



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10

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OFFICE OF
AIR AND WASTE

NOV 9 2016

Mr. Larry Hartig
Commissioner
Office of the Commissioner
Alaska Department of Environmental Conservation
P.O. Box 111800
410 Willoughby Avenue, Suite. 303
Juneau, Alaska 99811-1800

Re: December 16, 2015, Exceptional Event Submittal by the Alaska Department of Environmental Conservation

Dear Mr. Hartig:

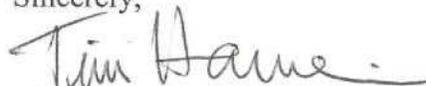
This letter responds to the ADEC's December 16, 2015, submittal regarding the elevated 24-hour PM_{2.5} concentrations measured at the Fairbanks State Office Building site and the Fairbanks NCore site between June 27 and August 14, 2013. The ADEC has requested that the U.S. Environmental Protection Agency concur that the PM_{2.5} levels for seven days during this period at each site were due to a wildfire exceptional event. On one of the seven days, June 27, 2013, the 24-hour PM_{2.5} concentrations at both sites exceeded the 35 µg/m³ PM_{2.5} 24-hour National Ambient Air Quality Standard (NAAQS).

Our response to the ADEC's request is governed by the "Treatment of Data Influenced by Exceptional Events" rule (72 FR 13560, March 22, 2007). After careful consideration of the information provided, we concur with the ADEC's exceptional events flag for June 27, 2013, at the Fairbanks State Office building and NCore sites. The basis for our decision is set forth in the enclosed document. We have not acted on the flags for the remaining six days given that the PM_{2.5} levels recorded on these dates did not exceed the 24-hour PM_{2.5} NAAQS and did not have regulatory significance with regard to the 24-hour PM_{2.5} NAAQS.

Note that the EPA's decisions on exceptional event exclusions are not considered final agency action until they are acted upon as part of a final regulatory action subject to public notice and comment. Such actions would include, for example, decisions to exclude the affected data from use in an approval of a non-attainment plan or determination of attainment.

Thank you for the ADEC's timely submittal of this exceptional event documentation. If you have any questions or wish to discuss this matter further, please contact me or have your staff contact Justin Spenillo, Air Planning Unit in the Office of Air and Waste at (206) 553-6125.

Sincerely,


Timothy B. Hamlin, Director

Enclosure

cc: Denise Koch
Director, Division of Air Quality
Alaska Department of Environmental Conservation

Barbara Trost
Program Manager, Air Monitoring and Air Quality
Alaska Department of Environmental Conservation

**EPA Region 10
 Review of Exceptional Event Request
 Fairbanks, AK
 24-hour PM_{2.5} NAAQS
 Dates Analyzed: June 27, 2013**

Background

On March 22, 2007, the EPA adopted a final rule, *Treatment of Data Influenced by Exceptional Events* (Exceptional Events Rule or EER, 72 FR 13560), to govern the review and handling of certain air quality monitoring data for which the normal planning and regulatory processes are not appropriate. Under the EER, the EPA may exclude data from use in determinations of National Ambient Air Quality Standard (NAAQS) exceedances and violations if a state demonstrates that an “exceptional event” caused the exceedances. Before the EPA can exclude data from these regulatory determinations, the state must flag the data in the EPA’s Air Quality System (AQS) database and, after notice and opportunity for public comment, submit a demonstration to justify the exclusion. After considering the weight of evidence provided in the demonstration, the EPA decides whether or not to concur with each flag.

ADEC’s Request

The Alaska Department of Environmental Conservation (ADEC) requested concurrence 24-hour PM_{2.5} data for Fairbanks, Alaska on seven days flagged as exceptional events. These days are on June 27 and 30, July 6 and 15, and August 8, 11, and 14, 2013, at the State Office Building (SOB) site (AQS monitor ID 02-090-0010-88101-1) and the Fairbanks NCore site (AQS monitor ID 02-090-0034-88101-1 and monitor ID 02-090-0034-88101-2). As the ADEC flagged the precision monitor values in AQS for June 27, August 8, and August 14, at the NCore site, the EPA considers the request to apply to both monitors at the NCore site (Primary monitor ID: 02-090-0034-88101-1, and Precision monitor ID: 02-090-0034-88101-2). The recorded 24-hour PM_{2.5} levels at both sites ranged from 11.9 µg/m³ to 58.7 µg/m³ for the seven days for which ADEC is requesting the EPA’s concurrence, and the PM_{2.5} levels for June 27, 2013, at both sites exceeded the 35 µg/m³ 24-hour PM_{2.5} NAAQS. These days and corresponding concentrations are shown in Table 1.

Table 1. Fairbanks Monitored 24-hour PM_{2.5} Values (µg/m³)

Date	NCore Primary	NCore Precision	State Office Building
6/27/13	58.0	58.3	58.7
6/30/13	32.9	n/a	32.6
7/6/2013	27.5	n/a	34.4
7/15/2013	12.9	n/a	11.9
8/8/2013	12.1	11.9	12.1
8/11/2013	21.0	n/a	20.6
8/14/2013	20.8	22.6	23.5

The ADEC flagged the monitored data as values influenced by wildfire exceptional events before the statutory deadline of July 1, 2014 and made the documentation available for a 30-day public comment period on October 26, 2013. The ADEC submitted exceptional event documentation to the EPA on December 16, 2015, for the seven dates listed above.

The EPA’s Exceptional Event Evaluation

The EPA evaluated whether the documentation provided by the ADEC for the flagged values of the 24-hour PM_{2.5} NAAQS exceedance on June 27, 2013, at both the SOB and NCore sites in Fairbanks, Alaska, demonstrate that the requirements of the EER were met. The EPA has not evaluated the documentation for the remaining six days identified in Table 1 that were flagged at both monitoring sites because the flagged values for these days did not exceed the 24-hour PM_{2.5} NAAQS, and as such, do not have regulatory significance with regard to the 24-hour PM_{2.5} NAAQS.

The table below summarizes the requirements of the EER and describes how the ADEC met each requirement. All references to page numbers, tables, and figures relate to the ADEC’s December 16, 2015 submittal (the Submittal).

Procedural Requirements:	The EPA’s Evaluation of Flagged Exceedances:
<ul style="list-style-type: none"> The data are flagged and include an initial event description in EPA’s AQS database. 40 CFR 50.14(c)(2)(i) and (iii) 	<p>The ADEC flagged and described the June 27, 2013, 24-hour PM_{2.5} values at the Fairbanks SOB and NCore sites as wildfire exceptional events in EPA’s AQS database prior to the July 1, 2014, deadline.</p>
<ul style="list-style-type: none"> The public had an opportunity to review and comment on demonstration justifying data exclusion. 40 CFR 50.14(c)(3)(i) and (iv) 	<p>The ADEC provided a 30-day public comment period on the documentation for the claimed exceptional event. The public comment period began on October 26, 2013 and closed on November 27, 2013. The ADEC received no comments.</p>
<ul style="list-style-type: none"> Demonstration justifying data exclusion submitted timely to EPA. 40 CFR 50.14(c)(3)(i) 	<p>The EPA received demonstration documentation from the ADEC on December 16, 2015, before the deadline of not later than three years following the end of the calendar quarter in which the first flagged concentration was recorded (in this case, June 30, 2016).</p>

Technical Criteria:	
<ul style="list-style-type: none"> The event satisfies the criteria in 40 CFR 50.1(j) (i.e., affects air quality, is not reasonably controllable or preventable, is an event caused by human activity that is unlikely to recur at a particular location or a natural event, and is determined by EPA to be an exceptional event). 40 CFR 50.14(c)(3)(iii)(A) 	<p><i>Conceptual Model / Affected Air Quality</i></p> <p>In the Submittal, the ADEC showed how the wildfire events of the summer of 2013 affected air quality in Fairbanks. As evidence that the wildfires affected air quality, Figure 4 shows that the PM_{2.5} levels measured at the SOB and NCore monitoring sites in Fairbanks on June 27 exceeded the PM_{2.5} 24-hour NAAQS, and shows that the values measured on that day substantially exceeded any other values recorded at these two site for the period of June through September 2013. Figure 13 is a MODIS satellite image taken on June 26, 2013 at the start of the wildfire season. The image with overlying outlines shows locations of the wildfires surrounding Fairbanks and the extent of smoke in Fairbanks and the surrounding area in late June. Further, for the exceptional event day under review (June 27, 2013), the ADEC has included a MODIS image, with overlaying outlines showing locations of wildfires and the extent of wildfire smoke on that day. The event day also includes HYSPLIT back trajectories on Google Maps showing the locations of the wildfires, hourly PM_{2.5} data recorded at the NCore BAM monitor (AQS ID 02-090-0034-88502-3), and local meteorological observations collected at the Fairbanks International Airport. Appendix A includes multiple articles about the wildfires impacting air quality in Fairbanks during the summer of 2013 which include such information as the area burned, rate of growth, and percent containment of the wildfires.</p> <p>This analysis describes how the June 27, 2013, exceedance day was affected by wildfires using HYSPLIT back trajectories, hourly PM_{2.5} levels, hourly meteorological data, an Alaska Fire Service (AFS) 2013 Fire Season Weather Summary, an AFS Fuel and Fire Behavior Advisory, and descriptive narrative text. The EPA concludes that the submitted information supports the claim that wildfires in Alaska affected air quality in Fairbanks on June 27, 2013.</p> <p><i>Natural Event and not Reasonably Controllable or Preventable.</i></p> <p>According to a Fuels and Fire Behavior Advisory issued by AFS on June 19, 2013 (Appendix G), record heat and dry fuels were producing record-setting fire spread potential, and areas of particularly high fire danger</p>

included the central and eastern interior and the interior portions of Southwest Alaska.

The 2013 Fire Season Weather Summary (Appendix E), contains a month-by-month description of the weather conditions in Alaska that summer. Precipitation in May and June, prior to the exceptional event of June 27, were drier than normal, and temperature was warmer than normal in June. In May 2013, the monthly precipitation was only 0.15 inches, about 25% of normal, and a late cold spell kept conditions drier than normal and also kept the ground from thawing. With a very sudden warm-up after the May 21, the regional snow pack rapidly melted causing the water to run off into streams and rivers. June 2013 continued to reinforce the favorable fire conditions, and was warmer than normal, with a monthly mean of 66.8°F, or 6.4°F above the long-term mean of 60.4°F. On June 25 and 26, the temperature was 92°F in Fairbanks, significantly above the historic averages for those days. June was also a very dry month with just 0.43 inches of precipitation, 31% of the average amount of 1.37 inches.

The AFS also determines the cause of each fire at the time a fire occurs. During the months of June and July in 2013, AFS identified numerous lightning-caused fires that contributed to area-wide smoke over interior Alaska. Additionally, the AFS identified two fires near Fairbanks, the Skinny Road and Stuart Creek² fires, which were accidentally caused by military training exercises. While these two fires contributed the most to elevated PM_{2.5} concentrations in Fairbanks, numerous other lightning-caused fires were also undergoing explosive growth and contributed to the smoke recorded in Fairbanks in late June and early July. The most significant fires in interior Alaska, and their growth from June 26 to June 27, are shown in Table 10. Figure 11 shows the location of the fires that were mostly responsible for elevated PM_{2.5} concentrations in Fairbanks that summer.

On pages 18-19, the ADEC discussed the Alaska Interagency Wildland Fire Management Plan (AIWFMP), an interagency plan that coordinates federal land management agencies' activities regarding controlling wildland fires. The plan manages fire response and suppression in Alaska based on a variety of factors including: the protection of life and valued resources, the need for fire to ensure a healthy

	<p>ecosystem, and the allocation of resources for wildfire management. Because of limited resources to control wildfires, a large portion of the state has been designated as Modified or Limited Maintenance areas. The Modified management option is intended to be the most flexible option available to land managers/owners, and provides a higher level of protection when fire danger is high, the probability of significant fire growth is high, and the probability of containment is low.</p> <p>Prior to the fire season, wildfire mitigation is carried out in Alaska in accordance with the Alaska Enhanced Smoke Management Plan (ESMP) and ADEC 18 AAC 50, Air Quality Control. Under the ESMP and air quality regulations, the ADEC is responsible for reviewing controlled burns for resource management, reviewing and approving land clearing applications, and issuing controlled burn approvals.</p> <p>Based on the information provided in the Submittal, the EPA concludes that the wildfires during the summer of 2013 in interior Alaska were natural, or were events caused by human activity that is unlikely to recur at a particular location. Also, these wildfires were not reasonably controllable or preventable, given the number and size of the fires, the remoteness of the fires, and the limitations of the fire management options under the AIWFMP, which calls for the state to protect life and high value areas but not to suppress all fires given limited resources and ecological benefit of fires.</p>
<ul style="list-style-type: none"> • There is a clear causal relationship between the exceedance and the claimed exceptional event. 40 CFR 50.14(c)(3)(iii)(B) 	<p>The ADEC established a clear causal relationship between monitor readings in Fairbanks, and wildfire smoke, by first describing the major fires impacting air quality in Fairbanks during the summer of 2013, as described above. To further support a clear causal relationship, the ADEC provided daily descriptions of fire locations, measured hourly PM_{2.5} concentrations, HYSPLIT backward trajectory forecasts, meteorological data, which included wind speed and direction, and visual observations taken at the Fairbanks International Airport (pages 25-104). The days impacting the exceedance on June 27 were analyzed.</p> <p>For the event which caused an exceedance of the NAAQS on June 27 (pages 32-34), the ADEC provided the following evidence that the monitor readings in Fairbanks were affected by wildfires. The MODIS image for that day shows extensive smoke in the area surrounding Fairbanks, and the locations of several</p>

nearby wildfires. Many regional fires were contributing to the smoke around Fairbanks, but the fires closest to Fairbanks that contributed the most to the elevated PM_{2.5} concentrations were the Skinny Road fire, 27 miles to the WSW of Fairbanks, and the Stuart Creek² fires, 35 miles to the ESE of Fairbanks. The HYSPLIT trajectories at both 30 and 100 meters show air mass flowing initially over the Stuart Creek² fire, traveling to the west-southwest to the southwest of Fairbanks, then shifting to the northeast back to Fairbanks. The final leg of this path towards Fairbanks passes close to the Skinny Road fire and possibly captures smoke from that fire before proceeding to Fairbanks. Both these fires experienced explosive growth during this period.

Surface observations of wind directions reported at the Fairbanks International Airport show that beginning at 6:00 AM the wind direction shifted to the WSW, in the direction of the Skinny Road fire. As soon as the wind shifted, the visibility dropped to one mile and remained at that distance until 11:00 AM and smoke was observed at the Fairbanks Airport until 1:00 PM that day.

PM_{2.5} data that supports a causal relationship include the following. The hourly PM_{2.5} concentration increased dramatically at 5:00 AM to 120 $\mu\text{g}/\text{m}^3$, and then remained above 200 $\mu\text{g}/\text{m}^3$ for the next three consecutive hours. The hourly concentrations did not drop below the PM_{2.5} NAAQS until 2:00 PM that afternoon. The primary NCORE FRM recorded a 24-hour average PM_{2.5} concentration of 58.0 $\mu\text{g}/\text{m}^3$ for that day, the secondary NCORE FRM recorded 58.3 $\mu\text{g}/\text{m}^3$, and the SOB FRM recorded a 24-hour average concentration of 58.7 $\mu\text{g}/\text{m}^3$.

In addition, Figure 13 which is a MODIS satellite image taken on June 26, shows the location of the fires around Fairbanks that were responsible for the smoke that covered Fairbanks on that day, and Figure 14 shows a MODIS image taken on June 27, which shows the fires and smoke that contributed to the exceedance of PM_{2.5} NAAQS in Fairbanks on that day.

Based on the suite of evidence provided, including HYSPLIT model trajectories, Google maps with fire location and trajectories overlaid, hourly PM_{2.5} data, wind speed and direction data, and observations of smoke at the Fairbanks Airport during the period of time when the wind was blowing primarily from the WSW,

	<p>in the direction of the Skinny Road fire, the EPA concludes that there is a clear causal connection between the wildfire events and the SOB and NCore monitor values recorded on June 27, 2013.</p> <p>(The EPA has not evaluated the documentation for the June 30, July 6, July 15, August 8, August 11, or August 14 events because the levels recorded on these dates in Fairbanks did not exceed the 24-hour PM_{2.5} NAAQS and do not have regulatory significance with regard to the 24-hour PM_{2.5} NAAQS.)</p>
<ul style="list-style-type: none"> The event is associated with measured concentrations in excess of normal historical fluctuations including background. 40 CFR 50.14 (c)(3)(iii)(C) 	<p>The historical daily average PM_{2.5} concentrations for 1999 through 2013, measured at the SOB monitor in Fairbanks for summer days not influenced by wildland fire smoke, is 4.5 µg/m³ (page 21). In 2013, the 24-hr average PM_{2.5} concentrations were below 10 µg/m³ for the period June through September, except for the days when wildfire smoke impacted Fairbanks (Figure 4). The 24-hour average concentrations of 58.0, 58.3, and 58.7 ug/m³ measured by FRMs in Fairbanks on June 27, 2013, substantially exceeded the historical daily average concentrations on summer days in Fairbanks not impacted by wildfire smoke.</p> <p>Based on this information, the EPA concludes that the values recorded on June 27, 2013, at the Fairbanks SOB and NCore FRM monitors were in excess of normal historical fluctuations.</p>
<ul style="list-style-type: none"> There would have been no exceedances “but for” the event. 40 CFR 50.14(c)(3)(iii)(D) 	<p>The ADEC showed that there were minimal emissions from prescribed burns in June 2013, (Figure 9). The major stationary sources in the Fairbanks area operate year round and only marginally contribute to PM_{2.5} concentrations during the summer months. A model run for the entire 2009 summer season (part of the Exceptional Events Waiver Request for Exceptional PM_{2.5} Events between July 6 and August 8, 2009 at the SOB in Fairbanks) showed little contribution of fine particulates from these sources to air quality during the summer months.</p> <p>Figure 10 shows PM_{2.5} 24-hour concentration ranges measured in Fairbanks from June 1 to August 31 for the period of 2000 to 2013. For years 2001, 2003, 2006-2008, 2011, and 2012, the years with the lowest number of acres burned (less than 700,000/year), the 90 percentile PM_{2.5} values were 10 ug/m³ or less. This indicates that in the absence of significant wildfire smoke, even the 90 percentile concentrations in Fairbanks during the summer months are substantially</p>

	<p>below the NAAQS. In 2013, the 24-hr average PM_{2.5} concentrations were below 11 µg/m³ for the period of June 1, 2013 through September 30, 2013 except for the days when smoke impacted Fairbanks (Figure 4).</p> <p>Based on the weight of evidence demonstration of a clear causal relationship between wildfires and the elevated PM_{2.5} concentrations measured in Fairbanks, and the lack of contribution from prescribed burns or other anthropogenic PM_{2.5} sources during that time period, the EPA concludes that but for the wildfires near Fairbanks during the summer of 2013, there would have been no exceedances of the 24-hour PM_{2.5} NAAQS on June 27, 2013, at the Fairbanks SOB and NCore monitors.</p>
<ul style="list-style-type: none"> • Mitigation, 40 CFR 51.930 	<p>The ADEC implements the Alaska ESMP to evaluate potential dispersion of smoke emissions from a proposed prescribed burn before approving such burns. All controlled burns for resource management or land clearing that are greater than 40 acres must have an approved burn permit. Furthermore, the permits require that the party conducting the burn notify ADEC at least 24 hours in advance to obtain a favorable dispersion forecast from the National Weather Service, and approval from the ADEC meteorologist.</p> <p>The State of Alaska participates in implementing the AIWFMP, an interagency plan that coordinates federal land management agencies' activities regarding controlling wildland fires in Alaska. The AIWFMP requires an annual, pre-season land manager(s)/owner(s) review of the fire protection needs on lands under their management authority. The ADEC also issues air quality advisories to protect public health from poor air quality. The ADEC issued an air quality advisory on June 27, 2013, and a total of seventeen air quality advisories for the Fairbanks area for the period of June 27 through August 15, 2013 (Appendix B).</p>

Conclusion

Based on the documentation submitted by the ADEC on December 16, 2015, the EPA concurs on the PM_{2.5} data for June 27, 2013 listed in following table, which have been flagged by the ADEC in AQS as influenced by exceptional events.

Table 2. Data that EPA Concurs are Influenced by Exceptional Events ($\mu\text{g}/\text{m}^3$)

Date	NCore Primary	NCore Collocated	State Office Building
6/27/13	58.0	58.3	58.7

The information and analyses presented in the ADEC's submittal provided weight of evidence sufficient for the EPA concurrence on the flagged data from the Fairbanks SOB site and the Fairbanks NCore site on the date listed above. Accordingly, we are placing concurrence indicators in the EPA's AQS database for the Fairbanks SOB monitor, and the NCore primary and precision monitors, for June 27, 2013.

Note that the EPA's decisions on exceptional event exclusions are not considered final agency action until they are acted upon as part of a final regulatory action subject to public notice and comment. Such actions would include, for example, decisions to exclude the affected data from use in an approval of a non-attainment plan or determination of attainment.

