Comment and Response Document Concerning Pennsylvania's Ozone Exceptional Event Analysis for May 24-26, 2016

Overview

On December 2, 2017, the Pennsylvania Department of Environmental Protection ("Department") published a notice in the *Pennsylvania Bulletin* concerning public inspection of the Department's ozone exceptional event analysis (hereinafter "EE analysis") (47 Pa.B. 7388). The EE analysis outlines the impacts that the Fort McMurray fires had on ozone concentrations across Pennsylvania from May 24 to May 26, 2016.

The Fort McMurray fires were a series of fires that burned within the Alberta province of Canada. During the entire months of May 2016 and June 2016, the wildfires that burned in and around Fort McMurray, Alberta, Canada encompassed upwards of 1,500,000 acres of land. The meteorological pattern that developed across the northern US during the week of May 22, 2016, was conducive for smoke to transport from western Canada to the northeastern U.S. The Department's ozone monitoring network measured maximum 8-hour average concentrations that ranked in the top four highest at that respective monitor for 2016.

Within its analysis, the Department used air monitoring and meteorological data to support its argument that the Fort McMurray fires caused ozone exceedances across the Commonwealth. Key findings that were included as part of this analysis include the following:

1.) Smoke-induced ozone was generated upstream (across the Great Lakes) of Pennsylvania and then transported south and east across the Commonwealth.
2.) The ozone concentrations experienced from May 24 to May 26, 2016, were abnormally high for May; ozone concentrations at many locales were in the upper tier (top 1%) of historical May ozone concentrations.
3.) Fine particulates ($PM_{2.5}$) and speciated $PM_{2.5}$ were elevated during the same period.
4.) Meteorological conditions (at the surface and aloft) were favorable for transport of smoke from Canada to the northeastern U.S.
5.) Satellite imagery displays the presence of smoke in air across the northeastern U.S. during the same time as the ozone concentrations peaked.
6.) Additional analyses, such as an estimate of wildfire emissions with respect to transport distance, similar day analysis and photochemical modeling demonstrates the smoke's influence on ozone formation across the Commonwealth.

The Department used multiple techniques to demonstrate that the Fort McMurray fires had an impact on ozone formation across the Commonwealth from May 24 to May 26, 2016. As part of this exceptional event demonstration, the Department determined the following:

1.) There was a relationship between the smoke and the frequency of daily 8-hour ozone exceedances across the Commonwealth.
2.) The Fort McMurray fires were considered a natural event.
3.) The smoke event in question were not reasonably preventable and are unlikely to reoccur.

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As a result of its EE analysis, the Department is requesting concurrence from EPA to flag the ozone data at 40 of its monitors and three of Philadelphia Air Management Services monitors for this particular exceptional event. The flagging of three monitors (Lebanon, Norristown, and Reading) would potentially modify the Department's response to EPA's recent proposed designations for the 2015 ozone NAAQS of nonattainment for the three counties (Lebanon, Montgomery and Berks, respectively) where the monitors reside. After flagging of the May 24 to May 26 ozone concentration data at the three monitors listed above, the 2016 ozone design values at each one of the three monitors would be attaining the 2015 ozone NAAQS.

Public Comment

Notice of the availability of the Department's EE analysis for public review and comment was published in the *Pennsylvania Bulletin* on December 2, 2017 (47 Pa.B. 7388). The public comment period on the Department's EE analysis closed on January 2, 2018. This document summarizes the written comments received during the 30-day public comment period. Comments were received from one commentator in the form of two different letters. Most of the comments demonstrated support of the Department's EE analysis and the conclusions addressed within the analysis. Comment summaries and the Department's responses follow the List of Commentators in this document.

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List of Commentators for Pennsylvania's Ozone Exceptional Event Analysis for May 24-26, 2016

1. Vince Brisini – Letter - Dated 12/20/2017
2. Vince Brisini – Addendum to First Letter – Dated 1/2/2018

Comments and Responses

The identity of the commentator is indicated by the assigned number in parenthesis following each comment. Comments are bolded and are listed by subject area. Department responses follow each comment or set of related comments.

1. **Olympus Power, LLC (Olympus) is writing in support of the Department's Exceptional Events Analysis on the Fort McMurray fires. Olympus is a power plant investment and management firm with assets located throughout the United States, including Pennsylvania. Olympus has been the owner and/or asset manager of projects with interests in 45 operating power plants across the U.S. with over $3 .5 billion of assets and the responsibility for operating projects with a gross capacity in excess of 4,900 megawatts (MW) of electricity generation. Over time, these assets have included coal refuse-fired, natural gas-fired, coal-fired, hydroelectric, solar, biomass-fired and wind powered electric generating facilities. Our current investments in Pennsylvania include three coal refuse to energy facilities - Panther Creek Energy, Northampton Generating and Scrubgrass Generating as well as interests in two coalfired facilities - Keystone Generating Station and Conemaugh Generating Station. (1)**

   On December 22, 2017, Olympus Power, LLC (Olympus) submitted comments in support of the Department's Exceptional Events Analysis on the Fort McMurray fires. This letter is an addendum to that letter. Olympus is a power plant investment and management firm with assets located throughout the United States, including Pennsylvania. Olympus has been the owner and/or asset manager of projects with interests in 45 operating power plants across the U.S. with over $3.5 billion of assets and the responsibility for operating projects with a gross capacity in excess of 4,900 megawatts (MW) of electricity generation. Over time, these assets have included coal refuse-fired, natural gas-fired, coal-fired, hydroelectric, solar, biomass-fired and wind powered electric generating facilities. Our current investments in Pennsylvania include three coal refuse to energy facilities - Panther Creek Energy, Northampton Generating and Scrubgrass Generating as well as interests in two coal-fired facilities - Keystone Generating Station and Conemaugh Generating Station. (2)

   The Department appreciates the background information provided by the commentator.

2. **The Department's Exceptional Event Analysis identifies ozone monitoring data collected during the May 24-26, 2016, period that should be excluded from use in determining ozone design values because of the natural pollution caused by the McMurray wildfire event. This analysis is not only important to the public and businesses located in Pennsylvania because of the more accurate representation of ozone design values but also**

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because this analysis shows that other states, both upwind and downwind of Pennsylvania, should be engaging in this same type of analysis and excluding high measured ozone concentrations that were affected by this same wildfire event. If this doesn't occur, other state environmental agencies and non-governmental organizations could claim that Pennsylvania emissions sources are not adequately controlling their emissions of ozone precursors causing or contributing to ozone nonattainment in other states and regions. (1, 2)

The Department appreciates the comment. The Department's goal in completing the EE analysis was to flag the ozone concentration data at the appropriate monitors so that the ozone data would not be used for comparison of the 8-hour ozone NAAQS. Therefore, the intent was not to penalize those areas (by being classified as nonattainment) that could have met the NAAQS if not for this event. The Department will defer to EPA to address if other states should have completed a similar analysis with respect to their ozone concentrations.

3. **In October 2016, U.S. EPA released a revised Exceptional Event Rule (codified in 40 C.F.R. § 50.14). 40 C.F.R. § 50.14(b) discusses the determinations that the U.S. EPA Regional Administrator can make on excluding data, including wildfires. As provided in the Department's analysis:**

   "The Administrator shall exclude data from use in determinations of exceedances and violations where a State demonstrates to the Administrator's satisfaction that emissions from wildfires caused a specific air pollution concentration in excess of one or more national ambient air quality standard at a particular air quality monitoring location and otherwise satisfies the requirements of this section. Provided the Administrator determines that there is no compelling evidence to the contrary in the record, the Administrator will determine every wildfire occurring predominantly on wildland to have met the requirements identified in paragraph (c)(3)(iv)(D) of this section regarding the not reasonably controllable or preventable criterion." (1)

   Failure to use this available Exceptional Event Analysis to provide for the most appropriate representation of actual monitoring design values will cause monitors in three additional Pennsylvania counties to have 2014-2016 ozone design values that show nonattainment of the 2015 ozone NAAQS. Those monitors are Lebanon, Reading Airport and Norristown. Even though Pennsylvania is located entirely within the Ozone Transport Region (OTR) it is still a great disadvantage to the public and every business to be located in areas inappropriately designated as nonattainment when those areas should be designated as attainment. The correct designation of the various counties is also extremely important because the designation of counties and the location of those counties will have an effect on the design of future regulatory and control strategies to bring those remaining counties into attainment with the 2015 ozone NAAQS. (1)

   The Department appreciates the comment. The Department agrees with the commentator about ensuring the proper designation is made with respect to all counties within Pennsylvania.

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4. **The validity of the Department's Exceptional Events Analysis is substantiated with very easily understood graphics, maps and concise observations. As identified by the Department in the analysis:**

   "The overall meteorological pattern across the northeastern U.S. was not favorable for ozone formation until the last day (May 26) of the episode in Pennsylvania. Therefore, on a meteorological basis, this event can be characterized as uncommon for ozone formation across the Commonwealth. Even with the favorable meteorological conditions (high pressure stationed across the western Atlantic and high temperatures approaching the 90 degree mark across Pennsylvania), the elevated precursor emissions (specifically VOC and NOx associated with the fire) were necessary for such a widespread ozone event to occur across Pennsylvania." (1)

   The Department appreciates the comment and the support of the results of its EE analysis.

5. **Further, PADEP has made an extremely important assessment regarding the contemporaneous emissions from electric generating units (EGUs) relative to previous years emissions of nitrogen oxides (NOx), the main ozone precursor emitted from these facilities. While in the context of this analysis the point is that these EGUs were emitting at lower levels during this event than occurred in any of the previous 5 years, an important part of the messaging should also be that EGUs ozone season and non-ozone season NOx emissions have been declining for many years. And in the case of Pennsylvania, these lower emissions occurred prior to the implementation of Pennsylvania Reasonably Available Control Technology 2 regulation and prior to the implementation of the Cross States Air Pollution Rule (CSAPR) which significantly reduced the ozone season NOx emissions budgets for EGUs:**

   "When combined with the fact that the May 2016 CAMD emissions were the lowest of the last five years, the high concentrations during May 25 and May 26 were uncharacteristically high, suggesting the monitors were influenced by smoke from the Fort McMurray fires." (1)

   The Department appreciates the comment. The Department agrees that full implementation of its Reasonably Available Control Technology (RACT) 2 regulation and the federal CSAPR rule will lead to further reduction of NOx emissions for EGUs, which ultimately will lead to a lower number of ozone exceedances than 15-20 years ago.

6. **The most easily understood information contained in this Exceptional Event Analysis which clearly demonstrate the appropriateness of declaring this period as an "Exceptional Event" are the 8-hour peak ozone concentrations presented on pages 29, 30 and 31 that show the effect of the affected air mass passing over the region and the satellite analyses presented on pages 38, 39, 40 and 41 that show the presence of high levels of carbon monoxide (CO) which is a pollutant that can be used to track the affected air mass containing ozone and ozone precursors from the wildfire. Upon review of those data and the correlation of the information presented on those figures, it is abundantly obvious that EPA should accept and approve this Exceptional Event Analysis. (1)**

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The Department appreciates the comment and support of the data provided in its EE analysis.

7. **Based on the information presented in the Department's Exceptional Event Analysis, Olympus supports and concurs with the conclusion reached by the Department:**

   "In conclusion, based on the Department's in-depth analysis into the contributions of high ozone across the Commonwealth on May 24 to May 26, 2016, the Department concludes that transport of smoke associated with the Fort McMurray fires in Alberta, Canada, contributed to the elevated ozone concentrations that occurred on these dates. Utilizing factors such as surface and upper air meteorology, satellite imagery, and pollutant data (ozone and fine particulates), the Department was able to successfully determine that the smoke plume associated with the Fort McMurray fires had an impact on ozone formation across the Commonwealth. Specifically, the details outlined in Sections 2 and 3 of this document support the Department's position that the Fort McMurray fires affected air quality across the Commonwealth in such a way that a clear causal relationship between the Fort McMurray fires and ozone monitored exceedances exists on May 24, May 25, and May 26, therefore satisfying the clear causal relationship criterion as it relates to exceptional events." (1)

   The Department appreciates the comment and support of its EE analysis and conclusion.

8. **Further support for the Department's Exceptional Event Analysis is that Connecticut, New Jersey, Massachusetts, Rhode Island and Ohio have also submitted Exceptional Events Analysis for this time frame in May 2016. What is interesting however, is that it appears that New York, Maryland, Delaware Vermont, New Hampshire and Maine did not prepare an Exceptional Event Analysis for this same time frame in May 2016 when the 8-hour peak ozone concentrations and the satellite analyses in the Department's analysis show that those states were also affected by the Fort McMurray wildfires event. (1)**

   The Department appreciates the comment. The Department will defer to EPA to address if other states should have completed a similar analysis with respect to their ozone concentrations.

9. **In researching on the internet to determine if other states had also submitted Exceptional Event Analysis for this May 2016 period, an Exceptional Event Analysis submitted by Maryland for the July 21 and 22, 2016 time period was also found. Based on the information contained in the Maryland analysis it appears that Pennsylvania along with other Mid-Atlantic and Eastern states should have also submitted or should be preparing an additional Exceptional Events Analysis to address this July 2016 period. Olympus strongly urges the Department to prepare an Exceptional Event Analysis for the same affected July, 2016 time period. Following is an excerpt from the Maryland Analysis:**

   "2.3. Exceptional Event Description: July 2016 Northwest Canada Wildfires Abnormally warm and dry conditions across central Canada in late Spring of 2016 promoted wildfire

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conditions in the provinces of Alberta and Saskatchewan. In May, fire concern was most concentrated around or near the town of Fort McMurray when a large fire consumed over a million acres of woodland through early July. Fire prone conditions persisted even as this fire was extinguished, and the area prone to wildfires expanded into northeastern British Columbia and the Northwest Territories of Canada. Between July 13 and July 20, 2016, the NOAA Daily Hazard Mapping System (HMS) smoke and fire analyses (McNamara, et al., 2004) detected a large increase in the number of fires across British Columbia and the Northwest Territories, in addition to a number of fires across the Alberta and Saskatchewan (Figure 6). Fires and associated smoke plumes analyzed by HMS were derived from the GOES Imager, the POES A VHRR, MODJS satellites and expert subjective analysis. In fact, a total of 205 new fires started across northwestern Canada burning 109,724 ha (271,134 acres) over that week period. The majority of these fires (65%) occurred in British Columbia, Alberta and the Northwest Territories. The majority of the area burned (60%) was in the Northwest Territories. Lightning was suspected as starting the majority of the fires reported across the area." (1)

The Department appreciates the comment. The Department initially considered submitting an exceptional event analysis for the July 21-23, 2016, period. As part of its consideration, the Department preliminarily reviewed the air quality and meteorological data during the July 2016 period. The Department ultimately decided not to pursue an exceptional event declaration for the July 2016 period due to lack of supporting evidence and response in its ambient air monitoring data.

10. **In researching the Fort McMurray wildfire, officially identified as the Horse River Fire, it has been learned that this fire started on May 1, 2016; was identified as "under control" on July 5, 2016; but was not fully extinguished until August 2, 2017. This wildfire existed in some fashion for over a year and burned over 1,500,000 acres of forest.**

    Considering the extent of this event, it is somewhat remarkable that only two to three days in May, 2016 are identified as impacting the air quality by some number of northeastern states. Especially when these same states are using their monitored ozone concentrations and insisting that other states use their monitored ozone concentrations to designate whether areas are meeting the 2015 ozone national ambient air quality standard (NAAQS). Considering the likely impacts of the emissions over this long and widespread wildfire event to various monitored ozone concentrations throughout the Northeastern and Mid-Atlantic regions, it is imperative that not only the Pennsylvania Department of Environmental Protection ensure that all impacted ozone concentrations are excluded from use in developing the 2014-2016 ozone design values for Pennsylvania, it is imperative that all environmental agencies in all of the Northeastern and Mid - Atlantic regions states ensure that all impacted ozone concentrations are excluded from the development of their 2014-2016 ozone design values. Further, it is inappropriate for any classifications for the 2015 ozone NAAQS to be completed until <u>all</u> monitored ozone concentrations affected by this wildfire event are identified and excluded from the 2014-2016 ozone design values.

    Following are links to some reports and articles related to this wildfire event:

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https://en.wikipedia.org/wiki/2016_Fort_McMurray_Wildfire
http://wildfiretoday.com/tag/canada/
https://globalnews.ca/news/3137099/the-beast-is-still-burning-east-of-fort-mcmurray/
https://www.bloomberg.com/features/2016-wildfire-fort-mcmurray/ (2)

The Department appreciates the comment and the supporting information (and web links) provided by the commentator. As outlined in its EE analysis, it took a very special meteorological pattern to set up over the northern U.S. to transport the smoke associated with the Fort McMurray fires across Pennsylvania. As outlined in its satellite analysis, the smoke was very concentrated to be able to produce the amount of ozone precursors (NOx and VOCs) necessary for abundant ozone formation, as was witnessed across the northeastern U.S. from May 24-26, 2016. As mentioned in a response to several comments above, the Department will defer to EPA to address if other states should have completed a similar analysis with respect to their ozone concentrations.

11. **What is especially concerning is that, as identified in the Olympus December 22, 2017, letter, some of the states in the Northeast and Mid-Atlantic regions have not provided adequate or any Exceptional Event Analyses for any time periods. From the information provided by the states that have prepared Exceptional Events Analysis, it is clear that these states were also impacted by this event. The question is how can all areas in Pennsylvania, as well as other Mid-Atlantic and Northeastern states, be designated relative to the 2015 ozone NAAQS without adequate analyses to ensure the exclusion of all measured ozone concentrations impacted by this long-term wildfire event from the 2014-2016 ozone design values. Failure to do so could result in both local and "Good Neighbor" emissions reduction programs being required that are actually beyond what would otherwise be required. As the U.S. Supreme Court in the Homer City case ruled, it is essential that Good Neighbor states be required to eliminate "only those 'amounts' of pollutants that contribute to the nonattainment of NAAQS in downwind States ... " ... EPA cannot require a State to reduce its output of pollution by more than is necessary to achieve attainment in every downwind State ... "**

    Failure of Pennsylvania, and other states, to not exclude all impacted ozone concentrations from the development of design values used to designate areas as meeting or not meeting the 2015 ozone NAAQS could and likely would result in requirements beyond those which the U.S. Supreme Court has determined would be allowable. (2)

    The Department appreciates the comment. As mentioned in a response to several comments above, the Department will defer to EPA to address if other states should have completed a similar analysis with respect to their ozone concentrations.

12. **Thank you for the opportunity to provide these comments in support of the Department's Exceptional Event Analysis. Olympus appreciates the Department's efforts to reflect as accurately as possible the appropriate ozone design values for all Pennsylvania counties and monitors. (1, 2)**

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We also believe that the Department should ensure that all other states that have been affected by this exceptional event also submit the same kind of analysis that the Department has prepared. Failure to do so could result in those other states making claims that Pennsylvania sources are causing or contributing to ozone nonattainment in their states by using design values that inappropriately include measured ozone concentrations that include the tin1e periods that were affected by this and other wildfire polluted air masses. (1)

The Department appreciates the comment and the support of the Department's results within its EE analysis.

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