New Rule Revisions for Exceptional Events

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Overview of Exceptional Events Rule Revisions

- Scope of Exceptional Events Rule Revisions
- Exceptional Events Definition
- Exceptional Event Technical Criteria
- Demonstration development, submittal and review
- Demonstration Submittal Timeline
- Demonstration Review Timeline
- AQS Applications
- Mitigation Plan
- Next Steps EE Project Scope

Scope of Exceptional Events New Rule Revisions

- ✓ New rule effective 9/30/16; published in Federal Register 10/3/16 (81 FR 68216)
- ✓ Applies to the treatment of data showing exceedances or violations of any NAAQS for purposes of the specific types of regulatory determinations by the Administrator:
- ✓ Affects Designations/ Redesignations; Classifications; Attainment demonstrations (including clean data determinations); Attainment date extensions; Findings of SIP inadequacy leading to a SIP call
- ✓ Applies to all state air agencies, to (delegated) local air agencies, to tribal air agencies that operate air quality monitors that produce regulatory data and to federal land managers/federal agencies if agreed to by the state
- ✓ Other actions on a case-by-case basis. If determined by the EPA to have regulatory significance based on discussions between the air agency and the EPA Regional office during the Initial Notification of Potential Exceptional Event process.

Exceptional Events Definition

An event(s) and its resulting emissions that affect air quality in such a way that there:

- exists a **clear causal relationship** between the specific event(s) and the monitored exceedance(s) or violation(s)
- is not **reasonably controllable** or **preventable**
- is an event(s) **caused by human activity** that is unlikely to recur at a particular location
- or a **natural event(s)**

and is determined by the Administrator in accordance with 40 CFR 50.14 to be an exceptional event.

Exceptional Events Rule Revisions
Technical Criteria: Clear Causal Relationship

*"exists a **clear causal relationship** between the specific event(s) and the monitored exceedance(s) or violation(s)"*

- Wise for air agencies to consider this criteria first.
- Clear causal relationship:
  - Analyses to show the event occurred
  - Analyses to show that emissions from the event reached the monitor
  - Demonstrated using Tier 1, Tier 2 and Tier 3 key factors
  - Supported by a comparison to historical concentration data
- Weight of evidence analysis

Exceptional Events Rule Revisions
Technical Criteria: Human Activity

*"is an event(s) caused by **human activity** that is unlikely to recur at a particular location a **natural event(s)**"*

- Air agencies must demonstrate that the human activity (ex. prescribed fire, chemical spill or other industrial accident) is not likely to recur.
- Particular Location:
  - Can vary depending on the specifics of the area
  - Air agencies and regions should proactively discuss what a "particular location" means
- Event recurrence - Three events in 3 years benchmark: Has there been a similar event type generating emissions of the same pollutant (regardless of whether it was an exceptional event) within 3 years before the date of the event?
  - A single discrete event is one occurrence even if it extends over more than one day
  - An event that does not fit this recurrence benchmark may be approvable on a case-by-case basis

Exceptional Events Rule Revisions
Technical Criteria: Natural Event(s)

*"is an event(s) caused by **human activity** that is unlikely to recur at a particular location a **natural event(s)**"*

- EPA generally considers wildfires, stratospheric ozone intrusions, volcanic and seismic (*e.g.,* earthquake) activities, natural disasters (*e.g.,* hurricanes and tornados) and windblown dust from natural, undisturbed landscapes to be natural events. (81 FR 68232)

- Emissions do not have to be entirely without a human component. If anthropogenic sources contribute to the event and are reasonably controlled, then an air agency can make the case that these emissions play no direct causal role. 40 CFR 50.1(k). Thus, they can satisfy the definition of "natural events."

- Natural events **can** recur

Exceptional Events Rule Revisions

Technical Criteria: Reasonably Controllable or Preventable

*"is not **reasonably controllable** or **preventable**"*

An air agency must demonstrate that an event was both **not** reasonably preventable and **not** reasonably controllable.

- Not reasonably controllable?
  - ✓ Reasonable measures to control the impact of the event on air quality were applied at the time of the event
- Not reasonably preventable?
  - ✓ Reasonable measures to prevent the event were applied at the time of the event

- Approach event emissions without presumptions:
  1. Identify the natural and anthropogenic sources of emissions causing and contributing to the monitored exceedance or violation, including the contribution from local sources
  2. Identify the relevant SIP, FIP or TIP or other enforceable control measures in place for these sources and the implementation status of these controls
  3. Provide evidence of effective implementation and enforcement of reasonable controls, if applicable

Exceptional Events Rule Revisions

Technical Criteria: Reasonably Controllable or Preventable

*"is not **reasonably controllable** or **preventable**"*

Circumstances that **do not** require detailed analysis:

1. The emissions generating activity is beyond the jurisdictional boundaries of the state submitting the demonstration.
2. The emissions generating activity is a natural event and all anthropogenic contributors are reasonably controlled
   - Wildfires on wildland
   - Large-scale, high-energy high wind dust events
   - Stratospheric ozone intrusions
3. Deference to measures in a nonattainment or maintenance SIP/FIP/TIP approved within 5 years of the date of the event
   - Does not apply if the air agency is under obligation to revise SIP

If the event-type exclusion applies to the event emissions, then the not reasonably controllable or preventable section of the demonstration should include a statement explaining this point and cite to the rule presumption.

Exceptional Events Rule Revisions
Demonstration Development

- **Initial event description** and **flagging associated data** submitted to the AQS database
- **Initial notification by the State to the EPA** of a potential exceptional event a required (but waivable) preliminary step before submitting a demonstration
- The **State** and the **appropriate EPA Regional office shall engage in regular communications to identify those data that have been potentially influenced by an exceptional event**, to determine whether the identified data may affect a regulatory determination and to discuss whether the State should develop and submit an exceptional events demonstration
- For **data** that **may affect** an **anticipated regulatory** determination or where circumstances otherwise compel the Administrator to **prioritize the resulting demonstration**, the Administrator shall respond to a State's Initial Notification of Potential Exceptional Event with a **due date for demonstration submittal** that considers the nature of the event and the anticipated timing of the associated regulatory decision
- **EPA Regional offices may defer EE packages that have no regulatory significance**

Example Initial Notification: Washoe County, Nevada

Initial Notification of Potential Exceptional Event Information Summary

Submitting Agency: Washoe County Health District, Air Quality Management Division
Agency Contact: Daniel Inouye, Branch Chief
Date Submitted: June 3, 2016
Applicable NAAQS: 2006 24-Hour $PM_{2.5}$ and 2015 8-Hour Ozone
Affected Regulatory Decision[1]: Attainment of the 2015 8-Hour Ozone NAAQS
Area Name/Designation Status: Washoe County Attainment Area
Design Value Period: 2013-2015

Narrative: On August 18, 2015 smoke from numerous wildfires in the Northwest portion of California impacted the Reno/Sparks area. The smoke impacts contributed to several exceedances of the National Ambient Air Quality Standards (NAAQS) for Particulate Matter less than or equal to 2.5 microns in aerodynamic diameter ($PM_{2.5}$) and Ozone (O_3) at several sites in the Washoe County Health District, Air Quality Management Division's (AQMD) monitoring network. The AQMD requests that the Regional Administrator for Region IX of the U.S. Environmental Protection Agency (EPA) accepts this Initial Notification so an Exceptional Events Demonstration document can be prepared to petition for the exclusion of the air quality monitoring data effected from these fires from the normal planning and regulatory requirements under the Clean Air Act (CAA) in accordance with the Exceptional Events Rule (EER).

Example Initial Notification: Washoe County, Nevada

Table A (1):
Information specific to each flagged site day that may be submitted to EPA in support of the affected regulatory decision listed above.

Date(s) of Event	NAAQS Standard	Type of Event (high wind, volcano, wildfires/prescribed burns, other)	AQS Flag	Site AQS ID	POC	Site Name	Monitor Concentration
08/21/2015	$PM_{2.5}$	Northwest Wildfires	RT	32-031-0016 32-031-1005	3 1	Reno3 Sparks	38.8 $\mu g/m^3$ 39.2 $\mu g/m^3$

*Data was flagged in AQS on 04/14/2016 and 05/03/2016 as Wildfire Event from 08/18/2015 (00:00) to 08/21/2015 (23:59)

Table A (2):
Information specific to each flagged site day that may be submitted to EPA in support of the affected regulatory decision listed above.

Date(s) of Event	NAAQS Standard	Type of Event (high wind, volcano, wildfires/prescribed burns, other[2])	AQS Flag	Site AQS ID	POC	Site Name	Monitor Concentration
08/18/2015	Ozone	Northwest Wildfires	RT	32-031-0016	1	Reno3	0.075 ppm
				32-031-1005	1	Sparks	0.070 ppm
				32-031-0025	1	Toll	0.068 ppm
				32-031-0020	1	South Reno	0.073 ppm
				32-031-2009	1	Lemmon Valley	0.069 ppm
				32-031-2002	1	Incline	0.063 ppm
08/19/2015	Ozone	Northwest Wildfires	RT	32-031-0016	1	Reno3	0.073 ppm
				32-031-1005	1	Sparks	0.071 ppm
				32-031-0025	1	Toll	0.069 ppm
				32-031-0020	1	South Reno	0.071 ppm
				32-031-2009	1	Lemmon Valley	0.067 ppm
				32-031-2002	1	Incline	0.061 ppm
08/20/2015	Ozone	Northwest Wildfires	RT	32-031-0016	1	Reno3	0.070 ppm
				32-031-1005	1	Sparks	0.069 ppm
				32-031-0025	1	Toll	0.070 ppm
				32-031-0020	1	South Reno	0.070 ppm
				32-031-2009	1	Lemmon Valley	0.068 ppm
				32-031-2002	1	Incline	0.061 ppm
08/21/2015	Ozone	Northwest Wildfires	RT	32-031-0016	1	Reno3	0.073 ppm
				32-031-1005	1	Sparks	0.072 ppm
				32-031-0025	1	Toll	0.073 ppm
				32-031-0020	1	South Reno	0.072 ppm
				32-031-2009	1	Lemmon Valley	0.067 ppm
				32-031-2002	1	Incline	0.064 ppm

Example Initial Notification: Washoe County, Nevada

Table C (1):
Summary of Maximum Design Value (DV) Site Information for **24-Hour $PM_{2.5}$** (Effect of EPA Concurrence on Maximum Design Value Site Determination)

Maximum DV site (AQS ID) **without EPA concurrence** on any of the events listed in Table A (1) above	Design Value 32	Design Value Site Sparks (32-031-1005)	Comment
Maximum DV site (AQS ID) **with EPA concurrence** on all events listed in Table A (1) above	Design Value 32	Design Value Site Sparks (32-031-1005)	Comment

Table C (2):
Summary of Maximum Design Value (DV) Site Information for **8-Hour Ozone** (Effect of EPA Concurrence on Maximum Design Value Site Determination)

Maximum DV site (AQS ID) **without EPA concurrence** on any of the events listed in Table A (2) above	Design Value 71	Design Value Site Reno3 (32-031-0016)	Comment
Maximum DV site (AQS ID) **with EPA concurrence** on all events listed in Table A (2) above	Design Value 70	Design Value Site Reno3 (32-031-0016)	Comment

Exceptional Events Rule Revisions
Demonstration Components

- **Conceptual model** that describes the event(s) causing the exceedance or violation and a discussion of how emissions from event(s) led to exceedance or violation at affected monitor(s) - Tiered approach
- Sections for each of the 3 technical criteria
  - **clear causal relationship** supported by comparison to historical concentrations
  - **human** activity **unlikely to recur/natural** event
  - not reasonably **controllable** or **preventable**
- **Public Input**
  - Documentation that (30 day) public comment process was conducted
  - Comments received
  - Address comments disputing or contradicting factual evidence in demonstration*

Exceptional Events Rule Revisions

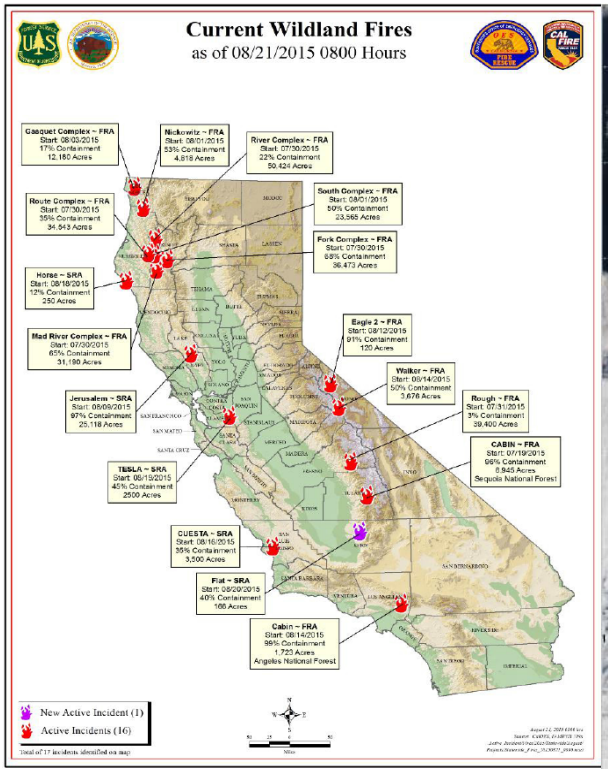
Conceptual Model

A narrative that describes the event, is supported by summary tables or maps, and provides context for required statutory technical criteria analyses.

Examples Include:

- Maps and tables of the wildfire event information including location, size, and extent. The maps should also include the location of the monitor(s) where data exclusion is requested. This map and table should clearly identify the wildfire(s) believed by the air agency to have caused the exceedance, not just a list of wildfires occurring within the jurisdiction of the submitting air agency.
- Characteristics and description of the monitor with the request for data exclusion. Non-event similarities and differences between this monitor and nearby monitors should be explained.
- A brief explanation and identification of the cause and point of origin for the event wildfire(s) (to the extent known).
- Examples of media coverage of the event, including special weather statements, advisories, and news reports.
- Smoke forecasts based on meteorology and burn conditions (often provided as part of the Wildland Air Quality Response Program).
- Description of meteorological data from or near the affected monitor and how this relates to the transport of the wildfire emissions.
- Description of the route of the wildfire emissions to the influenced monitor, including meteorological information (*e.g.*, general atmospheric circulation characteristics) regarding the transport of wildfire emissions to the monitor.
- Non-event O_3 formation characteristics of the area normally influencing the monitor (*i.e.*, the non-event conceptual model).
- Discussion of the differences observed between the non-event conceptual model and event related conditions causing high O_3 concentrations at a particular location.
- A summary of spatial and temporal O_3 patterns on the day of interest, and days before and after the event, relative to other, non-event days (either high O_3 days, or days with similar meteorology than the event day), including maps of affected and non-affected monitors.
- Description of the regulatory determination anticipated to be influenced by the exceptional event, including a table of the monitor data requested for exclusion (*e.g.*, date, hours, monitor values, and design value calculations with and without the exceptional event).
- NAAQS attainment and classification information, including O_3 State Implementation Plan (SIP) status.

Exceptional Events Rule Revisions
Conceptual Model Example



Exceptional Events Rule Revisions
Tiered Analysis - Clear Casual Relationship Criterion

- The tiered strategy contains three tiers of analyses with key factors for the clear causal relationship criterion.
- Tiers are cumulative and increase in complexity depending on the evidence needed to support the exclusion request.

Tier 1	Tier 2	Tier 3
Wildfires that clearly influence monitored O_3 exceedances or violations when they occur in an area that typically experiences lower O_3 concentrations. This tier is associated with an O_3 concentration that is clearly higher than non-event related concentrations, or occur outside of the area's normal O_3 season.	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.	The wildfire does not fall into the specific scenarios that qualify for Tier 1 or Tier 2, but the clear causal relationship criterion can still be satisfied by a weight of evidence showing.

Exceptional Events Rule Revisions

Tier 1 Analysis

Seasonality <u>OR</u> distinctive level of the monitored O_3 exceedance

- **Outside normal O_3 season**
- **5-10 ppb higher than non-event related concentrations**

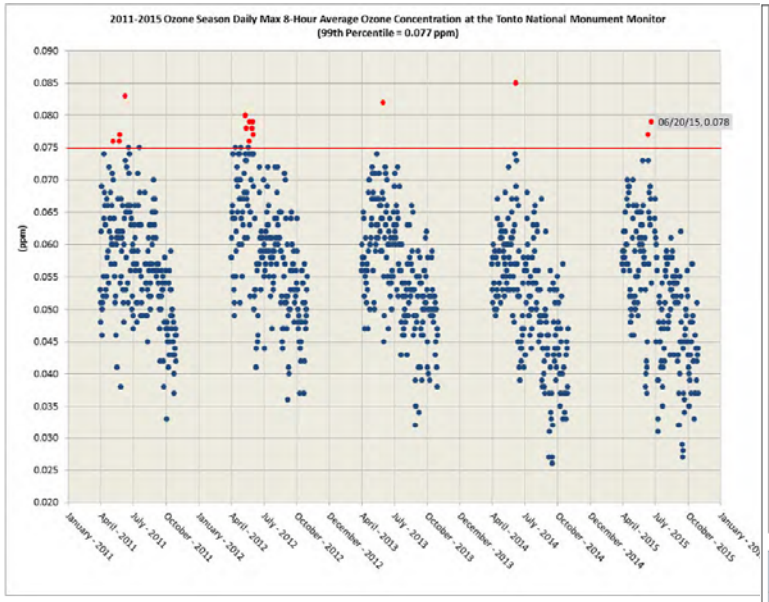
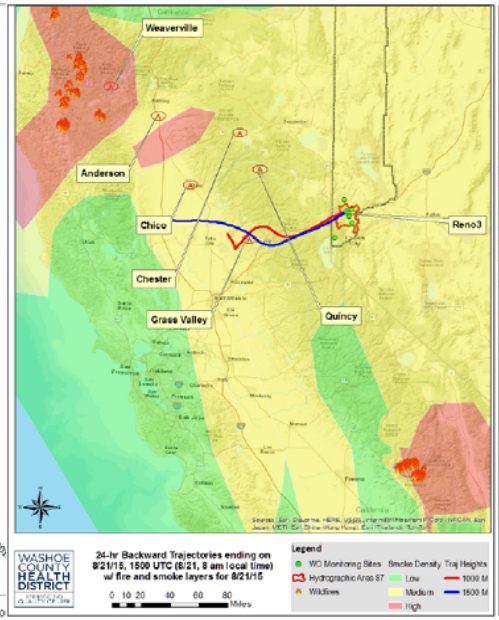
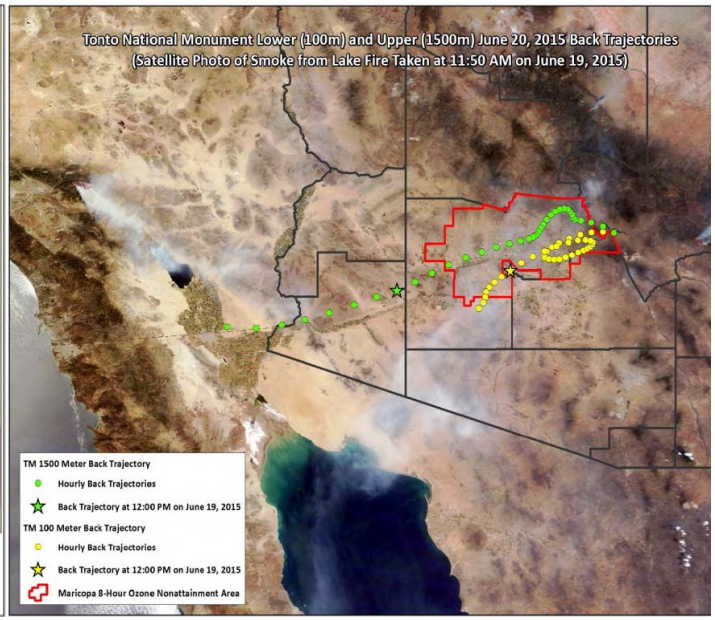


Figure 3-6. Plot of 5-year ozone season daily maximum 8-hour average concentrations at the Tonto National Monument monito





Exceptional Events Rule Revisions
Tier 2 Analysis

Wildfire events that do not meet the criteria of Tier 1

Key Factor #1

Fire emissions and distance of fire(s) to affected monitoring site location

- Q/D >= 100 tons/km

Emissions data resources :
NEI
Smart Fire
Blue Sky Playground (STI & Forest Service)

Key Factor #2

Comparison of the event-related O_3 concentration with non-event high O_3 concentrations

- 99th or higher percentile of 5-year distribution
- One of the four highest values within 1 year

Exceptional Events Rule Revisions
Tier 2 Analysis

1. Tier I Analysis
2. Addition evidence that the emissions from the wildfire affected the monitored O_3 concentration
   a. Evidence of changes in spatial/temporal patterns of O_3 and/or NOx
   b. Photographic evidence of ground-level smoke at the monitor (visibility)
   c. Diurnal patterns and historic distribution
   d. Concentrations of supporting ground level measurements
      - CO
      - PM (mass or speciation)
      - VOCs
      - Pollutant Ratios
      - Levoglucosan biomarker found in wood smoke

Exceptional Events Rule Revisions

Tier 2 Analysis

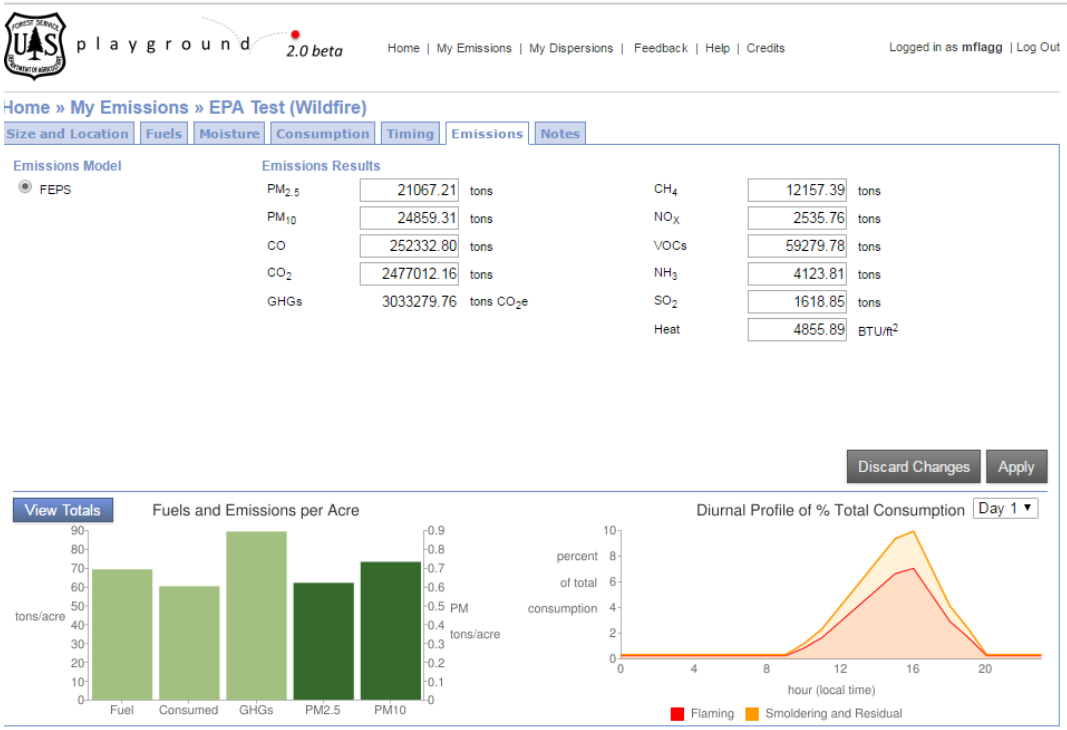


Table 3.1: Q/D Calculations for Seven Northwest Wildfires on August 20, 2015

Fire Name	Lat/Long	Distance (km)	Acres	Emissions (tons)	Q/D (tpd/km)
Fork Complex	40.45/-123.128	187	1,120		
Mad River Complex	40.34/-123.383	197	3,622		
South Complex	40.62/-123.448	207	290		
Route Complex	40.64/-123.586	215	1,391		
River Complex	40.91/-123.437	214	2,622		
Gasquet Complex	41.85/-123.969	271	3,563		
Nickowitz	41.47/-123.75	246	904		
Totals			13,512	24,566	86

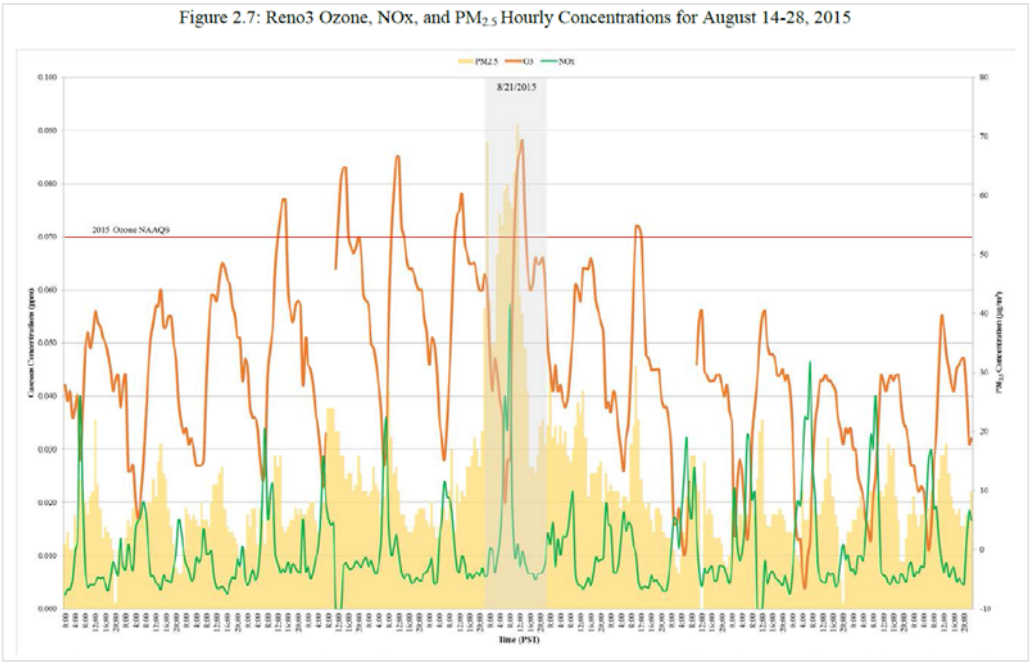
Table 3.2: Q/D Calculations for Seven Northwest Wildfires on August 21, 2015

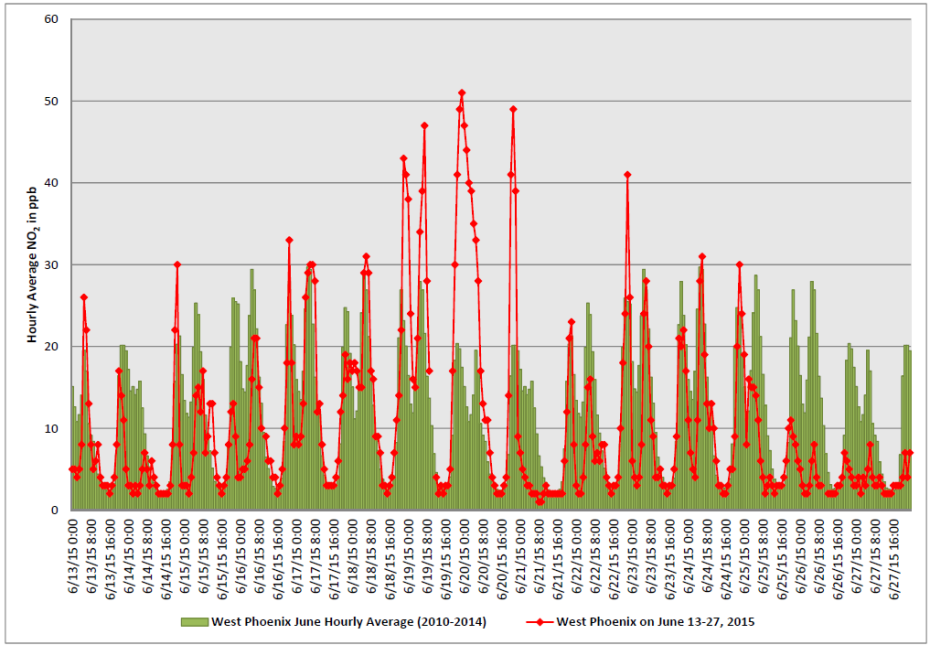
Fire Name	Start Lat/Long	Distance (km)	Acres	Emissions (tons)	Q/D (tpd/km)
Fork Complex	40.45/-123.128	187	188		
Mad River Complex	40.34/-123.383	197	1,106		
South Complex	40.62/-123.448	207	758		
Route Complex	40.64/-123.586	215	193		
River Complex	40.91/-123.437	214	2,325		
Gasquet Complex	41.85/-123.969	271	1,357		
Nickowitz	41.47/-123.75	246	152		
Totals			6,079	11,053	39

Exceptional Events Rule Revisions

Tier 2 Analysis

Figure 2.7: Reno3 Ozone, NOx, and $PM_{2.5}$ Hourly Concentrations for August 14-28, 2015





Exceptional Events Rule Revisions

Tier 2 Analysis

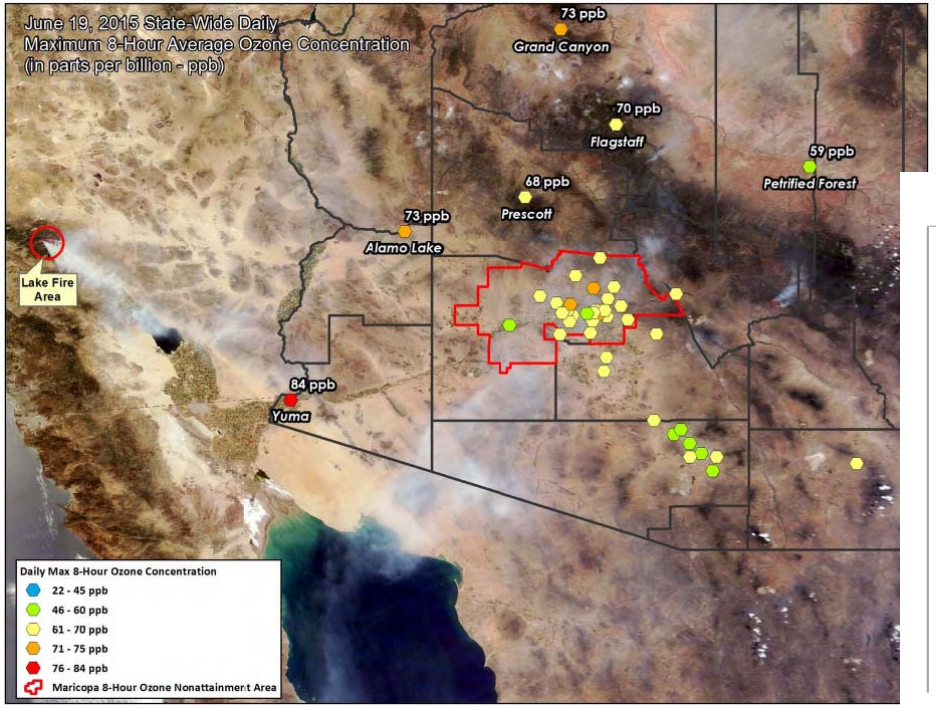
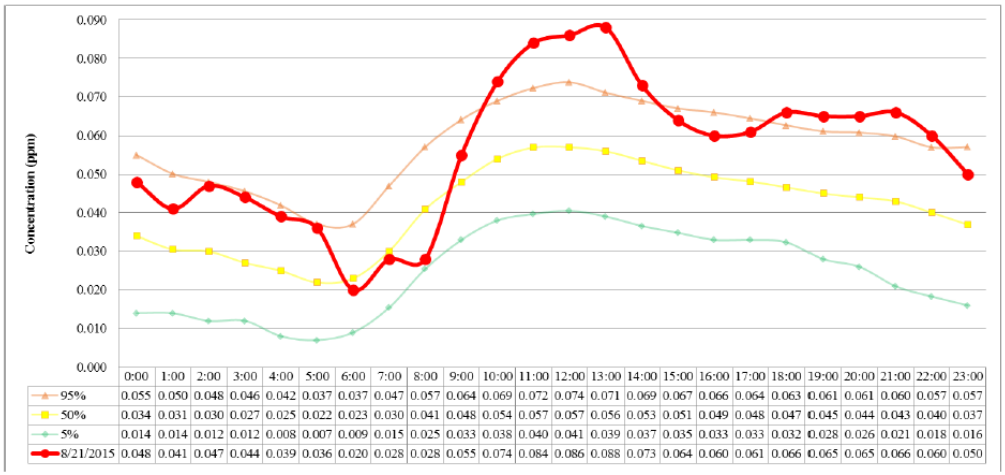


Figure 3.3: Percentiles for Hourly Seasonal Ozone for 2010-2014 with August 21, 2015



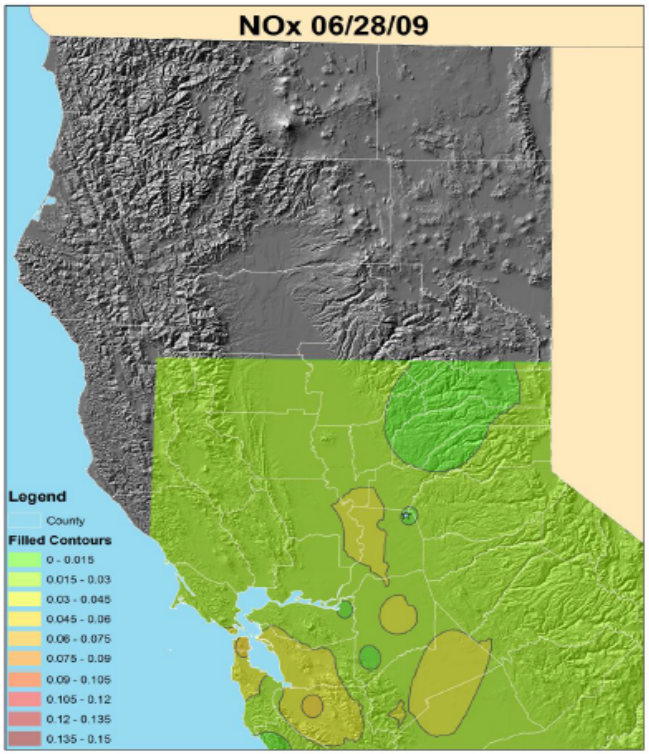
	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
95%	0.055	0.050	0.048	0.046	0.042	0.037	0.037	0.047	0.057	0.064	0.069	0.072	0.074	0.071	0.069	0.067	0.066	0.064	0.063	0.061	0.061	0.060	0.057	0.057
50%	0.034	0.031	0.030	0.027	0.025	0.022	0.023	0.030	0.041	0.048	0.054	0.057	0.057	0.056	0.053	0.051	0.049	0.048	0.047	0.045	0.044	0.043	0.040	0.037
5%	0.014	0.014	0.012	0.012	0.008	0.007	0.009	0.015	0.025	0.033	0.038	0.040	0.041	0.039	0.037	0.035	0.033	0.033	0.032	0.028	0.026	0.021	0.018	0.016
8/21/2015	0.048	0.041	0.047	0.044	0.039	0.036	0.020	0.028	0.028	0.055	0.074	0.084	0.086	0.088	0.073	0.064	0.060	0.061	0.066	0.065	0.065	0.066	0.060	0.050

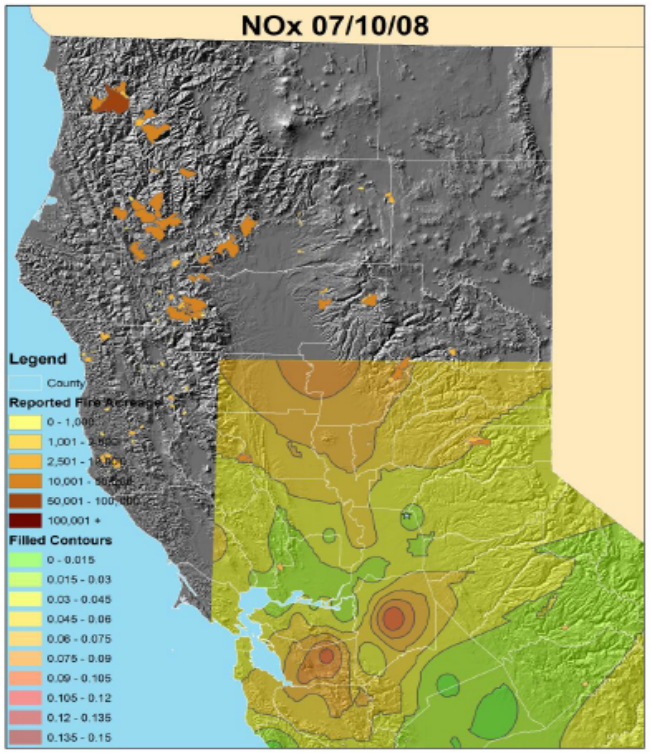
Exceptional Events Rule Revisions
Tier 3 Analysis

1. Tier I Analysis
2. Tier II Analysis
3. Additional Analysis to Support the Clear Causal Relationship
   a. Comparison of O_3 concentrations on Meteorologically Similar Days (Matching Day Analysis)
   b. Statistical Regression Modeling
   c. Photochemical Modeling

Exceptional Events Rule Revisions
Tier 3 Analysis

Maximum 1-hour Surface NO_x Concentrations on Surrogate and Fire Days

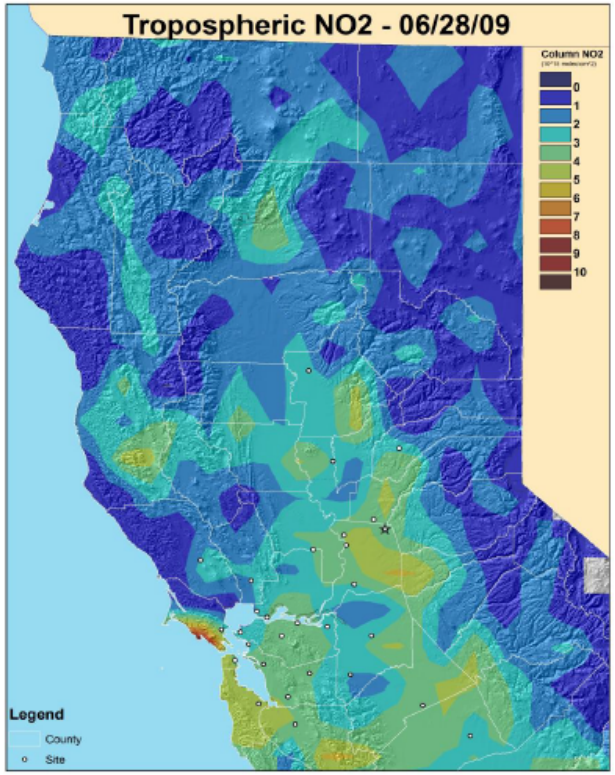


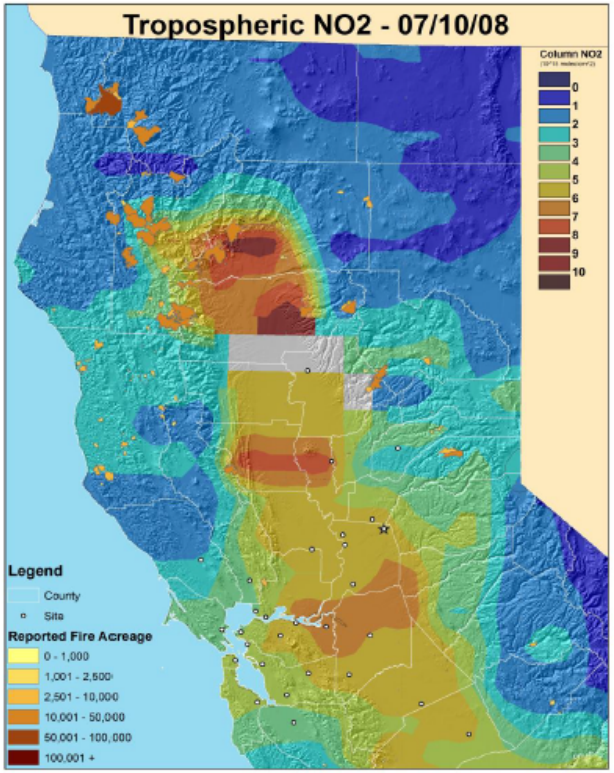


Exceptional Events Rule Revisions

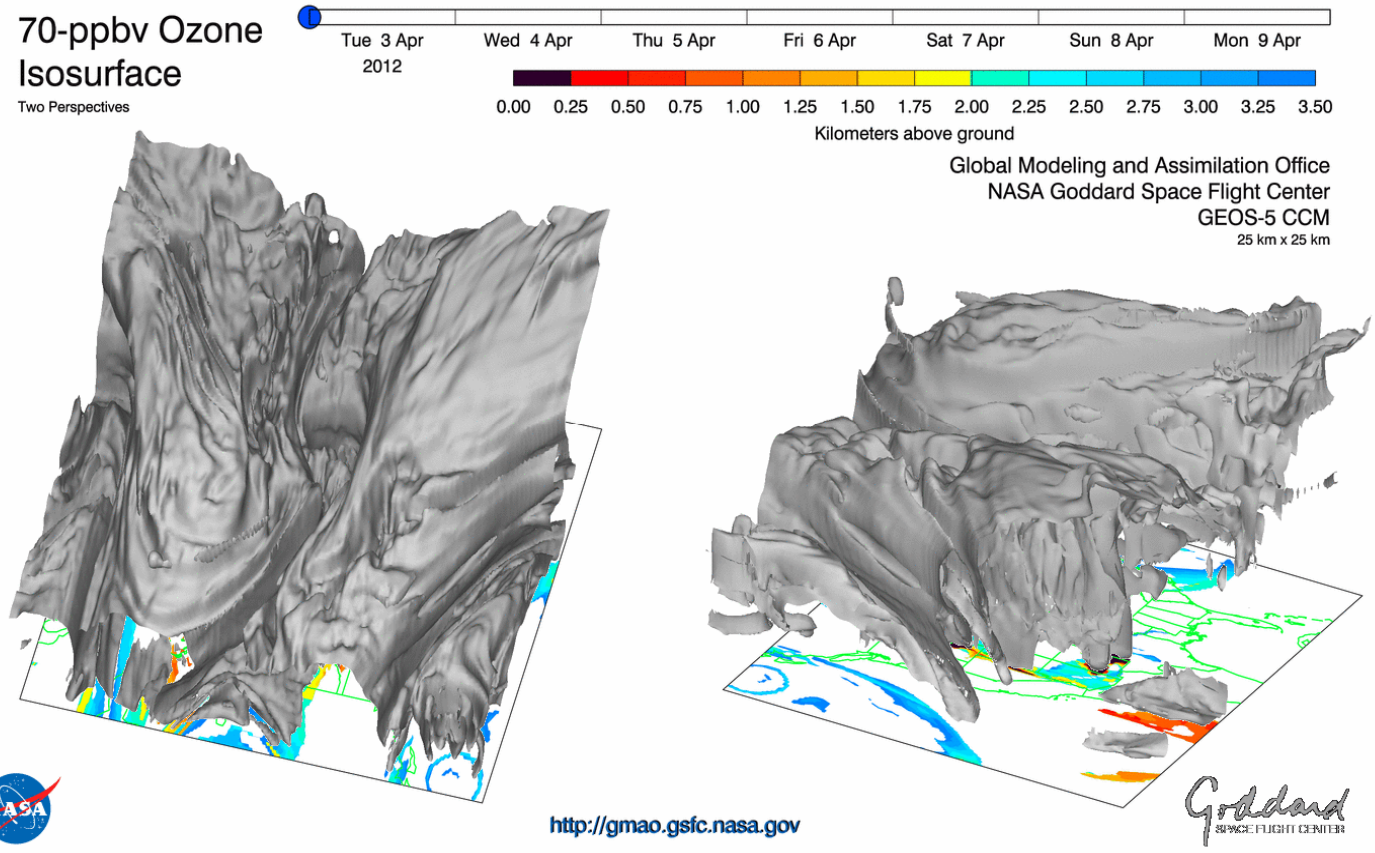
Tier 3 Analysis

Tropospheric NO_2 Concentrations on Surrogate and Fire Days





Stratospheric Ozone Intrusion



http://gmao.gsfc.nasa.gov

Exceptional Events Rule Revisions
Demonstration Submittal Timeline

Established 2015 Ozone NAAQS demonstration submission deadlines:

- November 29, 2016 (for 2013 - 2015 data)
- May 31, 2017 (2016 data) for ozone designations promulgated in Oct. 2017 (CAA 2-yr schedule)
- May 31, 2018 (for 2017 data) only if designations are completed under a 3-year schedule

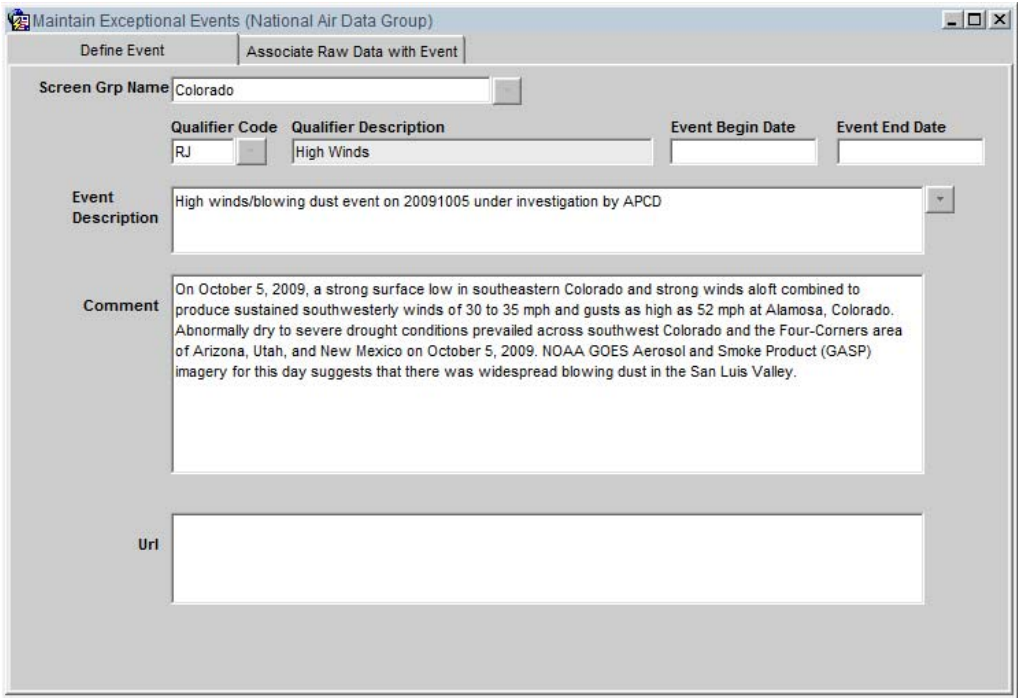
Exceptional Events Rule Revisions
Demonstration Review Timeline

General timelines for EPA action and review

- 60 days - formal response to the Initial Notification
- 120 days of receipt - initial review of an exceptional events demonstration with regulatory significance
- 12 months of receipt of a complete demonstration - a decision regarding event concurrence/nonconcurrence
- 60 days of receipt of a demonstration that the EPA determined during the Initial Notification process to not to have regulatory significance – issue "deferral letter"

Exceptional Events Rule Revisions
AQS Applications

- "R" flags should be used only when the air agency intends to submit a EE demonstration package and request data exclusion.
- "I" flags should be used to inform data users of event influenced concentrations.
- Initial event definitions are created in the *Maintain Exceptional Event* screen.



Exceptional Events Rule Revisions
Mitigation Plan Requirements

- Preamble identifies areas with recurring events (generally three events in a 3-year time period, which for final rule purposes was 1/1/13 – 12/31/15)
- Requires development of mitigation plan (elements specified)
  - Prepared and after notice and opportunity for public comment
  - Submitted for EPA's review and verification of the plan components
  - Administrator shall notify the State upon completion of the review.
- Identified areas have 2 years from the rule effective date (September 30, 2016 or subsequent notification from the Regional office) to submit a mitigation plan
  - After 2-year period, the EPA will not concur with demonstrations for events that are the focus of the mitigation plan.
- "R" flags could trigger mitigation requirements

Exceptional Events Rule Revisions
Initial Mitigation Plan and Periodic Reviews

- With the submission of the ***initial*** mitigation plan, State must
  - Document that a draft version of the mitigation plan was available for public comment for a minimum of 30 days
  - Submit the public comments it received along with its mitigation plan to the EPA Regional office
  - In its submission, for each public comment received, explain the changes made to the mitigation plan or explain why the State did not make any changes to the mitigation plan

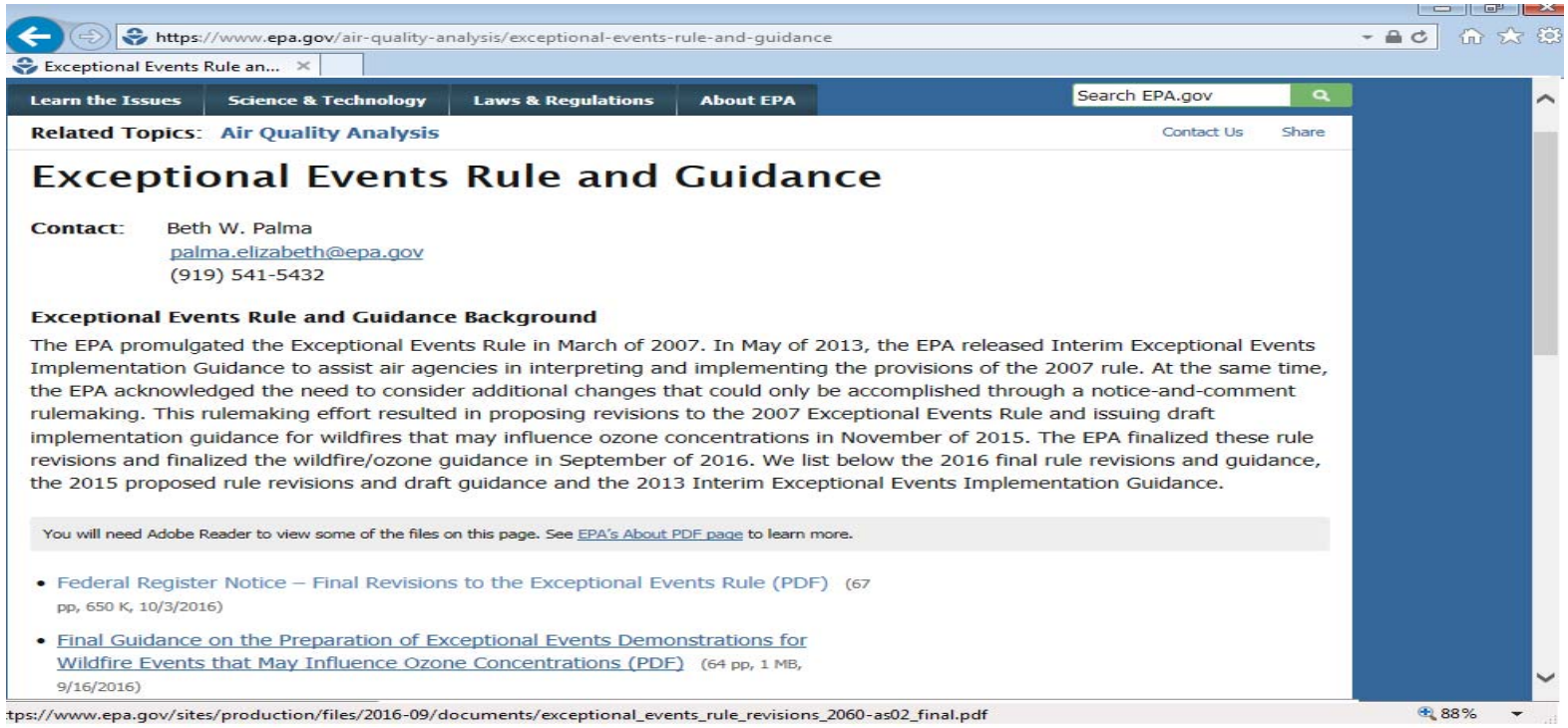
- The State shall specify in its mitigation plan the periodic review and evaluation process that it intends to follow for reviews following the initial review

Exceptional Events Rule Revisions
Next Steps Project Scope

- The 2016 rule revisions and final wildfire/ozone guidance were needed first steps, but efficient and coordinated implementation is critical.
- What is next?
- Additional Implementation Guidance
  - Revisions to *Interim Exceptional Events Guidance Documents*
  - Stratospheric Ozone Intrusion Guidance
  - Alternate Paths for Data Exclusion Guidance
  - Prescribed Fire Guidance
- Continued development of exceptional events tools
  - Templates
  - Website updates
  - AQS modifications to reflect rule revisions
  - Standardized metrics and tracking
  - Targeted efforts with FLMs – communications and tools

Exceptional Events Rule & Guidance
Online Documents

https://www.epa.gov/air-quality-analysis/exceptional-events-rule-and-guidance



Exceptional Events Rule
Acknowledgements

References:
CFR 50.14, 81 FR 68216, and presentations from the November 30, 2016 Exceptional Events Implementation Workshop, Dallas TX.

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Questions & Comments