable controls and/or implementation of controls.
- The EPA disagrees with the wind threshold (#8).

The EPA may subsequently approve an initially unapprovable prospective controls analysis, if the submitting air agency revises the demonstration to address the EPA's concerns (e.g., missing elements are provided, the high wind threshold is altered, or new information on existing controls is provided). If the EPA identifies the need for reasonable controls on additional sources, then the EPA may not approve the prospective controls analysis until the submitting agency develops, submits, and establishes a plan (e.g., High Wind Action Plan) to implement the needed controls.

## 6.3 Recommended Methods for the Technical Elements of a High Wind Dust Exceptional Events Package

This section contains recommendations and examples for preparing and demonstrating the technical elements for high wind dust events. These recommendations and examples do not represent all analyses that air agencies could or should complete as part of a high wind dust exceptional events package. The examples were taken from EPA Region 9 analyses and the following high wind dust event demonstration packages that air agencies submitted to the EPA Region 9:[47]

[47] Full exceptional event demonstration packages are available as follows:
- Anaheim (SCAQMD, event date: October 13, 2008) at http://www.aqmd.gov/pub_edu/notice_exceptional_events_2009.html
- Assessment of Qualification for Treatment under the Federal Exceptional Events Rule: High Particulate (PM10) Concentration Event in the Phoenix Area on April 30, 2008. Technical report prepared by the Arizona Department of Environmental Quality, Air Quality Division. August 16, 2010.
- State of Arizona Exceptional Event Documentation for the Events of July 2nd through July 8th 2011, for the Phoenix PM10 Nonattainment Area. Report prepared by Arizona Department of Environmental Quality (ADEQ), March 8. 2012.

- Anaheim (October 13, 2008), South Coast Air Quality Management District (SCAQMD)
- Phoenix (April 30, 2008; July 2-8, 2011), Arizona Department of Environmental Quality (ADEQ)

### 6.3.1 Step 1: Develop a Conceptual Model

A demonstration package for a high wind dust event should include a conceptual model of how the event occurred. A conceptual model is generally used to describe various concepts and their relationships. For exceptional events, the conceptual model should identify the various phenomena (e.g., high wind conditions and emissions) that occurred that resulted in the exceedance. In its simplest form, this could be a narrative description of how the event unfolded and resulted in the exceedance(s). The conceptual model could be similar to an abstract and should help tie the various rule criteria together into a cohesive explanation of the event. Air agencies could include the following information in the conceptual model:

- Description of weather phenomena that resulted in high wind
- Description of sources (land areas, industrial sources, other anthropogenic sources, natural sources, types of PM/dust) likely entrained by the high wind
- Explanation of the path by which the dust reached the monitor(s)
- Description of and map showing relevant monitors, topography, and other relevant geographic features that assist in understanding how the event developed and resulted in the exceedance.
- Description of how the event day differs from non-event days
- Description of concentration and wind patterns for the exceeding monitor(s) and for surrounding area

The following is an example conceptual model narrative.[48]

> Southern California's South Coast Air Basin (Basin) consists of 10,743 square miles and consists of Orange County and the non-desert portions of Los Angeles, Riverside and San Bernardino Counties. The population of the Basin is approximately 16 million people, with approximately 11 million gasoline powered vehicles and 300,000 diesel vehicles. The coastal plain contains most of the population of the Basin, which is surrounded by tall mountains, including the San Gabriel Mountains to the north, the San Bernardino Mountains to the northeast, and the San Jacinto Mountains to the east. The coastal range of the Santa Ana Mountains separates the inland part of Orange County from Riverside County. The proximity of the Pacific Ocean to the west has a strong influence on the climate, weather patterns and air quality of the Basin. The mountains also have a significant impact on the wind patterns of the Basin. Offshore winds flow down slope and are warmed and dried by compressional heating, gaining momentum through the passes and canyons. Northeasterly winds, known as Santa Ana winds, typically account for the

[48] Letter dated November 22, 2010 to Matthew Lakin, Manager Air Quality Analysis Office USEPA Region 9, from Karen Magliano, Chief Air Quality Data Branch California Air Resources Board, transmitting final report dated August 5, 2010 entitled, "Analysis of Exceptional Events Contributing to High PM10 Concentrations in the South Coast Air Basin on October 13, 2008."

highest wind events in the Basin, occurring several times each year. Onshore high-wind events also occur with the strongest winds typically occurring in the mountains and deserts.

Violations of the $PM_{10}$ NAAQS were recorded at the South Coast Air Basin Anaheim monitoring station on October 13, 2008, due to high winds. The 24-hour mass concentration at Anaheim was measured with a federal equivalent method (FEM) Tapered Element Oscillating Microbalance (TEOM) continuous monitor, with a midnight-to-midnight 24-hour average concentration of 199 $\mu g/m^3$. This was not a sampling day for the Federal Reference Method (FRM) filter measurements in the Basin. While no other $PM_{10}$ measurements exceeded the federal standard level (150 $\mu g/m^3$), other stations in the Basin had elevated concentrations during the same period.

A strong Santa Ana wind event developed on October 13th, causing very high northerly through easterly winds in the mountains and deserts, especially through and below the wind-favored passes and canyons in the Basin. National Weather Service (NWS) weather stations measured extremely high peak wind gusts throughout the day in areas upwind of the high SCAQMD $PM_{10}$ stations, including: 87 mph by in [*sic*] the Santa Ana Mountains of Orange County (Freemont Canyon RAWS); 87 mph in the San Gabriel Mountains of Los Angeles County (Chilao RAWS); 79 mph in the Malibu Hills of Los Angeles County; 61 mph at Ontario International Airport in San Bernardino County; 55 mph at Corona Airport in Riverside County; 51 mph at Chino Airport in San Bernardino County and 41 mph at the Santa Ana – John Wayne Airport in Orange County.
Due to the widespread winds, sources of the windblown dust were both natural areas, particularly from the mountains and deserts, and BACM-controlled anthropogenic sources. The timing of this event is verified with the high wind observations and reports of reduced visibility and blowing sand and dust, in conjunction with the hourly TEOM and BAM $PM_{10}$ measurement data from nearby monitors in the Basin, when available.

The following maps support the conceptual model:

- Map of the South Coast Air Basin Showing Air Monitoring Stations and Forecast Areas
- Map of South Coast Air Basin with Selected Cities and Topography
- Map of South Coast Air Basin $PM_{10}$ Monitors

### 6.3.2 Step 2: Address not Reasonably Controllable or Preventable (nRCP)

The nRCP demonstration should identify the natural and anthropogenic emissions believed to have contributed to the event and indicate how they were not reasonably controllable or preventable. Generally, the nRCP will include identification of natural sources and whether they are reasonably controllable, and identification of anthropogenic sources and the associated reasonable controls.

#### *6.3.2.1 Identify source areas and source categories expected to have contributed to the event*

The EPA recommends that the first step of the nRCP demonstration is to identify the likely source area and source categories expected to have contributed to the event. The source areas and

categories can be general, such as, "The area upwind of the monitor includes portions of the Santa Ana Mountains to the NE of the station and extending down into the Basin. Sources of the windblown dust were both natural areas, particularly from the mountains and deserts, and BACM-controlled anthropogenic sources."[49] Identifying the geographic references on a map informs the analysis.

*6.3.2.2 Consideration of wind speed*

The demonstration should indicate what the expected high wind threshold is for the local area and whether the sustained wind speed exceeded this level (See Appendix A2 and A3 for information on developing a high wind threshold). The wind speed data do not necessarily have to be at the location of the exceedance, but they should represent the source area generating the emissions. The EPA recognizes that official and reliable wind measuring stations may be spatially sparse, especially in rural areas. There may be also be occasions when official wind stations do not record significant winds during an event. In these instances, the submitting air agency should consult with the appropriate EPA regional office regarding use of wind speed or other appropriate data. Generally, the EPA will accept that high winds could be the cause of a high 24-hour average $PM_{10}$ or $PM_{2.5}$ concentration if there was at least one full hour in which the hourly average wind speed was above the area-specific high wind threshold. Potential issues arise when determining the hourly average wind speed if wind speeds are not recorded at specified intervals throughout each hour. While some sources of wind speed data use hourly averages, other data sources employ 1 - 5 minute ("short-period") averages. When the available wind speed data consist of only the wind speed during a fixed short period of each hour (e.g., the first or last five minutes of each hour) or the wind speed during the variable short period when wind speed was at its maximum during the hour, the EPA will generally accept that the hourly average wind speed was above the threshold if the reported short-period wind speed was above the threshold. Where wind speed is recorded at specified intervals throughout each hour, agencies should use all recorded data to calculate the hourly average wind speed.[50] The EPA may, however, consider multiple occurrences of high wind measured at these shorter averaging times as part of the weight-of-evidence demonstration. At a minimum, demonstrations should include the maximum sustained wind speed for each hour of the event and also the number of periods above the high wind threshold.

The EPA notes that The National Climate Center has started archiving the 2-minute winds for every 2-minute period of each hour for all ASOS stations in the country. Almost all sites have data since March 2005, with most archiving data since 2000. The EPA has further developed a preprocessor to AERMOD, called AERMINUTE, that takes short-period wind speed observations and calculates an hourly average wind that can be fed into AERMET, the AERMOD meteorological processor. The AERMINUTE output is user friendly. AERMET can also accept, process, and calculate hourly average wind speeds from sub-hourly data with a resolution equal or greater than 5-minutes from sources other than AERMINUTE.

[49] Letter dated November 22, 2010 to Matthew Lakin, Manager Air Quality Analysis Office USEPA Region 9, from Karen Magliano, Chief Air Quality Data Branch California Air Resources Board, transmitting final report dated August 5, 2010 entitled, "Analysis of Exceptional Events Contributing to High PM10 Concentrations in the South Coast Air Basin on October 13, 2008."

[50] While the National Weather Service defines a "sustained wind" as the wind speed determined by averaging observed values over a two-minute period, the EPA believes that it would take a longer period of high wind speeds to raise enough dust to significantly influence measured 24-hour average values of PM10 or PM2.5

The EPA will consider shorter-term "snapshots" of wind data such as National Weather Service hourly summaries as part of the weight-of-evidence demonstration.

Generally, the EPA recommends using NWS data or the National Climate Data Center. Where meteorological data are not available for a particular area and such data are critical for the demonstration, agencies may substitute modeled surface wind speeds for actual measured data. Models that agencies can use to develop estimates for actual measured wind speed surface measurements include MM5, WRF, and, possibly, NAM. Wind speed data from a multitude of sources and with different averaging times, including model outputs may be included in a high wind dust event demonstration.

*6.3.2.3 Basic controls analysis*

Generally, if the wind speed data is at or above the area-specific high wind threshold, the air agency can provide a basic controls analysis to show that the event was not reasonably controllable or preventable (see Section 3.1.5.1). A basic controls analysis should identify all contributing emission sources in upwind areas and provide evidence that those sources were reasonably controlled, whether anthropogenic or natural.

A basic controls analysis would include a brief description of local/upwind sources contributing to the event and a description of the controls on the anthropogenic sources in place at the time of the event (e.g., local BACM measures). In general, the EPA anticipates all upwind areas of disturbed soil to be potential contributing sources. For the sources identified, the submitter should explain that dust emissions occurred despite having reasonable controls in place (e.g., controls that overwhelmed by high wind). After reviewing the demonstration, the EPA may ask for additional information on specific sources.

An example of a basic controls analysis for the anthropogenic sources in a nonattainment area is:[51]

> This requirement is met by demonstrating that despite reasonable and appropriate measures in place, the October 13, 2008 wind event caused the NAAQS violation. During this event, there were no other unusual $PM_{10}$-producing activities occurring in the Basin and anthropogenic emissions were approximately constant before, during and after the event. SCAQMD has implemented regulatory measures to control emissions from fugitive dust sources and open burning in the South Coast Air Basin. Implementation of Best Available Control Measures (BACM) in the Basin has been carried out through SCAQMD Rule 403 (Fugitive Dust), as well as source-specific rules. With its approvals of the South Coast $PM_{10}$ Attainment Plans in the State Implementation Plan (SIP), EPA has concluded that this control strategy represents BACM and Most Stringent Measures (MSM) for each significant source category, and that the implementation schedule was as expeditious as practicable.

[51] Letter dated November 22, 2010 to Matthew Lakin, Manager Air Quality Analysis Office USEPA Region 9, from Karen Magliano, Chief Air Quality Data Branch California Air Resources Board, transmitting final report dated August 5, 2010 entitled, "Analysis of Exceptional Events Contributing to High PM10 Concentrations in the South Coast Air Basin on October 13, 2008."

- SCAQMD Rule 403 establishes best available fugitive dust control measures to reduce fugitive dust emissions associated with agricultural operations, construction/demolition activities (including grading, excavation, loading, crushing, cutting, planning, shaping or ground breaking), earth-moving activities, track-out of bulk material onto public paved roadways, and open storage piles or disturbed surface areas.
- SCAQMD Rule 1156, Further Reductions of Particulate Emissions from Cement Manufacturing Facilities, is a source-specific rule that applies to all operations, including material handling, storage and transport at cement manufacturing facilities. It restricts visible emissions from facility operations, open piles, roadways and unpaved areas and requires enclosed systems for loading, unloading and transfer of materials. Other operations must employ wind fencing and wet suppression systems or be enclosed with permitted control equipment.
- SCAQMD Rule 1157, $PM_{10}$ Emissions Reductions from Aggregate and Related Operations, is a source-specific rule applicable to all permanent and temporary aggregate and related operations that produce sand, gravel, crushed stone or quarried rocks. Like Rule 1156, this rule restricts the discharge of fugitive dust emissions into the atmosphere through plume opacity tests and limiting visible plume travel to within 100 feet of the operation. This rule requires: prompt removal of material spillage; stabilization of piles with dust suppressants; the control of loading, unloading, transferring, conveyors, and crushing or screening activities with dust suppressants or other control methods; stabilization of unpaved roads, parking and staging areas; sweeping of paved roads; and the use of track-out control systems.
- SCAQMD Rule 1158, Storage, Handling, and Transport of Coke, Coal and Sulfur, is a source-specific rule that applies to any facility that produces, stores, handles, transports or uses these materials. This rule restricts visible emissions and requires that piles be maintained in enclosed storage and that unloading operations be conducted in enclosed structures with water spray systems or venting to permitted air pollution control equipment. It also has specific requirements to control emissions from roadways, other facility areas, and conveyors and the loading of materials.
- SCAQMD Rule 1186, $PM_{10}$ Emissions from Paved and Unpaved Roads and Livestock Operations, requires rapid removal of paved road dust accumulations and establishes a treatment schedule for unpaved roads, street sweeper procurement standards, and design standards for new road construction. SCAQMD Rule 1186.1, Less-Polluting Sweepers, requires procurement of alternative-fueled equipment when governmental agencies replace street sweepers.
- SCAQMD Rule 444, Open Burning, ensures that open burning is conducted in a manner that minimizes emissions and impacts, and that smoke is managed to protect public health and safety. This rule requires authorization for agricultural and prescribed fire, limited to days that are predicted to be meteorologically conducive to smoke dispersion and that will not contribute to air quality that is unhealthy for sensitive groups or worse. It also restricts residential and waste burning.

- SCAQMD Rule 445, Wood Burning Devices, reduces pollution from wood-burning fireplaces and other devices through requirements for new construction, curtailment of wintertime wood burning in specified areas when poor air quality is forecast and restriction of the sale of unseasoned firewood. The SCAQMD Healthy Hearths program provides public education on how to reduce air pollution from wood burning and encourages the conversion to natural gas burning fireplaces through an incentive program.

October 13, 2008 was designated an agricultural and prescribed wildland "no-burn" day, in accordance with SCAQMD rule 444. The $PM_{2.5}$ 24-hour averages at all stations in the Basin, including Anaheim, were well below the 24-hour $PM_{2.5}$ NAAQS and the $PM_{10}$ was estimated to be composed of 87% PM-Coarse particles ($PM_{10-2.5}$) and only 13 percent $PM_{2.5}$. This shows that mostly crustal material comprised the $PM_{10}$ mass and not transported or locally generated urban pollution or combustion sources.

A survey of the SCAQMD complaint records and inspection reports for Anaheim and all other areas of the Basin indicated no evidence of unusual particulate emissions on October 13, 2008 other than related to the strong winds. The complaints are summarized in Table 2-7 from the SCAQMD Clean Air Support System (CLASS) database for complaints and compliance actions. Due to the windy conditions, SCAQMD compliance staff responded to 17 complaints related to windblown dust on October 13. Most were in Riverside and San Bernardino County, but two were in Orange County with no further compliance action taken. No Notices of Violation or Notices to Comply were issued in the Basin for fugitive dust on this day. Several complaints were directly related to the strong winds and windblown dust that overwhelmed the strict fugitive dust controls that are enforced in the Basin. The control methods were generally effective throughout the Basin, but were apparently overwhelmed in several instances by the strong, gusty winds, causing windblown dust and sand to be entrained in the atmosphere.

In addition to the information provided in the example above, the basic controls analysis should also include an explanation of why the control measures should be considered as reasonable. For example, an explanation could include statements similar to: "the source area is within the boundaries of a serious nonattainment area and therefore control measures required to reduce windblown dust as part of the area's approved SIP should suffice as reasonable controls, as additional controls, beyond what is currently required, are economically and technically infeasible." The basic controls analysis should also ensure that the controls discussed include controls for disturbed areas and materials open storage areas susceptible to winds, as well as controls on production sources such as materials loading and unloading.

While the above example provided a basic controls analysis for anthropogenic sources in a non-attainment area, an area attaining the NAAQS can similarly present the current rules, if any, and how the identified rules are reasonable given the attainment status.

In addition to identifying controls on anthropogenic sources, it is important to indicate whether the natural sources could have been reasonably-controlled. For example, the following statement could fulfill this need: "Wind speeds were high enough to entrain dust from natural areas including undisturbed mountain and desert areas upwind of the monitor. Emissions from these

sources were not reasonably controllable due to the cost of applying controls over such a large land area and because of the detrimental effect on the natural ecosystem that could result." Finally, if the EPA recommended controls improvements (e.g., as part of a previous high wind dust exceptional event review) then the controls analysis should address how these controls improvements have been addressed.

*6.3.2.4 Comprehensive controls analysis*

Generally, if the wind speed data is below the area-specific high wind threshold, the air agency will be asked to provide a comprehensive controls analysis to show that the event was not reasonably controllable or preventable (see Section 3.1.5.2). Significant emissions from reasonably-controlled anthropogenic or natural sources are not expected below the high wind threshold, and therefore the analysis should further consider whether all contributing sources are reasonably-controlled. Comprehensive controls analysis could include detailed analyses such as back-trajectories indicating specific sources in the upwind area, a day specific inventory of the contribution for significant sources, detailed descriptions of controls and their effective implementation and enforcement (where appropriate), and also include a detailed explanation of why the control measures should be considered as reasonable.

For a comprehensive controls analysis, the EPA will place significantly more weight on the wind speed data associated with high particulate matter concentrations and will likely expect more detailed demonstrations as sustained wind speeds decrease below the applicable high wind threshold. The EPA may be unable to concur on some of these cases.

One type of analysis that an air agency could use when developing a comprehensive controls analysis is a source contribution analysis, similar to the analysis presented below, for multiple hours of the day. For most events, a single back trajectory may not account for wind direction fluctuations during the event and may not accurately capture all the sources that may be contributing to the exceedance, and where continuous PM measurements are available, trajectories for hours with the greatest PM concentrations are most critical. Also, when moderate winds are responsible for high levels of measured particulate matter, considerably more attention should also be placed on the hours of the day preceding the event to adequately assess the sources contributing to the exceedance that may have influenced particulate matter concentrations before the arrival of the claimed event.

Following is an example of a methodology of a back-trajectories and inventory for a comprehensive controls analysis:[52]

> Back-trajectories were plotted in 5-minute links based on 5-minute average wind speed and wind direction data recorded at the West 43rd Avenue station. The back-trajectory plot for April 30, 2008 is shown in the following figure. These back-trajectories revealed that winds accompanying peak $PM_{10}$ concentrations typically blew from the west-southwest to the West 43rd Avenue station, crossing a mosaic of agricultural, residential, industrial, and riverbed lands. GIS files were used to determine the zoned uses of all

[52] Assessment of Qualification for Treatment under the Federal Exceptional Events Rule: High Particulate (PM10) Concentration Event in the Phoenix Area on April 30, 2008. Technical report prepared by the Arizona Department of Environmental Quality, Air Quality Division. August 16, 2010.

lands within ½ mile of each back-trajectory track over which wind parcels travelled during the two hours prior to delivering the peak $PM_{10}$ concentration to the West 43rd Avenue monitor. Lands under active construction on each exceedance day were identified from earthmoving permit records. Parcel areas were aggregated within seven general categories for which limited emission factor data were available: vacant, agriculture, construction, open/restricted access, riverbed, sand and gravel/landfill, and other lands. The uses of these land categories are generally defined as follows:

Vacant – represents undeveloped land to which public access is not restricted;
Agriculture – represents lands under agricultural cultivation;
Construction – represents lands being developed for long term use that will include ground coverage elements such as pavement, structures, or landscaping that will prevent the generation of windblown dust;
Passive/restricted open space – represents undeveloped or partially developed lands to which public vehicular access is restricted (these lands include public parks, national forests, military posts, and Indian reservations);
Riverbed – represents riverbed channels of the Salt and Gila River branches;
Landfill/sand and gravel – represents lands being used for mineral extraction or waste deposit;
Other – represents developed lands that are protected from windblown dust generation by elements such as paving, structures, and landscaping.

$PM_{10}$ emissions were calculated for each back-trajectory hour using emission factors derived from the Nickling and Gillies data, 5-minute wind speed averages recorded at the West 43rd Avenue monitoring station, and the land use acreage along each back-trajectory computed by MAG staff. The emission factor equations were used to compute $PM_{10}$ emissions for each 5-minute portion of each back-trajectory hour. For each 5-minute period, the measured average wind speed was compared to the threshold friction velocity calculated at a 10-meter height to determine whether the threshold wind speed necessary to the generation of windblown $PM_{10}$ on each land use, undisturbed and disturbed, had been exceeded. If the threshold velocity was exceeded, the appropriate Nickling and Gillies emission factor equation was used to compute $PM_{10}$ emissions in units of gm/cm2-sec. Emissions for each 5-minute period within each hour and within each land use category were converted to units of lb/acre-hr and then summed to produce hourly average $PM_{10}$ emission rates per land use category. The emission rates for the other land use categories and the 2nd hour were calculated using a similar methodology. The land use category emission rates were then multiplied by the acreages within each appropriate land use category to derive $PM_{10}$ emissions for each back-trajectory hour by land use category. The $PM_{10}$ emissions for each of the back-trajectory hours on each exceedance day were summed together to calculate total emissions over each exceedance day back-trajectory by land use category. These land use category emissions were then grouped by anthropogenic and nonanthropogenic categories to assess the relative contribution of nonanthropogenic sources to exceedances recorded at the West 43rd Avenue monitoring station during 2008. A summary of the results of these calculations for the April 30, 2008 exceedance day is presented in the following table.

**Table 5-2. Anthropogenic and Nonanthropogenic Windblown $PM_{10}$ Emissions From W. 43rd Ave. Monitor Back-Trajectory Lands on April 30, 2008**

| Land Use Category | $PM_{10}$ Emissions (lb) | | % of Anthropogenic |
|---|---|---|---|
| | Anthropogenic | Nonanthropogenic | |
| Vacant/Undisturbed | - | 0 | |
| Vacant/Disturbed | 1,501 | - | 20.7% |
| Agriculture/Undisturbed | 0 | - | 0.0% |
| Agriculture/Disturbed | 0 | - | 0.0% |
| Construction/Undisturbed | 0 | - | 0.0% |
| Construction/Disturbed | 277 | - | 3.8% |
| Passive-Restricted/Undisturbed | - | 0 | |
| Passive-Restricted/Disturbed | 0 | - | 0.0% |
| Riverbed/Undisturbed | - | 8,234 | |
| Riverbed/Disturbed | 2,408 | - | 33.3% |
| Sand & Gravel Landfill/Undisturbed | 0 | - | 0.0% |
| Sand & Gravel Landfill/Disturbed | 3,053 | - | 42.2% |
| Other | | - | |
| Total | 7,240 | 8,234 | |
| % of Grand Total | 46.8% | 53.2% | |

The analysis should also include information on whether controls on anthropogenic sources were appropriately implemented and enforced during the time of the event. In addition to identifying controls on anthropogenic sources, it is important to indicate whether the natural sources could have been reasonably-controlled. Available inspection reports and/or notices of violations (NOVs) in upwind areas should be submitted, if available. The EPA recognizes that agencies have varied methods of permitting and enforcement and does not expect *all* agencies to have these records for *all* events. The EPA does, however, ask agencies to make a general showing that the agency has a program in place to ensure controls are being enforced as appropriate (even if no specific evidence exists for the particular day of the event). The EPA will also consider the overall compliance rates for specific source categories in determining whether reasonable controls were in place.

The controls analyses when wind speeds are below the high wind threshold should address whether control improvements were recommended by the EPA (e.g., as part of a previous high wind dust exceptional event review). If controls improvement had been previously recommended then the controls analysis should address how these controls improvements have been implemented.

### 6.3.3 Step 3: Present Historical Fluctuations (HF) Analyses

As described in Section 3.2, the historical fluctuations (HF) analyses and an air agency conclusion will aid the EPA's review and will also inform CCR, NEBF, and AAQ. Specific analyses generally expected to provide the historical context for the event include:

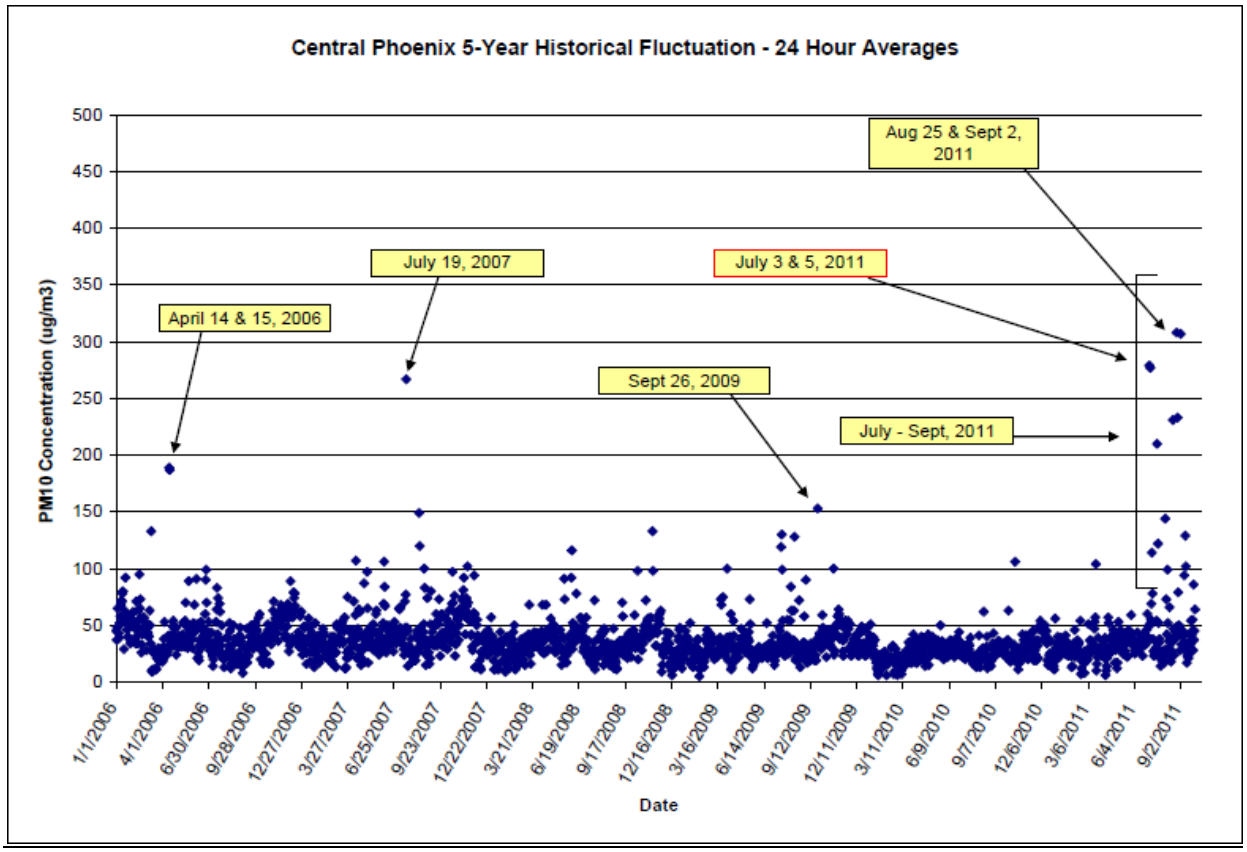
1. A time series for concentration for the event area for the previous three years, or longer if available, with high wind dust events identified: Concentration data should be 24-hour concentrations for each day. Depending on the quantity of data, it may be appropriate to present monthly maximums (note that it is not appropriate to present monthly-averaged daily data or any other average of the daily data as this masks other high values). It is appropriate to identify information such as: seasonal or monthly 24-hour means, other event days, and relevant standards. The following figure[53] is an appropriate example of this type of analysis.

2. Percentile rank of concentration relative to annual data with and without all high wind dust events: The percentile rank of the 24-hour average PM concentration should be provided for the event day relative to all measurement days over the previous three years or longer. To ensure statistical robustness, the EPA generally recommends that submitting agencies to include a minimum of 300 data points in this calculation. If the sampling schedule is 1-in-6 day sampling then the EPA generally recommends that this percentile rank include five years of data (60 sample days/year for five years provides 300 data points). Higher frequency sampling can utilize fewer years of data

[53]State of Arizona Exceptional Event Documentation for the Events of July 2nd through July 8th 2011, for the Phoenix PM10 Nonattainment Area. Report prepared by Arizona Department of Environmental Quality (ADEQ), March 8. 2012.

but not fewer than three years. If three years of data are not available, consult with the EPA.

3. Percentile rank of concentration relative to seasonal data with and without all high wind dust events: The percentile rank of the 24-hour average PM concentration should be provided for the event day relative to all measurement days for the season (or appropriate alternative 3-month period) of the event over the previous three years or longer. It is appropriate to use the same time horizon as used for the percentile calculated relative to annual data.




## 6.3.4 Step 4: Address Clear Causal Relationship (CCR)

As described in Section 3.3, the following types of evidence can support the CCR demonstration:

- Occurrence and geographic extent of the event
- Transport of emissions related to the event in the direction of the monitor(s) where measurements were recorded
- Spatial relationship between the event, sources, transport of emissions, and recorded concentrations
- Temporal relationship between the high wind and elevated PM concentrations at the monitor in question
- Chemical composition and/or size distribution of measured pollution that links the pollution at the monitor(s) with particular sources or phenomena
- Comparison of event-affected day(s) to specific non-event days

Each of these types of evidence is treated in detail below. Note that information generated in this portion of the demonstration submittal may result in revisions to the conceptual model and controls analysis. As the flow diagram (Figure 2) suggests, preparation of a high wind dust exceptional event package is not necessarily a step-wise process.

*6.3.4.1 Occurrence and geographic extent of the event*

Air agencies can provide the following information to help establish the occurrence and geographic extent of the event: special weather statements, advisories, news reports; nearby visibility readings; measurements from monitoring stations; MODIS and other satellite maps; and description of weather conditions that created the high wind.

- Special weather statements, advisories, news reports on both predictions and occurrence of the event:
  SCAQMD provided the following information for an exceptional event showing for Anaheim ***(Note that Appendices from the SCAQMD demonstration submittal are referenced in the excerpt below, but they are not provided as part of this document or the example).***

> The National Weather Service had predicted this first strong Santa Ana event of the season well in advance and Governor Schwarzenegger issued a press release on October 10 to prepare the state for Santa Ana winds and the associated wildfire potential (see Appendix A.7).
>
> The Appendix to this document (Sections A.2 through A.6) contains the forecast discussions, short-term forecasts (nowcasts), fire weather forecasts, warnings and significant wind reports, as available from the NWS Los Angeles/Oxnard and San Diego Forecast Offices, whose areas of responsibility cover the Basin and much of southern California. These show that the strong Santa Ana wind event was well predicted in advance, warning the public of potentially damaging winds and windblown dust and sand, along with reduced visibilities.
>
> NWS advisories and warnings for high winds (Appendix, Section A.5) were already in place on October 12, extending through Tuesday, October 14, or longer. A Wind Advisory is issued by NWS when sustained winds of 30 to 39 mph are expected for 1 hour or longer. A High Wind Warning is issued when sustained winds of 40 mph or more are expected for 1 hour or longer, or for wind gusts of 58 mph or more with no time limit. NWS Oxnard issued High Wind Warnings on October 12, extending through the period for the Los Angeles and Ventura County Mountains and Wind Advisories for the Santa Monica Mountains, the Ventura County coastal and interior valleys, the Santa Clarita Valley, the Los Angeles County San Fernando Valley, and the Ventura and Los Angeles County coasts, including Downtown Los Angeles. NWS San Diego issued High Wind Warnings for the San Bernardino and Riverside County valleys (Inland Empire) and the Santa Ana mountains and foothills and Wind Advisories for the San Bernardino County mountains, Orange County coastal areas, the Riverside County mountains, the San Diego County mountains, and the San Diego County valleys, In short, High Wind Advisories and Warnings were in place for most of the South Coast Air Basin and much of southern California to warn the public of this high

wind event. Northeasterly winds with sustained speeds in the 35 to 45 mph range were predicted throughout the region, along with damaging gusts to 70 mph, especially in the mountains and below passes and canyons in the Inland Empire. Hazardous driving conditions were predicted, especially through and below canyons and passes, as well as blowing dust and sand with reduced visibility, broken tree limbs and downed power lines.

The AQMD Meteorology Section predicted high winds for October 13 in the Coachella Valley for AQMD Rule 403.1, which requires specific actions in this area when wind gusts exceed 25 mph. While there are no other AQMD rule requirements to forecast winds in the Basin, the daily forecast discussion by AQMD issued on October 12 for Monday, October 13 predicted the strong winds. A smoke advisory was already in effect in the morning of October 12 and the strong winds were prominent in the forecast discussion, as follows:

- *SMOKE ADVISORY for Sunday: Concentrations of fine particulates may reach Unhealthy for Sensitive Groups or higher in areas of Los Angeles County directly impacted by smoke from a wildfire in the Angeles National Forest north of Pacoima.*

- *Monday will be mostly clear, windy and warmer as the offshore Santa Ana winds strengthen. Gusty winds through and below canyons and passes will cause elevated particulate concentrations due to windblown dust and possibly continued wildfire activity.*

PM10 predictions were increased throughout the Basin for October 13 and agricultural and prescribed burning was prohibited with a No-Burn declaration for the entire Basin. AQMD issued a Smoke and Windblown Dust Advisory in the morning of October 13, reproduced in the Appendix, Section A.10, that warned of the likelihood of strong Santa Ana winds causing high PM10 concentrations in several areas of the Basin, including Central Orange County (Forecast Area 17, including Anaheim), as follows:
*In addition, strong Santa Ana winds will likely cause PM10 concentrations to reach Unhealthy for Sensitive Groups concentrations or higher in areas throughout the Basin downwind of the winds areas. This includes any areas where windblown dust is visible, especially through and below passes and canyons, until the winds subside. Wind prone areas are likely to include: the San Bernardino Valley (Areas 32, 33, 34, 35), Riverside County Valleys (Areas 22, 23, 24, 25, 26), Orange County (Areas 16, 17, 18, 19, 20) and the Los Angeles County northern and southern coastal areas (Areas 2 and 4).*

- Nearby visibility readings:
  SCAQMD supplied the visibility readings and ADEQ submitted the visibility pictures for nearby airports during Arizona events.

- MODIS satellite maps:
  SCAQMD provided the following maps showing the spatial distribution of windblown dust.

- Description of weather conditions that created the high wind:
  SCAQMD provided the following description of weather conditions around the time of the event:

> An upper level trough of low pressure moved through California, between October 9 and 11. The low pressure system did not create much rain in California during this period, but temperatures were cool throughout the state. By Sunday, October 12, the backside of the trough was over California, providing upper level support for a developing strong Santa Ana wind event. The strong pressure gradients that developed between the high and low pressure aloft created strong winds. The National Weather Service (NWS) 500 millibar (MB) analyses every 12 hours between 0400 PST on October 12 and 0400 PST on October 14 are shown in the Appendix, Section A.11. The winds over California at the 500 MB pressure level started out northwesterly in the morning of October 12 with speeds to 81 mph (70 knots), then became more northerly by the morning of Monday, October 13 with speeds to 57 mph (50 knots). The strong northerly flows aloft, coupled with strong northeasterly surface pressure gradients, enhanced the offshore flows at the surface.
>
> The passage of the low pressure trough aloft brought the first strong cold front of the season at the surface. Section A.12 in the Appendix shows the NWS sea-level pressure analyses, every three hours between 1600 PST on October 12 and 0100 PST on October

14. By 1600 PST October 12, the surface low and cold front was over the northeastern border of New Mexico and high pressure was building over northern Nevada, increasing the northerly gradients. By 0100 PST on October 13, the high pressure over Nevada had increased to 1033 MB, strengthening the gradient flows across California. By 0700 PST, the area of high pressure had expanded and peaked at 1037 MB. The strength of the high pressure remained nearly the same through the rest of the day, while the broad area of high pressure slowly moved to the east, causing the winds to shift from northerly to northeasterly, then easterly throughout the day. The strong pressure gradients caused strong winds, especially in southern California as the flow of cold air from the area of high pressure further enhanced the winds as it flowed across the mountains. Some gusty winds had already been observed on October 12, but they increased considerably in the early morning of October 13.

This is the classic Santa Ana wind pattern that brings strong winds to southern California. High pressure builds over the Great Basin desert region of the western United States in the cold air behind the front with lower pressure off the southern California coast. This pressure gradient creates strong north through northeasterly winds, enhanced by thermal gradients due to denser cold air over the Great Basin. The relatively cool air from the Great Basin deserts flows over the southern California mountains, gaining momentum on the lee side. The downslope flow causes compressional warming and drying of the air in the South Coast Air Basin. This combination of strong wind, high temperatures and low relative humidities make these Santa Ana conditions highly conducive to wildfires in southern California.

The AQMD Meteorology Section routinely analyzes sea-level pressure gradients in southern California to assess winds and air pollution potential. The Summation Pressure Gradient (SPG) is a good indicator of the strength of the flow and whether it is onshore (positive) or offshore (negative), where

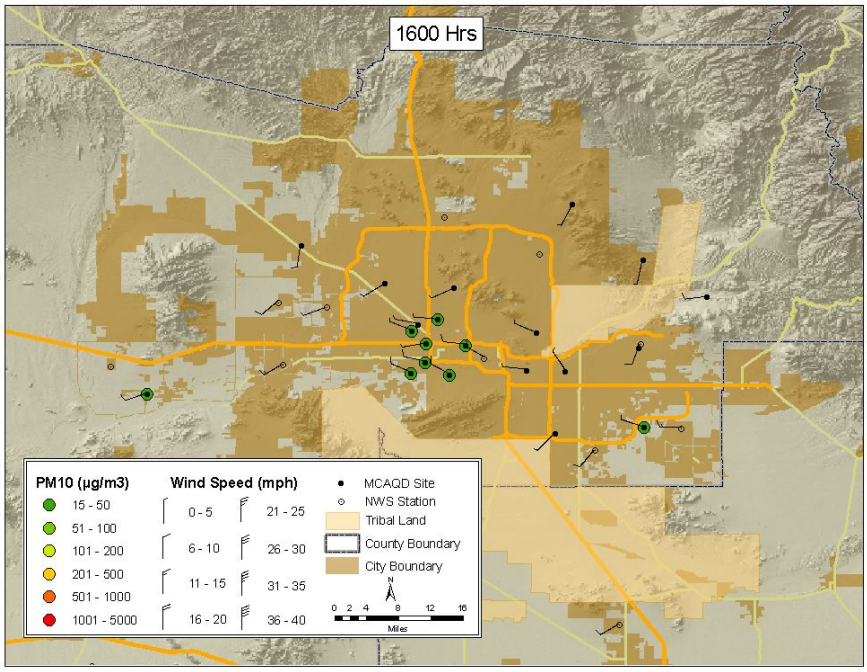
SPG = (SAN-LAS)[54] + (LGB-DAG)[55] + (RIV-DAG)[56]

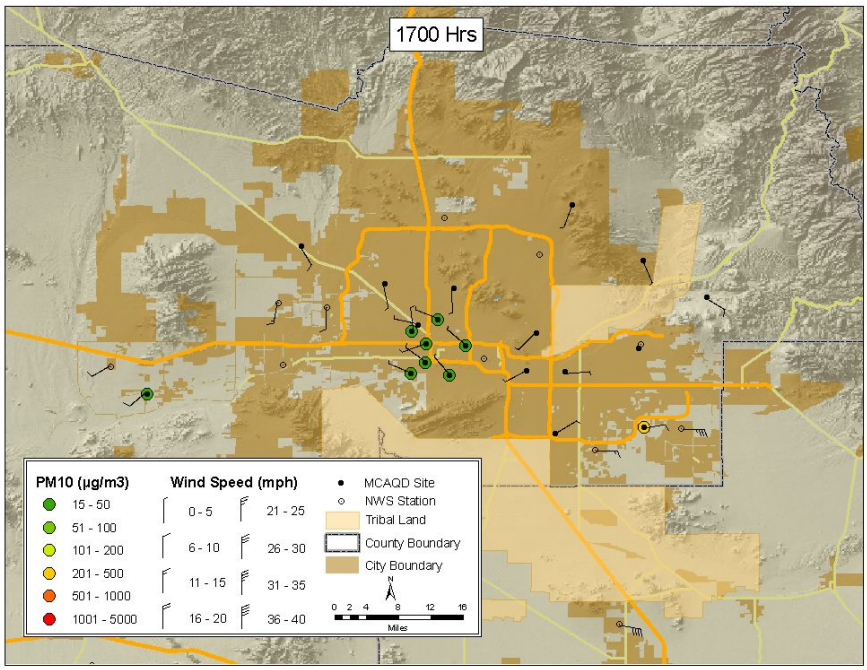
In the morning of October 12, the 0700 PST SPG was −5.5 MB, indicating moderate offshore flow. At the same time in the morning of October 13, the SPG strengthened to −14.7 MB, indicating a stronger offshore gradient. The gradient was enhanced by the upper level pattern and thermal gradient as described above, to create a strong wind event, especially for several hours through the morning of October 13.

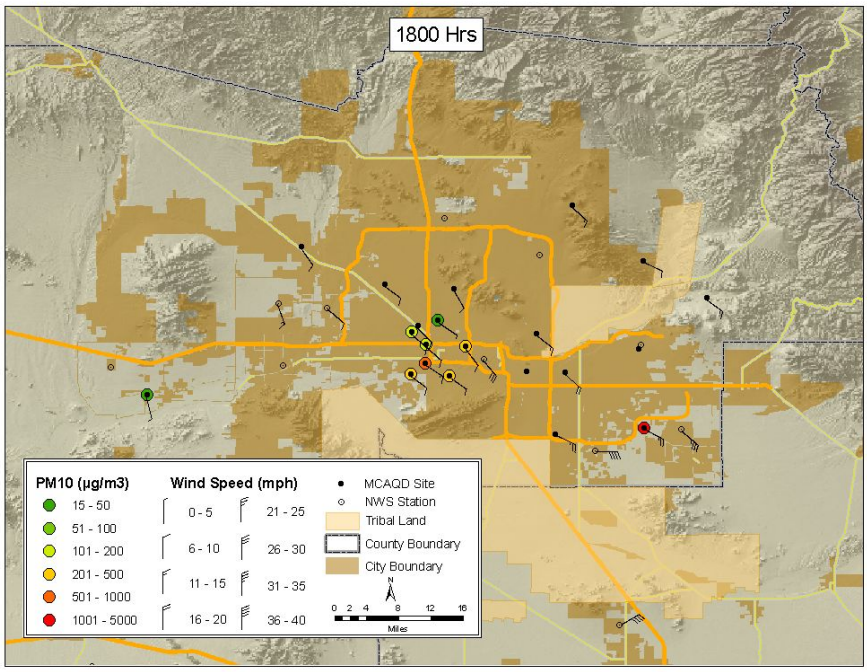
- Measurements from monitoring stations:
  The following figures show the kind of analyses based on measurements from air monitoring and meteorological stations that could be used to show the occurrence and geographic extent of the event.[57] The figures also show that only when the wind speeds

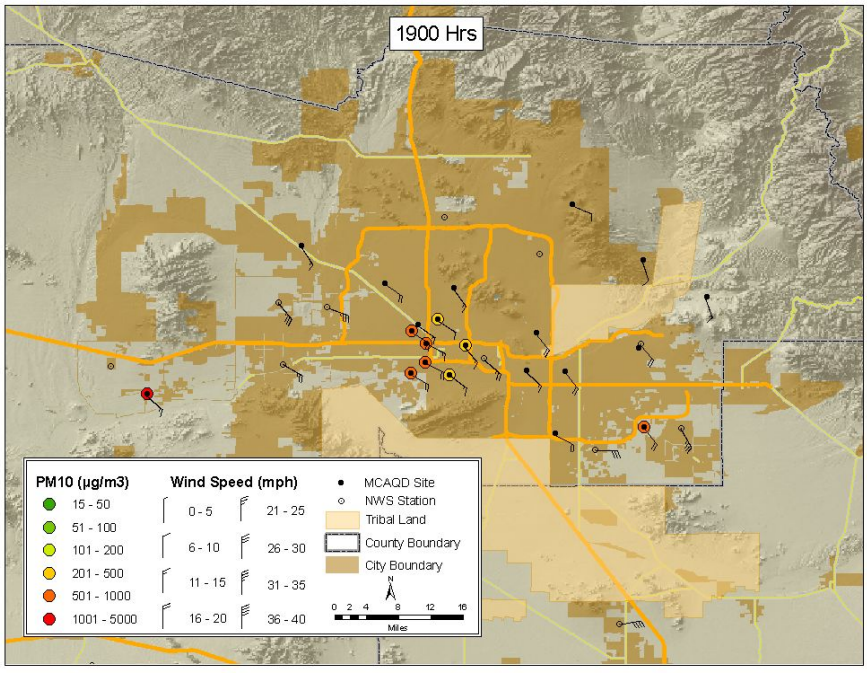
[54] Sea Level Pressure difference between San Diego and Las Vegas
[55] Sea Level Pressure difference between Long Beach and Daggett
[56] Sea Level Pressure difference between Riverside and Daggett
[57] EPA Region 9. ArcGIS analysis using PM10, wind speed, and wind direction data from AQS.

became elevated did $PM_{10}$ concentrations also become elevated, supporting the causal relationship.



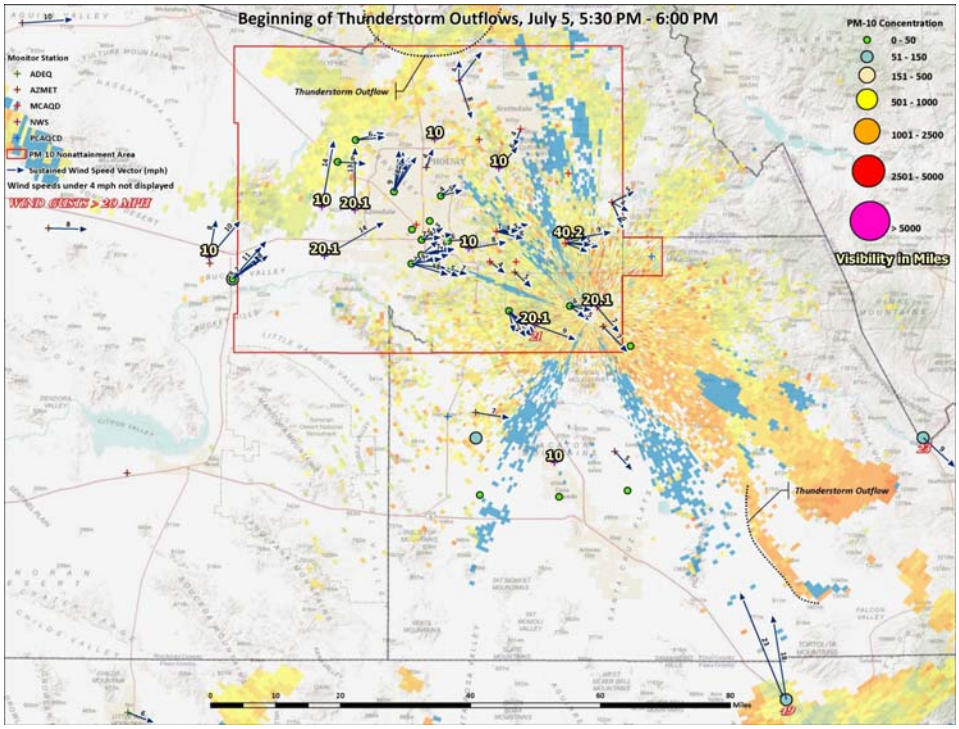






Further analysis may include more refined GIS data combined with surface measurements from various sources. The EPA acknowledges that there are few areas, except large metropolitan areas that have the number of monitors to document the sequential nature of an event. The following is an example[58] of the type of analysis that can occur with these types of resources.

[58] ADEQ


Beginning of Thunderstorm Outflows, July 5, 5:30 PM - 6:00 PM
PM-10 Concentration
0 - 50
51 - 150
151 - 500
501 - 1000
1001 - 2500
2501 - 5000
> 5000
Visibility in Miles
Monitor Station
ADEQ
AZMET
MCAQD
NWS
PCAQCD
PM-10 Nonattainment Area
Sustained Wind Speed Vector (mph)
Wind speeds under 4 mph not displayed
WIND GUSTS > 20 MPH
Thunderstorm Outflow
Thunderstorm Outflow
10
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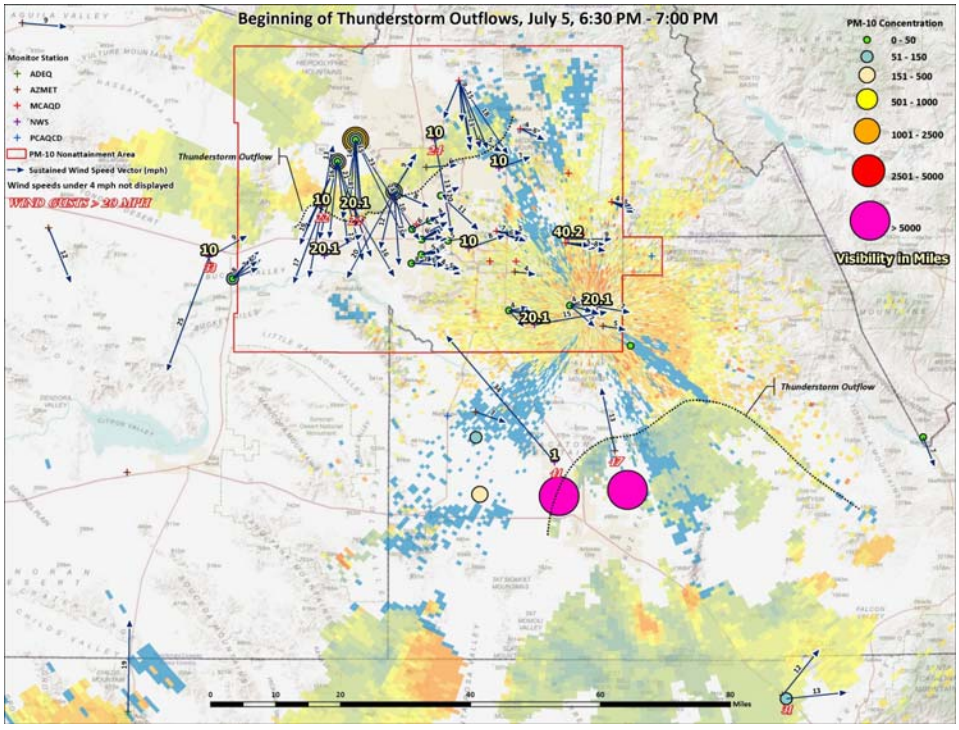
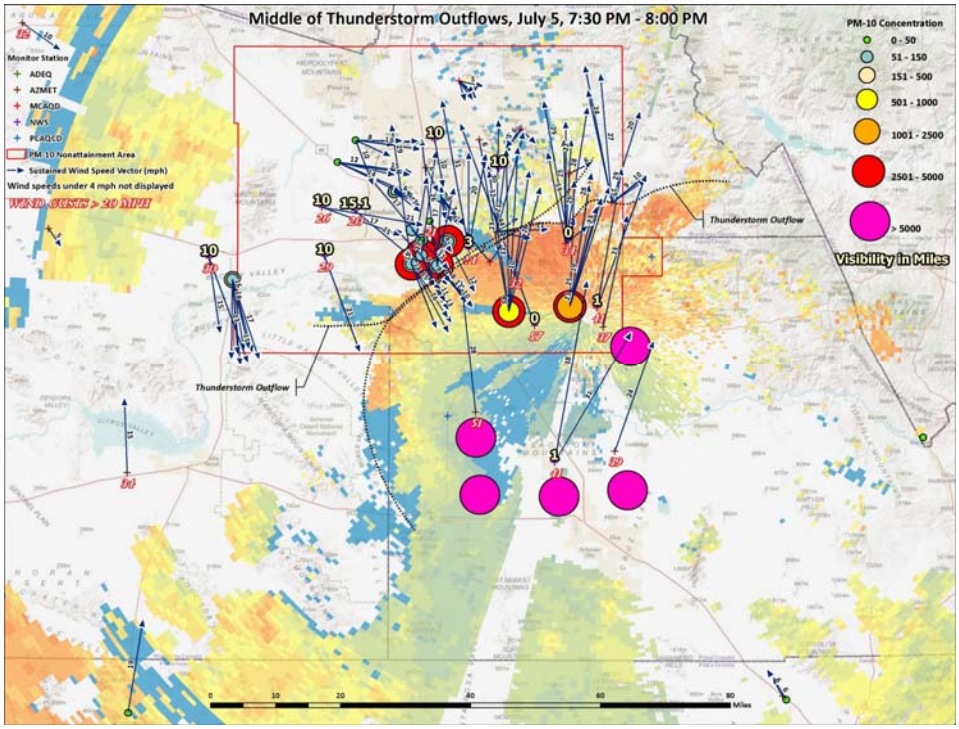
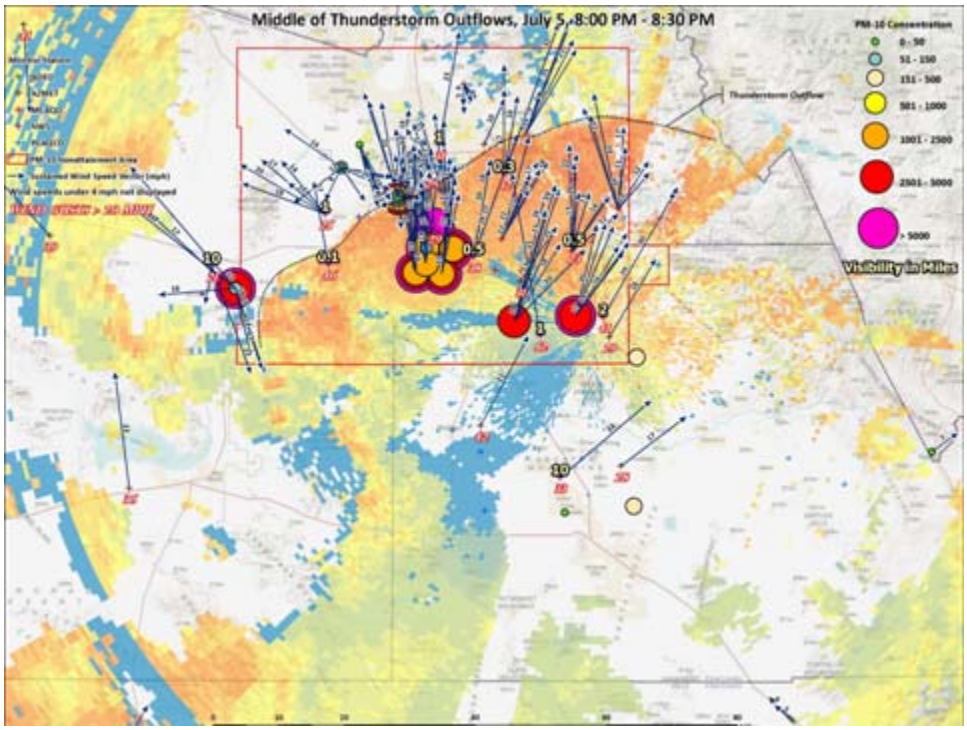
10
20.1
20.1
10
40.2
20.1
20.1
10
0 10 20 40 60 80 Miles


Beginning of Thunderstorm Outflows, July 5, 6:30 PM - 7:00 PM
PM-10 Concentration
0 - 50
51 - 150
151 - 500
501 - 1000
1001 - 2500
2501 - 5000
> 5000
Visibility in Miles
Monitor Station
ADEQ
AZMET
MCAQD
NWS
PCAQCD
PM-10 Nonattainment Area
Sustained Wind Speed Vector (mph)
Wind speeds under 4 mph not displayed
WIND GUSTS > 20 MPH
Thunderstorm Outflow
Thunderstorm Outflow
10
10
10
20.1
20.1
10
40.2
20.1
20.1
1
0 10 20 40 60 80 Miles

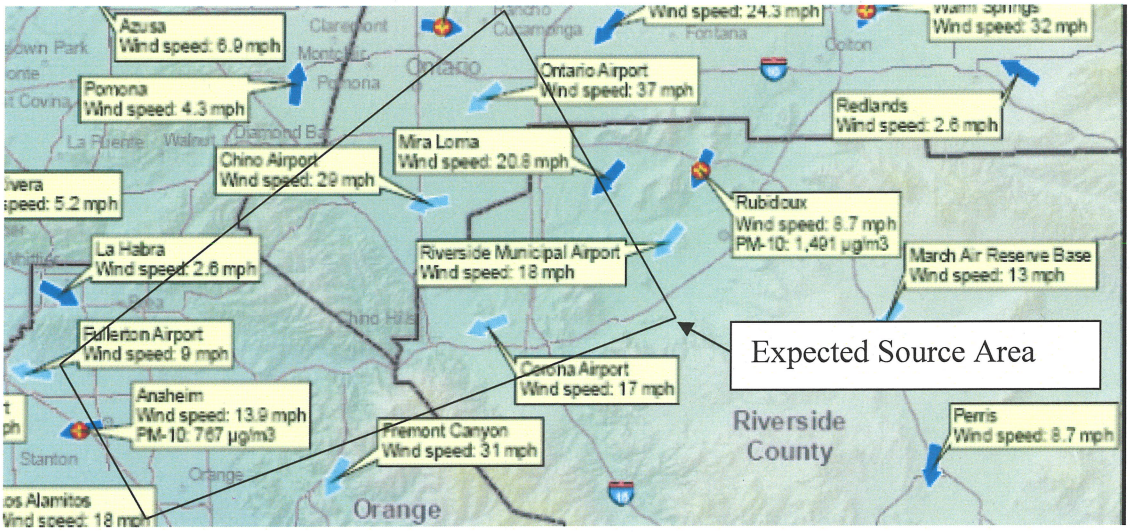



*6.3.4.2 Transport of emissions related to the event in the direction of the monitor(s) where measurements were recorded*

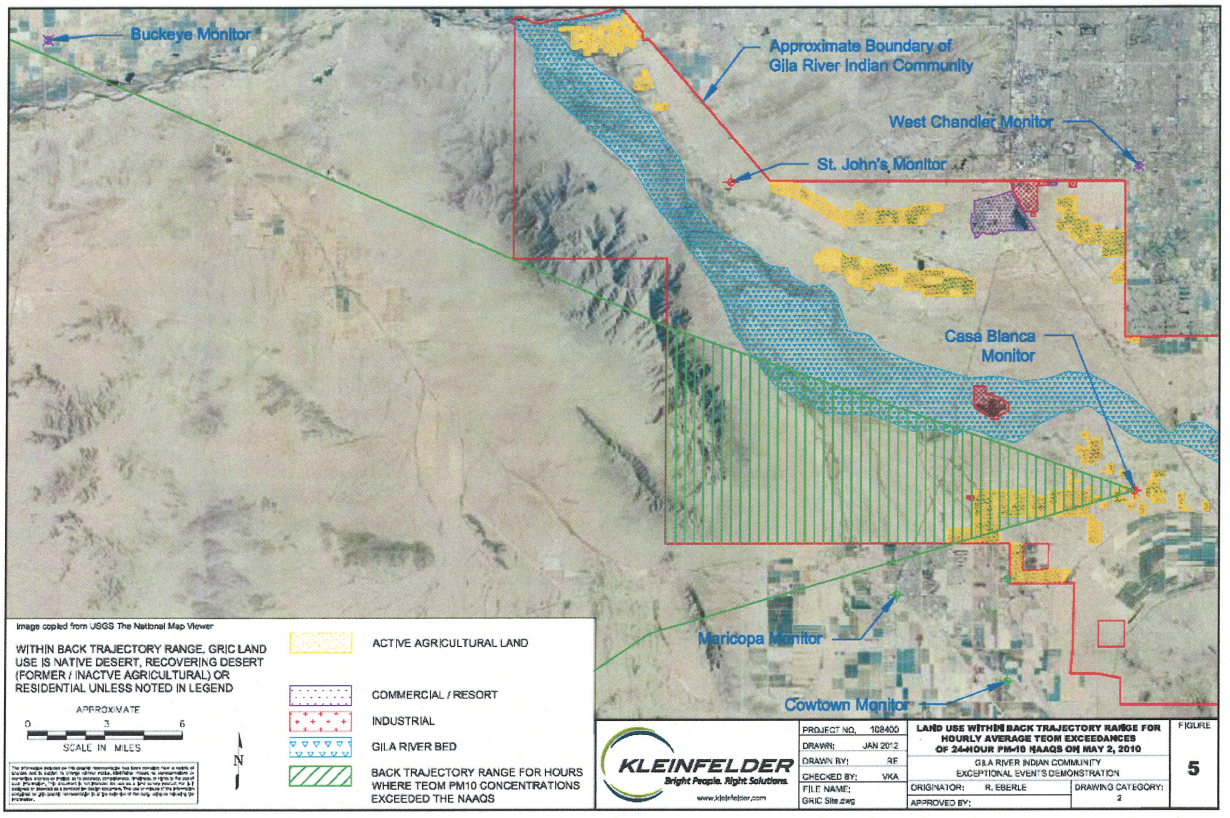
Example information to support transport of event-related emissions in the direction of monitor includes wind direction data showing that emissions from sources identified as part of the nRCP demonstration were upwind of the monitor(s) in question.

- Map showing local sources and wind direction[59]
  Note that the topography gives an indication of sources in this map. Ideally, the likely significant sources such as agriculture fields, desert areas, mountains, and industrial sources would be identified (see next example).




- Back Trajectories:
  Even if extensive comprehensive controls analysis is not needed, a back-trajectory analysis as shown in Section 6.2.2.5 would be appropriate as part of the CCR demonstration. Note that HYSPLIT trajectories that cover hundreds of miles are of limited use if the sources of dust are local. The example[60] below uses 1-hour back trajectories based on local surface wind measurements during periods of high $PM_{10}$ and GIS data to identify contributing source categories as well as the geographic extent of the event. The total area between the green lines represents the range of hourly back trajectories during periods of high $PM_{10}$, while the hatched green area represents the portion of the total area that is located with the Gila River Indian Community boundaries (signified by the solid red line).

[59] EPA Region 9
[60] GRIC

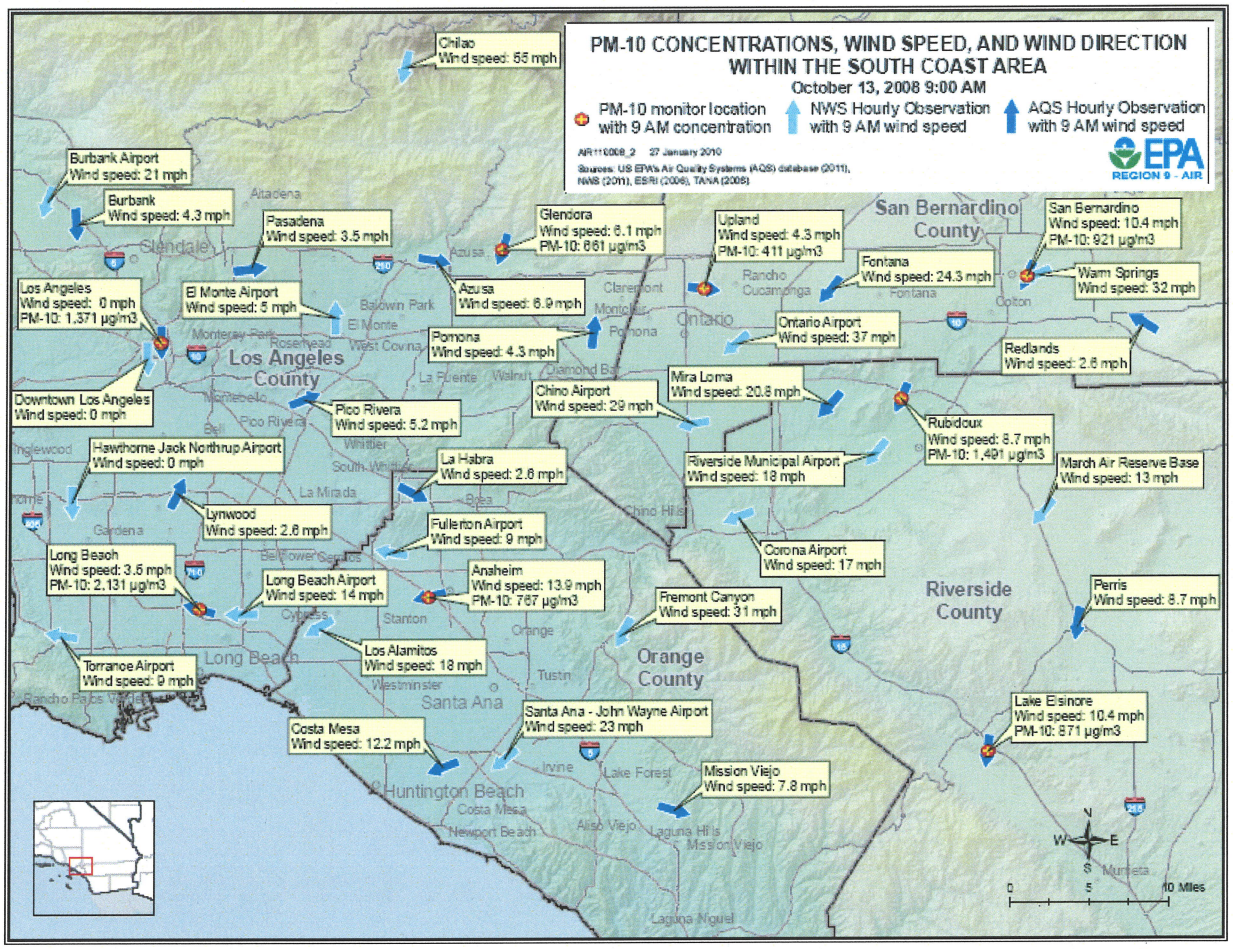



- Wind roses:
  A wind rose for periods of the event day showing wind speed and direction at or near the concentration monitor, coupled with a description of the area suggested by the wind rose, could provide evidence of where the dust was transported from. This approach may not suffice for situations where the sources of dust are not proximate to the monitor.

### *6.3.4.3 Spatial relationship between the event, sources, transport of emissions, and recorded concentrations*

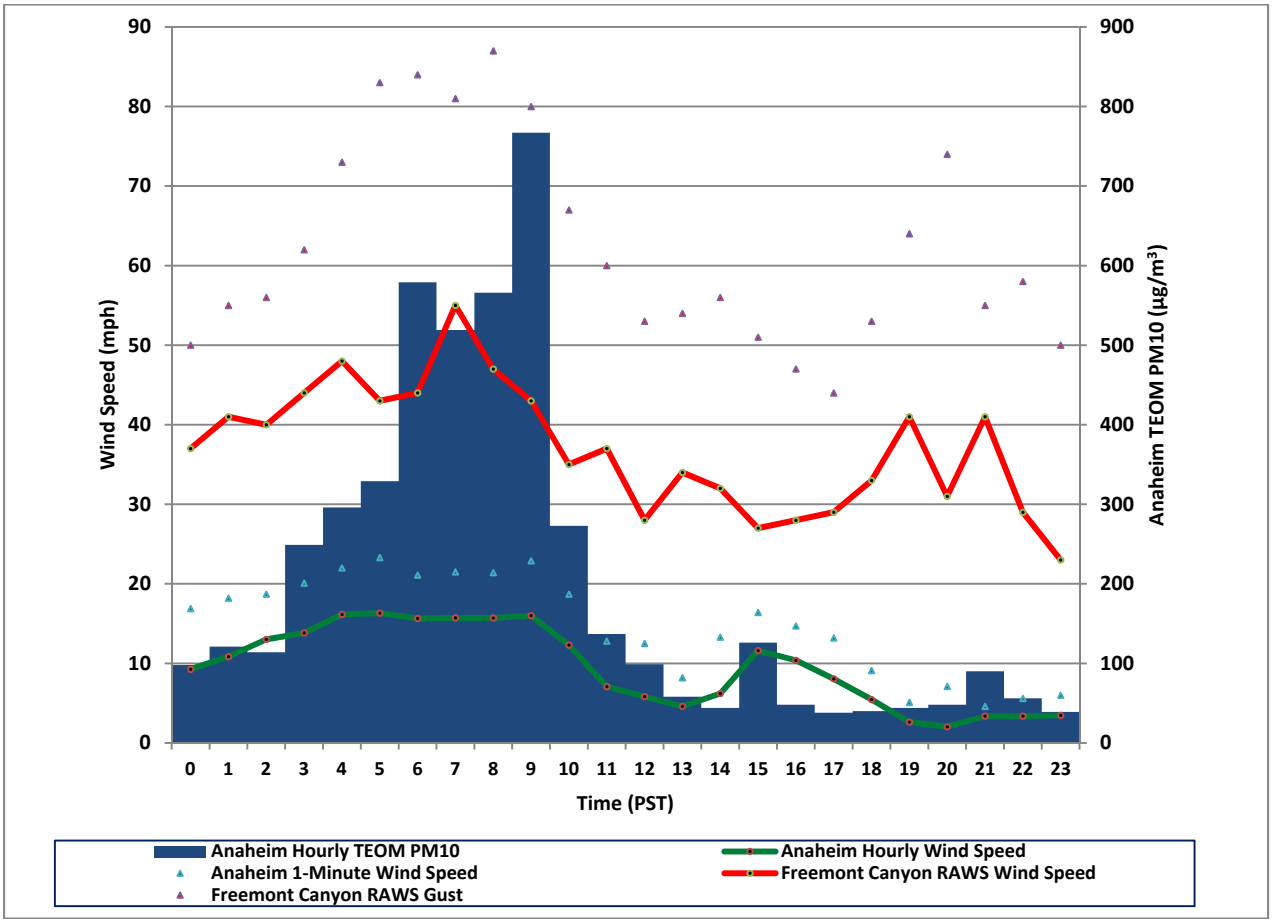
The type of information that would support this evidence could be a map showing likely source area, wind speeds, wind direction, and particulate matter concentrations for the affected area during the time of the event: see the example figure below.[61]

[61] EPA Region 9




*6.3.4.4 Temporal relationship between the high wind and elevated PM concentrations at the monitor in question*

Evidence for establishing the temporal relationship can include 24-hour time series showing PM concentrations at the monitor in question in combination with sustained and maximum wind speed data at the area where emissions originated. As shown below, it is most informative to include the sustained wind speed data and the concentration data on the same figure.




*6.3.4.5 Similarity of chemical composition of measured pollution with that expected from sources identified as upwind*

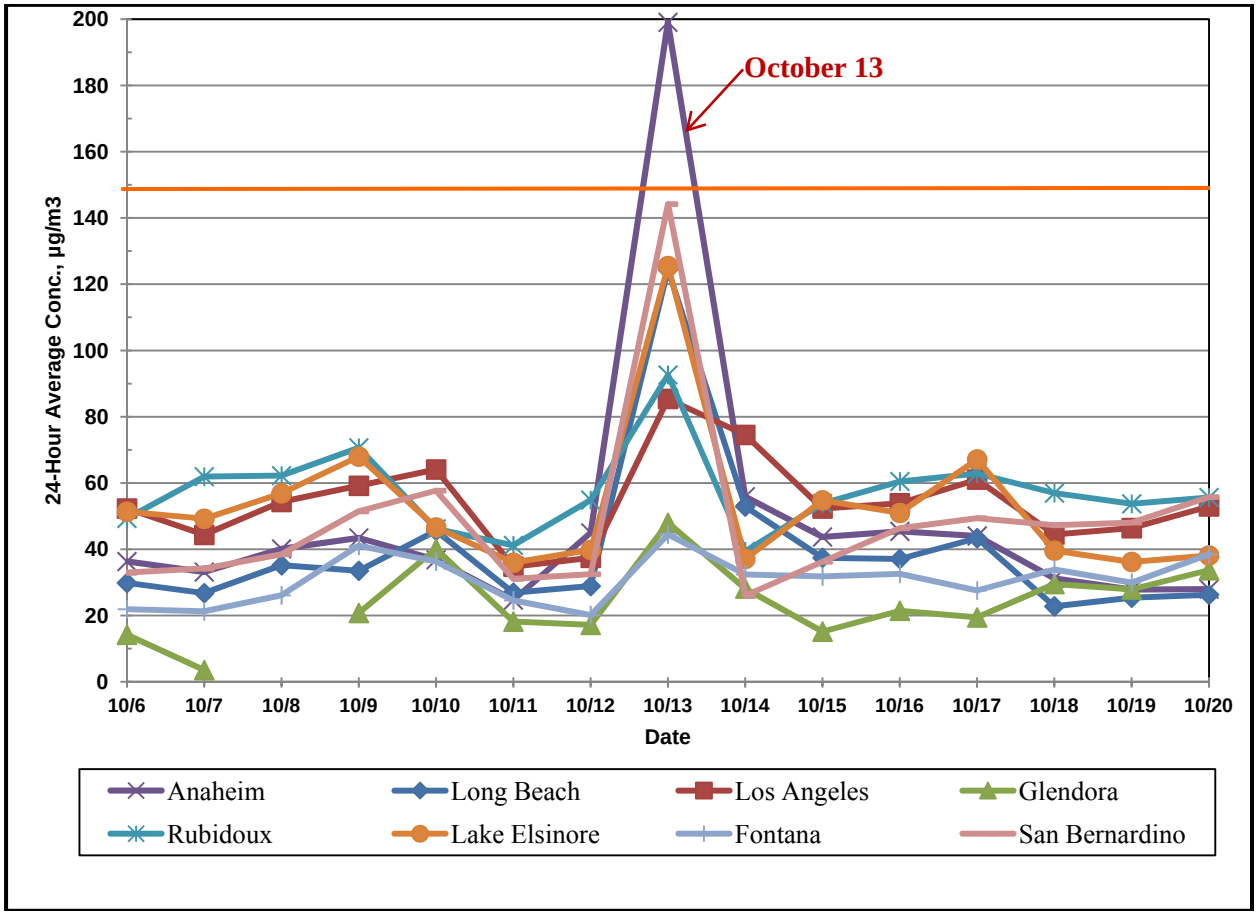
This evidence could include chemical speciation data from the monitored exceedance(s) and sources or size distribution data. These data are not always available, but should be included wherever possible. The EPA will post an example of this type of analysis to the EPA exceptional events website as one becomes available.

*6.3.4.6 Comparison of event-affected day(s) to specific non-event days:*

The following types of analyses could be part of this piece of evidence:

- comparison of concentrations and wind speed in the area to days preceding and following the event
- comparison of concentration data to specific days that are similar to the event day with respect to emissions and meteorology
- comparison to other high wind days without elevated concentrations
- comparison of chemical composition (if available)

The following figure is an example of a comparison of concentrations in the area to days preceding and following the event.[62]




### *6.3.4.7 Alternative Hypotheses*

Eliminating other possible non-event causes supports the claimed causal relationship to the high wind event, although conclusively proving the absence of all possible or plausible other causes is not required or expected. For example, SCAQMD provided the following:

> Three wildfires were reported in southern California on October 13, fanned by the strong, dry Santa Ana winds, two in the San Gabriel Mountains north of the San Fernando Valley and one at Camp Pendleton in the north coastal part of San Diego County. Only one of these, the Marek Fire, was active during the early morning hours when the hourly $PM_{10}$ concentrations spiked at Anaheim. Also, the northeasterly wind flows throughout the period, make it unlikely the smoke or ash from the fires contributed significantly to the $PM_{10}$ measured at Anaheim. Crustal material from windblown dust was the primary

[62]Letter dated November 22, 2010 to Matthew Lakin, Manager Air Quality Analysis Office USEPA Region 9, from Karen Magliano, Chief Air Quality Data Branch California Air Resources Board, transmitting final report dated August 5, 2010 entitled "Analysis of Exceptional Events Contributing to High PM10 Concentrations in the South Coast Air Basin on October 13, 2008."

> component of the measured $PM_{10}$, as confirmed by comparing with the $PM_{2.5}$ measured on this day. Prescribed, agricultural or residential burning did not appear to have added any significant amount of $PM_{10}$ to the concentrations measured in the Basin; these activities were not permitted on this day. The $PM_{2.5}$ portion of $PM_{10}$, which would indicate combustion sources, was very small throughout the Basin. $PM_{10}$ was emitted from some BACM-controlled sources (mainly agricultural and construction activities) as BACM controls were locally overwhelmed by the high winds. Natural particulate sources areas also contributed to the measured $PM_{10}$, particularly the upwind mountain and desert areas.

6.3.5 Address Affects Air Quality (AAQ)

Once sufficient HF analyses have been provided and CCR has been demonstrated the event will generally have been considered to have affected air quality at the exceeding monitor, and thus the AAQ element will have been met. The demonstration should include a statement that AAQ has been met by providing HF analyses and demonstrating CCR.

6.3.6 Address [HAURL] / Natural Event

Once both CCR and nRCP have been demonstrated, the event will generally be considered a natural event, thus satisfying the [HAURL]/Natural Event element. The demonstration should include a statement that the Natural Event criterion has been met by demonstrating nRCP and CCR.

6.3.7 Step 5: Address No Exceedance But For the Event (NEBF)

The NEBF demonstration generally builds on information gathered to support other elements of an exceptional event demonstration. Further, if the exceptional events demonstration fails on a different element then the NEBF analysis becomes moot since there is no portion of the concentration than can be attributed to an exceptional event. For these reasons, the EPA suggests that air agencies complete the NEBF demonstration last after addressing all other EER elements.

*6.3.7.1 Qualitative NEBF*
If non-event pollution levels are typically significantly below the NAAQS during the season of the event then a qualitative NEBF may be adequate. The following is provided as an example:[63]

> Activities that generate anthropogenic $PM_{10}$ were approximately constant in the Basin immediately preceding, during and after the event. Activity levels in the Basin were typical for the time of year and $PM_{10}$ emissions control programs were being implemented, not only for fugitive dust-generating activities, but also for agricultural burning in the Basin. Furthermore, due to the forecasts for high winds on October 13, the SCAQMD compliance teams were ready to act quickly to fugitive dust complaints to

[63]Letter dated November 22, 2010 to Matthew Lakin, Manager Air Quality Analysis Office USEPA Region 9, from Karen Magliano, Chief Air Quality Data Branch California Air Resources Board, transmitting final report dated August 5, 2010 entitled "Analysis of Exceptional Events Contributing to High PM10 Concentrations in the South Coast Air Basin on October 13, 2008."

minimize emissions and to enforce mitigation methods like watering and soil stabilization.

Vehicular traffic, cooking and residential fires do not directly cause $PM_{10}$ 24-hour NAAQS violations in the Basin. Activity levels in the Basin were typical for the time of year and $PM_{10}$ emissions control programs were being implemented, for fugitive dust-generating activities, as well as open burning. With the unsettled conditions on October 13, such emissions would not contribute significantly to the $PM_{10}$ measured. There were reasonable and appropriate measures in place to control $PM_{10}$ in the Basin on October 13, 2008, including SCAQMD Rules 403, 444, 445, 1156, 1157, 1158 and 1186.

Examining the make-up of the $PM_{10}$ in the Basin on this day using $PM_{2.5}$ data, the coarse particles ($PM_{10-2.5}$), which are associated with windblown dust, represent well over 75% of the total $PM_{10}$ mass collected in the Basin. The three wildfires that were burning in the Basin, one of which started on October 12 and two other after the high hourly $PM_{10}$ concentrations started, were not the primary cause of the high $PM_{10}$. $PM_{2.5}$ remained relatively low throughout the Basin on this day with no exceedance of the 24-hour NAAQS. While there were no $PM_{10}$ filters collected on this day for laboratory analyses for soluble potassium, an indicator of wood smoke, the predominance of coarse particles, the timing of the fires and the lack of supporting wind directions to bring smoke to Anaheim provide support the conclusion that while there could have been a minor contribution from the wildfires, it was relatively small portion of the $PM_{10}$ measured.

Based on the data provided in this report, SCAQMD concludes that there would not have been exceedances of the $PM_{10}$ NAAQS in the Basin on October 13, 2008 if high winds were not present. Even if the extreme 99.5 percentile concentration for the Basin, 139.5 $\mu g/m^3$, were used as the background concentration to compare to the measured $PM_{10}$ concentrations, the particulate contribution from the high wind event clearly caused these exceedances. The causal connection of the measured $PM_{10}$ and the strong winds in the Basin, and throughout southern California, along with the high contribution of fugitive dust to the $PM_{10}$ mass indicate that but for the high wind event this NAAQS violation would not have occurred.

*6.3.7.2 Quantitative NEBF*

A quantitative NEBF analysis is particularly informative if concentrations on days without events during the same season exceed, or approach, the standard and/or if the contribution of non-event pollution produces concentrations near the applicable NAAQS. An example of a quantitative NEBF analysis will be incorporated in this document as one becomes available.

## 6.4 Prepare High Wind Action Plan (optional)

A High Wind Action Plan is primarily used to document controls on additional sources that need reasonable controls for future events to be considered not reasonably controllable or preventable. If an air agency discovers (an) uncontrolled source(s) of dust during the course of the event demonstration, the air agency may choose to submit a High Wind Action Plan, either separately or along with the demonstration package. Alternatively, the EPA may identify a source

previously unidentified by the air agency that the EPA considers to be reasonably controllable. In this case, an air agency could submit a High Wind Action Plan following the submission of the demonstration package. A High Wind Action Plan addresses sources that could reasonably be controlled to minimize the occurrence of future events and would generally include the following information:

- Source(s) targeted for controls
- Description of controls
- Oversight/enforcement plan, including on/before event days
- Implementation timeline
- Documentation of effective implementation and enforcement
- The high wind threshold for the collective set of high wind dust sources, including those previously subject to reasonable controls and those that are being proposed for reasonable controls in the High Wind Action Plan (refer to Appendix A3 for determining this threshold).

The EPA has not established a particular format for the High Wind Action Plan but notes that most of the information recommended for an approvable High Wind Action Plan was included in a Natural Events Action Plan (see Section 3.7.2). Therefore, a NEAP may be a useful template. When the High Wind Action Plan is submitted with a demonstration package, the EPA recommends including it as an appendix and referencing it in the nRCP section. As mentioned in Section 3.7.2, air agencies can submit the High Wind Action Plan before, with, or after submittal of a demonstration package.

## Appendix A1. Summary of Studies on Windblown Dust Emissions

Windblown dust is often but not always a controllable and preventable form of $PM_{10}$ pollution. To ensure effective implementation of the EER, it is useful to determine the wind speed at which windblown dust no longer becomes reasonably controllable. Agencies may develop a high wind threshold for each area experiencing high wind dust events. Appropriate area-specific thresholds would consider local conditions, sources, and controls and specify a speed above which these controls would be overwhelmed. This approach is consistent with the Natural Events Policy where the EPA recommended that the air agencies define the conditions in which BACM level controls were overwhelmed. If an agency is unable to develop an area-specific wind threshold, the EPA will generally accept a default threshold of 25 mph for areas in the west provided the agencies support this as the level at which they expect stable surfaces (i.e., controlled anthropogenic and undisturbed natural surfaces) to be overwhelmed. Areas with local data supporting of an area-specific high wind threshold should submit this information to the EPA for review and approval.

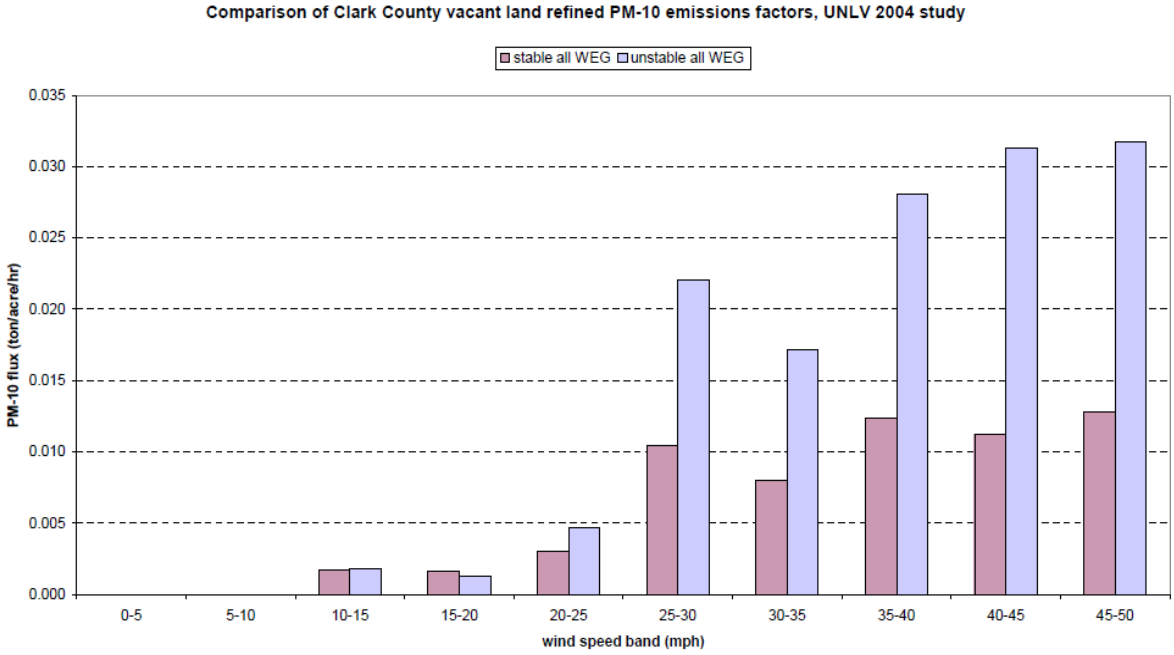
The default 25 mph high wind threshold is mainly based on extensive windblown dust emissions research performed by the University of Nevada, Las Vegas (UNLV). The Clark County Department of Air Quality and Environmental Management (DAQEM) contracted with the Department of Civil and Environmental Engineering, University of Nevada, Las Vegas (UNLV) to conduct field studies to generate refined wind-blown $PM_{10}$ emissions factors for stable natural, and unstabilized, disturbed surfaces.[64] The latest study was performed in 2004 using a portable wind tunnel at 31 locations in the Las Vegas valley that represented nine different soil groups.[65] All of the test sites were determined to be stable through the same methods as outlined in DAQEM's fugitive dust rules for open areas and vacant lots and thus provide a consistent measure of "stable" conditions.[66] The sites chosen for the wind tunnel tests were determined to be stable "as-is" (i.e. no physical stabilization was performed to alter the site conditions).These same test sites were then intentionally destabilized and subsequently retested using the same wind tunnel approach that had been used on the previously stabilized surfaces. A summary of the 2004 field study results can be seen in Figure ES-1. The 2004 data show that non-linear increases in $PM_{10}$ flux generally begin to occur at sustained 10 meter velocities exceeding 25 mph. Note that the Clark County study found small amounts of entrainment below 25 mph. The small $PM_{10}$ fluxes observed at lower winds speeds could be attributed to aerodynamic entrainment, which occurs primarily when fine particles are lifted directly off the ground and remain elevated. While it is expected that small amounts of aerodynamic entrainment could occur when wind speeds are below 25 mph, these are not expected to result in exceedances in most western areas, particularly the desert areas such as in Clark County.

[64] Refined $PM_{10}$ Aeolian Emission Factors for Native Desert and Disturbed Vacant Land Areas. Final Report, June 30, 2006, http://www.clarkcountynv.gov/Depts/daqem/Documents/Planning/SIP/PM10/App_E_-Refined%20Emission%20Factors.pdf.

[65] Sites were characterized in terms of Wind Erodibility Groups (WEGs).

[66] Clark County Department of Air Quality and Environmental Management Air Quality Regulations, Section 90 – Fugitive Dust from Open Areas and Vacant lots, Subsection 90.4. Test Methods, revised 12/17/2002.

**Figure ES-1 – Summary of wind-blown geometric mean PM-10 Emissions factors, averaged over all wind erodibility groups. UNLV 2004 wind tunnel field study. Error bars omitted to clarify differences between wind speed bands.**

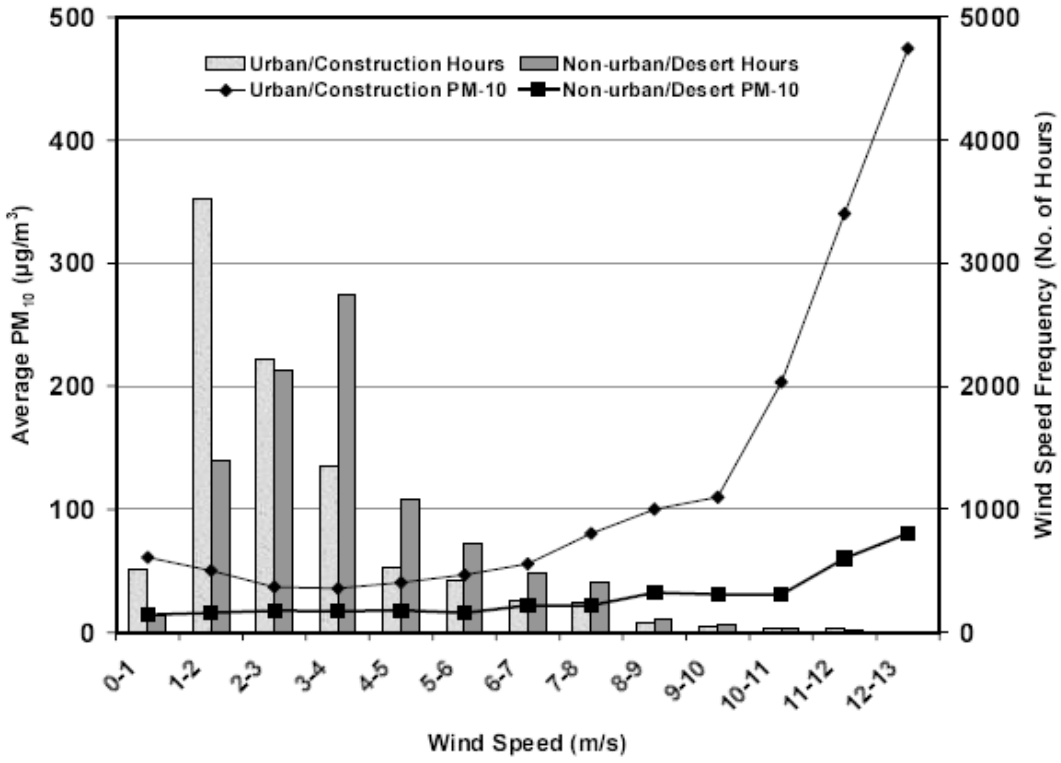



The EPA believes that for Clark County and areas similar to it, these results clearly differentiate emissions from stable and disturbed conditions and provide a reasonable baseline for establishing a high wind threshold for exceptional events purposes.

Furthermore, studies conducted by the Desert Research Institute (DRI) in Clark County, NV have concluded that windblown desert dust contributes to approximately 20% of measured $PM_{10}$ in urban areas and that only desert soils that have been disturbed by anthropogenic activities are large emitters under common high wind conditions.[67] These studies also conclude that windblown $PM_{10}$ from urban/disturbed surfaces are not seen until 10 meter hourly average wind speeds are greater than 7 m/s (16 mph), while nonurban desert show a significant increase in $PM_{10}$ emissions only when hourly average wind speeds are greater than 11 m/s (25 mph). See Figure 3-1 for a graphical representation of these data. The authors note that these results refute the argument that most urban dust derives from natural surfaces.

[67] Watson, J.G. and Chow, J.C. 2000. Reconciling Urban Fugitive Dust Emissions Inventory and Ambient Source Contribution Estimates: Summary of Current Knowledge and Needed Research. *DRI Document No. 6110.4F*.

**Figure 3-1..** Average $PM_{10}$ classifed by wind speed from hourly beta attenuation monitor (BAM) measurements at an Urban/Construction site and a Non-Urban/Desert site near Las Vegas, NV during 1995 (Chow and Watson, 1997b; Chow et al., 1999). Wind speeds were measured at 10 m above ground level.




These results are also consistent with results obtained from wind tunnel studies performed throughout the state of Arizona.[68] These studies suggest that windblown dust emissions from scrub desert and dune flat areas occur when wind speeds are greater than 11.3 m/s (25 mph) and 18.31 (41 mph), respectively. The same study revealed that surfaces that had been disturbed by anthropogenic activities began to produce emissions when wind speeds ranged from 5.11 m/s (11 mph) to 8.11 m/s (18 mph). The effect of surface disturbance on threshold wind speeds was further examined for a number of natural desert soils by a number of researchers.[69] The main

[68] Nickling, W.G. and Gillies, J.A. 1989. Emission of Fine Grained Particulates From Desert Soils. In *Paleoclimatology and Paleometeorology: Maodern and Past Patterns of Global Atmospheric Transport*. Leinen, M. and Sarnthein, M., (Eds.) Kluwer Academic Publishers. 133-165.

[69] Gillette, D.A. 1980. Threshold Velocities for Input of Soil Particles into the Air by Desert Soils. *Journal of Geophysical Research*. 85: 5621-5630; Gillette, D.A. 1982. Threshold Friction Velocities and Rupture Moduli for Crusted Desert Soils for the Input of Soil Particles into the Air. *Journal of Geophysical Research*. 87: 9003-9015; Belnap, J. 2007. Wind Erodibility of Soils at Fort Irwin, California (Mojave Desert), USA, Before and After Trampling Disturbance: Implications for Land Management. *Earth Surface Processes and Landforms.* 32: 74-84; Belnap, J. 1998. Vulnerability of Desert Biological Soil Crusts to Wind Erosion: The Influences of Crust Development, Soil Texture, and Disturbance. *Journal of Arid Environments.* 39: 133-142.

conclusion was that disturbance of soils profoundly lowers the threshold friction velocity of desert soils.

In the EPA's weight-of-evidence analysis of high wind dust events, the EPA will generally assume that sustained wind speeds above the applicable high wind threshold (area specific or 25 mph default) are capable of overwhelming reasonable controls on anthropogenic sources or causing emissions from natural undisturbed areas in arid, semi-arid, or seasonally dry regions, such as in Clark County, NV. The EPA will generally further assume that wind speeds below this threshold will entrain more dust emissions per acre or square mile from disturbed anthropogenic sources that have not been reasonably-controlled than from natural surfaces and stabilized disturbed surfaces.

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## Appendix A2. Summary of Available Relevant Literature Related to Establishing Area-Specific High Wind Thresholds

Alfaro, S. 2004. Estimation of PM20 Emissions by Wind Erosion: Main Sources of Uncertainties. *Geomorphology*, 59: 63-74.

Alfaro, S. 2001 Modeling Mineral Aerosol Production by Wind Erosion: Emission Intensities and Aerosol Size Distributions in Source Areas. *Journal of Geophysical Research*, 106: NO. D16, 18075-18084.

Benlap, J. and Gillette, D. 1998. Vulnerability of Desert Biological Soil Crusts to Wind Erosion: the Influences of Crust Development, Soil Texture, and Disturbance. *Journal of Arid Environments.* 39: 133-142.

Brazel, A.J. and Nickling, W.G. 1986. The Relationship of Weather Types to Dust Storm Generation in Arizona (1965-1980). *Journal of Climatology*. 6: 255-275.

Brazel, A.J. and Nickling, W.G. 1984. Temporal and Spatial Characteristics of Arizona Dust Storms (1965-1980). *Journal of Climatology.* 4: 645-660.

Breed, C.S., and Reheis, M.C. (Eds.) 1999. Desert Winds: Monitoring Wind-Related Surface Processes in Arizona, New Mexico, and California. *U.S. Geological Survey Professional Paper 1598.*

Chow, J.C., Pace, T.G., and Watson, J.G. 2000. Fugitive Dust Emissions. In *Air Pollution Engineering Manual*, Davis, W.T., (Ed.) Van Nostrand Reinhold, New York, NY.

Countess Environmental. 2006. WRAP Fugitive Dust Handbook. Prepared for Western Governors' Association by Countess Environmental, Westlake Village, California. September 7.

Cowherd, C. 1995. Wind Tunnel Studies of BACM Effectiveness. Final Test Report. Prepared for South Coast Air Quality Management District by Midwest Research Institute (MRI). Contract No. 95017. MRI Project No. 3826.

Cowherd, C. 2000. Wind Erodibility Assessment of the Stabilized Soils in the Antelope Valley. Test Report. Prepared for Southern California Edison and the City of Los Angeles Department of Airports by Midwest Research Institute (MRI). Contract No. U1109008. MRI Project No. 110028.

ENVIRON. 2004. Determining Fugitive Dust Emissions from Wind Erosion. Final Report. Prepared for Western Governors' Association by ENVIRON International Corporation, Novato, California; ERG, Inc., Sacramento, California; Desert Research Institute, Reno, Nevada, MACTEC Engineering & Consulting, Gainsville, Florida and University of California Riverside, Riverside, California. March 12.

ENVIRON. 2006. Fugitive Windblown Dust Emissions and Model Performance Evaluation Phase II Final Report. Prepared for Western Governors' Association by ENVIRON International Corporation, Novato, California and University of California Riverside, Riverside, California. May 5.

Environmental Quality Management and MRI. 2006. An Inventory of Vacant Land Soil Stability and Private Unpaved Roads in the Las Vegas Valley Using Remote Sensing Imagery. Prepared for Clark County Department of Finance Purchasing and Contracts by Environmental Quality Management, Inc. and Midwest Research Institute. PN 70204.001.

Gillette, D.A. 1978. Tests with a Portable Wind Tunnel for Determining Wind Erosion Threshold Velocities. *Atmospheric Environment*. 12: 2309-2313.

Gillette, D.A., Adams, J., Endo, A., and Smith, D. 1980. Threshold Velocities for Input of Soil Particles into the Air by Desert Soils. *Journal of Geophysical Research*. 85: 5621-5630.

Gillete, D.A., Adams, J., Muhs, D., and Kihl, R. 1982 Threshold Friction Velocities and Rupture Moduli for Crusted Desert Soils for the Input of Soil Particles into the Air. *Journal of Geophysical Research.* 87: 9003-9015.

Gillette, D.A and Stockton, P.H. 1989. The Effect of Nonerodible Particles On Wind Erosion of Erodible Surfaces. *Journal of Geophysical Research.* 94: 12855-12893.

Gillette, D.A. 1999. A Qualitative Geophysical Explanation for "Hot Spot' Dust Emitting Source Regions. *Contr. Atomos. Phys*. 72: 67-77.

Gillies, J.A. and Berkofsky, L. 2004. Eolian Suspension Above the Saltation Layer, the Concentration Profile. *Journal of Sedimentary Research.* 72: 176-183.

Goudie, A.S. and Middleton, N.J. 1992. The Changing Frequency of Dust Storms Through Time. *Climatic Change*. 20: 197-225.

Houser, C.A. and Nickling, W.G. 2007. The Emission and Vertical Flux of Particulate Matter <10 μg from a Disturbed Clay Crusted Surface. *Sedimentology*. 48: 255-267.

Fitz, D.R. 1996. Field Study to Determine Limits of Best Available Control Methods for Fugitive Dust Under High Wind Conditions. Final Report. Prepared for South Coast Air Quality Management District by University of California Riverside, CA. Contract R-C94159.

Kjelgaard, J. 2004. PM10 Emission from Agricultural Soils on the Columbia Plateau: Comparison of Dynamic and Time-Integrated Field-Scale Measurements and Entrainment Mechanisms. *Agriculture and Forest Meteorology*. 125: 259-277.

Mansell, G.E., Lau, S., Russell, J. and Omary, M. 2006. Fugitive Wind Blown Dust Emissions and Model Performance Evaluation Phase II. Prepared for Western Governors'

Association by ENVIRON International Corporation and the University of California at Riverside College of Engineering.

Macpherson, T., Nickling, W.G., Gillies, J.A., and Etyemezian, V. 2008. Dust Emissions from Undisturbed and Disturbed Supply-Limited Desert Surfaces. *Journal of Geophysical Research*. doi: 10.1029/2007JF000800.

Neuman, C.M., Boulton, J.W., and Sanderson, S. 2009. Wind Tunnel Simulation of Environmental Controls on Fugitive Dust Emissions from Mine Tailings. *Atmospheric Environmen*t. 43: 520-529.

Nickling, W.G. and Gillies, J.A. 1989. Emission of Fine Grained Particulates From Desert Soils. In *Paleoclimatology and Paleometeorology: Modern and Past Patterns of Global Atmospheric Transport*. Leinen, M. and Sarnthein, M., (Eds.) Kluwer Academic Publishers. 133-165.

Ono, D. 2006 Application of the Gillette Model for Windblown Dust at Owens Lake, CA. *Atmospheric Environment*. 40: 3011-3021.

Roney, R.A. and White, B.R. 2004. Definition and Measurement of Dust Aeolian Thresholds. *Journal of Geophysical Research*. doi: 10.1029/2003JF000061.

Shao, Y., 2000a. Physics and Modelling of Wind Erosion. Kluwer Academic Publishers, Dordrecht, 393 pp.

Sharratt, B., Feng, G, and Wending, L. 2007. Loss of Soil and PM10 From Agricultural Fields Associated with High Winds on the Columbia Plateau. *Earth Surface Processes and Landforms*. 32: 621-630.

Sierra Research. 2003. Final BACM Technological and Economic Feasibility Analysis. Prepared for San Joaquin Valley Unified Air Pollution Control District by Sierra Research, Inc, Sacramento, California. March 21.

U.S. EPA 1992. Fugitive Dust Background Document and Technical Information Document for Best Available Control Measures. EPA-450/2-92-004.

Wancaser, R., James D., Jeong, H., and Pulurgurtha, S. 2006. Refined PM10 Aeolian Emission Factors for Native Desert and Disturbed Vacant Land Area. Final Report, June 30, 2006.

Watson, J.G. and Chow, J.C. 2000. Reconciling Urban Fugitive Dust Emissions Inventory and Ambient Source Contribution Estimates: Summary of Current Knowledge and Needed Research. *DRI Document No. 6110.4F.*

## Appendix A3. Methods for Establishing Area-Specific High Wind Thresholds

As explained in Appendix A1, the EPA primarily based the 25 mph threshold on extensive windblown dust emissions research performed by the University of Nevada, Las Vegas (UNLV). During UNLV's studies, researchers used a wind tunnel to quantify emissions from undisturbed areas meeting the definition of "stable" surfaces within Clark County's (Nevada) BACM level fugitive dust regulations and mechanically disturbed open areas. The research performed by UNLV is one of the few field studies that clearly relate BACM level control of windblown dust from open areas and $PM_{10}$ emissions. The EPA believes that the study results clearly differentiate emissions from these two types of conditions and provide a reasonable baseline for establishing a high wind threshold that generally can be used for exceptional events purposes for such areas.

While the UNLV study stands out as the most definitive source of information concerning wind speeds capable of overwhelming BACM for open area windblown dust sources and/or causing emissions from natural undisturbed areas, the EPA believes that other sources of information can be used to develop an area-specific high wind threshold.

First, the EPA encourages state, local, and tribal agencies to evaluate the existing windblown dust literature identified in Appendix A2 when developing an area-specific threshold and determine if any of the preexisting information is applicable to their area.

Secondly, while full-scale windblown dust emissions field studies are not always feasible, agencies may deploy temporary monitoring stations or use existing monitoring data to evaluate the effects of wind speed on different source categories. For example, as explained in Appendix A1, DRI used existing monitoring sites in Clark County to evaluate the relationship between urban/construction and non-urban/desert conditions.[70] While this data was independent of the detailed wind tunnel emissions studies performed by UNLV in the same area, the results were similar: nonurban desert show a significant increase in $PM_{10}$ emissions only when wind speeds are greater than 11 m/s (25 mph). The EPA believes that this is valid method for determining an area-specific threshold, but the use of existing monitoring sites (or temporary sites) to establish a wind speed/PM relationship for different source categories should be carefully evaluated for representativeness. For example, sites used to evaluate emissions from natural undisturbed desert areas should not be located downwind of any potential anthropogenic sources, as the influence from such sources would lower the expected high wind threshold. Also, simply correlating PM to wind speed without assessing representativeness of the monitoring site locations does not provide useful information for exceptional events purposes.

Finally, area and/or source specific research may be performed, if needed. Specific information on the techniques used to assess windblown dust emissions can be found within the literature listed in Appendix A2.

[70] Watson, J.G. and Chow, J.C. 2000. Reconciling Urban Fugitive Dust Emissions Inventory and Ambient Source Contribution Estimates: Summary of Current Knowledge and Needed Research. *DRI Document No. 6110.4F*.

Regardless of the method used, an area-specific high wind threshold should be consistent with the requirements of the EER, specifically nRCP, and representative of wind speeds capable of overwhelming reasonable controls or causing emissions from natural undisturbed areas. The EPA generally does not intend to approve the use of an area-specific threshold if these basic principles are not upheld. The EPA encourages the state, local, and tribal agencies responsible for developing an area-specific threshold to consult with their respective regional office during the development process.

# Appendix B1. Checklist for High Wind Exceptional Events Demonstration Submission

**Completeness Checklist for High Wind Dust Exceptional Events.**

*Instructions:* This checklist is provided as a guideline to help submitting agencies identify the types of information and analyses to include in an exceptional events demonstration package. In some cases (e.g., wind speeds above the identified high wind threshold), agencies will not need to include all parameters under each criterion. The EPA encourages agencies to include a completed checklist with their submitted exceptional events demonstration package. Note that completion of this checklist does not indicate that the event in question is concurrable nor does it guarantee a "complete" package. The EPA may ask for clarification or additional information to support a specific criterion.

Site Name/AQS ID: _____

Pollutant: _____

Date(s): _____

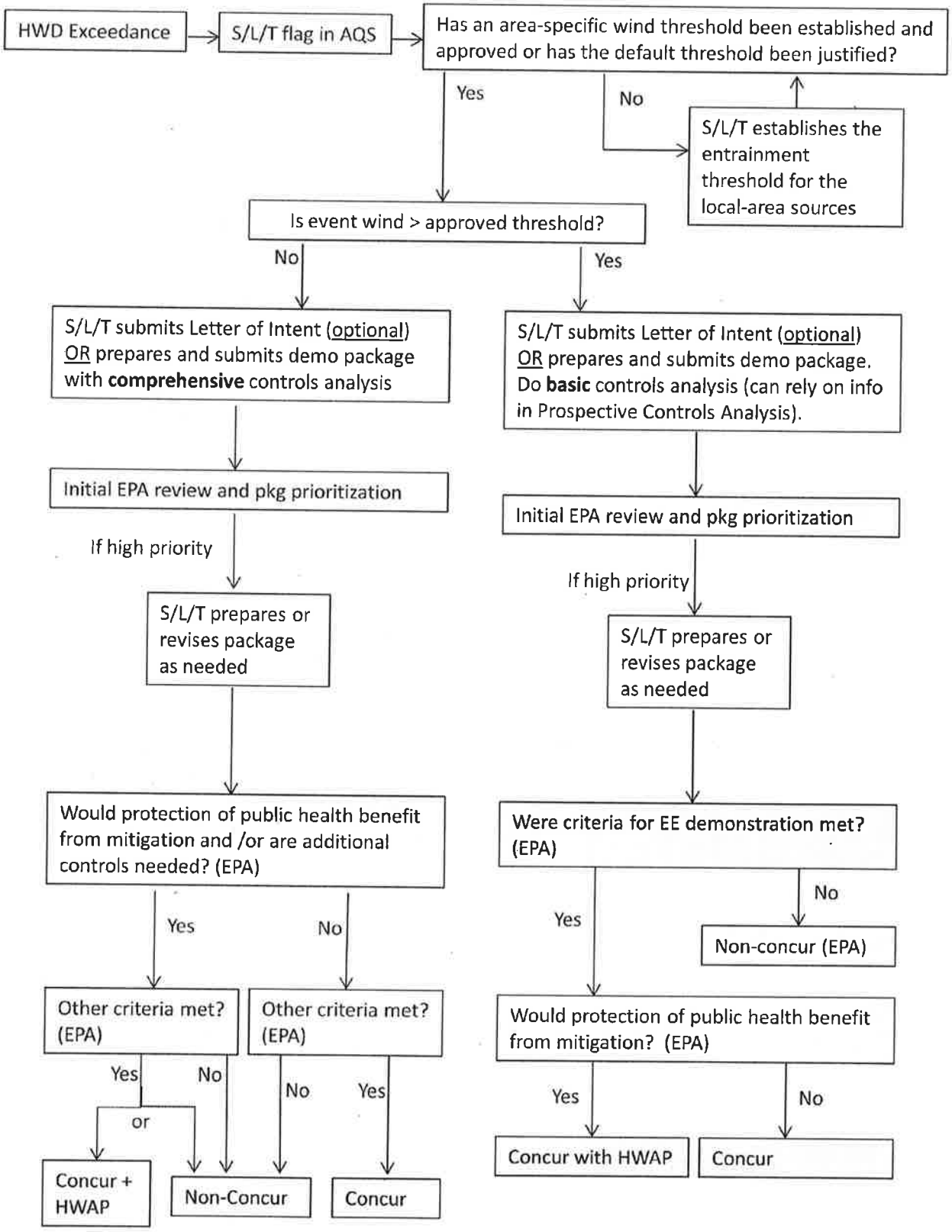
| **Procedural Criteria** | | EPA Use |
|---|---|---|
| Did an exceedance of the NAAQS occur? | [Y/N] | |
| Were data flagged by July 1st of following year (or by another appropriate deadline associated with a new or revised NAAQS)? | [Y/N] | |
| Was there a 30-day public comment period?<br>Is documentation for the comment period included? | [Y/N]<br>[Y/N] | |
| If public comments were received, are the public comments and responses included? | [Y/N] | |
| Was the package 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 the EPA (or by another appropriate deadline associated with a new or revised NAAQS)? | [Y/N] | |

(over)

| **Evidence** | **Information Included** | **Page(s)** | EPA Use |
|---|---|---|---|
| Conceptual Model | | | |
| -description of weather phenomena resulting in high wind | [Y/N] | [page #] | |
| -description of what sources were likely entrained by the high wind | [Y/N] | [page #] | |
| -explanation of the path by which the dust reached the monitor(s) | [Y/N] | [page #] | |
| -map showing relevant monitors, topography, other relevant geographic features | [Y/N] | [page #] | |
| -description of how the event day differs from non-event days | [Y/N] | [page #] | |
| -description of concentration and wind patterns for the exceeding monitor(s) and surrounding area | [Y/N] | [page #] | |
| | | | |
| Wind Statistics | | | |
| -max sustained wind (Hourly avg) | [X mph] | [page #] | |
| - max sustained wind (1-5 min avg) | [X mph] | [page #] | |
| -max gust (1 min avg) | [X mph] | [page #] | |
| -wind trajectories included? | [Y/N] | [page #] | |
| | | | |
| -other: | [list other wind analyses] | [page #] | |
| | | | |
| nRCP | | | |
| -Area-specific high wind threshold (default = 25mph) | [25 mph] | [page #] | |
| -sources contributing to event identified, including anthropogenic vs. natural? | [Y/N] | [page #] | |
| -controls identified for anthropogenic sources? (note: level of control analysis depends on wind speed) | [Y/N] | [page #] | |
| -are natural sources not reasonably controllable? | [Y/N] | [page #] | |
| -was a High Wind Action Plan included? | [Y/N] | [page #] | |
| | | | |
| HF | | | |
| -were time-series analyses for concentration and wind data included? | [Y/N] | [page #] | |
| -annual comparison to historical data (wind and concentrations) | [%ile] | [page #] | |
| -seasonal comparison to historical data (wind and concentrations) | [%ile] | [page #] | |
| | | | |
| CCR (=> AAQ & / Natural Event) | | | |
| -were spatial analyses included, establishing a | [Y/N] | [page #] | |

| | | | |
|---|---|---|---|
| spatial relationship between the event, sources, transport of emissions, and recorded concentrations? | | | |
| -were temporal analyses included, establishing a temporal relationship between the high wind and elevated PM concentrations at the monitor? | [Y/N] | [page #] | |
| -comparison of event-affected day(s) to specific non-event days? | [Y/N] | [page #] | |
| -was the dust shown to be from the sources discussed in the nRCP section? | [Y/N] | [page #] | |
| -were alternative hypotheses discussed? | [Y/N] | [page #] | |
| -was a causal (not just correlational) relationship established? | [Y/N] | [page #] | |
| | | | |
| NEBF | | | |
| -was a "but for" analysis included? | [Y/N] | [page #] | |

## Appendix B2. Flowchart of Potential Review Process



# Appendix C. Sample Letter of Intent

September 16, 2011

Matthew Lakin
U. S. Environmental Protection Agency, Region 9
75 Hawthorne Street
Mail Code: AIR-7
San Francisco, CA 94105

SUBJECT: Exceptional Event Documentation
District: San Luis Obispo APCD
Event Type: PM2.5 - Wildfire/Smoke Impact
Event Date: August 14, 2009

| Site | AQS No | POC | Pollutant/Monitor | Concentration |
|---|---|---|---|---|
| Atascadero | 060798001 | 3 | PM2.5 FEM BAM | 51.6 $\mu g/m^3$ |

Dear Mr. Lakin:

The San Luis Obispo County Air Pollution Control District (APCD) submitted Exceptional Event Documentation on July 22, 2010 to the U. S. Environmental Protection Agency and the California Air Resources Board (CARB) that addresses wildfire emission impacts on PM2.5 concentrations at the Atascadero monitoring station on August 14, 2009. This data has been appropriately flagged in the AQS data base. The EPA was notified of the intent to submit this documentation via a CARB email on June 21, 2010. CARB provided comments to the APCD and the APCD revised and resubmitted the report to CARB on May 25, 2011. On June 15, 2011, CARB provided additional comments to the APCD illustrating how the documentation should be specifically modified to ensure acceptance by EPA.

Before the APCD proceeds with further modifications to the documentation based on CARB comments, the APCD respectfully requests that EPA provide feedback as to whether EPA will act on this Exceptional Event Documentation package. In addition, please indicate whether the 2009 data year will be used for future San Luis Obispo County PM2.5 attainment demonstrations.

The Exceptional Event Documentation dated July 22, 2010 is located on the APCD website:

http://www.slocleanair.org/air/pdf/2010/ExceptionalEventAug_14_2009_AtascaderoPM2.pdf

The revised working draft dated May 25, 2011 that was submitted to CARB for comment is located on a not-public location on the APCD website:

http://www.slocleanair.org/air/epa.php

If you have need for additional materials, please contact me at (805) 781 5743 or garcemont@co.clo.ca.us.

Sincerely,

Gary Arcemont
Air Quality Specialist

GJA/arr

cc: Karen Magliano, ARB