



# Wildfire Exceptional Event (EE) Demonstrations Best Practices & Lessons Learned

Exceptional Events Wildfire and Prescribed Fire Smoke Workshop  
February 27-29, 2024  
Drury Plaza Hotel St. Louis at the Arch (St. Louis, MO)

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# Acknowledgments

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**STI** | **Sonoma Technology**

# Open & Transparent Communication w/ Your EPA Region

As an SLT, Consider the Following when Coordinating with Your EPA Region:

- Establish timelines and expectations
- Early coordination improves EE demonstration approvability chances:
  - Document agreements
  - No surprises
- Share preliminary analyses with your EPA Region to foster collaboration on an event.
- Collaborate with nearby/similarly affected air agencies to build a stronger EE case



# Data Considerations

## Have a Clear Understanding of Your Data

- Continuously track exceedances and NAAQS attainment status
- Tracking challenges (form of NAAQS, NAAQS revisions and multiple NAAQS)
- Develop process/procedure for exceedances tracking.

## Data Completeness

### Monitoring Data Requirements vs. NAAQS Design Values for Attainment Purposes

- Monitoring: Quarterly and Daily Requirements
- Attainment Purposes: If  $>$  NAAQS, then data will be used!
- 40 CFR Part 50 Appendix U (Ozone) and Appendix K (Particulate Matter)
- Part 50 (4)(b) “A design value greater than the level of the NAAQS is always considered to be valid.”



# Data Flagging and Processes

## Flagging AQS Data (I & R Qualifier Codes)

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

INI – Establishes Regulatory Significance

Develop Atypical Events and Narratives

- Difficult demos first

## Draft Reviews to Include:

EPA Review

Public Comment Process

- Timing
- Comments of Substance
- Documentation

*Note: Data Certification*



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# Air Agency and EPA Coordination

## Meet with your EPA Region Routinely

### Review Specific Events

- Present your data and evidence.
- Ensure evidence meets EPA guidance criteria.
- May need to refine/do more than once.

## Preemptive/Strategic Measurements if Resources Allow (e.g., during wildfire season)

- Plan-ahead and work with monitoring partners
- Consider types of data needs

# Wildfire/Smoke O<sub>3</sub> EE Demonstrations: Lessons Learned

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## For Successful Demonstration: Key Objectives

- Demonstrate clear causal relationship between EE and exceedance(s)
- Not reasonably controllable or preventable
- Unlikely to reoccur (if caused by human activity)

## Wildfire/Smoke O<sub>3</sub> Demonstrations Submitted to Region 9

- Regulatory Significance
- Non-Concurrence Received (on all demos/batch)
- Bump-Up (Marginal to Moderate Nonattainment)

For Clark County: Some cases were not clear-cut. More Compelling evidence needed (per Region 9)



# EE Demo Comments and Criticisms



## Comments/Criticisms Received from EPA Region 9

Suggestion that wildfire smoke does not reach impacted area at peak O<sub>3</sub> hour for the day

- O<sub>3</sub> may not increase right as smoke enters the area (secondary pollutant)

Satellite, HYSPLIT, ground concentration, and webcam data do not provide significant evidence of the smoke impacts.

- Smoke was not “significant enough” to cause EE

Per EPA: Levoglucosan data should be 2 x standard deviation above the mean

- DES Recommendation: Do not include non-detects (0 ng/m<sup>3</sup>) in data/calculations

GAM Calculations:

- Region 9 mentioned (verbal discussion) 95th percentile wasn't a hard and fast rule
- We included the 75<sup>th</sup> percentile in calculations (because had been significantly affected by wildfires in the modeling years).
- But Region 9 reverted back to 95th percentile in TSD

# HYSPLIT/Model Discussion

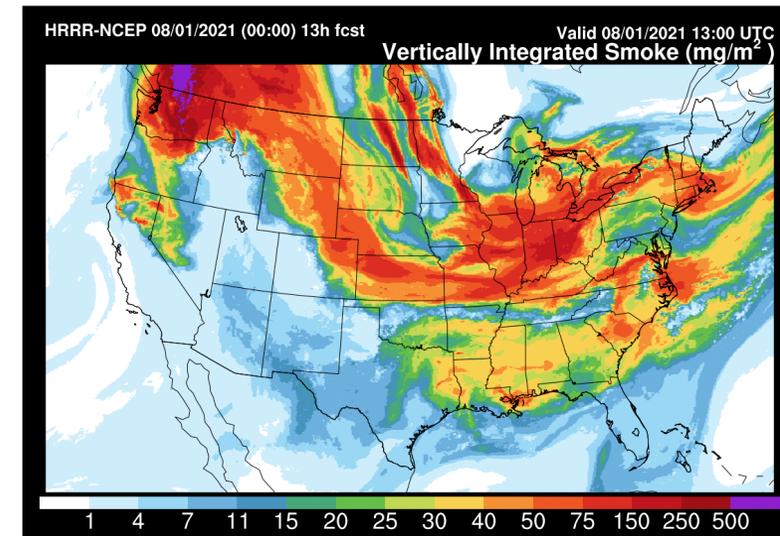
## Timing and Peak Monitor Hours Example

- Trajectories are models
- Local (valley) weather

## Use the Best Meteorological Data in the Models

### For Example:

- For regional smoke use large-scale model to examine flow (GDAS 0p25 or NAM12)
- For local fires, use high resolution meteorological data like HRRR (3km)





# Pollutant Ratios

## O<sub>3</sub>/CO: Expect higher ratios w/ fresh smoke

- Caveats: NO<sub>x</sub> titration, cloud cover, nighttime transport
- Other options: PM<sub>2.5</sub>/CO or NO<sub>x</sub>/CO
- Stratospheric Ozone Intrusions: Very low CO

## PM<sub>2.5</sub>/PM<sub>10</sub>

- Wildfire smoke: High ratios
- High wind/dust: Low ratios

## PM<sub>2.5</sub> EC/OC

- Biomass burning has higher ratios (range: 3.8-13.2), Average: 9.0
- Coal (range: 2.5-10.5), Average 2.4
- Diesel/gasoline (range: 0.3-4.2), Average: 1.1

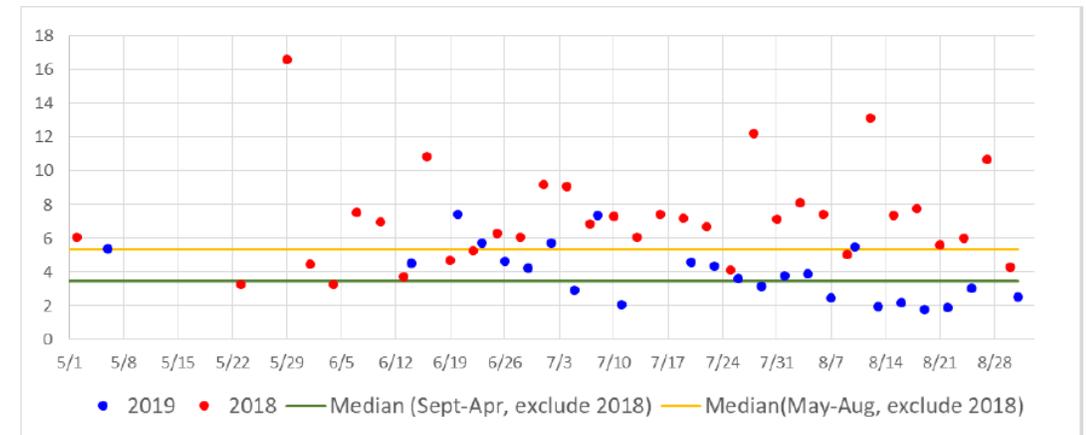


Figure 4-9. OC/EC ratio at Jerome Mack, 2018-2019 Ozone Season.

# The End

## Thank You!

## Any Questions?



**Clark County DES Website**

[https://www.clarkcountynv.gov/government/departments/environment\\_and\\_sustainability/index.php](https://www.clarkcountynv.gov/government/departments/environment_and_sustainability/index.php)