

Chapter 16

National Ambient Air Quality Standards Exceedance Investigations

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1.0 Introduction

As defined by 40CFR§50.1(l), an **exceedance** with respect to a National Ambient Air Quality Standard (NAAQS) is defined as “one occurrence of a measured or modeled concentration that exceeds the specified concentration level of such standard for the averaging period specified by the standard.” When an exceedance of a NAAQS occurs, it is the responsibility of the reporting organization to investigate, document, and report the exceedance, especially if it is a violation of the NAAQS. All investigations should follow the standard protocol presented here. The purpose of any investigation is to ascertain the validity of the exceedance, and when appropriate, provide evidence for data influenced by exceptional events, natural or manmade.

At the conclusion of any exceedance investigation, there should be reasonable explanation as to the cause of the exceedance (e.g., pollution control malfunction, industrial accident, an exceptional event). To the fullest extent possible, the causal explanation for the exceedance should be clearly demonstrated.

2.0 Exceedance Investigation

2.1 Responsible Party

The reporting organization assumes responsibility for investigating, documenting, and reporting a parameter exceedance. The Ambient Monitoring Section of the Indiana Department of Environmental Management, Office of Air Quality (IDEM-OAQ) is responsible for preparing an exceedance report of events collected by state samplers and monitors. For any Primary Quality Assurance Organization (PQAO) that reports a criteria pollutant value that exceeds the NAAQS, then it will be their responsibility to initiate the investigation. Any questions concerning exceedance investigations should be addressed to the IDEM-OAQ Ambient Monitoring Section or the Quality Assurance Section.

A copy of the final investigation report initiated by a local agency or other reporting organization must be sent to the Ambient Monitoring Branch at the following address:

**Ambient Monitoring Branch
Office of Air Quality
Indiana Department of Environmental Management
100 N. Senate Avenue
MC 61-54-2 Shadeland
Indianapolis, Indiana 46204-2251**

2.2 Timeliness

All investigations should be initiated as soon as possible or at least within one week after the responsible organization becomes aware of the exceedance event. The investigating organization is responsible for informing the Ambient Monitoring Section (preferably by e-mail message or by phone call) that an exceedance has occurred and that an investigation has begun. This notification must be made within 24-hours after the responsible organization becomes aware of the exceedance event. For standards based on longer data evaluation periods (three-month rolling periods or annual data evaluation periods), significant short term events that would contribute substantially to the averages should be reported within 24-hours of when the responsible organization becomes aware of the occurrence. For example, the averaging time for the lead (Pb) standard is based on a rolling three-month average. Notification would be appropriate if a sample that was collected had a 24 hour concentration that exceeded the .15 $\mu\text{g}/\text{m}^3$ quarterly limit and may contribute to an exceedance. Exceedance investigations should be included with the regular quarterly data report; however, they may be submitted as soon as they are completed.

2.3 Investigation

Staff members initiating an exceedance investigation should be familiar with contents of this chapter, the exceptional event review process, Air Quality System (AQS) data submittal process, and information presented in 40 CFR Part 50 “[National Primary and Secondary Ambient Air Quality Standards](#)”.

2.4 Report Format

Reports should contain the following information:

- a. Name of reporting organization.
- b. Date and time of the exceedance.
- c. Location of the monitoring/sampling site, including AQS number.
- d. Date the investigation began.
- e. Map or diagram of exceedance site may be appropriate especially in cases when an exceptional event has caused or affected the exceedance.
- f. Summary of before and after values of the pollutant surrounding the exceedance.
- g. Meteorological conditions before and during the exceedance. The meteorological conditions should include wind speed, wind direction, temperature, precipitation, relative humidity, and when applicable, stability and mixing height.
- h. Field or office investigation to determine if an exceptional event may have had a

causative impact on the exceedance.

- i. Chronology of investigation:
 1. Each person interviewed, the date, and result
 2. Listing of possible causes (point sources, etc.) investigated
 3. Ruling out of possible causes (micro-inventory of sources)
- j. Validity status of data including audit results prior to and after the exceedance event.
- k. Data comparison of the exceedance value to current season and historical values.
- l. Conclusion: Each exceedance report must offer a conclusion as to the cause of the exceedance. The conclusion may in fact be that the exceedance is a measure of existing ambient pollutant levels for which no specific causative phenomena can be established.
 1. Brief statement of the reason for the exceedance
 2. Recommendation for flagging of data

3.0 Exceptional Events

As defined by 40 CFR §50.1(j), an **exceptional event**

- i. is an event that affects air quality,
- ii. is not reasonably controllable or preventable,
- iii. is an event caused by human activity that is unlikely to recur at a particular location or a natural event, and
- iv. is determined by the (USEPA) Administrator in accordance with 40 CFR 50.14 to be an exceptional event.

It does not include stagnation of air masses or meteorological inversions, a meteorological event involving high temperatures or lack of precipitation, or air pollution relating to source noncompliance. It is an event not expected to recur routinely at a given location or that is possibly uncontrollable or unrealistic to control through the state implementation plan (SIP).

USEPA's designation of an exceptional event will allow it to exclude air quality monitoring data from regulatory determinations related to NAAQS exceedances or violations and avoid designating an area as nonattainment if the State can adequately demonstrate that an exceptional event has caused a violation of the NAAQS. Additional information on Exceptional Events can be found in "Treatment of Data Influenced by Exceptional Events; Final Rule." Federal Register, Vol. 81, No. 191, (October 3, 2016).

Exceptional events may be categorized as:

- a. Occasional occurring natural events
- b. Anthropogenic (manmade) events

3.1 Exceptional Events due to Occasional Natural Events

Examples of exceptional events due to occasional natural events include:

- a. Transported pollution. This includes such natural events as forest fires originating outside the U.S., interstate wildfires, or dust originating from Asia or Africa.
- b. Natural disasters and associated clean-up activities. This includes major natural disasters, such as hurricanes and tornadoes for which State, local, or Federal relief has been granted and clean-up activities associated with those events.
- c. Volcanic and seismic activities. Volcanic activities can contribute to ambient concentrations by influencing concentrations of particulate matter and the emissions of precursor pollutants. Seismic activities (e.g., earthquakes) can contribute to the concentration of particulate matter.
- d. High wind events. Events that affect ambient particulate matter concentrations through the raising of dust or through the re-entrainment of material previously deposited.
- e. Wildland Fires. Events of this nature include several types (wildfire, wildland fire use fire, and prescribed burns). A *wildfire* is defined as an unplanned, unwanted wildland fire (e.g., fire caused by lightning) and includes unauthorized human-caused fires (arson or acts of carelessness). A *wildland fire use fire* is the application of the appropriate management response to a naturally ignited fire to accomplish specific resource management objectives as outline in fire management or land management plans. Ambient particulate matter and ozone concentrations due to smoke from a wildland fire will be considered for treatment as an exceptional event.
- f. Stratospheric ozone intrusions. A stratospheric ozone intrusion is an infrequent, localized, short-term occurrence when a parcel of stratospheric air (air at a height of 20 km) is transported to the earth's surface.

3.2 Exceptional Events due to Anthropogenic Events

Examples of exceptional events due to manmade events include:

- a. Chemical Spills and Industrial Accidents. Emissions resulting from accidents such as fires, explosions, power outages, train derailments, vehicular accidents, or a combination of such events may be treated as exceptional events.

- b. Structural fires. Structural fires include any large accidental fire involving a manmade structure.
- c. Transported pollution. This includes transported pollution from agricultural or mining activities.
- d. Terrorist attacks. Emissions resulting from a terrorist attack, such as smoke from fires, dust, explosions, power outages, train derailments, vehicular accidents, or combinations of the preceding events may be treated as an exceptional event.
- e. Prescribed fire. This is a controlled fire of vegetative material that is required to protect agricultural or forestry resources or resource values associated with agricultural or forestry operating procedures.

3.3 Exceptional Event Demonstration

USEPA requires detailed documentation when a State petitions to exclude data that are affected by an exceptional event. The documentation to justify the exclusion of monitoring data may include any reliable and accurate data that demonstrates a clear causal relation between the measured exceedance or violation of a standard and the event. The evidence provided to justify and document the monitoring data exclusion must answer completely the following questions:

- a. Does the event meet the criteria definition of an exceptional event as outlined in 40 CFR 50.1(j)?
- b. Was there a causal connection between the event and air quality measurements?
- c. Was the concentration higher than typical air quality, including background?
- d. Would the exceedance or violation not have occurred, “but – for” the event?

In addition, the State must document that the public comment process was followed. The documentation to USEPA must include the public announcement, description of the public forum in which the exceptional events and the evidence were reviewed, and the specific public comments received. Based on the weight of evidence proving the causal link between the exceptional event and the exceedance or violation of the NAAQS, USEPA will make a determination on the exclusion of the data.

3.3.1 Exceptional Event Evidence

The organization of the exceptional event demonstration documentation should make it easy for USEPA and the public to review the evidence. Examples of exceptional event demonstrations and other publically available support information and tools can be found on the following USEPA webpage, <https://www.epa.gov/air-quality-analysis/exceptional-events-rule-and-guidance>

The information in the exceptional event demonstration includes, but is not limited to, the following evidence:

- a. Date(s) of the event caused exceedance or violation as summarized by sampling monitor. Include all relevant raw data, i.e., monitor/sampler data (e.g., pollution rose), meteorological data (e.g., wind rose), Air Quality Index (AQI) information/forecasts.
- b. Monitor location including AQS site identification number, including street address, city, county, and state. Include satellite maps and GPS coordinates of the monitor location and nearby monitors.
- c. Site specific event day evidence:
 1. Measured FRM/FEM concentrations
 2. Speciation data (PM_{2.5} composition data)
 3. Comparisons to current season and historical values
 4. Comparison to nearby monitors
 5. Diurnal profiles of the event day compared to a typical high day during the current monitoring season
 6. Meteorological data from the event monitoring site or a nearby site
- d. Satellite images that may provide evidence of broad smoke or dust impacts (e.g., National Oceanographic and Atmospheric Administration (NOAA) Hazard Mapping System (HMS) fire pixels, Aerosol Optical Depth (AOD) satellite imagery, Ozone Monitoring Instrumentation (OMI) satellite imagery).
- e. Air trajectories (e.g., HYSPLIT) between the suspected source region and event receptor.
- f. Nearby site and adjacent States data for comparison, relative to the general air trajectories.
- g. Other documentation that supports the existence and actual occurrence of the exceptional event (e.g., visibility photographs, newspaper/Internet press accounts).

3.4 Exceptional Event AQS Database Flag

A state must notify USEPA of its intent to exclude one or more measured exceedances of an ambient air quality standard as being an exceptional event by placing a flag(s) in the appropriate field of the Air Quality System (AQS) database. The flags are for informational purposes only and the data will not be excluded from the exceedance or violation determinations until the State has submitted the demonstration evidence and allowed USEPA to review and make a determination. Information for flagging the AQS data is provided on the following USEPA webpage:

<https://www.epa.gov/air-quality-analysis/exceptional-events-requirements-reference-guide>

Information on the parameter qualifier codes and the exceptional event codes can be found on the following USEPA webpage:

<https://www.epa.gov/aqs/aqs-code-list>