ENCLOSURE: TECHNICAL SUPPORT DOCUMENT FOR EPA'S DECISION ON OZONE AIR MONITORING DATA MEASURED IN THE GREATER CONNECTICUT NONATTAINMENT AREA; APRIL 13–14, JUNE 30–JULY 1, AND JULY 12, 2023, AS EXCEPTIONAL EVENTS

1.0 INTRODUCTION

On July 1, 2024, the Connecticut Department of Energy and Environmental Protection (CT DEEP) Bureau of Air Management submitted an exceptional events demonstration for exceedances or violations of the 2015 8-hour ozone (O_3) National Ambient Air Quality Standards (NAAQS) that occurred at the Cornwall, East Hartford, and Groton monitoring sites. The demonstration submitted by CT DEEP stated that the exceedances measured on April 13–14 were caused by annual agricultural and prescribed fires from the Flint Hills region of Kansas, and nearby wildfires from Pennsylvania, New York, and New Jersey. The demonstration from CT DEEP also stated that there were exceedances or violations on June 30–July 1 due to Quebec, Canada, wildfires that transported extremely high fine particulate matter ($PM_{2.5}$) levels into the area. CT DEEP also asserted that high levels of ozone were recorded from smoke from western Canadian wildfires on July 12. Under the Exceptional Events Rule, air agencies can request the exclusion of event-influenced data, and the EPA can agree to exclude these data, from the data set used for certain regulatory decisions, only if the EPA determines that the agencies have demonstrated that the event meets the rule criteria and requirements. The remainder of this document summarizes the Exceptional Events Rule requirements, the events that are the subject of the submitted demonstration, the EPA's review process, and the bases for the EPA's determinations regarding the events.

2.0 EXCEPTIONAL EVENTS RULE REQUIREMENTS

The EPA promulgated the Exceptional Events Rule in 2007, pursuant to the 2005 amendment of Clean Air Act (CAA) Section 319.[1] In 2016, the EPA finalized revisions to the Exceptional Events Rule.[2] The 2007 Exceptional Events Rule and 2016 Exceptional Events Rule revisions added sections 40 CFR §50.1(j)-(r); §50.14; and §51.930 to title 40 of the Code of Federal Regulations (CFR). These sections contain definitions, criteria for EPA approval, procedural requirements, and requirements for air agency demonstrations. The EPA reviews the information and analyses in the air agency's demonstration package using a weight of evidence approach and decides to concur or not concur. The demonstration must satisfy all of the Exceptional Events Rule criteria for the EPA to concur with excluding the air quality data from regulatory decisions. If any one of the criteria are not met, the EPA will not concur with the demonstration.

[1] 72 FR 13560 (May 21, 2007).
[2] 81 FR 68216 (Oct. 3, 2016).

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

A. A narrative conceptual model that describes the event(s) causing the exceedance or violation and a discussion of how emissions from the event(s) led to the exceedance or violation at the affected monitor(s);

B. A demonstration that the event affected air quality in such a way that there exists a clear causal relationship between the specific event and the monitored exceedance or violation;

C. Analyses comparing the claimed event-influenced concentration(s) to concentrations at the same monitoring site at other times to support requirement (B) above;

D. A demonstration that the event was both not reasonably controllable and not reasonably preventable; and

E. A demonstration that the event was a human activity that is unlikely to recur at a particular location or was a natural event.[3]

In addition, the air agency must meet several procedural requirements, including:

1. submission of an Initial Notification of Potential Exceptional Event and flagging of the affected data in the EPA's Air Quality System (AQS) as described in 40 CFR §50.14(c)(2)(i);

2. completion and documentation of the public comment process described in 40 CFR §50.14(c)(3)(v); and

3. implementation of any relevant mitigation requirements as described in 40 CFR §51.930.

For data influenced by exceptional events to be excluded from use in initial area designations, air agencies must also meet the initial notification and demonstration submission deadlines specified in Table 2 to 40 CFR §50.14. We include below a summary of the Exceptional Events Rule criteria, including those identified in 40 CFR §50.14(c)(3)(iv).

The EPA expects that the documentation and analyses that air agencies include in their demonstrations will vary consistent with the event characteristics, the relationship to the monitor where the exceedance or violation occurred, and the complexity of the airshed, among

[3] A natural event is further described in 40 CFR §50.1(k) as "an event and its resulting emissions, which may recur at the same location, in which human activity plays little or no direct causal role. For purposes of the definition of a natural event, anthropogenic sources that are reasonably controlled shall be considered to not play a direct role in causing emissions."

other points. The EPA reviews exceptional events demonstrations on a case-by-case basis using a weight of evidence approach considering the specifics of the individual event.

2.1 Regulatory Significance

The 2016 Exceptional Events Rule includes regulatory language that applies the provisions of CAA section 319 to a specific set of regulatory actions. As identified in 40 CFR §50.14(a)(1)(i), these regulatory actions include initial area designations and redesignations; area classifications; attainment determinations (including clean data determinations); attainment date extensions; findings of State Implementation Plan (SIP) inadequacy leading to a SIP call; and other actions on a case-by-case basis as determined by the Administrator. Air agencies and the EPA should discuss the regulatory significance of an exceptional events demonstration during the Initial Notification of Potential Exceptional Event prior to the air agency submitting a demonstration for the EPA's review.

2.2 Narrative Conceptual Model

The 2016 Exceptional Events Rule directs air agencies to submit, as part of the demonstration, a narrative conceptual model of the event that describes and summarizes the event in question and provides context for analyzing the required statutory and regulatory technical criteria. Air agencies may support the narrative conceptual model with summary tables or maps. For wildfire O_3 events, the EPA recommends that the narrative conceptual model also discuss the interaction of emissions, meteorology, and chemistry of event and non-event O_3 formation in the area, and, under 40 CFR §50.14(a)(1)(i), must describe the regulatory significance of the proposed data exclusion.

2.3 Clear Causal Relationship and Supporting Analyses

The EPA considers a variety of evidence when evaluating whether there is a clear causal relationship between a specific event and the monitored exceedance or violation. For wildfire O_3 events, air agencies should compare the O_3 data requested for exclusion with seasonal and annual historical concentrations at the air quality monitor to establish a clear causal relationship between the event and monitored data. In addition to providing this information on the historical context for the event-influenced data, air agencies should further support the clear causal relationship criterion by demonstrating that the wildfire's emissions were transported to the monitor, that the emissions from the wildfire influenced the monitored concentrations, and, in some cases, air agencies may need to provide evidence of the contribution of the wildfire's emissions to the monitored O_3 exceedance or violation.

For wildfire O_3 events, the EPA has published a guidance document that provides three different tiers of analyses that apply to the "clear causal relationship" criterion within an air agency's

exceptional events demonstration.[4] This tiered approach recognizes that some wildfire events may be clearer and/or extreme and, therefore, require relatively less evidence to satisfy the rule requirements. If a wildfire/O_3 event satisfies the key factors for either Tier 1 or Tier 2 clear causal analyses, then those analyses are the only analyses required to support the clear causal relationship criterion within an air agency's demonstration for that particular event. Other wildfire/O_3 events will be considered based on Tier 3 analyses.

- Tier 1: Wildfires that clearly influence monitored O_3 exceedances or violations when they occur in an area that typically experiences lower O_3 concentrations.
    - Key Factor: seasonality and/or distinctive level of the monitored O_3 concentration. The event-related exceedance occurs during a time of year that typically has no exceedances, or is clearly distinguishable (e.g., 5–10 parts per billion (ppb) higher) from non-event exceedances.
    - In these situations, O_3 impacts should be accompanied by clear evidence that the wildfire's emissions were transported to the location of the monitor.

- Tier 2: The wildfire event's O_3 influences are higher than non-event related concentrations, and fire emissions compared to the fire's distance from the affected monitor indicate a clear causal relationship. If both key factors are met, then a Tier 2 demonstration will likely be sufficient.
    - Key Factor 1: fire emissions and distance of fire(s) to affected monitoring site location(s). Calculated fire emissions of nitrogen oxides (NO_X) and reactive volatile organic compounds (VOC) in tons per day (Q) divided by the distance from the fire to the monitoring site (D) should be equal to or greater than 100 tons per day/kilometers ($Q/D \geq 100$ tpd/km). The guidance document provides additional information on the calculation of Q/D.
    - Key Factor 2: comparison of the event related O_3 concentration with non-event related high O_3 concentrations. The O_3 concentration due to the exceptional event:
        - is in the 99th or higher percentile of the five-year distribution of O_3 monitoring data, OR
        - is one of the four highest O_3 concentrations within one year (among those concentrations that have not already been excluded under the Exceptional Events Rule, if any).
    - In addition to the analysis required for Tier 1, the air agency should supply additional evidence to support the weight of evidence that emissions from the wildfire affected the monitored O_3 concentration.

[4] "Guidance on the Preparation of Exceptional Events Demonstrations for Wildfire Events that May Influence Ozone Concentrations" (September 2016) ("wildfire O_3 guidance document").

- Tier 3: The wildfire does not fall into the specific scenarios (i.e., does not meet the key factors) that qualify for Tier 1 or Tier 2, but the clear causal relationship criterion can still be satisfied by a weight of evidence showing.
    - In addition to the analyses required for Tier 1 and Tier 2, an air agency may further support the clear causal relationship with additional evidence that the fire emissions caused the O_3 exceedance.

2.4 Not Reasonably Controllable or Preventable

The Exceptional Events Rule requires that air agencies establish that the event be both not reasonably controllable and not reasonably preventable at the time the event occurred. This requirement applies to both natural events and events caused by human activities; however, it is presumed that wildfires on wildland will satisfy both factors of the "not reasonably controllable or preventable" element unless evidence in the record clearly demonstrates otherwise.[5]

2.5 Natural Event

According to the CAA and the Exceptional Events Rule, an exceptional event must be "an event caused by human activity that is unlikely to recur at a particular location or a natural event" (emphasis added). The 2016 Exceptional Events Rule includes in the definition of wildfire that "[a] wildfire that predominantly occurs on wildland is a natural event." Once an agency provides evidence that a wildfire on wildland occurred and demonstrates that there is a clear causal relationship between the measurement under consideration and the event, the EPA expects minimal documentation to satisfy the "human activity that is unlikely to recur at a particular location or a natural event" element. The EPA will address wildfires on other lands on a case-by case basis.

3.0 EPA REVIEW OF EXCEPTIONAL EVENTS DEMONSTRATION

On January 10, 2024, CT DEEP submitted an Initial Notification of potential Exceptional Events for numerous exceedances or violations of the 2015 8-hour O_3 NAAQS that occurred at several monitoring sites in the Greater Connecticut nonattainment area during 2023. On July 1, 2024, CT DEEP submitted an exceptional events demonstration for exceedances or violations of the 2015 8-hour O_3 NAAQS that occurred at the Cornwall, East Hartford, and Groton monitoring sites. The request for 8-hour O_3 data exclusion for the Groton monitoring site is for April 13–14, June 30–July 1, and July 12, 2023. The submittal also requested exclusion of the 8-hour O_3 data at the East Hartford and Cornwall monitoring sites for July 1, 2023.

[5] A wildfire is defined in 40 CFR §50.1(n) as "any fire started by an unplanned ignition caused by lightning; volcanoes; other acts of nature; unauthorized activity; or accidental, human-caused actions, or a prescribed fire that has developed into a wildfire. A wildfire that predominantly occurs on wildland is a natural event." Wildland is defined in 40 CFR §50.1(o) as "an area in which human activity and development are essentially non-existent, except for roads, railroads, power lines, and similar transportation facilities. Structures, if any, are widely scattered."

3.1 Regulatory Significance

The EPA determined that some of the exceedances or violations referenced in CT DEEP's Initial Notification may have a regulatory significance for an attainment date extension or determination of attainment by the Moderate area attainment date for the Greater Connecticut nonattainment area (NAA) for the 2015 8-hour O_3 NAAQS and worked with CT DEEP to identify the relevant exceedances or violations, and monitoring sites affected. In consultation with EPA, CT DEEP's demonstration requested exclusion for monitoring data with regulatory significance pertaining to the August 3, 2024, moderate area attainment date for the 2015 ozone NAAQS.

Table 1 summarizes the exceedances or violations that CT DEEP included in the demonstration for exclusion under the Exceptional Events Rule.

Table 1: 8-hour O_3 Exceedance or Violation Summary

Exceedance Date	Monitor/Site Name	AQS ID	8-hour Avg. (ppm)
April 13, 2023	Groton	09-011-0124	0.076
April 14, 2023	Groton	09-011-0124	0.073
June 30, 2023	Groton	09-011-0124	0.070
July 1, 2023	Cornwall	09-005-0005	0.079
July 1, 2023	East Hartford	09-003-1003	0.082
July 1, 2023	Groton	09-011-0124	0.076
July 12, 2023	Groton	09-011-0124	0.081

Table 2 shows the impact on the 2023 design values with and without claimed event-influenced data from the proposed exceptional events. The design values at other monitors in the Greater Connecticut nonattainment area meet the 2015 ozone NAAQS and were not included in the demonstration.

Table 2: 2023 Design Values with and Without Claimed Event-Influenced Data from the Exceptional Events

Greater Connecticut							
				Not Excluding Claimed Event-Influenced Data		Excluding Claimed Event-Influenced Data	
Monitor/Site Name	AQS ID	2021 4th High	2022 4th High	Current 2023 4th High	Current 2021-2023 DV	Resulting 4th High	Resulting DV
Cornwall	09-005-0005	68	70	76	71	67	68
East Hartford	09-003-1003	66	74	73	71	70	70
Groton	09-011-0124	75	71	73	73	64	70

3.2 EPA Analysis of April 13–14 Event

3.2.1 Narrative Conceptual Model (April 13-14 Event)

CT DEEP's demonstration provided a narrative conceptual model to describe how emissions and subsequent ozone from the agricultural burning and prescribed fires in the Flint Hills region of Kansas impacted the Groton monitoring site on April 13–14. CT DEEP stated that forecasters have observed enhanced early season ozone levels due to a combined light smoke plume blanketing the eastern States in the past, but weather patterns in April of 2023 caused this smoke to be transported to Connecticut for an extended period with unusually warm temperatures. In concert with this smoke, CT DEEP asserted that nearby wildfires occurred just upwind in Pennsylvania, New York, and New Jersey to further raise ozone levels. CT DEEP proposed that collectively, and perhaps individually, these fires influenced O_3 exceedances or violations at the Groton monitoring location and included additional information to support their claim.

In its discussion, CT DEEP included information for nonevent characteristics in Connecticut, including a description of the four predominant scenarios of O_3 exceedances based on spatial patterns of measured O_3 and the contributing meteorological conditions. Specific to the observed event, CT DEEP described the classic statewide exceedance scenario with surface wind flow from the southwest along the I-95 corridor, transport at mid-levels from the southwest via the lower-level nocturnal jet stream, and flow at upper levels from the west. All of these flows are from emission-rich upwind areas, serving to transport O_3 precursors and previously formed O_3 into Connecticut. CT DEEP asserted the typically necessary meteorological conditions were not present to cause the magnitude of statewide exceedances that were observed on April 13–14, 2023. CT DEEP also asserted on April 13–14, nearby wildfires in Pennsylvania, New York, and New Jersey aligned with winds from the west—already laden with smoke, ozone, and precursors from fires out west—to cause exceptionally high ozone levels throughout the state. With only the exception of New Haven, all monitors in the state exceeded the 2015 ozone standard for one or both of these days. Connecticut had not seen such widespread statewide ozone exceedances since May 18, 2017.

Ozone exceedance days in Connecticut are due in part to the transport of O_3 and its precursors, particularly nitrogen oxide (NO_X) and volatile organic compound (VOC), from upwind states. Therefore, CT DEEP also provided information on regional NO_X and VOC emissions, including maps showing the reduction in NO_X and VOC emissions that have occurred from 1990 to 2017 over the northeastern United States. These maps illustrate the predominant source of regional precursor emissions are southwest of Connecticut and have been substantially reduced. In addition, CT DEEP included an analysis of NO_X emissions from upwind electric generating units (EGUs) to demonstrate that the exceedances on April 13 and 14 would most likely not be attributed to EGUs operating on high electric demand days as is more typically the case later in the O_3 season. However, EPA notes the figures, which show EGU emissions from New York, New Jersey, and Pennsylvania, do show some increase in the NO_X emissions during this event.

CT DEEP provided information on agricultural and prescribed burning events that take place every year, especially in the southern U.S and the Flint Hills region of Kansas and showed trajectory analysis from the Cornwall monitor overlaying the Hazard Mapping System (HMS) smoke/fire analysis. CT DEEP described how wildfire smoke plumes contain gases, including non-methane hydrocarbons, carbon monoxide (CO), NO_X, and aerosols, which are all important precursors to the photochemical production of tropospheric O_3, and can travel for thousands of kilometers. Multiple factors such as fuel, plume path, and distance affect the intensity of the fire and its ability to enhance O_3 production downwind. CT DEEP contends that for this event the elevated ozone observations at the Groton monitoring location was the result of the prescribed burning from the Flint Hills region of Kansas, and the regional wildfires that occurred just upwind.

Based on the information described above, CT DEEP's demonstration meets the narrative conceptual model criterion of the Exceptional Events Rule.

Table 3: Documentation of Narrative Conceptual Model

Exceedance Date	**Demonstration Citation**	**Quality of Evidence**	**Criterion Met?**
April 13, 2023	Section 2. (pages 19–37)	Sufficient	Yes
April 14, 2023	Section 2. (pages 19–37)	Sufficient	Yes

3.2.2 Clear Causal Relationship and Supporting Analyses (April 13-14 Event)

CT DEEP's demonstration contained multiple analyses to attempt to demonstrate a clear causal relationship between the prescribed/agricultural fires and nearby wildfires and the monitored exceedances at the Groton monitoring location for April 13–14 consistent with the EPA's wildfire O_3 guidance. These analyses are presented throughout the demonstration.

3.2.2.1 Comparison with Historical Concentrations (April 13-14 Event)

CT DEEP included a comparison of historical concentrations, as required by 40 CFR §50.14(c)(3)(iv)(C). For April 13, CT DEEP compared the event-related O_3 concentrations with historical data and determined the maximum daily 8-hour O_3 concentration met or exceeded the 99th percentile for observed data over the last 5 years for the Groton monitoring location; while for April 14, CT DEEP showed that the Groton site did not meet or exceed the 99th percentile. CT DEEP constructed wind roses for the Groton monitoring site using data from the Madison location, which is 25 miles to the east, since Groton does not have collocated wind data at that location. An analysis of the wind roses for Groton using meteorological data from Madison for April 13–14 shows winds associated with elevated ozone were from the west and southwest, which is typical for patterns of elevated ozone at this monitoring location.

3.2.2.2 Tier 1: Key Factor (April 13-14 Event)

To meet the key factor for a Tier 1 analysis, exceedances should be clearly higher than other, non-event related exceedances, or occur during a time of year that typically experiences no exceedances. Although O_3 exceedance days in Connecticut usually occur during the June–August timeframe, exceedances do occasionally occur in May and September. The event-related exceedances identified in this demonstration occurred during April, which is in the regular O_3 season, but is during a month when exceedances typically do not occur in Connecticut. April 22, 2017, was the most recent ozone exceedance day before May 1 prior to 2023. Therefore, the event exceedances do meet the seasonality Tier 1 Key Factor, and the demonstration does not show the exceedances were 5–10 ppb higher than non-event related exceedances as recommended by EPA's O_3 wildfire guidance. As a result, the proposed event ozone concentrations do not meet the Tier 1 Key Factors, and additional evidence beyond a Tier 1 analysis is needed to support the clear causal relationship.

3.2.2.3 Tier 2: Key Factors (April 13-14 Event)

Because the influence of the combination of the prescribed fires in the central plains and nearby wildfires was not clearly higher than non-event related concentrations, CT DEEP evaluated the Tier 2 Key Factors in Section 5 of the demonstration. For Tier 2 Key Factor 1, CT DEEP provided an analysis of fire emissions (Q) and distance (d) of the wildfires to the Groton monitoring location. For the nearby fires, the description of the Q/d calculation for the Crystal Lake fire in Luzerne County, Pennsylvania, was given to illustrate the methodology used. The fires began burning on April 12 and were contained by April 18. CT DEEP used the National Center for Atmospheric Research's Fire Inventory (FINN), which characterizes fires using satellite data, to determine the area burned, which is part of the Q value. They then used the distance to the Groton monitor as d. Due to a low emission rate (Q) from Crystal Lake fire, the calculated value for Q/d was well below the EPA's recommended level of 100 tpd/km to indicate clear causality ($Q/d < 1$).

In addition to the description of the Crystal Lake fire, Table 5-1 of the demonstration shows a Q/d summary of several of the nearby fires. The total Q/d for all these fires is approximately 1.2 tpd/km, with the low emission rate being the primary factor contributing to the low Q/d value. For the Flint Hills fires, CT DEEP used data for acreage burned available from reports posted at the Kansas Flint Hills Management website to determine Q, and the distance d to the Groton monitor. CT DEEP determined the Q/d from the distant Flint Hills was 0.60 tpd/km, which exceeded the value for any of the individual nearby fires but was still low. In summary, the total Q/d value for all of the nearby wildfires and the prescribed fires in Kansas was well below the threshold of 100 tpd/km for establishing clear causality, and therefore, the event exceedances do not meet Tier 2 Key Factor 1.

For Tier 2 Key Factor 2, CT DEEP compared the event-related O_3 concentrations with historical data for the April–September O_3 season over the past five years. For April 13, CT DEEP

compared the event-related O_3 concentrations with historical data and determined the maximum daily 8-hour O_3 concentration met or exceeded the 99th percentile for observed data over the last 5 years for the Groton monitoring location. For April 14, CT DEEP determined the maximum daily 8-hour O_3 concentration met or exceeded the 99th percentile for observed data over the last 5 years for the Cornwall and East Hartford sites, but not for the Groton site.

Based on the analysis of the Key Factors for Tier 2, EPA's wildfire O_3 guidance document indicates that a Tier 3 analysis is appropriate for this event. As described below, CT DEEP's demonstration included the required elements for a Tier 3 clear causal relationship analysis, based on EPA's wildfire O_3 guidance document. This includes information that proposes that wildfire emissions were transported from the wildfire to the monitors, wildfire emissions affected the monitors, and wildfire emissions contributed to the O_3 exceedances.

3.2.2.4 Evidence of transport of wildfire emissions from the wildfire to the monitors (April 13-14 Event)

CT DEEP provided images showing that numerous fires were detected by satellite prior to the April 13–14 event over the central plains and upper Midwest, the majority of which were prescribed burns or agricultural fires. The figures showed both visible images of smoke and particulates as well as fire detections across the central plains and upper Midwest. Images of the HMS fire detections show a very wide area of agricultural and prescribed burning across the central and eastern U.S., with a concentration in the central plains and Midwest. Based on the images, it is hard to determine which fire or group of fires is predominantly contributing to the smoke that is seen in the visible images. CT DEEP contends that the Flint Hills prescribed burn was the primary cause of ozone exceedances on April 13–14.

In addition, CT DEEP provided trajectory analysis using the Hybrid Single-Particle Lagrangian Integrated Trajectory (HYSPLIT) model, with meteorological data from the North American Mesoscale Forecast System (NAM), which uses a 12-km grid. The analysis included trajectories that show the movement of smoke from the central plains, across the upper Midwest and Great Lakes region, and then through New York state before eventually moving into Connecticut. For the Groton monitor, 100-meter 48-hour backward trajectories show the origin of air parcels on both days in eastern Missouri; however, the winds have a southwest component in the afternoon on both days. CT DEEP explained that this wind pattern allows for additional smoke from local fires in Pennsylvania, New York, and northern New Jersey to increase ozone precursors and enhance ozone formation over Long Island Sound. These pollutants would have been trapped within the shallow, marine boundary layer and result in increased ozone levels at Groton and shoreline sites. However, EPA notes that the southwest wind component at Groton and mixing of air masses, make it difficult to determine the exact origin of the air that impacted the Groton monitor, especially given the historical exceedances that occur at this location and just west of this location along coastal Connecticut.

CT DEEP continued their trajectory analysis by providing 72-hour forward trajectories starting on April 10 and 11 and originating from the Flint Hills in eastern Kansas. These forward trajectories, starting at 1000, 1500, and 2000 meters showed plume movement in a general northeasterly direction before becoming east-southeast. However, EPA finds that this analysis did not conclusively show that the Flint Hills fires impacted the Groton monitor.

CT DEEP also provided an analysis of synoptic scale meteorological features using weather maps from April 10 through 14. The surface analysis for April 10 shows high pressure over the midwestern United States. High pressure remained over the southeastern United States on April 11 and April 12, as a frontal system slowly moved across the country. The front stalled over the northern Great Lakes and Midwest regions allowing for smoke, ozone, and precursors to be transported to Connecticut on April 13 and April 14 as the high-pressure system again slowly moves eastward. A similar analysis for flow at 850 millibar (mb) across this time period was done with a similar set-up indicating conditions were such that flow of ozone and precursors from the west and southwest could make their way into Connecticut.

Hourly observational data at several local monitors was also shown. Figures 9-10 through 9-11 of the demonstration show the hourly ozone with temperatures and the hourly ozone with wind direction for the days surrounding the April 13–14 event at Cornwall, East Hartford, Stafford, and Westport. Unfortunately, Groton was not selected because complete meteorological data were not available. EPA notes that these figures show warm conditions across Connecticut for both days with temperatures at the East Hartford location reaching at least 90°F on both April 13 and 14. This set-up coupled with flow from the west, and particularly southwest at the Groton monitor, is a set-up for a typical ozone episode over this region.

EPA's wildfire O_3 guidance document suggests that to show transport, satellite imagery should be accompanied by evidence of the plume reaching the ground. CT DEEP provided data of elevated hourly $PM_{2.5}$ measurements at the monitors, as well as webcam images of haze moving into Connecticut during the event. EPA notes that the hourly observations for the Groton monitor do show an increase over the historical Connecticut average, but not significantly higher. An analysis provided by CT DEEP for 2017–2023 shows that for this event the maximum daily average concentrations are in line with 2018, in terms of absolute magnitude.

EPA's review of the trajectory analysis, satellite imagery, monitored $PM_{2.5}$ levels, and meteorological conditions provided by CT DEEP does show some evidence of widespread smoke throughout the eastern U.S. and that it moved eastward. However, given the temperature set-up in Connecticut and upwind of Connecticut over this period, the wind direction at the Groton monitor coincident with the highest ozone observations, the upstream ozone observations, and the widespread agricultural burning that was evident in the satellite imagery, CT DEEP's analysis does not definitively conclude that smoke from the Flint Hills prescribed burn or nearby fires reached the ground level at the Groton monitoring location.

3.2.2.5 Evidence that the wildfire emissions affected the monitors and caused O_3 exceedances or violations (April 13-14 Event)

CT DEEP's demonstration contained analyses proposing that emissions from the wildfires affected the monitored O_3 concentrations. The demonstration included hourly $PM_{2.5}$ monitoring data from Connecticut monitors that do show an elevated trend during the event, which is likely due to the influence of smoke in the area. Unfortunately, Connecticut's aerosol backscatter ceilometer, which operates at the New Haven monitoring site and is capable of providing backscatter plots up to 4,000 m, could not be used due to equipment failure.

Ground-level monitors were also analyzed for concentrations of other monitored parameters indicative of smoke such as black carbon (BC), CO, and DeltaC. DeltaC is the difference between 370 and 880 Aethalometer measurements (in $\mu g/m^3$) and is a semi-quantitative indicator of biomass combustion specific to wood smoke.[6] When data were not available for one of the requested monitors, data from the nearest monitor and/or upwind monitor with this information were provided. Since these data are not available at the Groton location, CT DEEP reviewed data from the East Hartford and New Haven locations. For the East Hartford monitor, the DeltaC and BC were fairly flat over this period, while there was some elevated CO. For the New Haven monitor, the BC was slightly elevated, but the CO and DeltaC were similar to East Hartford.

The demonstration also contained a discussion of the meteorological conditions during the event. CT DEEP showed maps of a surface high pressure system from April 10–14 moving from the central U.S. to the east and southeast, which allowed clockwise flow around the high to open up flow into the northeastern U.S. As the high continued to move eastward, it also allowed temperatures to increase over this region, resulting in temperatures in the 90s over a portion of Northeast. The analysis of 850 mb height maps shows a similar set-up at the surface, however with more of a westerly component. Given that 850-mb height analysis is a good proxy for transport, this westerly component does allow elevated precursors, as well as ozone, to be transported above the boundary layer from the Midwest into the Northeast.

Additionally, CT DEEP compared hourly O_3 concentrations to surface wind and temperature measurements at each site. Since there were not any measurements available at the Groton location, a review of the East Hartford and Wesport sites was done. Temperature measurements at the two sites were conducive to O_3 formation during the event, especially at East Hartford, and were very anomalous for this time of the year. The wind direction at East Hartford was very variable during these two days, with a range from the southeast around to the west, but with

[6] Allen GA, Babich P, Poirot RL (2004) Evaluation of a new approach for real time assessment of woodsmoke PM. In "Proceedings of the Regional and Global Perspectives on Haze: Causes, Consequences and Controversies", Paper #16, Air and Waste Management Association Visibility Specialty Conference, Asheville, NC.

large changes. The wind direction at the Westport site was not available until midday on April 13 but was variable as well.

CT DEEP provided a similar-day analysis for these two days looking at data from 2019 through 2023. CT DEEP states that, historically, temperatures over 90°F have been a good indicator for ozone production, but in recent years due to significant regional reductions in precursor emissions very warm temperatures do not always lead to an ozone exceedance in Connecticut. CT DEEP chose to look at July 21, 2019. On this date, the high temperature recorded at Bradley International Airport was 100°F. In the demonstration on this date, they showed that there was a west wind flow for most of the state, except the coastline. Back trajectory analysis shows the air parcels originated in the Great Lakes region and travelled north of New York City before arriving in Connecticut. CT DEEP further stated that it is more critical that wind trajectories must pass through areas high in ozone and ozone precursors for Connecticut to exceed the standards. A second example for April 11 and 16, 2017, using similar 850 mb pressure and wind patterns as April 13 and 14 was used for similar day analysis. CT DEEP chose days with similar HYSPLIT back-trajectories and wind speeds observed during the event. However, an analysis of upwind locations that were in the flow patterns of the air parcels entering Connecticut showed elevated ozone (at levels that are moderate to unhealthy for sensitive groups) over the upper Midwest, Great Lakes area, and the states that would have been crossed as the air moved east (PA, NY, OH, NJ). This indicates that the trajectories showing the air entering Connecticut was crossing over elevated ozone levels that were already in-place and that included ozone precursors that were also elevated due to the pollution already there and elevated temperatures.

EPA notes that the various analyses presented in this demonstration and discussed above show conflicting pieces of information as to linking the elevated smoke observations to the exceedances shown at the Groton monitor for this event. Based on the satellite imagery, there is smoke around the eastern U.S. during this period, but the spatial variability of the HMS fire counts makes it very difficult to determine a clear causal relationship between any one fire (or group of fires) to the elevated ozone concentrations. With elevated ozone upwind of the Groton monitor and the meteorological conditions present at the time of the observations, it points to an ozone episode created by many factors, and smoke was likely only one such factor. EPA finds that although smoke was present, CT DEEP's demonstration does not show a clear causal relationship between the emissions generated by the Flint Hills prescribed/agricultural burns and nearby (Pennsylvania, New York, and New Jersey) wildfires and the exceedances measured at the Groton monitoring location.

Table 4: Documentation of Clear Causal Relationship and the Supporting Analyses

Exceedance Date	**Demonstration Citation**	**Quality of Evidence**	**Criterion Met?**
April 13, 2023	Sections 2–10	Not sufficient	No
April 14, 2023	Sections 2–10	Not sufficient	No

3.2.3 Not Reasonably Controllable or Preventable (April 13-14 Event)

The Exceptional Events Rule presumes that wildfire events on wildland are not reasonably controllable or preventable [40 CFR §50.14(b)(4)]. Based on the documentation provided in the introduction and Section 4 of this demonstration, the wildfires were naturally caused and/or caused by human activity. CT DEEP is not aware of any evidence clearly demonstrating that prevention or control efforts beyond those actually made would have been reasonable. Additionally, the prescribed fires occurred outside of Connecticut's jurisdiction. Therefore, emissions from these fires were not reasonably controllable or preventable.

Table 5: Documentation of not Reasonably Controllable or Preventable

Exceedance Date	**Demonstration Citation**	**Quality of Evidence**	**Criterion Met?**
April 13, 2023	Section 4	Sufficient	Yes
April 14, 2023	Section 4	Sufficient	Yes

3.2.4 Natural Event or Event Caused by Human Activity That is Unlikely to Recur (April 13-14 Event)

Wildfires are defined at 40 CFR 50.1(n) as "…any fire started by an unplanned ignition caused by lightning; volcanoes; other acts of nature; unauthorized activity; or accidental, human-caused actions, or a prescribed fire that has developed into a wildfire. A wildfire that predominantly occurs on wildland is a natural event." CT DEEP provided information which discusses the origin and evolution of the wildfire event. Regarding the prescribed burns described in the demonstration, CT DEEP added a statement from the Kansas Department of Health and Environment: '*This evaluation demonstrates that the likelihood of prescribed fire recurrence is within the range of the natural fire return interval established historically for the tall grass prairie ecosystem and thus meets the ''unlikely to recur at a particular location'' requirement of the statutory language.*'

Table 6: Documentation of Natural Event

Exceedance Date	**Demonstration Citation**	**Quality of Evidence**	**Criterion Met?**
April 13, 2023	Section 4	Sufficient	Yes
April 14, 2023	Section 4	Sufficient	Yes

3.3 EPA Analysis of June 30 – July 1 Event

3.3.1 Narrative Conceptual Model (June 30 – July 1 Event)

CT DEEP's demonstration provided a narrative conceptual model to describe how emissions from the Quebec wildfires Canada influenced O_3 exceedances or violations at the Cornwall, East Hartford, and Groton monitoring locations on June 30 – July 1, and included additional information to support their claim.

In their discussion, CT DEEP describes ozone exceedances in Connecticut that are traditionally classified into four categories based on spatial patterns of measured ozone and the contributing meteorological conditions. Historically, most exceedances occurred on sunny summer days with inland maximum surface temperatures approaching or above 90°F, surface winds from the southwest (favorable for transport of pollutants from the New York metropolitan area and the I-95 corridor), and aloft winds from the west-southwest (favorable for transport of pollutants from Midwest power plants). CT DEEP included information for non-event characteristics in Connecticut, including a description of the four predominant scenarios of O_3 exceedances based on spatial patterns of measured O_3 and the contributing meteorological conditions. These exceedances are categorized as Inland-only Exceedances, Coastal-only Exceedances, Western Boundary-only Exceedances, and Statewide Exceedances.

Specific to the June 30–July 1 event, CT DEEP described the classic State-wide exceedance scenario with surface wind flow from the southwest along the I-95 corridor, transport at mid-levels from the southwest via the lower-level nocturnal jet stream, and flow at upper levels from the west. All these flows are from emission-rich upwind areas, serving to transport O_3 precursors and previously formed O_3 into Connecticut. CT DEEP asserted the typically necessary meteorological conditions were not present to cause the magnitude of State-wide exceedances that were observed on June 30 and July 1, 2023, and that a thick plume of smoke from the Quebec wildfires recirculated into the state causing elevated levels of $PM_{2.5}$ and ozone.

Because typical O_3 exceedance days in Connecticut are largely due to the transport of O_3 and O_3 precursors from upwind states, CT DEEP also provided information on regional NO_X and VOC emissions, including Figure 2.9 of the submittal indicating NO_X and VOC emissions per square mile for the northeastern United States. Figure 2.9 illustrates the predominant source of regional precursor emissions are southwest of Connecticut. In addition, CT DEEP included an analysis of NO_X emissions from upwind EGUs to demonstrate that the exceedances on June 30 and July 1 cannot be attributed, at least in part, to EGUs operating on high electric demand days as is more typically the case later in the O_3 season. EGU emissions have been decreasing for many years and Table 2-1 of CT's submittal, shows that there was a further decrease from 2022–2023. CT DEEP states that the highest EGU NO_X emissions for 2023 occurred later in the summer, following the dates of their proposed exceptional event episodes. Connecticut's 2023 ozone season EGU emissions typically fluctuate only slightly, never exceeding ten tons per day and show little, if any, correlation to ozone exceedance days. During the June 30–July 1 event,

Figure 2-10 of CT DEEP's submittal indicates that Connecticut's EGU emissions remain near baseline.

CT DEEP stated that the Quebec wildfires had been burning since early June, and by late June smoke from these fires was once again transported to the eastern States. The Quebec fires that brought the area extremely high $PM_{2.5}$ during early June, began burning as result of lightning strikes around June 1. Figure 1-7 of CT DEEP's submittal is a satellite image of smoke plumes being transported south over Quebec on June 2. Smoke from Quebec settled into the region on June 30 with fine particulate levels in Connecticut and surrounding areas reaching unhealthy levels and prompting EPA and DEEP officials to release health advisories. Although $PM_{2.5}$ levels would be the main air quality issue for the next several days, continued burning of the Quebec fires throughout the summer, and the transported smoke plumes, would elevate ozone levels throughout Connecticut by June 30. In Figure 1-9 of the submittal, CT DEEP included a snapshot of the AirNow Ozone AQI Map for June 30 - July 1, 2023, showing elevated AQI levels. Figure 3-6 and 3-7 of CT DEEP's submittal shows the early morning visible satellite image over Connecticut with visible smoke aloft for June 30 and July 1. Surface $PM_{2.5}$ levels were also elevated, as can be seen in Figure 3-8 of the demonstration, which shows the analyzed smoke plume and $PM_{2.5}$ AQI levels. Figure 3-9 of the demonstration shows the haze camera image from Cornwall with an inset charting the Aeronet aerosol optical depth (AOD) data on June 30. Levels of AOD-340nm below 0.10 are indicative of clean air. During this smoke event, the AOD-340nm levels were at least ten times higher, at well above 1.0. CT DEEP also provided near surface smoke animations from National Oceanic and Atmospheric Administration for June 30 and July 1, 2023.

Table 7: Documentation of Narrative Conceptual Model

Exceedance Date	Demonstration Citation	Quality of Evidence	Criterion Met?
June 30, 2023	Section 2. (Pages 7 – 32)	Sufficient	Yes
July 1, 2023	Section 2. (Pages 7 – 32)	Sufficient	Yes

3.3.2 Clear Causal Relationship (June 30 – July 1 Event)

CT DEEP's demonstration includes multiple analysis to demonstrate a clear causal relationship between the Quebec wildfires and the observed ozone concentrations on June 30 and July 1. This is consistent with the EPA's wildfire ozone guidance. These analyses start in Section 3 of the demonstration and continue through Section 10.

3.3.2.1 Comparison with historical concentrations (June 30 – July 1 Event)

CT DEEP included a comparison with historical concentrations, as required by 40 CFR §50.14(c)(3)(iv)(C). The demonstration compared 8-hour daily maximum ozone levels observed at the three sites on the days being considered compared with the 99th percentile ranked 8-hour ozone levels observed during the last five years (2019–2023). The ozone concentrations at the Cornwall, East Hartford, and Groton monitoring sites all exceeded the 99th percentile for July 1 dates. The ozone levels at Cornwall and East Hartford exceeded the 99th percentile on July 1 by

10 and 9 ppb, respectively. On June 30, 2023, the observed ozone concentration at the Groton monitoring site reached the 97.5 percentile.

3.3.2.2 Tier 1: Key Factor (June 30 – July 1 Event)

To meet the key factor for a Tier 1 analysis, exceedances should be clearly higher than other non-event related exceedances or occur during a time of year that typically experiences no exceedances. The event-related exceedances or violations identified in this demonstration occurred during the regular ozone season (March – September), during times when other exceedances similar in magnitude have been historically measured. Therefore, the event exceedances do not meet the Tier 1 Key Factor, and additional evidence beyond a Tier 1 analysis is needed to support the clear causal relationship.

3.3.2.3 Tier 2: Key Factors (June 30 – July 1 Event)

Because the influence of the Québec, Canada, fire was not clearly higher than non-event related concentrations or outside of the normal ozone season for the data requested for exclusion to meet the criteria for a Tier 1 analysis, CT DEEP evaluated the Tier 2 Key Factors in Sections 5.0 and 5.2 of the demonstration. For Tier 2 Key Factor 1, CT DEEP provided an analysis of fire emissions (Q) and distance (d) of the wildfires to the affected monitoring station locations. CT DEEP determined that due to the vast size of the fire and weather patterns that it was appropriate to calculate a multiday Q/d using area estimates of the fire from the week preceding the event. CT DEEP used AP-42 emission factors for north central U.S. conifer forest as a conservative estimate of emissions. The distance from Quebec (an area just south of Lake Mistassini) to Connecticut's farthest monitor (Groton) is approximately 1000 km. Therefore Q/d is approximately 1050 tons/1000 km on June 27, or 1.05 tpd/km, which is well below the EPA's recommended level of 100 tpd/km to indicate clear causality. Therefore, the event exceedances do not meet Tier 2 Key Factor 1.

For Tier 2, Key Factor 2, CT DEEP compared the event-related O_3 concentrations with historical data for the April – September ozone season over the past five years (2019–2023). CT DEEP's analysis determined the maximum daily 8-hour O_3 concentration met or exceeded the 99^{th} percentile for observed data at the Cornwall, East Hartford, and the Groton monitoring locations on July 1 but not for the Groton monitor on June 30. Therefore, the criteria for Tier 2 Key Factor 2 on June 30 is not met, although all three of the monitors meet the criteria for July 1, 2023.

Based on the analysis of the Key Factors for Tier 2, EPA's wildfire O_3 guidance document indicates that a Tier 3 analysis is appropriate for this event. As described below, CT DEEP's demonstration included the required elements for a Tier 3 clear causal relationship analysis, based on EPA's wildfire ozone guidance document. This includes evidence to support that wildfire emissions were transported from the wildfire to the monitors, wildfire emissions affected the monitors, and wildfire emissions contributed to the ozone exceedances or violations.

3.3.2.4 Tier 3 Evidence of transport of wildfire emissions from the wildfire to the monitors (June 30 – July 1 Event)

In the demonstration, CT DEEP provided trajectory analysis using the Hybrid Single-Particle Lagrangian Integrated Trajectory (HYSPLIT) model along with the HMS fire and smoke product maps, EPA AirNow Fire and Smoke Map, visible satellite imagery, LiDAR, near surface from the High-Resolution Rapid Refresh (HRRR) animation, AERONET AOD photometers, and ceilometer backscatter images.

CT DEEP also provided a matrix of backward trajectories for western New England on June 30 and July 1. On June 30, most of the matrix points show backward trajectories pointing to the Quebec wildfires. However, the matrix points in northern New England are further east than the rest of the region allowing for a cleaner airmass for those areas. On July 1, all matrix points in New England are showing backward trajectories to the Quebec wildfires, allowing for widespread ozone exceedances and high moderate levels. CT DEEP shows the June 30 backward trajectories overlaid on the June 27 HMS Fire and Smoke map. Similarly, Figure 8-10 of the demonstration shows backward trajectories for July 1 overlaid with the HMS Fire and Smoke map for June 28. On both June 30 and July 1, the backward trajectories point toward the smoke plume created from the Quebec fires (See Figure 8-8 and Figure 8-9 of CT DEEP's submittal).

On a smaller scale, 100-meter backward trajectories were presented in Figures 8-11 through 8-12 of CT DEEP's submittal. For Cornwall, July 1 backward trajectories show the source of the smoke in Quebec along with south winds that transported smoke and ozone precursors into Connecticut. For East Hartford and Groton, similar backward trajectories confirm the smoke impacts from the Quebec wildfires while also featuring smoke enhancement over Long Island Sound. The south winds that are further offshore for more than a few hours typically bring cleaner air to Connecticut. Precursors and smoke enhanced ozone production likely contributed to poorer air quality than would normally occur under these conditions.

CT DEEP also submitted forward trajectories in Figure 8-14 from June 27, 2023, which illustrated smoke funneled southward from the Quebec wildfires before moving eastward. By June 30, the smoke plume impacted the U.S. east coast as it recirculated from the mid-Atlantic region. 72-hour forward trajectories were used to allow for transport over the Great Lakes and Mid-Atlantic regions and into Connecticut. The trajectories show the transport of smoke into Connecticut on June 30 – July 1, 2023, from the area of the Quebec fires.

EPA's wildfire O_3 guidance document suggests that to show transport, satellite imagery should be accompanied by evidence of the plume reaching the ground. CT DEEP provided data of elevated hourly $PM_{2.5}$ measurements at the monitors, as well as webcam images of haze moving into Connecticut during the event (See Figure 3-9 of CT's submittal).

CT DEEP provided aerosol backscatter from the Redhook lidar for June 30–July 1, 2023. Note the much greater intensity indicated in orange and red. This accurately reflects the highest surface $PM_{2.5}$ levels that were monitored on July 1, when the highest ozone levels were also monitored.

This plume was aged and advected northeast after dipping down to the mid-Atlantic states as depicted in Figure 7-6 of their submittal.

CT DEEP also included a Providence ceilometer backscatter image for June 30 through early morning July 1, 2023. The densest part of the aerosol plume settles down to within 500 meters of the surface. The highest surface $PM_{2.5}$ concentrations generally stayed west of Rhode Island during this event, but ozone exceedances did occur at the Rhode Island monitors as shown in Figure 7.7 of CT's submittal.

CT DEEP also provided the surface analysis in Figure 9-14, which shows how the low pressure moves over the northeast allowing pollutants from fires burning in Quebec to funnel southward towards the Great Lakes region. CT DEEP's discussion described how on June 29, the low-pressure system moved slightly eastward with continued smoke transport from the Quebec wildfires toward the Great Lakes and mid-Atlantic regions. By June 30, the low-pressure system shielding Connecticut moves offshore transporting the smoke plume over the east coast while high pressure builds into New England. The high-pressure system remained over New England on July 1 allowing the smoke plume to remain over Connecticut, which CT DEEP claims impacted $PM_{2.5}$ and ozone levels at the surface as shown in Figures 9-15 through 9-17 of CT DEEP's submittal.

CT DEEP stated that daily high temperatures remain near 80 degrees Fahrenheit from June 28 – July 3 with varying ozone levels each day. Figures 9-22 through 9-25 of demonstration showed winds mostly originating from the south or southeast; although, Cornwall and Wesport featured minimal north winds during the early morning hours. CT DEEP states that with these temperature and southeast wind directions, Connecticut would typically not see ozone exceedances.

3.3.2.5 Evidence that the wildfire emissions affected the monitors and caused the ozone exceedance (June 30 – July 1 Event)

In Figure 7-5, CT DEEP provided the EPA AirNow Fire and Smoke Map for the morning of June 30, 2023, showing elevated $PM_{2.5}$ AQI levels. In the demonstration, CT DEEP explained how ground level monitors demonstrated spikes in other monitored parameters that show the likely presence of a smoke plume include black carbon (BC), DeltaC $PM_{2.5}$, and CO. Figures 7-17 through 7-20 of CT DEEP's submittal show that DeltaC, $PM_{2.5}$, BC, and $PM_{2.5}$ data are shown for this event with the hourly ozone concentrations. CT DEEP shows ozone levels rising to similar magnitudes on both days at Cornwall with levels remaining elevated overnight. DeltaC $PM_{2.5}$, BC, and $PM_{2.5}$ all slowly built up on June 29 before spiking and peaking in the morning on June 30. All three of these pollutants gradually decreased as the event progressed and returned to typical levels by July 3. Particulate levels at all three sites during the June 30–July 1 event exceeded the level of the 24-hour $PM_{2.5}$ standard on both days. $PM_{2.5}$ exceedances are rare in Connecticut and levels are typically lower during the summer. Figure 6-18 shows particulate

increasing from June 28th and peaking on June 30th first at Cornwall, then East Hartford and later in the day at Groton.

In its demonstration, CT DEEP describes the relationship between ozone, surface winds, and temperatures at monitors can be useful for indicating emissions sources and increased photochemical reactivity. However, CT DEEP states that simply using surface winds and/or temperatures at Connecticut monitors as a predictor for ozone can be problematic because of the land/sea interface. Inland ozone monitoring sites can observe northwest winds and very warm temperatures while the coastal sites will experience a southwest sea breeze and much cooler temperatures. Historically, temperatures over 90 °F have been a good indicator for ozone production, but in recent years due to significant regional reductions in precursor emissions very warm temperatures do not always lead to an ozone exceedance in Connecticut. CT DEEP identified meteorologically similar days using 850 mb pressure and wind patterns. It was determined from the 12z sounding (using Albany location, i.e. ALB) on June 30 that the 850 mb wind from ALB was from 225 degrees (from the southwest) at 15 knots, and for July 1, the 850 mb wind from ALB was from 210 degrees (from the southwest) at 7 knots (Figure 10-4). Therefore, CT DEEP filtered wind direction for 200 – 235 degrees (from the southwest) and wind speed greater than or equal to 5 knots. In addition, a few days that matched 500m/1500m back trajectories to coastal New Jersey were selected by CT DEEP for comparison.

In Figures 10-10 through 10-22, CT DEEP compared June 30-July 1 with multiple days having similar meteorology. CT DEEP provided similar day maps to illustrate the 850 mb reference pressure patterns, HYSPLIT reference trajectories, and ozone observations for June 30 and July 1, respectively. These figures show a low-pressure area near the Hudson Bay with high-pressure east of Nova Scotia. With this pattern, source winds to Connecticut would be expected to originate offshore along the New Jersey coastline. The HYSPLIT trajectories for these days show the 100- and 500-meter backward trajectories originating offshore along the New Jersey coastline. While the 1500-meter backward trajectories originate over inland New Jersey. On June 30, ozone levels exceed the standard along the Connecticut coast and western Connecticut inland areas. On July 1, every monitor in Connecticut exceeds the standard with one monitoring site reaching unhealthy levels.

CT DEEP concluded that the comparison, based on similar weather patterns, back trajectories, as well as clear, smokeless skies for each of the similar day examples, demonstrated CT DEEP could reasonably expect no ozone exceedances in Connecticut under these similar conditions. As such, CT DEEP states the only variable unaccounted for is the presence of smoke on the event days.

EPA agrees that the analyses in the demonstration, specifically, the comparison with historical O_3 8-hour daily maximum concentrations and percentile analysis, HYSPLIT analysis, satellite imagery, aerosol backscatter analysis, time series plots of hourly concentrations of O_3 and other ground level pollutants associated with wildfire smoke, synoptic weather pattern analysis, comparison to non-event days with similar meteorology, sufficiently demonstrate a clear causal

relationship between the emissions generated by the Quebec, Canada wildfire and the exceedances or violations measured at the Cornwall, East Hartford, and Groton monitoring locations.

Table 8: Documentation of Clear Causal Relationship and the Supporting Analyses

Exceedance Date	Demonstration Citation	Quality of Evidence	Criterion Met?
June 30, 2023	Section 2-10 (Pages 7 – 205)	Sufficient	Yes
July 1, 2023	Section 2-10 (Pages 7 – 205)	Sufficient	Yes

3.3.3 Not Reasonably Controllable or Preventable (June 30 – July 1 Event)

The Exceptional Events Rule presumes that wildfire events on wildland are not reasonably controllable or preventable [40 CFR §50.14(b)(4)]. CT DEEP's demonstration provided evidence that the wildfire event meets the definition of a wildfire. Additionally, it is not reasonable to expect a downwind air agency to have required or persuaded an upwind foreign country to have implemented controls on sources sufficient to limit event-related emissions in the downwind state. Therefore, the documentation provided sufficiently demonstrates that the event was not reasonably controllable and not reasonably preventable.

Table 9: Documentation of not Reasonably Controllable or Preventable

Exceedance Date	Demonstration Citation	Quality of Evidence	Criterion Met?
June 30, 2023	Section 1.1 (Pages 2 – 3) Section 1.2 (Pages 9 – 10) Section 4.1 (Pages 60 - 62)	Sufficient	Yes
July 1, 2023	Section 1.1 (Pages 2 – 3) Section 1.2 (Pages 9 – 10) Section 4.1 (Pages 60 - 62)	Sufficient	Yes

3.3.4 Natural Event (June 30 – July 1 Event)

The definition of "wildfire" at 40 CFR 50.1(n) states, "A wildfire that predominantly occurs on wildland is a natural event." As previously described, the demonstration included documentation that the event meets the definition of a wildfire and occurred predominantly on wildland and has therefore shown that the event was a natural event. CT DEEP provided information which discusses the origin and evolution of the wildfire event.

Table 10: Documentation of Natural Event

Exceedance Date	Demonstration Citation	Quality of Evidence	Criterion Met?
June 30, 2023	Section 1.1 (Pages 2 – 3) Section 1.2 (Pages 9 – 10) Section 4.1 (Pages 60 - 62)	Sufficient	Yes
July 1, 2023	Section 1.1 (Pages 2 – 3)	Sufficient	Yes

	Section 1.2 (Pages 9 – 10) Section 4.1 (Pages 60 - 62)		

3.4 EPA Analysis of July 12 Event

3.4.1 Narrative Conceptual Model (July 12 Event)

CT DEEP's demonstration provided a narrative conceptual model to describe how emissions and subsequent ozone from fires in western Canada impacted the Groton monitor as shown in Table 1. CT DEEP stated that July 12 saw the highest ozone levels in the state for 2023 with a few coastal monitors registering maximum daily 8-hour averages of 89 ppb as smoke from the western Canadian wildfires moved into the area. CT DEEP included figures showing the highest ozone values for July 12 occurring over the Connecticut coastline, including the Groton monitor. By midafternoon clouds formed over the northern half of the state and inhibited ozone production, and while ozone in the northern section of the state was generally elevated, it did not exceed moderate levels. CT DEEP proposed that these fires influenced the O_3 exceedance at the Groton monitoring location and included additional information to support their claim.

In their discussion, CT DEEP included information for nonevent characteristics in Connecticut, including a description of the four predominant scenarios of O_3 exceedances based on spatial patterns of measured O_3 and the contributing meteorological conditions. Specific to the proposed July 12 event, CT DEEP described that this event started as the classic statewide exceedance scenario with surface wind flow from the southwest along the I-95 corridor, transport at mid-levels from the southwest via the lower-level nocturnal jet stream, and flow at upper levels from the west. All of these flows are from emission-rich upwind areas, serving to transport O_3 precursors and previously formed O_3 into Connecticut. However, a frontal system was approaching from the north to south creating a boundary between the cleaner air to the north and the more polluted air to the south of the front. As a result of this frontal boundary, the elevated ozone became concentrated along the coast, creating more of a coastal event than a statewide event. As the ozone become forced against the boundary, it resulted in some of the highest values of the season.

Because O_3 exceedance days in Connecticut are largely due to the transport of O_3 and O_3 precursors from upwind states, CT DEEP also provided information on regional NO_X and VOC emissions, including maps showing the reduction in NO_X and VOC emissions that have occurred from 1990 to 2017 over the northeastern United States. These maps illustrate the predominant source of regional precursor emissions are southwest of Connecticut and have been substantially reduced over this time period. In addition, CT DEEP included an analysis of NO_X emissions from upwind EGUs to demonstrate that the emissions from these units were not exceptionally higher during this event as compared to nonevent days.

CT DEEP provided information on the fires in western Canada that they proposed impacted the ozone levels at the Groton monitor. During Canada's 2023 fire season, western Canada had significant fires contributing to smoke events. Several fires ignited during the summer

throughout Saskatchewan, British Columbia, Alberta, and the Northwest Territories. As of September 19, the fires had burned through western Canada resulting in over 2 million hectares of charred land. Fires were burning throughout Canada during early July, but the most significant smoke impact to Connecticut shifted to the western Canadian fires beginning on July 6. Figure 4-13 in the demonstration showed the HMS satellite detected fire locations for the period from July 6–10 with the area of interest in the red circle. Also depicted is an arrow showing the 850mb mean wind vector (~5000 feet) where much of the transport would occur. CT DEEP explained how smoke from these fires were transported into the upper Midwest states by July 10 and then to New England by July 12. CT DEEP contends that for this event the elevated ozone observation at the Groton monitor was the result of these fires originating in western Canada and traveling across the country over the course of a week.

Based on the information described above, CT DEEP's demonstration meets the narrative conceptual model criterion of the Exceptional Events Rule.

Table 11: Documentation of Narrative Conceptual Model

Exceedance Date	Demonstration Citation	Quality of Evidence	Criterion Met?
July 12, 2023	Section 2. (pages 19–37)	Sufficient	Yes

3.4.2 Clear Causal Relationship and Supporting Analyses (July 12 Event)

CT DEEP's demonstration contained multiple analyses to propose a clear causal relationship between the western Canadian fires and the monitored exceedances consistent with the EPA's wildfire O_3 guidance. These analyses are presented throughout the demonstration and discussed below.

3.4.2.1 Comparison with historical concentrations (July 12 Event)

CT DEEP included a comparison of historical concentrations, as required by 40 CFR §50.14(c)(3)(iv)(C). CT DEEP compared the event-related O_3 concentrations with historical data and determined the maximum daily 8-hour O_3 concentration met or exceeded the 99th percentile for observed data over the last 5 years for Groton monitoring location on July 12. CT DEEP constructed wind roses for the Groton monitoring using data from the Madison location, which is 25 miles to the east, since Groton does not have collocated wind data at that location. An analysis of the wind roses for Groton for July 12 shows winds associated with elevated ozone were from the southwest to the south-southeast, which is in the typical range for patterns of elevated ozone at this monitoring location.

3.4.2.2 Tier 1: Key Factor (July 12 Event)

To meet the key factor for a Tier 1 analysis, exceedances should be clearly higher than other, nonevent related exceedances, or occur during a time of year that typically experiences no exceedances. The event-related exceedances identified in this demonstration on July 12

occurred during the regular O_3 season, during times when other exceedances similar in magnitude have been historically measured. Therefore, the event exceedances do not meet the Tier 1 Key Factor, and additional evidence beyond a Tier 1 analysis is needed to support the clear causal relationship.

3.4.2.3 Tier 2: Key Factors (July 12 Event)

Because the influence of the western Canadian fires was not clearly higher than non-event related concentrations or outside of the normal O_3 season for the data requested for exclusion, CT DEEP evaluated the Tier 2 Key Factors. For Tier 2 Key Factor 1, CT DEEP provided an analysis of fire emissions (Q) and distance (d) of the wildfires to the affected monitoring station locations. Using burn data from the Canadian Wildfire Information website, CT DEEP calculated the amount of hydrocarbons and NO_X emitted for a conservative day of burning (July 7) in Alberta. Using those emissions and the distance between the fire location and the Groton monitor, a Q/d was calculated. Due to the great distance of over 3,500 km between the burning in Alberta and Connecticut, the calculated value for Q/d was well below the EPA's recommended level of 100 tons per day per kilometer (tpd/km) to indicate clear causality. Therefore, the event exceedances do not meet Tier 2 Key Factor 1.

For Tier 2, Key Factor 2, CT DEEP compared the event-related O_3 concentrations with historical data for the April–September O_3 season over the past five years (2019–2023). CT DEEP's analysis determined the maximum daily 8-hour O_3 concentration met or exceeded the 99th percentile for observed data at the Groton monitoring location on July 12.

Based on the analysis of the Key Factors for Tier 2, EPA's wildfire O_3 guidance document indicates that a Tier 3 analysis is appropriate for this event. As described below, CT DEEP's demonstration included the required elements for a Tier 3 clear causal relationship analysis, based on EPA's wildfire O_3 guidance document. This includes proposed evidence to support that wildfire emissions were transported from the wildfire to the monitors, wildfire emissions affected the monitors, and wildfire emissions contributed to the O_3 exceedances.

3.4.2.4 Evidence of transport of wildfire emissions from the wildfire to the monitors (July 12 Event)

CT DEEP provided images showing that numerous fires over western Canada were detected by satellite prior to the July 12 event. A series of visible images showing the movement of the smoke starting on July 7 over British Columbia and Alberta, then progressing east over the Great Lakes on July 10, and then into Connecticut on July 12. Figure 1-11 shows the smoke on July 12 over New England at two different times: one at 8 a.m. and one at 5:01 p.m., both local time. The importance of this image is that it shows the progression of a front moving from north to south through the region and forcing the smoke and associated ozone down towards the coast. This build-up has been seen before when frontal systems are working through the area, causing higher ozone observations on the leading edge of the boundary. This is reflected in Figure 1-10,

which shows the maximum ozone AQI levels for July 12 and how all of the exceedances were on the coast.

In addition, CT DEEP provided trajectory analysis using the HYSPLIT model, with NAM meteorological data, which uses a 12-km grid. CT DEEP states in the demonstration that ozone began building up around the Great Lakes on July 9 and 10 (Figure 8-15) due to the smoke from fires in western Canada, and that trajectories and plume analysis show that the smoke plume settled over this area for several days before moving eastward over Connecticut. CT DEEP asserts that the back trajectory analysis in Figure 8-16 for this area confirms the source of the ozone precursors from the wildfires in western Canada, contributing to ozone enhancement for the Great Lakes region. Figure 8-17 of the submittal shows a 120-hour backward trajectory matrix was computed across western New England for July 12. CT DEEP states that these figures show the source region, 48 hours before, is clearly the Great Lakes region where elevated ozone values were located and that going beyond the Great Lakes, the backward trajectories suggest that the source of the smoke is the western Canada wildfires, particularly northern British Columbia and Alberta.

However, after further review by EPA of backward trajectories, an analysis of 48-hour 100-meter backward trajectories from Groton shows that winds are primarily from the west and southwest, which is the same as what the wind rose analysis shows. This flow allows air from the New York City (NYC) metro and Long Island Sound (LIS) areas to travel towards Groton and impact the ozone concentrations. It also shows the flow potentially being forced along the approaching front, which is seen in the exceedances that occurred to the east of Groton as well. This mixing of air masses makes it difficult to determine the exact origin of the air that impacted the Groton monitor.

CT DEEP continued their trajectory analysis by providing 144-hour forward trajectories starting on July 6 and originating from western Canada (Figure 8-23). These forward trajectories, starting at 1000, 1500, and 2000 meters, showed variable plume movements. The only trajectory that showed a general southeasterly direction from western Canada was the one starting at 1500 m and that one appeared to stay aloft as it entered New England. This indicates that the parcels more than likely did not make it down to the surface. Thus, EPA finds that this analysis appeared inconclusive as to its impact on the Connecticut monitors.

CT DEEP provided an analysis of synoptic scale meteorological features using surface and 850-mb weather maps from July 7 through July 12. At the surface, high pressure over western Canada behind a frontal system on July 7 starts to transport the smoke plume east and south. On July 9, a cold front behind the area of smoke pushes south with the high-pressure system. CT DEEP states that smoke continues moving southeastward with the high-pressure system and begins to impact the Great Lakes region by July 10, reaches the eastern Great Lakes as shown in Figures 9-28 and 9-29 of the demonstration. CT DEEP continues to discuss that on July 12, the front stalls along the Canadian and United States border allowing for continued smoke impacts and enhancement to ozone levels as presented in Figure 9-30. A similar analysis for flow at 850

mb across this time-period was done with a similar set-up indicating conditions were such that flow of smoke, ozone, and precursors from the north and west could make their way into Connecticut. As this front continued to push south from the north, a boundary was created separating the cleaner (and cloudier) air to the north from the polluted air to the south of it. This separation of air masses more than likely contributed to some of the elevated ozone observations seen along the coast, including the Groton monitoring location.

CT DEEP provided the hourly ozone with wind direction for the days surrounding the July 12 event at Cornwall, East Hartford, Stafford, and Westport, respectively. Unfortunately, Groton was not selected because complete meteorological data were not available. These maps show warm conditions across Connecticut for both days with temperatures in the mid-to-upper 80s. The Westport monitor, which is a coastal monitor and is upwind of Groton, shows variable wind direction overnight, but also shows southwest flow during the daytime during periods of higher ozone on July 11 and July 12. EPA believes this flow could indicate transport of precursors and ozone from NYC metro area and Long Island Sound impacting the Groton monitor.

EPA's wildfire O_3 guidance document suggests that to show transport, satellite imagery should be accompanied by evidence of the plume reaching the ground. CT DEEP provided data of elevated hourly $PM_{2.5}$ measurements at the monitors, as well as webcam images of haze moving into Connecticut during the event. The hourly observations for the Connecticut monitors on average do show an increase over the historical Connecticut average, but not significantly higher. An analysis provided by CT DEEP for 2017–2023 shows that for this event the maximum daily average concentrations are in line with 2018, in terms of absolute magnitude. However, EPA notes that leading up to July 12, the amounts were actually lower than in the other years CT DEEP used for comparison.

At the New Haven and Westport monitoring sites, Connecticut operates aerosol backscatter ceilometers from which graphical aerosol backscatter images can be produced. The CL-51 ceilometer is manufactured by Vaisala and provides lidar backscatter plots up to a height of 4000 meters. This instrument runs continuously and the BLVIEW software calculates the height of the maximum aerosol gradients, which are typically the height of the boundary layer(s). A review of data at the Westport site does show increasing aerosol backscatter intensity at the Westport site from July 11 to July 12. The Westport monitor is on the coast of Long Island Sound (LIS), and the ceilometer image indicates a very low marine layer (~100 meters) during the overnight. The aerosol layer shown extends above 2000 meters at Westport, with the highest concentrations appearing to settle below 1000 meters above ground level. CT DEEP contends that this thickness of aerosols is consistent with aerosols transported in a smoke plume and not produced locally. There is some evidence of smoke impacting Connecticut from the western Canada wildfires. However, EPA finds that the amount of aerosol backscatter evident at the Westport monitor does not correlate with the amount of ozone produced at the surface at that monitor. The Westport monitor had a maximum 8-hour average of 89 ppb for this day. EPA notes that an analysis of the New Haven ceilometer data was not provided. New Haven is closer to Groton than Westport and is also upwind of it.

EPA agrees that CT DEEP's analysis of the satellite imagery, the monitored $PM_{2.5}$ levels, and the meteorological conditions does show some evidence of widespread smoke impacting Connecticut as it was transported east from fires in western Canada. However, EPA finds that given the temperature set-up in Connecticut and upwind of Connecticut over this period, the wind direction at the Groton monitor that is coincident with the highest ozone observations, the magnitude of the exceedances relative to the $PM_{2.5}$ levels, the evidence of the front pushing southward towards the Connecticut coast causing accumulated pollution on the leading edge of it, and the exceedances downwind of the Groton monitor, CT DEEP's demonstration does not sufficiently show that the smoke reaches the ground sufficiently enough to impact the ozone levels to this magnitude on this exceedance day.

3.4.2.5 Evidence that the wildfire emissions affected the monitors and caused O_3 exceedances (July 12 Event)

CT DEEP's demonstration contained analyses proposing that emissions from the wildfires affected the monitored O_3 concentrations. The demonstration included hourly $PM_{2.5}$ monitoring data from Connecticut monitors that do show an elevated trend during the event, which is likely due to the influence of smoke in the area. However, their aerosol backscatter ceilometer at their Westport site does not show aerosol backscatter of the magnitude which would be reflected in the subsequent ozone exceedances at the surface. CT DEEP did not show ceilometer data for the New Haven site, which is closer to Groton than the Westport site.

Figures 6-20 and 6-21 show the hourly $PM_{2.5}$ and O_3 observations for July 10–14 at all three locations. All sites show a gradual increasing level of moderate $PM_{2.5}$ for the first half of the period and a drop off in the second following frontal passage. However, the ozone exceedance observed at the Groton monitor is not coincident with high levels of $PM_{2.5}$. The $PM_{2.5}$ levels are moderate throughout this period and do not have a peak that would line up with the large increase in ozone at this location over this time period.

Ground-level monitors were also analyzed for concentrations of other monitored parameters indicative of smoke such as BC, CO, and DeltaC and presented in Figures 7-21 through 7-24 of the demonstration. When data were not available for one of the requested monitors, data from the nearest monitor and/or upwind monitor with this information was provided. DeltaC is the difference between 370 and 880 Aethalometer measurements (in $\mu g/m^3$) and is a semi-quantitative indicator of biomass combustion specific to wood smoke.[7] Since these data are not available at the Groton location, a review of the East Hartford and New Haven monitors was included in the demonstration. For the East Hartford monitor, the DeltaC and BC were fairly flat over this period, while CO was not available at the Hartford monitor. For the New Haven, the DeltaC and BC were slightly elevated; however, the scales were different than the East Hartford

[7] See Footnote 4

monitor, so it was hard to make a monitor-to-monitor comparison. CO was also not available at the New Haven monitor.

Additionally, CT DEEP compared hourly O_3 concentrations to surface wind and temperature measurements at each site. Since there were not any measurements available at the Groton location, a review of the East Hartford and Wesport sites was done. Temperature measurements at the two sites were conducive to O_3 formation during the event. The Westport monitor, which is a coastal monitor and is upwind of Groton, shows variable wind direction overnight, but also shows southwest flow during periods of higher ozone during the daytime on July 11 and July 12. This flow could indicate transport of precursors and ozone from NYC metro area and LIS impacting the Groton monitor.

CT DEEP provided a similar-day analysis for the Groton location showing temperature and ozone data from 2019 through 2023. Connecticut states that, historically, temperatures over 90°F have been a good indicator for ozone production, but in recent years due to significant regional reductions in precursor emissions very warm temperatures do not always lead to an ozone exceedance in Connecticut. Figure 10-1 of the submittal charts the monitored maximum temperature with the daily maximum 8-hour ozone concentration at each of the monitors selected for data exclusion over the five years from 2019 through 2023. Each of the sites indicates that a majority of high temperature days, over 90°F, do not necessarily result in exceedances of the standard. However, many factors come into play when evaluating conditions that are conducive to ozone transport or formation. For this event, the wind roses at the Groton monitor show that air parcels for the elevated ozone were from the west and southwest. Upwind of the Groton monitor at several coastal CT locations were some of the highest ozone values of the season and were more than likely impacting the ozone at the Groton monitor as the day went on. This same ozone plume continued farther down the coast and impacted RI and southeastern MA as well with some exceedances.

EPA's review finds that the analyses presented in this demonstration show conflicting pieces of information as to linking the elevated smoke observations to the exceedances shown at the Groton monitor for this event. Based on the satellite imagery, there is smoke over the northeastern U.S. during this period, but the factors as described in this document make it difficult to determine a clear causal relationship between the fires originating in western Canada to the elevated ozone concentrations. With very high elevated ozone upwind of the Groton monitor close to the NYC metro and LIS areas, the meteorological conditions (temperature and wind) present at the time of the observations, elevated upwind ozone precursor emissions, the approaching frontal system to the north, and continued exceedances downwind of this location, it points to an ozone episode created by many factors, and smoke was likely one of several factors. However, there was not a clear causal relationship demonstrated between the emissions generated by the wildfires originating in western Canada, over 3500 km away, and the exceedances measured at the Groton monitoring location.

Table 12: Documentation of Clear Causal Relationship and the Supporting Analyses

Exceedance Date	Demonstration Citation	Quality of Evidence	Criterion Met?
July 12, 2023	Sections 2–10	Not sufficient	No

3.4.3 Not Reasonably Controllable or Preventable (July 12 Event)

The Exceptional Events Rule presumes that wildfire events on wildland are not reasonably controllable or preventable [40 CFR §50.14(b)(4)]. Based on the documentation provided in the introduction and Section 4 of this demonstration, the wildfires were naturally caused and/or caused by human activity. CT DEEP is not aware of any evidence clearly demonstrating that prevention or control efforts beyond those actually made would have been reasonable. Therefore, emissions from these fires were not reasonably controllable or preventable.

Table 13: Documentation of not Reasonably Controllable or Preventable

Exceedance Date	Demonstration Citation	Quality of Evidence	Criterion Met?
July 12, 2023	Section 4	Sufficient	Yes

3.4.4 Natural Event or Event Caused by Human Activity That is Unlikely to Recur (July 12 Event)

Wildfires are defined at 40 CFR 50.1(n) as "…any fire started by an unplanned ignition caused by lightning; volcanoes; other acts of nature; unauthorized activity; or accidental, human-caused actions, or a prescribed fire that has developed into a wildfire. A wildfire that predominantly occurs on wildland is a natural event." CT DEEP provided information which discusses the origin and evolution of the wildfire event.

Table 14: Documentation of Natural Event

Exceedance Date	Demonstration Citation	Quality of Evidence	Criterion Met?
July 12, 2023	Section 4	Sufficient	Yes

4.0 SCHEDULE AND PROCEDURAL REQUIREMENTS

In addition to technical demonstration requirements, 40 CFR §50.14(c) and 40 CFR §51.930 specify schedule and procedural requirements an air agency must follow to request data exclusion. Table 15 outlines EPA's evaluation of these requirements.

Table 15: Schedules and Procedural Criteria

Requirement	Reference	Demonstration Citation	Criterion Met?
Did the agency provide prompt public notification of the event?	40 CFR §50.14 (c)(1)(i)	https://portal.ct.gov/deep/air/planning/ozone/2023-exceptional-events	Yes
Did the agency submit an Initial Notification of Potential Exceptional Event and flag the affected data in the EPA's Air Quality System (AQS)?	40 CFR §50.14 (c)(2)(i)	Section 1.3 page 6 refers to Initial Notification letter (January 10, 2024) with EPA Central Data Exchange submittal referenced	Yes
Did the initial notification and demonstration submittals meet the deadlines for data influenced by exceptional events for use in initial area designations, if applicable? Or the deadlines established by EPA during the Initial Notification of Potential Exceptional Events process, if applicable?	40 CFR §50.14 Table 2 40 CFR §50.14 (c)(2)(i)(B)	January 10, 2024	Yes
Was the public comment process followed and documented? • Did the agency document that the comment period was open for a minimum of 30 days? • Did the agency submit to EPA any public comments received? • Did the state address comments disputing or contradicting factual evidence provided in the demonstration?	40 CFR §50.14 (c)(3)(v)	April 9, 2024-May 10, 2024 Cover letter submitted with final demonstration	Yes Comments were addressed from public and EPA Region 1

Requirement	Reference	Demonstration Citation	Criterion Met?
Has the agency met requirements regarding submission of a mitigation plan, if applicable?	40 CFR §51.930(b)	N/A	N/A

5.0 CONCLUSION

EPA has reviewed the documentation provided by CT DEEP to support claims that smoke from prescribed burns and/or wildfires contributed to exceedances or violations of the 8-hour O_3 NAAQS at the Cornwall, East Hartford, and Groton monitoring locations. EPA has determined that the flagged exceedances at the Groton monitoring location on June 30, and the Groton, East Hartford, and Cornwall monitoring sites on July 1 satisfy the exceptional event criteria: the event was a natural event, which affected air quality in such a way that there exists a clear causal relationship between the event and the monitored exceedance and was not reasonably controllable or preventable. EPA has also determined that the CT DEEP has satisfied the procedural requirements for data exclusion. Therefore, EPA is concurring with CT DEEP's claim that the exceedances described above were the result of an exceptional event.

The EPA has also determined that the exceedances at the Groton monitoring location on April 13 - 14 and July 12 do not satisfy the exceptional event criteria. Specifically, although the demonstration presented evidence that these wildfires meet the requirements that the event be not reasonably controllable or preventable and a natural event, the demonstration failed to show that there exists a clear causal relationship between the event and the monitored exceedances or violations. This conclusion is based on the review of the evidence presented in the demonstration, including meteorological information, fire emission information, HYSPLIT trajectories, satellite data, ground level monitoring data, and analysis of meteorologically similar days. These exceedance days experienced conditions favorable to local O_3 production and transport of O_3 from downwind sources. The data and analyses presented in the demonstration do not support that significant wildfire emissions were transported to the Greater Connecticut nonattainment area and impacted monitors there sufficiently enough to cause exceedances of the NAAQS. Because the demonstration failed to show that there exists a clear causal relationship between the proposed events and the April 13-14 and July 13 monitored exceedances at the Groton monitoring location, EPA is not concurring on these dates for exclusion under the Exceptional events rule.