

# Alabama



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 4

ATLANTA FEDERAL CENTER  
61 FORSYTH STREET  
ATLANTA, GEORGIA 30303-8960

August 19, 2008

The Honorable Bob Riley  
Governor of Alabama  
Alabama State Capitol  
600 Dexter Street  
Montgomery, Alabama 36130

Dear Governor Riley:

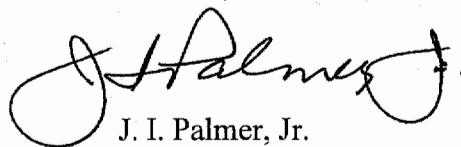
As you are aware, reducing fine particle pollution (PM<sub>2.5</sub>) represents one of the most significant challenges to improving air quality in our nation today. Health studies link these tiny particles – about 1/30<sup>th</sup> the diameter of a human hair – to serious human health problems, including aggravated asthma, increased respiratory symptoms like coughing and difficult or painful breathing, chronic bronchitis, decreased lung function, and even premature death in people with heart and lung disease. Fine particle pollution can remain suspended in the air for long periods of time and create public health problems far away from emission sources. Reducing levels of PM<sub>2.5</sub> is an important part of our nation's commitment to clean, healthy air.

We have reviewed the December 20, 2007, letter from Trey Glenn, Director of the Alabama Department of Environmental Management (ADEM), submitting Alabama's recommendations on air quality designations for the 2006 24-Hour PM<sub>2.5</sub> standards. We have also reviewed the technical information submitted to support Alabama's recommendations. In accordance with the Clean Air Act, I write to inform you that the U.S. Environmental Protection Agency (EPA) intends to modify Alabama's recommended designations and boundaries. Enclosed please find a detailed description of areas where EPA intends to modify ADEM's recommendations, and the basis for such modifications. In addition, we are enclosing the results of our review of Alabama's requests for consideration of data under the Exceptional Events rule for the Birmingham and Gadsden areas. If you have additional information that should be considered by EPA in this process, please provide it to us by October 20, 2008. In the near future, EPA will publish a notice in the Federal Register to solicit public comments on our intended designation decisions. We intend to make final designation decisions for the 2006 24-Hour PM<sub>2.5</sub> standards by December 18, 2008.

EPA has taken steps to reduce fine particle pollution across the country, such as implementing the Clean Diesel Program to dramatically reduce emissions from highway, nonroad and stationary diesel engines. In addition to on-going initiatives, state programs to attain the 1997 PM<sub>2.5</sub> standards will also help to reduce unhealthy levels of fine particle pollution.

I appreciate the leadership and attention provided by you and the management and staff of ADEM in protecting air quality. If you have any questions, please do not hesitate to contact me at (404) 562-8357. We look forward to continuing to work with you and ADEM officials in implementing the PM<sub>2.5</sub> standards.

Sincerely,

A handwritten signature in black ink, appearing to read "J. I. Palmer, Jr.", with a stylized flourish at the end.

J. I. Palmer, Jr.  
Regional Administrator

Enclosures

cc: Trey Glenn, Director, ADEM

# PM<sub>2.5</sub> Exceptional Events Technical Support Document

## **U.S. Environmental Protection Agency Region 4**

State of Alabama  
&  
Jefferson County, Alabama

2007

# Exceptional Event Technical Support Document

## U.S. Environmental Protection Agency Region 4

### Introduction

This document provides U.S. Environmental Protection Agency (EPA) Region 4 rationale for concurrence or non-concurrence with an exceptional event flag on the 24-hr average PM<sub>2.5</sub> concentration recorded at various Air Quality System (AQS) sites within the Alabama Department of Environmental Management (ADEM) and the Jefferson County Department of Health (JCDH) Ambient Air Monitoring Networks.

According to §50.1(j):

*"Exceptional event* means an event that affects air quality, is not reasonably controllable or preventable, is an event caused by human activity that is unlikely to recur at a particular location or a natural event, and is determined by the Administrator in accordance with 40 CFR 50.14 to be an exceptional event. It does not include stagnation of air masses or meteorological inversions, a meteorological event involving high temperatures or lack of precipitation, or air pollution relating to source noncompliance."

§50.14(b)(2) also states:

EPA shall exclude data from use in determinations of exceedances and NAAQS violations where a State demonstrates to EPA's satisfaction that emissions from fireworks displays caused a specific air pollution concentration in excess of one or more national ambient air quality standards at a particular air quality monitoring location and otherwise satisfies the requirements of this section. Such data will be treated in the same manner as exceptional events under this rule, provided a State demonstrates that such use of fireworks is significantly integral to traditional national, ethnic, or other cultural events including, but not limited to July Fourth celebrations which satisfy the requirements of this section."

Finally, §50.14(c)(3)(iii) states:

The demonstration to justify data exclusion shall provide evidence that:

- (A) The event satisfies the criteria set forth in 40 CFR 50.1(j);
- (B) There is a clear causal relationship between the measurement under consideration and the event that is claimed to have affected the air quality in the area;
- (C) The event is associated with a measured concentration in excess of normal historical fluctuations, including background; and
- (D) There would have been no exceedance or violation but for the event.

Each PM<sub>2.5</sub> 24-hr average concentration requested for exclusion was first evaluated against these criteria using a two-step analysis. This analysis was designed to compare the requested value to historical values observed at the site and determine whether the concentration was an exceedance of the 24-hr PM<sub>2.5</sub> NAAQS and whether any exceedances could have been caused by the flagged event.

### **Step 1: Monthly Average Comparison**

Using 24-hr PM<sub>2.5</sub> data from AQS for 2004-2007, a comparison three-year monthly average was calculated. The three-year monthly average concentration was calculated excluding data from the year in which the data in question was collected. For example, a requested value in May 2006 was compared to the average of all the samples collected at the site during May 2004, May 2005, and May 2007. If the three-year average was greater than the annual PM<sub>2.5</sub> NAAQS (15 µg/m<sup>3</sup>) and the requested value was less than the 24-hr PM<sub>2.5</sub> NAAQS (35 µg/m<sup>3</sup>), then EPA concurrence was not given to the requested value. This is because in this situation, it would be very difficult to demonstrate that “there would have been no exceedance or violation but for the event” as required by §50.14(c)(3)(iii)(D) because the normally expected concentration at the site (the three-year monthly mean concentration) is in violation of the NAAQS..

### **Step 2: Monthly 84th Percentile Comparison**

Using 24-hr PM<sub>2.5</sub> data from AQS for 2004-2007, a comparison three-year upper 84th percentile was calculated for the month in which the requested value was collected. The three-year monthly 84th percentile was calculated excluding data from the year in which the data in question was collected. For example, a requested value in May 2006 was compared to the upper 84th percentile calculated from of all the samples collected at the site during May 2004, May 2005, and May 2007. The calculated three-year monthly upper 84th percentile was considered to represent the range of normally expected high values at that site due to normal local and background sources. If the requested value was below the calculated three-year monthly upper 84th percentile, EPA concurrence was not given to the requested value. This is because in EPA’s judgment there is insufficient evidence to demonstrate that the NAAQS exceedance was caused by the suspected event as required by §50.14(c)(3)(iii)(D) and not by normal local and background sources at the site.

If a requested value did not pass one of the above steps, and the State did not submit compelling evidence to demonstrate that the event satisfied the exceptional event criteria, then EPA concurrence was not given to the exceptional event flag on the requested value. The values that did pass all of the above steps were then evaluated against the requirements of §50.14(c)(3)(iii).

### **Summary of maps and graphs used**

A variety of maps and graphs were used in this document. Unless otherwise noted, these products were obtained from the DATAFED Data Views Catalog, which can be accessed at [http://datafedwiki.wustl.edu/index.php/Data\\_Views\\_Catalog](http://datafedwiki.wustl.edu/index.php/Data_Views_Catalog). This includes maps using data from AQS, the National Aeronautics and Space Administration (NASA), and the Navy Aerosol Analysis and Prediction System (NAAPS). Some of the wind trajectories used in this document were obtained using the National Oceanic and Atmospheric Administration (NOAA) Hybrid Single-Particle Lagrangian Integrated Trajectory (HYSPLIT) utility, which can be accessed at <http://www.arl.noaa.gov/ready/hysplit4.html>. Also, unless otherwise noted, all ambient air monitoring data used in this analysis was obtained from the EPA AQS database. The state utilized data from research monitors as well. The **South Eastern Aerosol Research and CH**aracterization Study (SEARCH), is part of a public-private collaboration with EPRI (Electric Power Research Institute) and Southern Company. These sites are not part of the State or local program's ambient air monitoring network and the data are only made available on Atmospheric Research's web-site, <http://www.atmospheric-research.com/studies/SEARCH/index.html>. These SEARCH sites are also not used in the determination of compliance with any ambient air quality standard. However, these sites operate every day and are useful for filling in the gaps where a state or local program's own speciation monitor have no data available.

The following discussion will demonstrate that the 24-hr average PM<sub>2.5</sub> concentration observed at various ADEM and JCDH network monitoring sites on the following dates meet or fails to meet criteria of the Exceptional Events rule. All measured ambient air concentrations were the result of the wildfires in South Georgia and North Florida. A brief description follows.

The Bugaboo Scrub Fire (aka. Big Turnaround fire) (Figure 1a) was a wildfire that raged from April to June in 2007 and ultimately became the largest fire in the history of both Georgia and Florida. The Bugaboo, which was not actually named until it had blazed for nearly a month, started in the Okefenokee Swamp, most of which is located in Georgia. It was previously known as the Sweat Farm Road Fire (Figure 1b), which merged with the Big Turnaround Complex fire.



Figure 1a – Big Turnaround fire April 29, 2007 Blaine Eckberg, USFWS

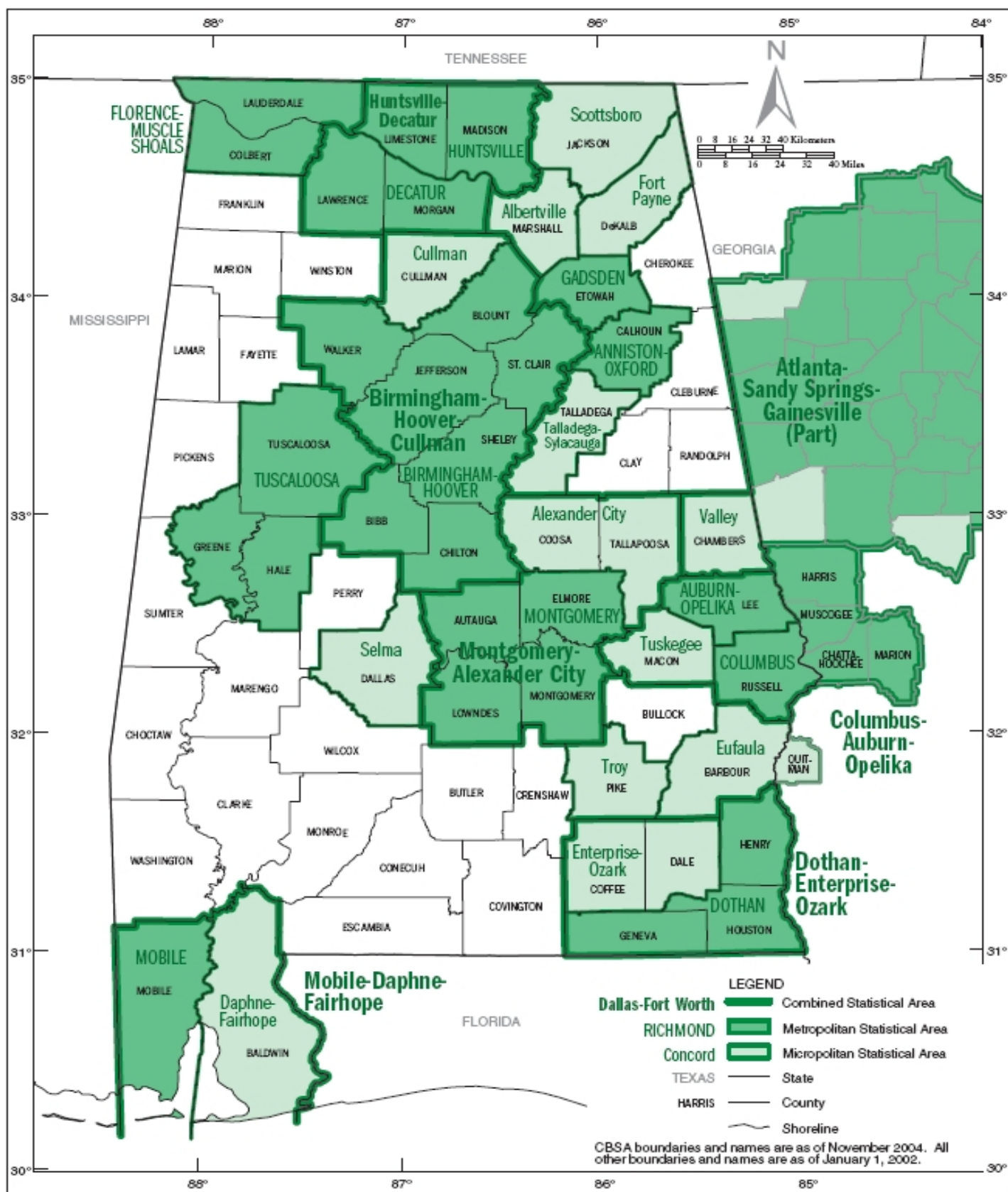




Figure 1b- Georgia Forestry Commission - Aerial View of Sweat Farm Road Fire on April 28, 2007.

For more information, please see the introduction to the final demonstration by the ADEM entitled, "Exceptional Event Demonstration to Justify Data Exclusion for the Impacts of the Georgia/Florida Wildfires on Air Quality in Alabama during May and June 2007" dated 06/13/2008.

Global Criteria: To meet criteria "A" and "B" above, in all instances in this TSD, ADEM and JCDH provided PM<sub>2.5</sub> speciation and meteorological documentation (including graphs, charts and various types of satellite pictures) along with statistical analysis of their data. The EPA Region 4 believes the information is sufficient to make a reasonable determination. Due to the amount of acreage consumed from these wildfires, copious smoke from May through the first week of June made its way around the region in many cases causing very large increases in the 24 hour PM<sub>2.5</sub> mass at many sites. Criteria "C" and "D" will be discussed separately for each area.



U.S. DEPARTMENT OF COMMERCE Economics and Statistics Administration U.S. Census Bureau

**EXCEEDANCE EVENT: Georgia/Florida Wildfires**

**Exceedance Date(s):** May 27 and May 30, 2007

**MSA or County:** Clay County, Alabama

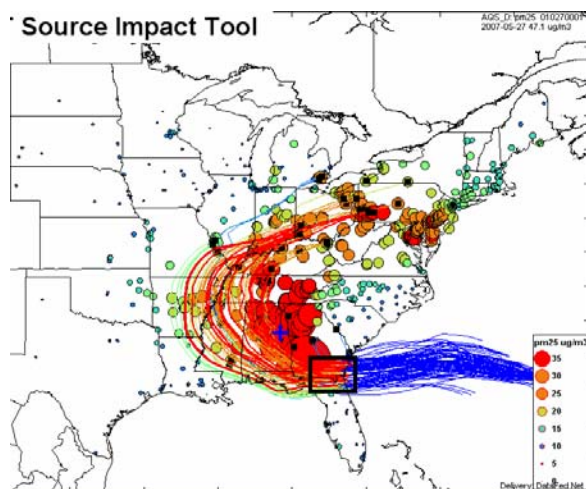
**Event Description:** Georgia/Florida Wildfires

Detailed Discussion of Evidence

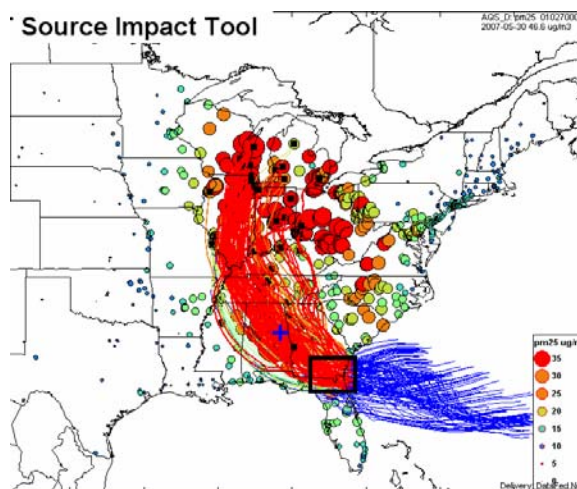
(C) Comparison of background levels

| AQS         | DATE   | Monthly Mean | 84 <sup>th</sup> Percentile | 95 <sup>th</sup> Percentile | Exceedance Concentration | EPA Concurrence |
|-------------|--------|--------------|-----------------------------|-----------------------------|--------------------------|-----------------|
| 01-027-0001 | May 27 | 14.8         | 20.6                        | 22.0                        | 47.1                     | YES             |
| 01-027-0001 | May 30 | 14.8         | 20.6                        | 22.0                        | 46.6                     | YES             |

The first two maps show wind trajectories and measured concentrations. Blue lines indicate air mass movement into the box and the red lines indicate where the air mass goes afterwards. A blue "+" identifies the monitor. Figures 1j and 1m in the appendix show the dispersion of PM<sub>2.5</sub> as a result of the measured concentrations. And finally, figures 2d, 2e, 3d and 3e in the appendix show the organic carbon and sulfate dispersion.



May 27, 2007

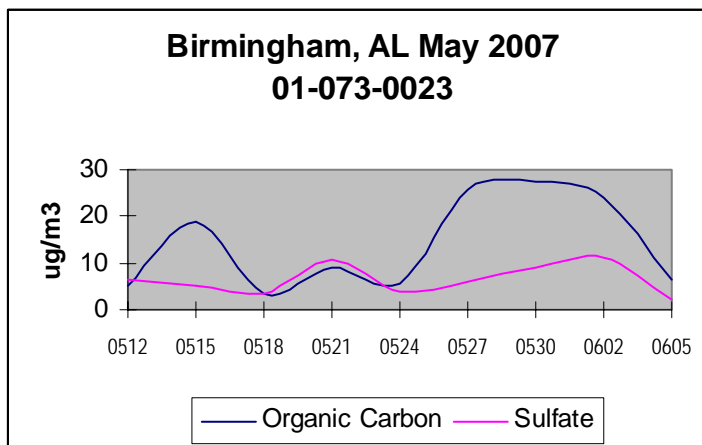


May 30, 2007

See sections 1, 2 and 3 in the appendix for other pertinent information.

(D) Demonstration of No Exceedance “But For”...

There are no speciation data for this site. As the data show, the measured concentrations for these two days are about 25 ug/m<sup>3</sup> above the ‘extreme high’ value as depicted by the 95<sup>th</sup> percentile (or two standard deviations) and 27 ug/m<sup>3</sup> above the ‘normal high’ value as depicted by the 84<sup>th</sup> percentile (or one standard deviation). Although there are no speciation data available in Clay County, this area is adjacent to the Birmingham MSA

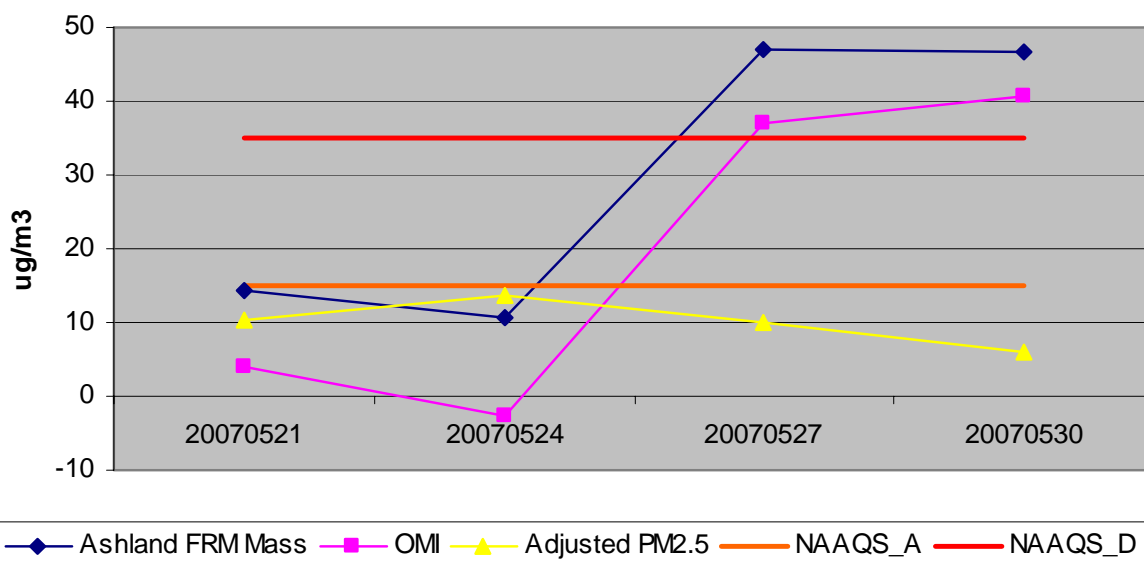


where speciation data are available. We will assume that the smoke impacts are relatively similar on these days as wind trajectories show similar impacts on both Clay county and Birmingham. In order to quantify the impacts of the fire on observed PM<sub>2.5</sub> concentrations, speciation data collected at the North Birmingham site were used to approximate the organic mass increment of the observed PM<sub>2.5</sub> mass that was caused by the wildfire. The organic mass increment was calculated using the following equation, adapted from Turpin and Lim (2001).

$$OMI = (OC_{observed} - OC_{average}) \times 2.0 \quad (\text{Eq. 2})$$

Where OMI is the organic mass increment due to smoke from the wildfire,  $OC_{observed}$  is the observed organic carbon mass, and  $OC_{average}$  is the average organic carbon mass observed at the site during the month of May, and separately for June, for 2004-2006. A multiplier of 2.0 is used to approximate the total PM<sub>2.5</sub> mass associated with smoke from wildfires (Turpin and Lim 2001). In order to approximate the PM<sub>2.5</sub> concentration that would have been observed but for the fire, the OMI was subtracted from the observed 24-hr average PM<sub>2.5</sub> concentration. This procedure was then repeated for each day that PM<sub>2.5</sub> speciation data was collected during these two months to compare impacts of smoke on different days. The results of this analysis are shown in the graph below. This graph shows the calculated OMI and the adjusted PM<sub>2.5</sub> mass (Observed PM<sub>2.5</sub> – OMI). In this particular case, the OMI was calculated by using the average OMI across all three sites. The graph below demonstrates that without the PM<sub>2.5</sub> mass emitted by the fire on these two days, there would have been no exceedance but for the wildfire. EPA concurrence was given to both values requested for this event.

Clay County (Ashland), AL  
01-027-0001





**EXCEEDANCE EVENT:** Georgia/Florida Wildfires

**Exceedance Date:** May 15, 27, 30, and June 2, 2007

**MSA:** Muscle Shoals, Colbert Co., Alabama

**Event Description:** Georgia/Florida Wildfires

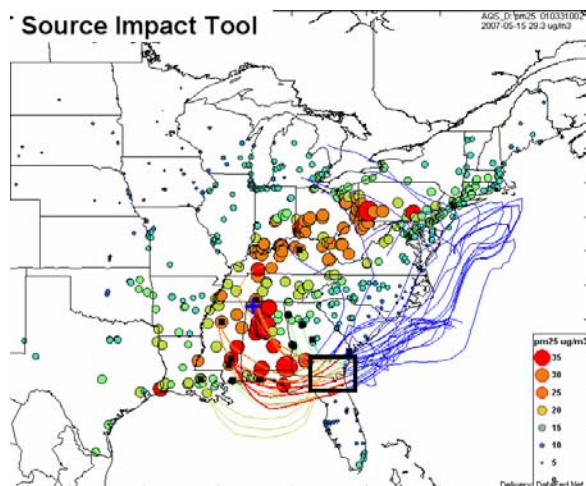
#### Detailed Discussion of Evidence

##### (C) Comparison of background levels

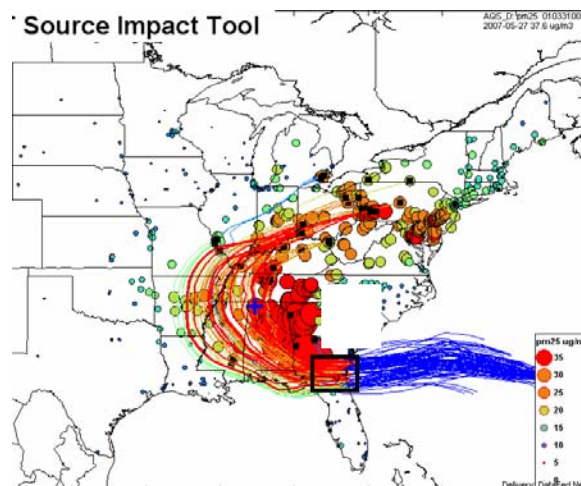
| AQS         | DATE   | Monthly Mean | 84 <sup>th</sup> Percentile | 95 <sup>th</sup> Percentile | Exceedance Concentration | EPA Concurrence |
|-------------|--------|--------------|-----------------------------|-----------------------------|--------------------------|-----------------|
| 01-033-1002 | May 15 | 12.8         | 18.2                        | 23.6                        | 29.3                     | YES             |
|             | May 27 | 12.8         | 18.2                        | 23.6                        | 37.6                     | YES             |
|             | May 30 | 12.8         | 18.2                        | 23.6                        | 28.3                     | YES             |
|             | June 2 | 15.6         | 21.7                        | 25.8                        | 39.8                     | YES             |

site-specific information used in analysis ( $\mu\text{g}/\text{m}^3$ )

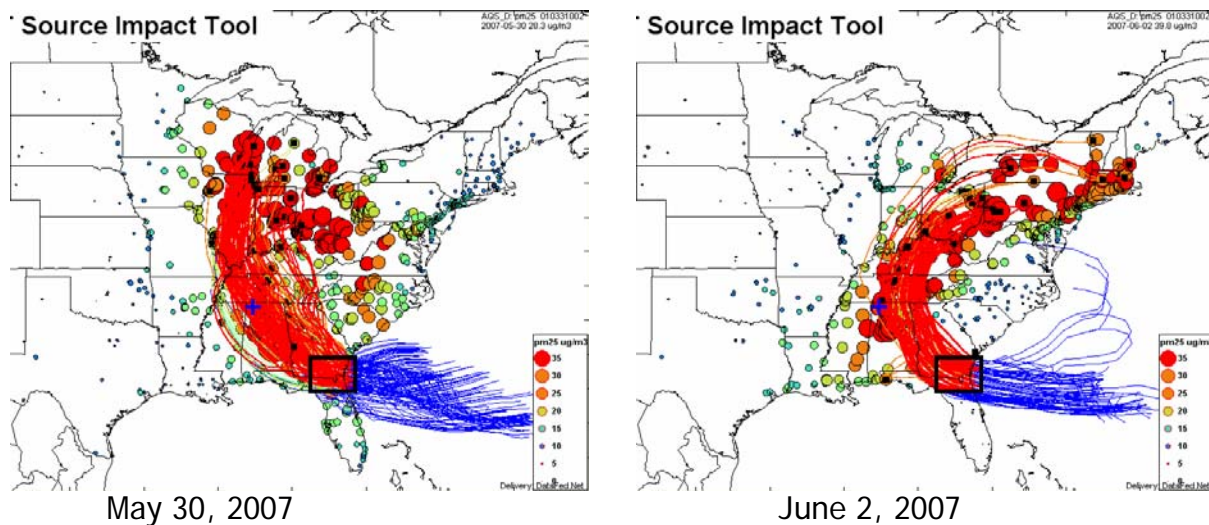
The first four maps show wind trajectories and measured concentrations. Blue lines indicate air mass movement into the box and the red lines indicate where the air mass goes afterwards. A blue "+" identifies the monitor. Figures 1d, 1j, 1m and 1p in the appendix show the dispersion of PM<sub>2.5</sub> as a result of the measured concentrations. Unfortunately, the organic carbon and sulfate maps were unavailable on [www.datafed.net](http://www.datafed.net) for June 2, 2007. See figures 2a, 2d, 2e, 3a, 3d and 3e for organic carbon and sulfate impacts, respectively.



May 15, 2007



May 27, 2007

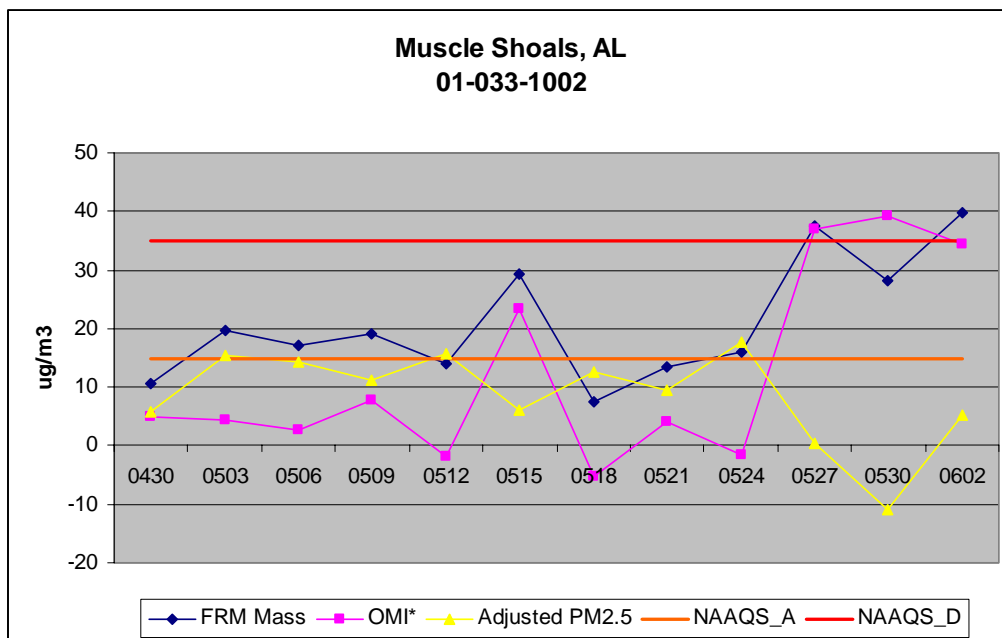


(D) Demonstration of No Exceedance “But For”...

Although there are no speciation data available in Muscle Shoals, this area is near two MSAs in the state where speciation data are available. We will assume that the smoke impacts are relatively similar on these days as wind trajectories show. In order to quantify the impacts of the fire on observed PM2.5 concentrations, speciation data collected at both Birmingham sites and the Huntsville speciation site were used to approximate the organic mass increment of the observed PM2.5 mass that was caused by the wildfire. The organic mass increment was calculated using the following equation, adapted from Turpin and Lim (2001).

$$OMI = (OC_{observed} - OC_{average}) \times 2.0 \quad (\text{Eq. 2})$$

Where OMI is the organic mass increment due to smoke from the wildfire,  $OC_{observed}$  is the observed organic carbon mass, and  $OC_{average}$  is the average organic carbon mass observed at the site during the month of May, and separately for June, for 2004-2006. A multiplier of 2.0 is used to approximate the total PM2.5 mass associated with smoke from wildfires (Turpin and Lim 2001). In order to approximate the PM2.5 concentration that would have been observed but for the fire, the OMI was subtracted from the observed 24-hr average PM2.5 concentration. This procedure was then repeated for each day that PM2.5 speciation data was collected during these two months to compare impacts of smoke on different days. The results of this analysis are shown in the graph below. The graph below shows the calculated OMI and the adjusted PM2.5 mass (Observed PM2.5 – OMI). In this particular case, the OMI was calculated by using the average OMI across all three sites. The graph below demonstrates that without the PM2.5 mass emitted by the fire on these four days, there would have been no exceedance but for the wildfire. EPA concurrence was given to all four values requested for this event.





**EXCEEDANCE EVENT:** Georgia/Florida Wildfires

**Exceedance Date:** May 27 and 30, 2007

**MSA:** Crossville, DeKalb Co., Alabama

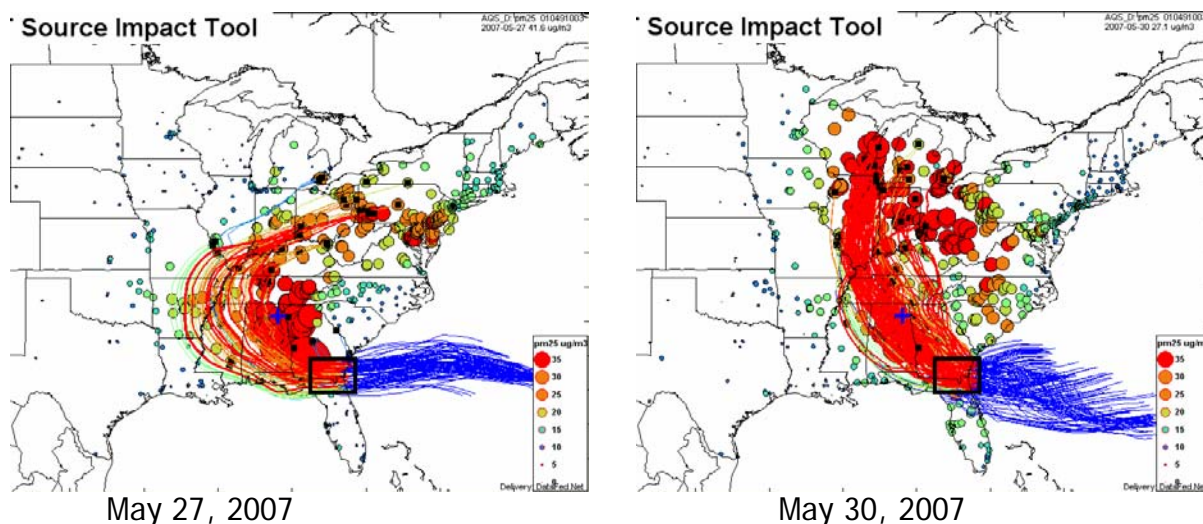
**Event Description:** Georgia/Florida Wildfires

#### Detailed Discussion of Evidence

##### (C) Comparison of background levels

| AQS         | DATE   | Monthly Mean | 84 <sup>th</sup> Percentile | 95 <sup>th</sup> Percentile | Exceedance Concentration | EPA Concurrence |
|-------------|--------|--------------|-----------------------------|-----------------------------|--------------------------|-----------------|
| 01-049-1003 | May 27 | 15.0         | 20.9                        | 24.8                        | 41.6                     | YES             |
|             | May 30 | 15.0         | 20.9                        | 24.8                        | 27.1                     | YES             |

The first two maps show wind trajectories and measured concentrations. Blue lines indicate air mass movement into the box and the red lines indicate where the air mass goes afterwards. A blue "+" identifies the monitor. Figures 1j and 1m (in the appendix) show the dispersion of PM<sub>2.5</sub> as a result of the measured concentrations. And finally, figures 2d and 2e show the large concentration of organic carbon as a result of the smoke from the wildfires.



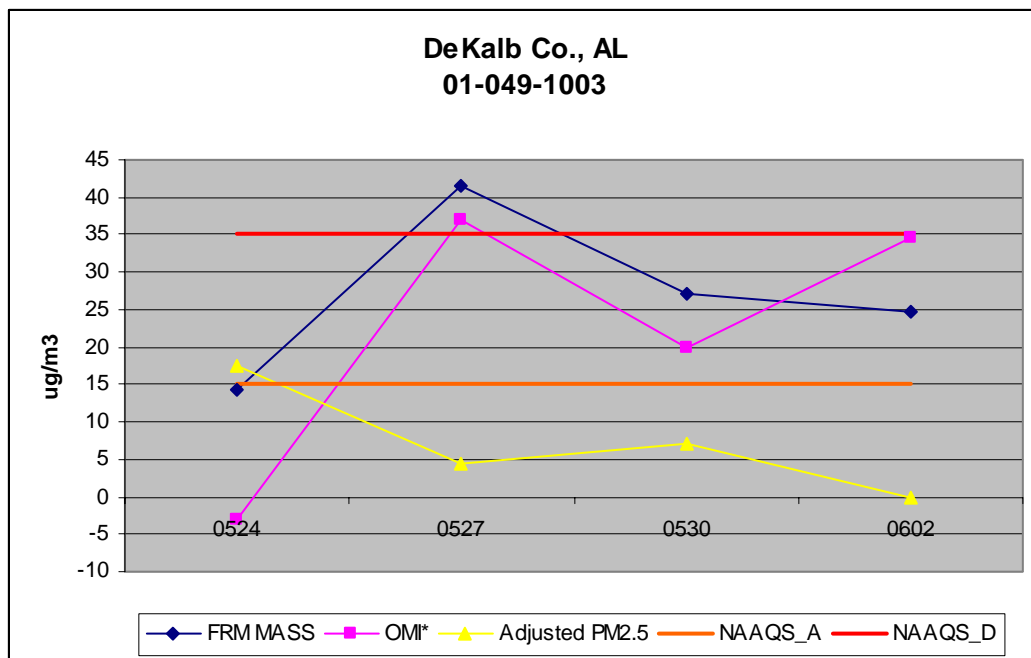
##### (D) Demonstration of No Exceedance "But For"...

There are no speciation data for this site. As the FRM data show, the measured concentrations for these two days are about 2.5 -17 ug/m<sup>3</sup> above the 'extreme high' value as depicted by the 95<sup>th</sup> percentile (or two standard deviations) and 6-20 ug/m<sup>3</sup> above the 'normal high' value as depicted by the 84<sup>th</sup> percentile (or one standard deviation). Although there are no speciation data available in DeKalb County, Alabama, this area is near two MSAs in the state and one in Georgia where speciation data are available. We will assume that the smoke impacts are relatively similar on these days as wind trajectories show similar impacts on these areas. In order to quantify the

impacts of the fire on observed PM2.5 concentrations, speciation data collected at both Birmingham sites, the Huntsville speciation site and the Rome, Georgia site were used to approximate the organic mass increment of the observed PM2.5 mass that was caused by the wildfire. The organic mass increment was calculated using the following equation, adapted from Turpin and Lim (2001).

$$OMI = (OC_{observed} - OC_{average}) \times 2.0 \quad (\text{Eq. 2})$$

Where OMI is the organic mass increment due to smoke from the wildfire,  $OC_{observed}$  is the observed organic carbon mass, and  $OC_{average}$  is the average organic carbon mass observed across all sites mentioned above during the month of May, and separately for June, for 2004-2006. A multiplier of 2.0 is used to approximate the total PM2.5 mass associated with smoke from wildfires (Turpin and Lim 2001). In order to approximate the PM2.5 concentration that would have been observed but for the fire, the OMI was subtracted from the observed 24-hr average PM2.5 concentration. This procedure was then repeated for each day that PM2.5 speciation data was collected during these two months to compare impacts of smoke on different days. The results of this analysis are shown in the graph below. The graph below shows the calculated OMI and the adjusted PM2.5 mass (Observed PM2.5 – OMI). In this particular case, the OMI was calculated by using the average OMI across all three sites. The graph below demonstrates that without the PM2.5 mass emitted by the fire on both days, there would have been no exceedance but for the wildfire. EPA concurrence was given to both values requested for this event.



**EXCEEDANCE EVENT:** Georgia/Florida Wildfires

**Exceedance Date:** May 15, 21, and 24, 2007

**MSA:** Brewton, Escambia Co., Alabama

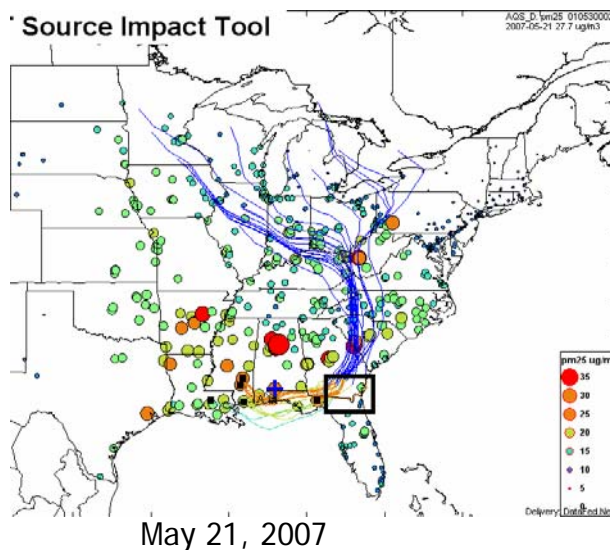
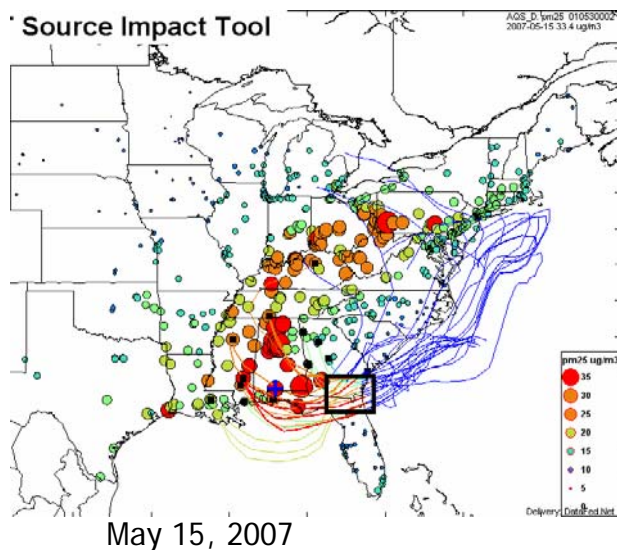
**Event Description:** Georgia/Florida Wildfires

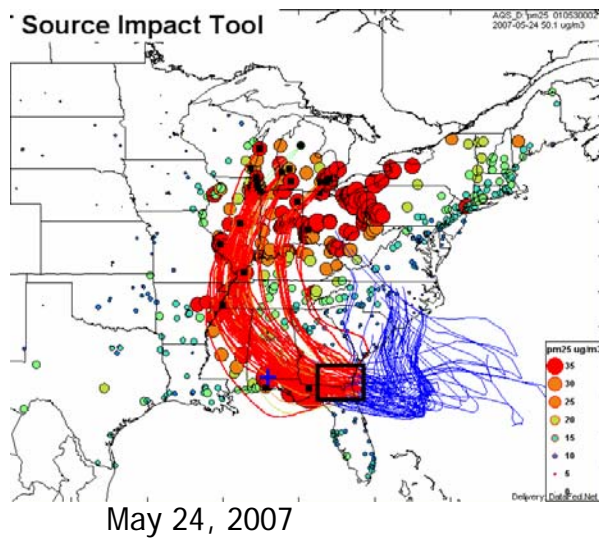
#### Detailed Discussion of Evidence

##### (C) Comparison of background levels

| AQS         | DATE   | Monthly Mean | 84 <sup>th</sup> Percentile | 95 <sup>th</sup> Percentile | Exceedance Concentration | EPA Concurrence |
|-------------|--------|--------------|-----------------------------|-----------------------------|--------------------------|-----------------|
| 01-053-0002 | May 15 | 14.5         | 20.9                        | 23.7                        | 33.4                     | YES             |
|             | May 21 | 12.8         | 18.2                        | 23.6                        | 27.7                     | YES             |
|             | May 24 | 12.8         | 18.2                        | 23.6                        | 50.1                     | YES             |

The first three maps show wind trajectories and measured concentrations. Blue lines indicate air mass movement into the box and the different colored lines indicate where the air mass goes afterwards. A blue "+" identifies the monitor. Figures 1d, 1e, and 1h in the Appendix show the dispersion of PM<sub>2.5</sub> as a result of the measured concentrations. Figures 2a, 2b and 2c in the appendix show the organic carbon impact. Unfortunately, the organic carbon maps were unavailable on datafed.net for May 24, 2007. However, available speciation data from Montgomery, AL (closest site with speciation data) show a large impact of organic carbon relative to sulfates on May 24, 2007.

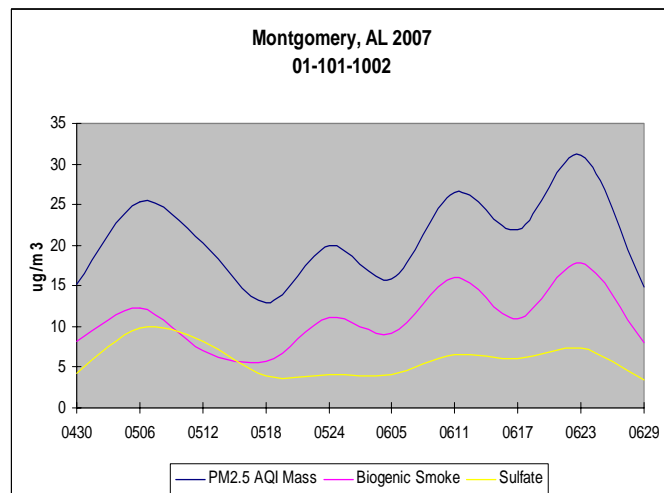




(D) Demonstration of No Exceedance "But For"...

There are no speciation data for this site. As the FRM data show, the measured concentrations for these three days are about 4 - 26 ug/m<sup>3</sup> above the 'extreme high' value as depicted by the 95<sup>th</sup> percentile (or two standard deviations) and 9-32 ug/m<sup>3</sup> above the 'normal high' value as depicted by the 84<sup>th</sup> percentile (or one standard deviation). Also, speciation data from Montgomery, Alabama show high impacts of organic carbon on May 24.

We believe, however, that based on historical averages and additional evidence presented, there is enough evidence to state that an exceedance would not have occurred on these days 'but for' the impacts due to the south Georgia wildfires. EPA Region 4 concurs with these days.



**EXCEEDANCE EVENT:** Georgia/Florida Wildfires

**Exceedance Date:** May 5, 22, 26-28, 30-31 and June 1-2, 2007

**MSA:** Gadsden, Etowah Co., Alabama

**Event Description:** Georgia/Florida Wildfires

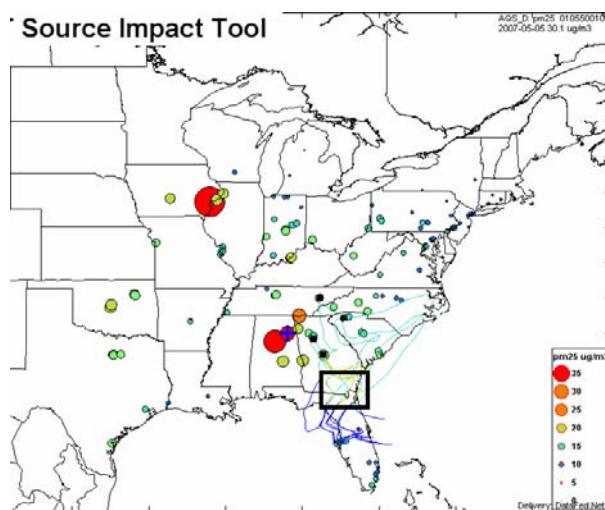
#### Detailed Discussion of Evidence

##### (C) Comparison of background levels

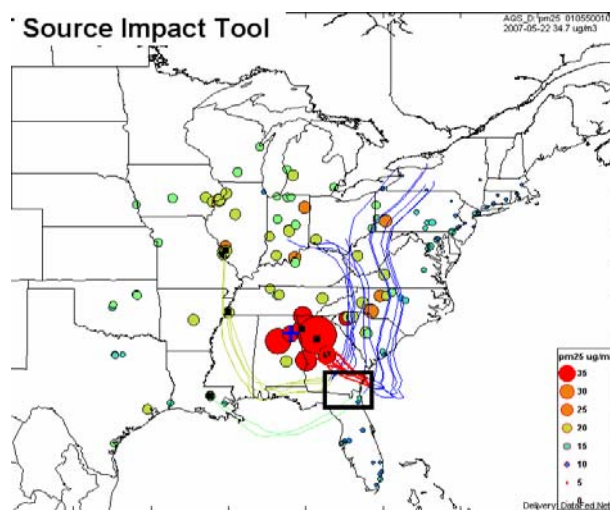
| AQS         | DATE   | Monthly Mean | 84 <sup>th</sup> Percentile | 95 <sup>th</sup> Percentile | Exceedance Concentration | EPA Concurrence |
|-------------|--------|--------------|-----------------------------|-----------------------------|--------------------------|-----------------|
| 01-055-0010 | May 5  | 15.4         | 20.9                        | 22.9                        | 30.1                     | NO <sup>1</sup> |
|             | May 22 | 15.4         | 20.9                        | 22.9                        | 34.7                     | NO <sup>1</sup> |
|             | May 26 | 15.4         | 20.9                        | 22.9                        | 53.4                     | YES             |
|             | May 27 | 15.4         | 20.9                        | 22.9                        | 53.1                     | YES             |
|             | May 28 | 15.4         | 20.9                        | 22.9                        | 45.9                     | YES             |
|             | May 30 | 15.4         | 20.9                        | 22.9                        | 37.0                     | YES             |
|             | May 31 | 15.4         | 20.9                        | 22.9                        | 30.0                     | NO <sup>1</sup> |
|             | June 1 | 17.9         | 24.7                        | 25.7                        | 42.9                     | YES             |
|             | June 2 | 17.9         | 24.7                        | 25.7                        | 30.3                     | NO <sup>1</sup> |

Notes: <sup>1</sup>Three-year monthly average above 15µg/m3

The maps shown below depict wind trajectories and measured concentrations. Blue lines indicate air mass movement into the box and the different colored lines indicate where the air mass goes afterwards. A blue "+" identifies the monitor. Figures 1c, 1f, 1i, 1j, 1k, 1m, 1n, 1o, and 1p in the Appendix show the dispersion of PM<sub>2.5</sub> as a result of the measured concentrations. Figures 2d and 2e in the appendix show the organic carbon impact on May 27 and May 30, respectively. Unfortunately, the organic carbon maps were unavailable on [www.datafed.net](http://www.datafed.net) for the other days. However, speciation data from surrounding sites are available from Birmingham and Huntsville, Alabama, as well as Rome, Georgia (shown below).

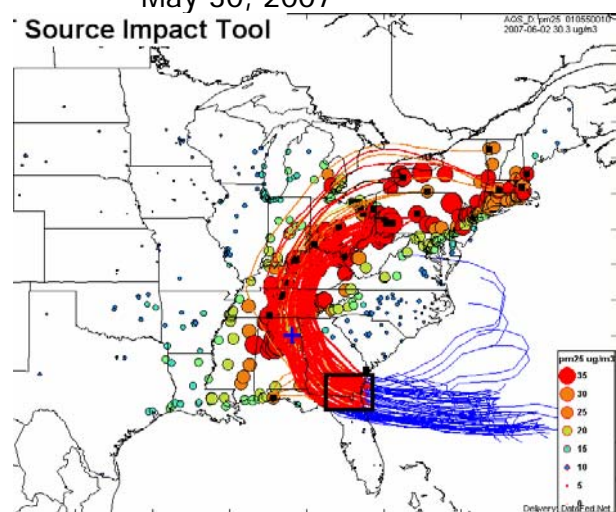
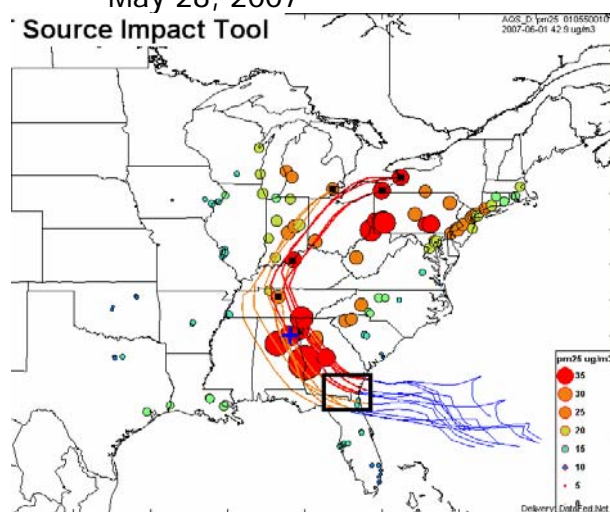
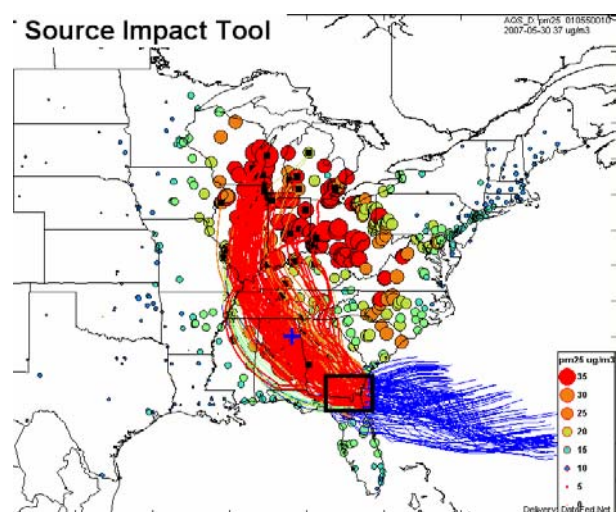
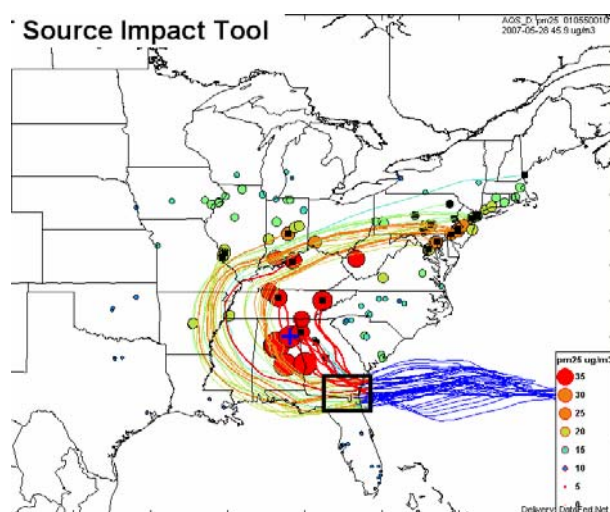
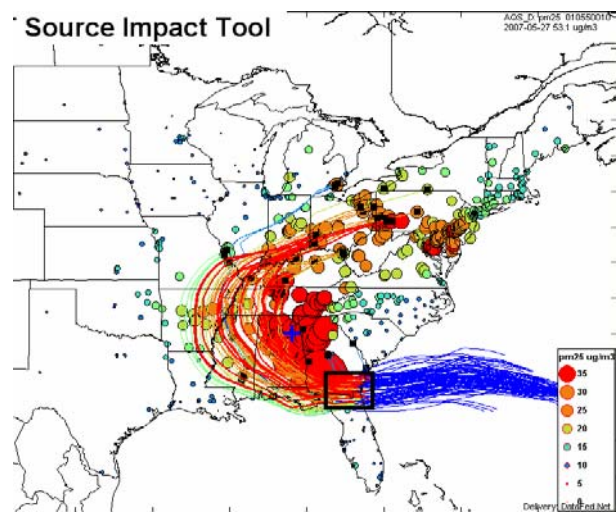
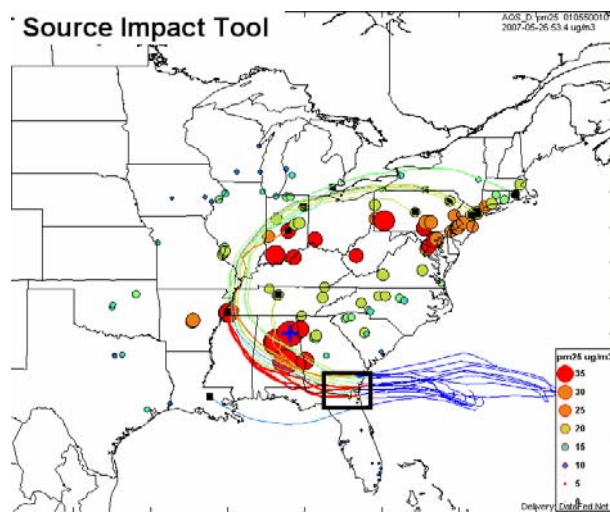


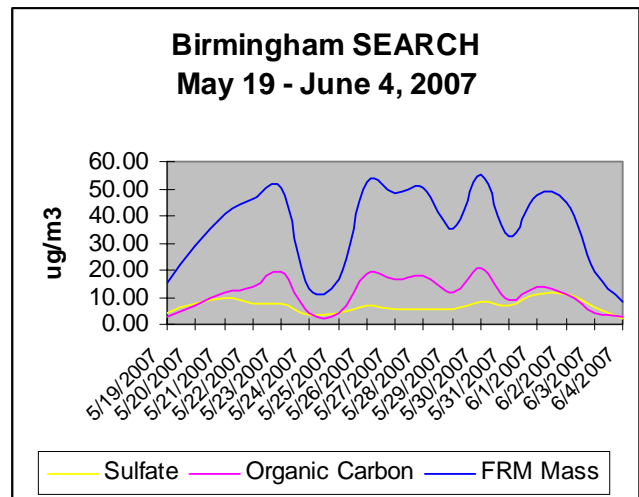
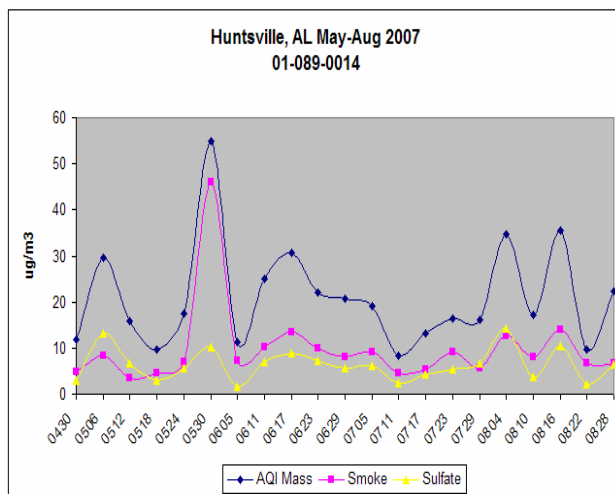
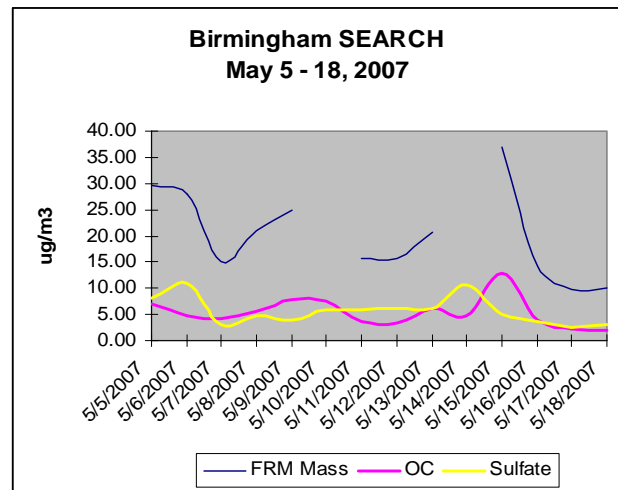
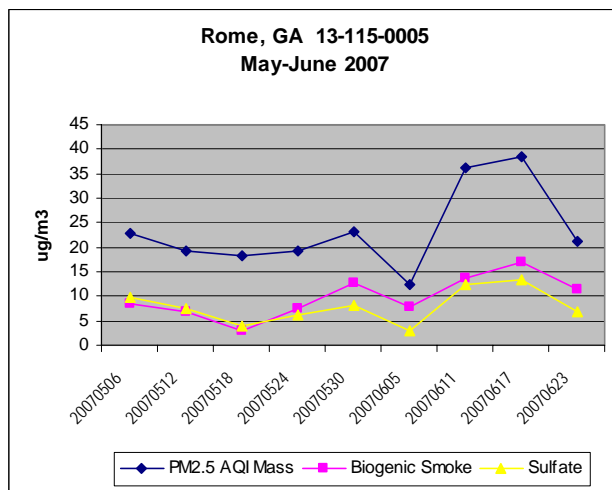
May 5, 2007



May 22, 2007







#### (D) Demonstration of No Exceedance "But For"...

There are no speciation data for this site. Since the historical monthly means as calculated exceed the annual standard already without the presence of an exceptional event, only values above the 24hr NAAQS of 35ug/m<sup>3</sup> will be considered for concurrence. EPA Region 4 does not concur on the following days and no further evaluation is necessary: May 5, 22, 31, and June 2, 2007.

As the FRM data show, the measured concentrations for those days exceeding the 24hr NAAQS (May 26-28, 30 and June 1, 2007), are about 15-31 ug/m<sup>3</sup> above the 'extreme high' value as depicted by the 95<sup>th</sup> percentile (or two standard deviations) and 16-33 ug/m<sup>3</sup> above the 'normal high' value as depicted by the 84<sup>th</sup> percentile (or one standard deviation). Also, speciation data from nearby sites show high impacts of organic carbon on May 26-30 and remains inconclusive for May 31-June 2, 2007. However, strong evidence from the NOAA HYSPLIT model for June 1, 2007, suggest direct air movement

[illegible]

We believe, that based on historical averages and additional evidence presented, there is enough evidence to state that an exceedance would not have occurred on the following days 'but for' the impacts due to the south Georgia wildfires: May 26-28, 30 and June 1, 2007. EPA Region 4 concurs with these days.



**EXCEEDANCE EVENT:** Georgia/Florida Wildfires

**Exceedance Date:** May 3, 15, 24, 27, 30 and June 2, 2007

**MSA:** Dothan, Houston Co., Alabama

**Event Description:** Georgia/Florida Wildfires

#### Detailed Discussion of Evidence

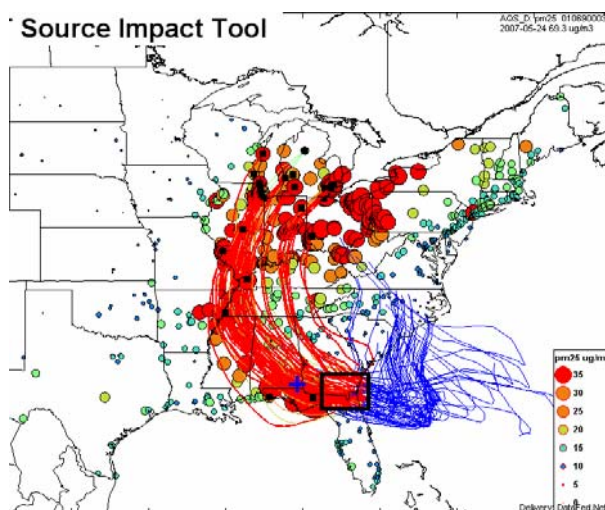
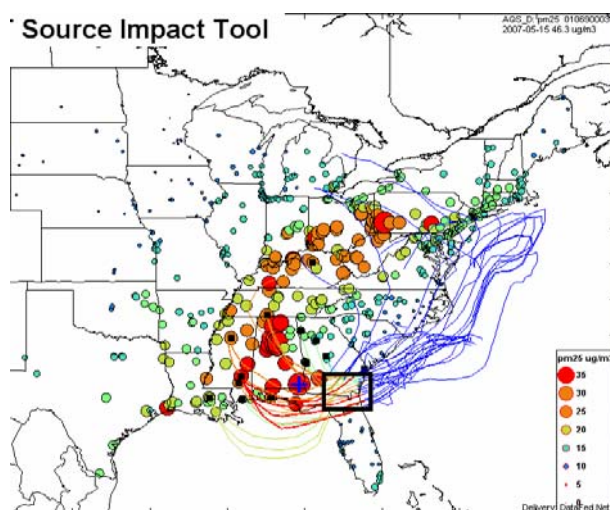
##### (C) Comparison of background levels

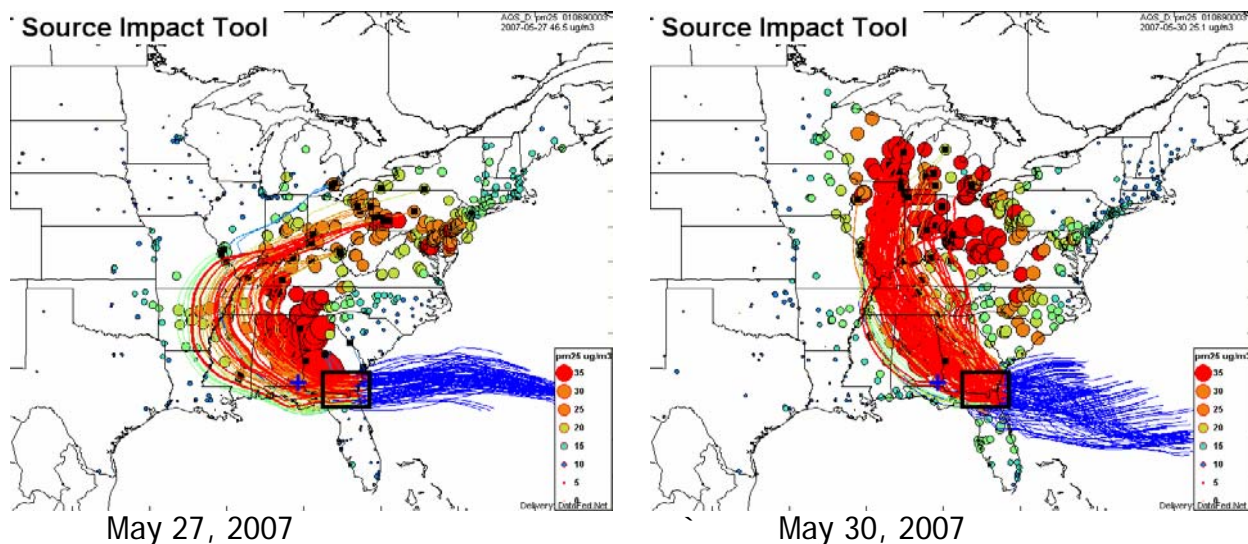
| AQS         | DATE   | Monthly Mean | 84th Percentile | 95th Percentile | Exceedance Concentration | EPA Concurrence |
|-------------|--------|--------------|-----------------|-----------------|--------------------------|-----------------|
| 01-069-0003 | May 3  | 14.1         | 17.4            | 22.1            | 27.1                     | NO <sup>2</sup> |
|             | May 15 | 14.1         | 17.4            | 22.1            | 46.3                     | YES             |
|             | May 24 | 14.1         | 17.4            | 22.1            | 69.3                     | YES             |
|             | May 27 | 14.1         | 17.4            | 22.1            | 46.5                     | YES             |
|             | May 30 | 14.1         | 17.4            | 22.1            | 25.1                     | YES             |
|             | June 2 | 16.0         | 22.0            | 27.6            | 29.8                     | NO <sup>1</sup> |

Notes: <sup>1</sup> Three-year monthly average above 15µg/m<sup>3</sup>

<sup>2</sup> Not enough evidence

The maps shown below depict wind trajectories and measured concentrations. Blue lines indicate air mass movement into the box and the different colored lines indicate where the air mass goes afterwards. A blue "+" identifies the monitor. Figures 1a, 1d, 1h, 1j, 1m and 1p in the Appendix show the dispersion of PM<sub>2.5</sub> as a result of the measured concentrations. Figures 2a, 2d and 2e in the appendix show the organic carbon impact on May 27 and May 30, respectively. Figures 3d and 3e show the sulfate impact on those same days. Unfortunately, the organic carbon maps were unavailable on [www.datafed.net](http://www.datafed.net) for the other days.





(D) Demonstration of No Exceedance "But For"...

There are no speciation data for this site. Since the historical monthly mean for June exceeds the annual standard already without the presence of an exceptional event, only values above the 24hr NAAQS of 35 ug/m<sup>3</sup> will be considered for concurrence. EPA Region 4 does not concur on the following days and no further evaluation is necessary: June 2, 2007. There is not enough evidence available to support an exceptional event claim for May 3, 2007. EPA Region 4 does not concur on this day.

As the FRM data show, the measured concentrations for the days in May are about 3-47 ug/m<sup>3</sup> above the 'extreme high' value as depicted by the 95<sup>th</sup> percentile (or two standard deviations) and 8-52 ug/m<sup>3</sup> above the 'normal high' value as depicted by the 84<sup>th</sup> percentile (or one standard deviation).

Also, speciation data from nearby sites show high impacts of organic carbon on May 26-30. Source impact trajectories above show potential fire impact on most flagged days.

We believe, that based on historical averages and additional evidence presented, there is enough evidence to state that an exceedance would not have occurred on the following days 'but for' the impacts due to the south Georgia wildfires: May 15, 24, 27 and 30, 2007. EPA Region 4 concurs with these days.

**EXCEEDANCE EVENT:** Georgia/Florida Wildfires

**Exceedance Date:** May 4, 15, 23, 26-30, 2007

**MSA:** Montgomery, Montgomery Co., Alabama

**Event Description:** Georgia/Florida Wildfires

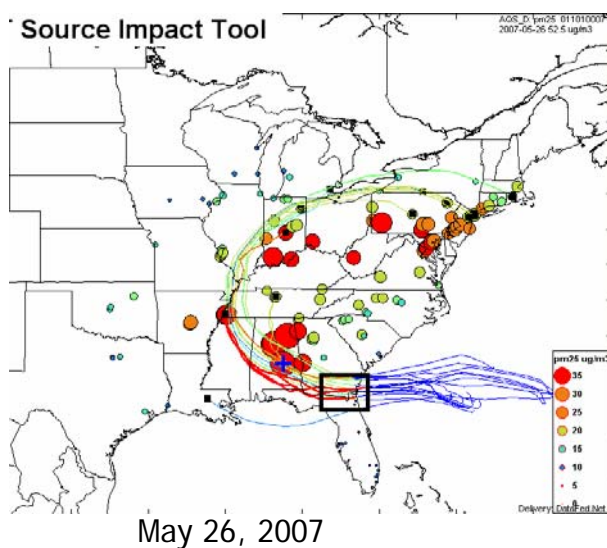
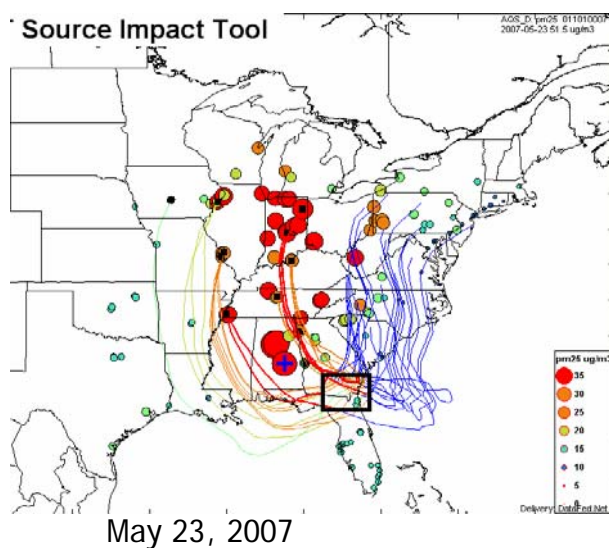
Detailed Discussion of Evidence

(C) Comparison of background levels

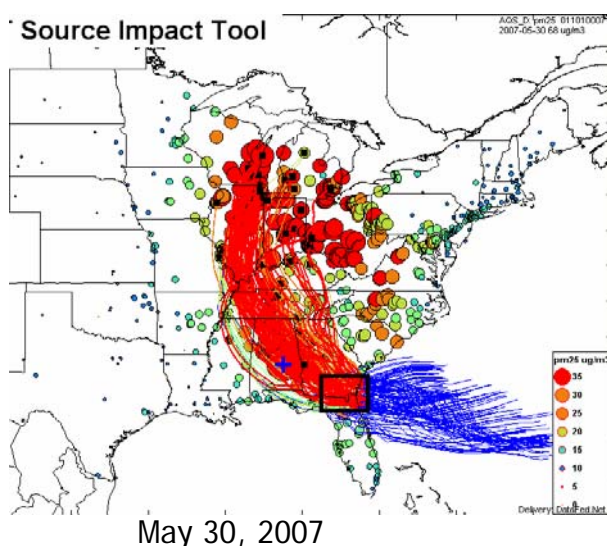
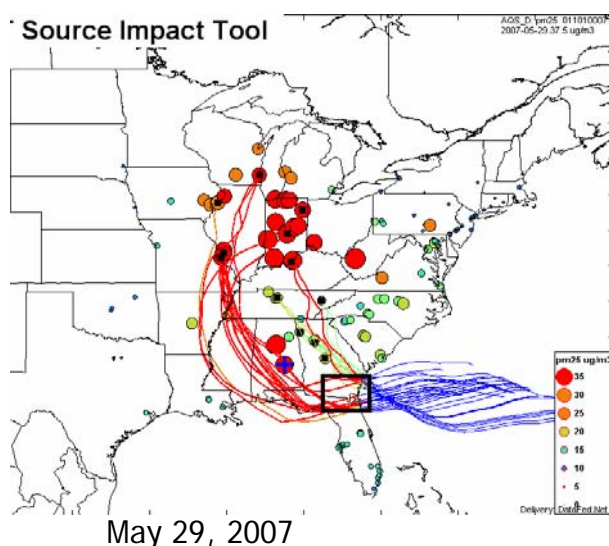
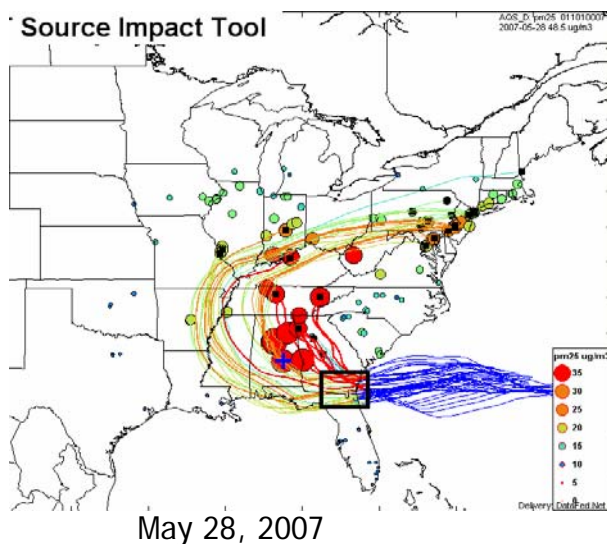
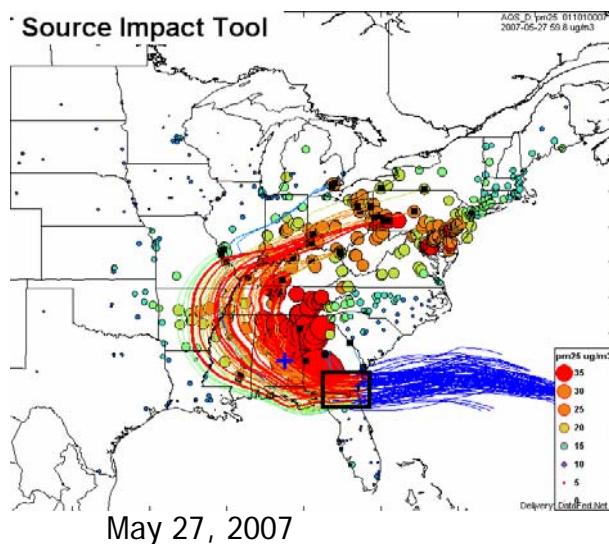
| AQS           | DATE   | Monthly Mean | 84th Percentile | 95th Percentile | Exceedance Concentration | EPA Concurrence |
|---------------|--------|--------------|-----------------|-----------------|--------------------------|-----------------|
| 01-101-0007   | May 4  | 15.8         | 21.7            | 27.2            | 27.9                     | NO <sup>1</sup> |
|               | May 15 | 15.8         | 21.7            | 27.2            | 31.3                     | NO <sup>1</sup> |
|               | May 23 | 15.8         | 21.7            | 27.2            | 51.5                     | YES             |
|               | May 26 | 15.8         | 21.7            | 27.2            | 52.5                     | YES             |
|               | May 27 | 15.8         | 21.7            | 27.2            | 59.8                     | YES             |
|               | May 28 | 15.8         | 21.7            | 27.2            | 48.5                     | YES             |
|               | May 29 | 15.8         | 21.7            | 27.2            | 37.5                     | YES             |
| 01-101-0007-2 | May 30 | 16.1         | 23.8            | 27.3            | 68.0                     | YES             |

Notes: <sup>1</sup>Three-year monthly average above 15µg/m3

The maps shown below depict wind trajectories and measured concentrations. Blue lines indicate air mass movement into the box and the different colored lines indicate where the air mass goes afterwards. A blue "+" identifies the monitor. Figures 1g, 1i, 1j, 1k, 1l and 1m in the Appendix show the dispersion of PM2.5 as a result of the measured concentrations. Figures 2d, 2e, 3d, and 3e in the appendix show the organic carbon and sulfate impacts, on May 27 and 30, respectively. Unfortunately, the organic carbon maps were unavailable on [www.datafed.net](http://www.datafed.net) for the other days.







#### (D) Demonstration of No Exceedance "But For"...

Although there are speciation data for this site, there are no data for any of these days. Since the historical monthly mean for both months exceed the annual standard already without the presence of an exceptional event, only values above the 24hr NAAQS of 35 ug/m<sup>3</sup> will be considered for concurrence. EPA Region 4 does not concur on the following days and no further evaluation is necessary: May 4 and 15, 2007.

As the FRM data show, the measured concentrations for the other flagged days in May are about 21-41 ug/m<sup>3</sup> above the 'extreme high' value as depicted by the 95<sup>th</sup> percentile (or two standard deviations) and 16-45 ug/m<sup>3</sup> above the 'normal high' value as depicted by the 84<sup>th</sup> percentile (or one standard deviation).

Also, speciation data from nearby sites like Birmingham (01-073-0023) and the Centerville SEARCH site show high impacts of organic carbon on May 27 and 30, 2007.

Source impact trajectories above show influence on May 23, 26-30, 2007. The most direct transport days were May 26-30, 2007.

We believe, that based on historical averages and additional evidence presented, there is enough evidence to state that an exceedance would not have occurred on the following days 'but for' the impacts due to the south Georgia wildfires: May 23, 26-30, 2007. EPA Region 4 concurs with these days.

**EXCEEDANCE EVENT:** Georgia/Florida Wildfires

**Exceedance Date:** May 15, 27, 30 and June 2, 2007

**MSA:** Decatur, Morgan Co., Alabama

**Event Description:** Georgia/Florida Wildfires

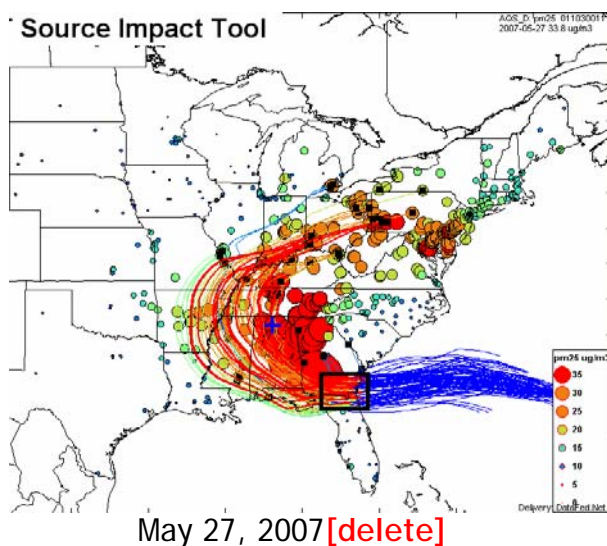
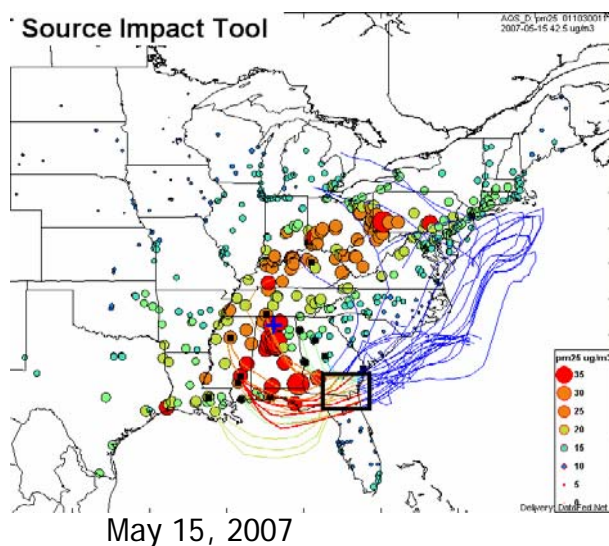
Detailed Discussion of Evidence

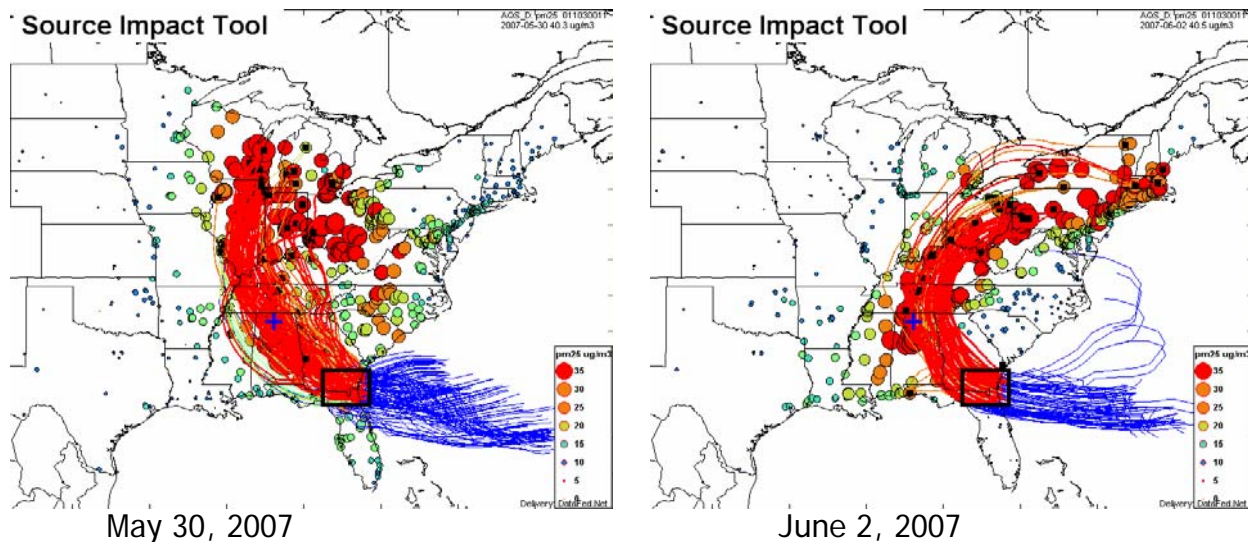
(C) Comparison of background levels

| AQS         | DATE   | Monthly Mean | 84th Percentile | 95th Percentile | Exceedance Concentration | EPA Concurrence |
|-------------|--------|--------------|-----------------|-----------------|--------------------------|-----------------|
| 01-103-0011 | May 15 | 13.9         | 19.7            | 24.2            | 42.5                     | YES             |
|             | May 27 | 13.9         | 19.7            | 24.2            | 33.8                     | YES             |
|             | May 30 | 13.9         | 19.7            | 24.2            | 40.3                     | YES             |
|             | June 2 | 17.5         | 24.5            | 31.2            | 40.5                     | YES             |

Notes: <sup>1</sup>Three-year monthly average above 15µg/m<sup>3</sup>

The maps shown below depict wind trajectories and measured concentrations. Blue lines indicate air mass movement into the box and the different colored lines indicate where the air mass goes afterwards. A blue "+" identifies the monitor. Figures 1d, 1j, 1m, and 1p in the Appendix show the dispersion of PM<sub>2.5</sub> as a result of the measured concentrations. Figures 2a, 2d, 2e, 3a, 3d, and 3e in the appendix show the organic carbon and sulfate impacts, on May 15, 27 and 30, respectively. No data were available for June 2.





(D) Demonstration of No Exceedance “But For”...

There are no speciation data for this site. Since the historical monthly mean for June exceeds the annual standard already without the presence of an exceptional event, only values above the 24hr NAAQS of 35 ug/m<sup>3</sup> will be considered for concurrence.

As the FRM data show, the measured concentrations for the days in May are about 3-47 ug/m<sup>3</sup> above the ‘extreme high’ value as depicted by the 95<sup>th</sup> percentile (or two standard deviations) and 8-52 ug/m<sup>3</sup> above the ‘normal high’ value as depicted by the 84<sup>th</sup> percentile (or one standard deviation).

Also, speciation data from Huntsville show high impacts of organic carbon on May 30, 2007, and does not have data available for the other days. Source impact trajectories above show more potential direct impact on May 27, 30 and June 2, 2007. In the demonstration provided by ADEM, pages 54-68, enough additional evidence was presented to warrant a concurrence by EPA Region for May 15, 2007.

We believe, that based on historical averages and additional evidence presented, there is enough evidence to state that an exceedance would not have occurred on the following days ‘but for’ the impacts due to the south Georgia wildfires: May 15, 27 and 30, and June 2, 2007. EPA Region 4 concurs with these days.



**EXCEEDANCE EVENT:** Georgia/Florida Wildfires

**Exceedance Date:** May 4, 21, 22, 26, 27, 28, 30 and June 1, 2007

**MSA:** Columbus-Phenix City, GA-AL, Russell Co., Alabama

**Event Description:** Georgia/Florida Wildfires

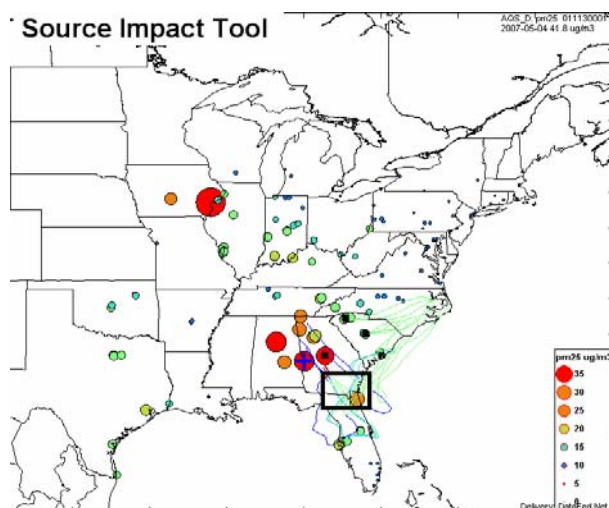
Detailed Discussion of Evidence

(C) Comparison of background levels

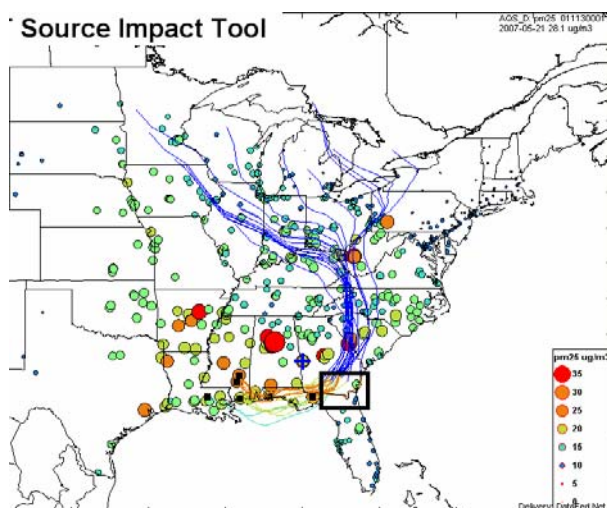
| AQS           | DATE   | Monthly Mean | 84th Percentile | 95th Percentile | Exceedance Concentration | EPA Concurrence |
|---------------|--------|--------------|-----------------|-----------------|--------------------------|-----------------|
| 01-113-0001   | May 4  | 16.7         | 23.0            | 28.6            | 41.8                     | YES             |
|               | May 21 | 16.7         | 23.0            | 28.6            | 28.1                     | NO <sup>1</sup> |
|               | May 22 | 16.7         | 23.0            | 28.6            | 44.3                     | YES             |
|               | May 26 | 16.7         | 23.0            | 28.6            | 37.0                     | YES             |
|               | May 27 | 16.7         | 23.0            | 28.6            | 53.0                     | YES             |
|               | May 28 | 16.7         | 23.0            | 28.6            | 47.9                     | YES             |
|               | June 1 | 17.6         | 23.0            | 28.6            | 71.2                     | YES             |
| 01-113-0001-2 | May 21 | 16.9         | 21.3            | 29.9            | 29.4                     | NO <sup>1</sup> |
|               | May 27 | 16.9         | 21.3            | 29.9            | 56.3                     | YES             |
|               | May 30 | 16.9         | 21.3            | 29.9            | 78.9                     | YES             |

Notes: <sup>1</sup> Three-year monthly average above 15µg/m<sup>3</sup>

The maps shown below depict wind trajectories and measured concentrations. Blue lines indicate air mass movement into the box and the different colored lines indicate where the air mass goes afterwards. A blue "+" identifies the monitor. Figures 1b, 1e, 1f, 1i, 1j, 1k, 1m and 1o in the Appendix show the dispersion of PM<sub>2.5</sub> as a result of the measured concentrations. Figures 2b, 2d, 2e, 3b, 3d, and 3e in the appendix show the organic carbon and sulfate impacts, on May 21, 27 and 30, respectively. Unfortunately, the organic carbon and sulfate maps were unavailable for the other days.

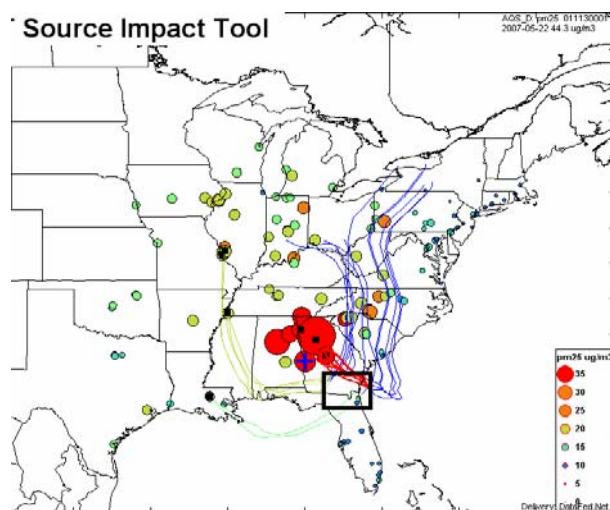


May 4, 2007

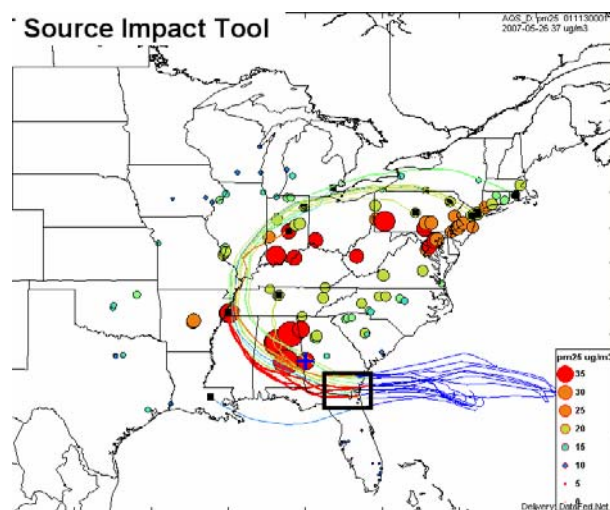


May 21, 2007

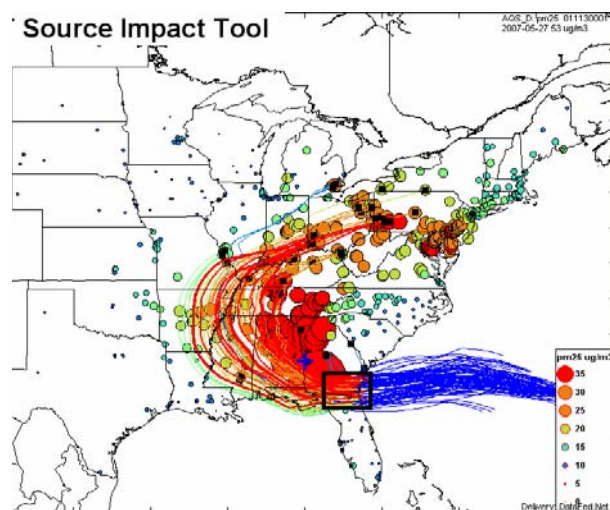




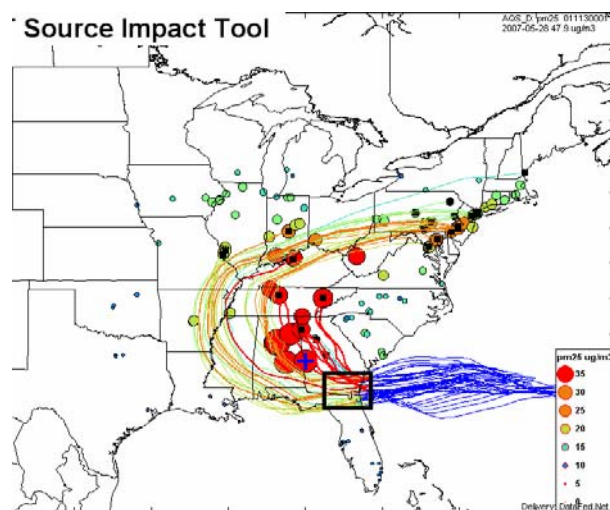
May 22, 2007



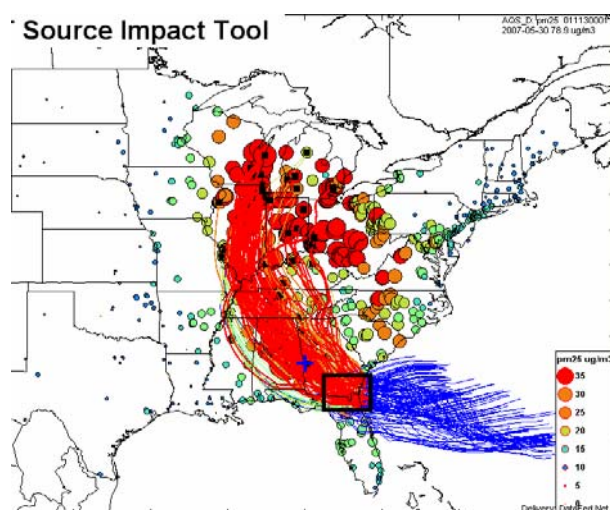
May 26, 2007



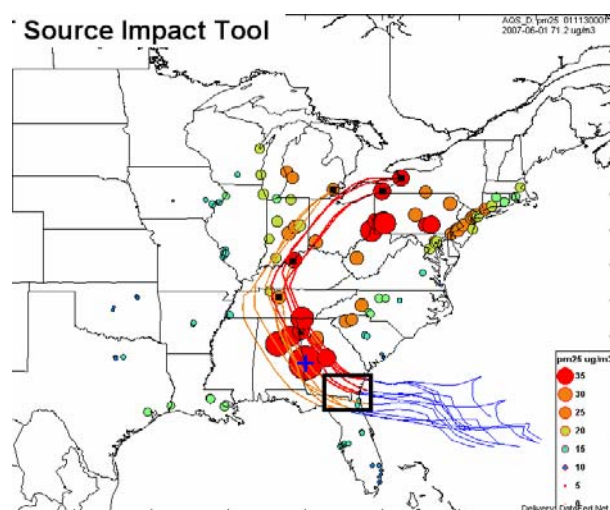
May 27, 2007



May 28, 2007



May 30, 2007



June 1, 2007

(D) Demonstration of No Exceedance "But For"...

Although there are speciation data for this site, there is only such data for May 30, 2007, out of all days requested for exclusion. Since the historical monthly mean for both months exceed the annual standard already without the presence of an exceptional event, only values above the 24hr NAAQS of 35 ug/m<sup>3</sup> will be considered for concurrence. EPA Region 4 does not concur on the following day and no further evaluation is necessary: May 21, 2007.

As the FRM data show, the measured concentrations for the other flagged days in May are about 8-49 ug/m<sup>3</sup> above the 'extreme high' value as depicted by the 95<sup>th</sup> percentile (or two standard deviations) and 14-58 ug/m<sup>3</sup> above the 'normal high' value as depicted by the 84<sup>th</sup> percentile (or one standard deviation).

The closest area with speciation data is Birmingham. The Montgomery speciation site only has speciation data for May 30. The North Birmingham site and the Birmingham and Centerville SEARCH sites show higher impacts of organic carbon relative to sulfate on May 22, 26, 27, 28, 30 and June 1 and 2, 2007. Source impact trajectories above show influence on most flagged days. The most direct transport days were May 26-30, and June 1, 2007. Although speciation data is not available for May 4, 2007, Other evidence presented by ADEM for May 4 in their demonstration on pages 41-48, show cause and provide enough information to make a determination for concurrence.

We believe, that based on historical averages and additional evidence presented, there is enough evidence to state that an exceedance would not have occurred on the following days 'but for' the impacts due to the south Georgia wildfires: May 4, 22, 26-28, 30 and June 1, 2007. EPA Region 4 concurs with these days.

**EXCEEDANCE EVENT:** Georgia/Florida Wildfires

**Exceedance Date:** May 15, 27, 30 and June 2, 2007

**MSA:** Pelham, Shelby Co., Alabama

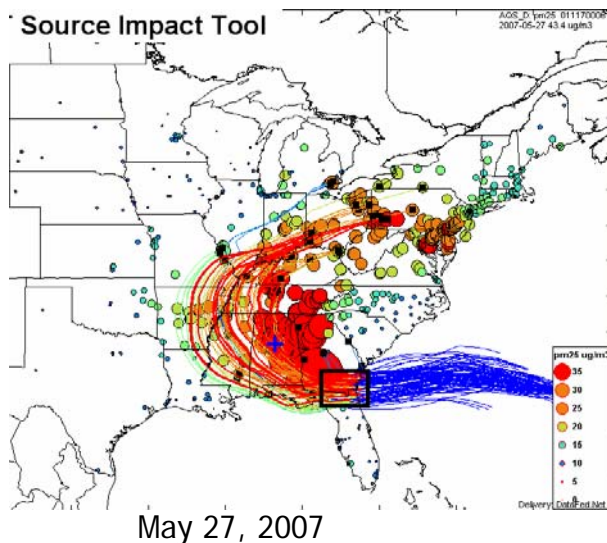
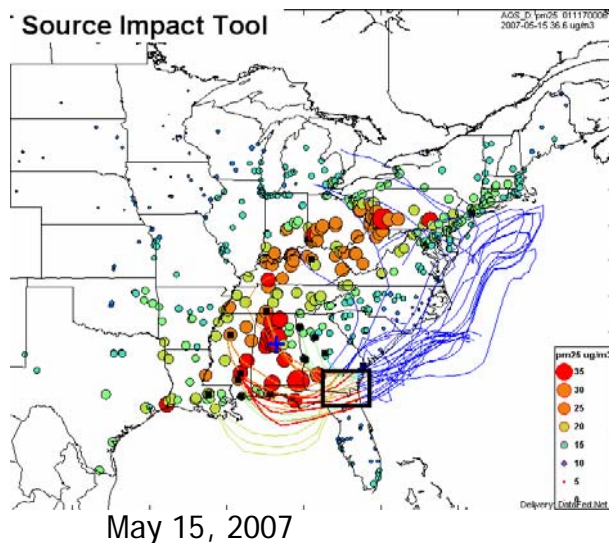
**Event Description:** Georgia/Florida Wildfires

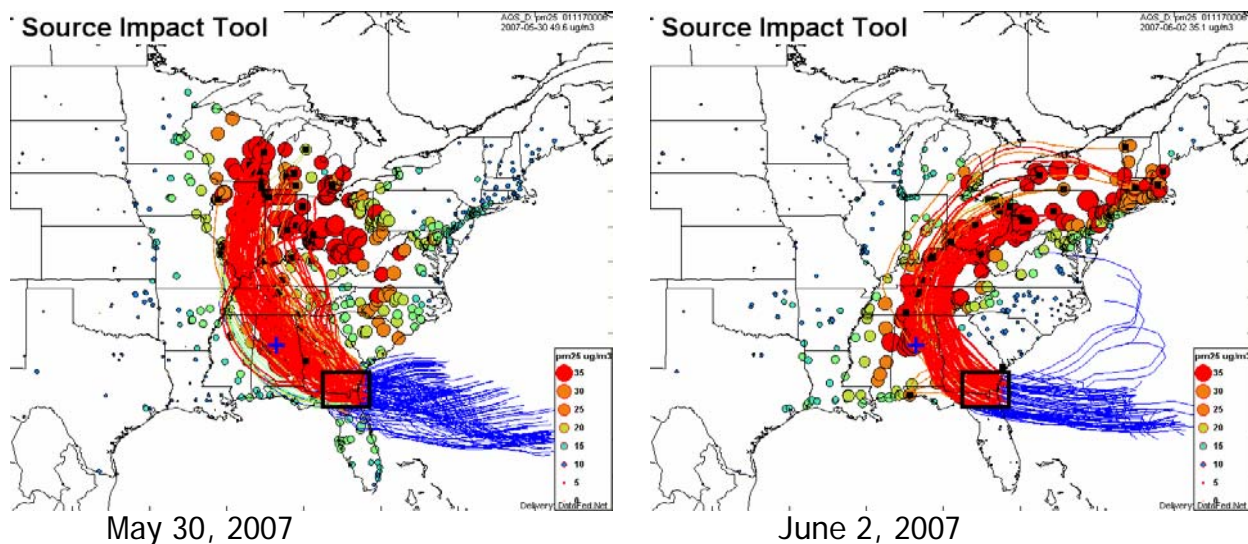
Detailed Discussion of Evidence

(C) Comparison of background levels

| AQS         | DATE   | Monthly Mean | 84th Percentile | 95th Percentile | Exceedance Concentration | EPA Concurrence |
|-------------|--------|--------------|-----------------|-----------------|--------------------------|-----------------|
| 01-117-0006 | May 15 | 14.7         | 20.5            | 25.6            | 36.6                     | YES             |
|             | May 27 | 14.7         | 20.5            | 25.6            | 43.4                     | YES             |
|             | May 30 | 14.7         | 20.5            | 25.6            | 49.6                     | YES             |
|             | June 2 | 17.5         | 25.1            | 29.2            | 35.1                     | YES             |

The maps shown below depict wind trajectories and measured concentrations. Blue lines indicate air mass movement into the box and the different colored lines indicate where the air mass goes afterwards. A blue "+" identifies the monitor. Figures 1d, 1j, 1m and 1p in the Appendix show the dispersion of PM<sub>2.5</sub> as a result of the measured concentrations. Figures 2a, 2d, 2e, 3a, 3d, and 3e in the appendix show the organic carbon and sulfate impacts, on May 15, 27 and 30, respectively.





#### D) Demonstration of No Exceedance "But For" the Event

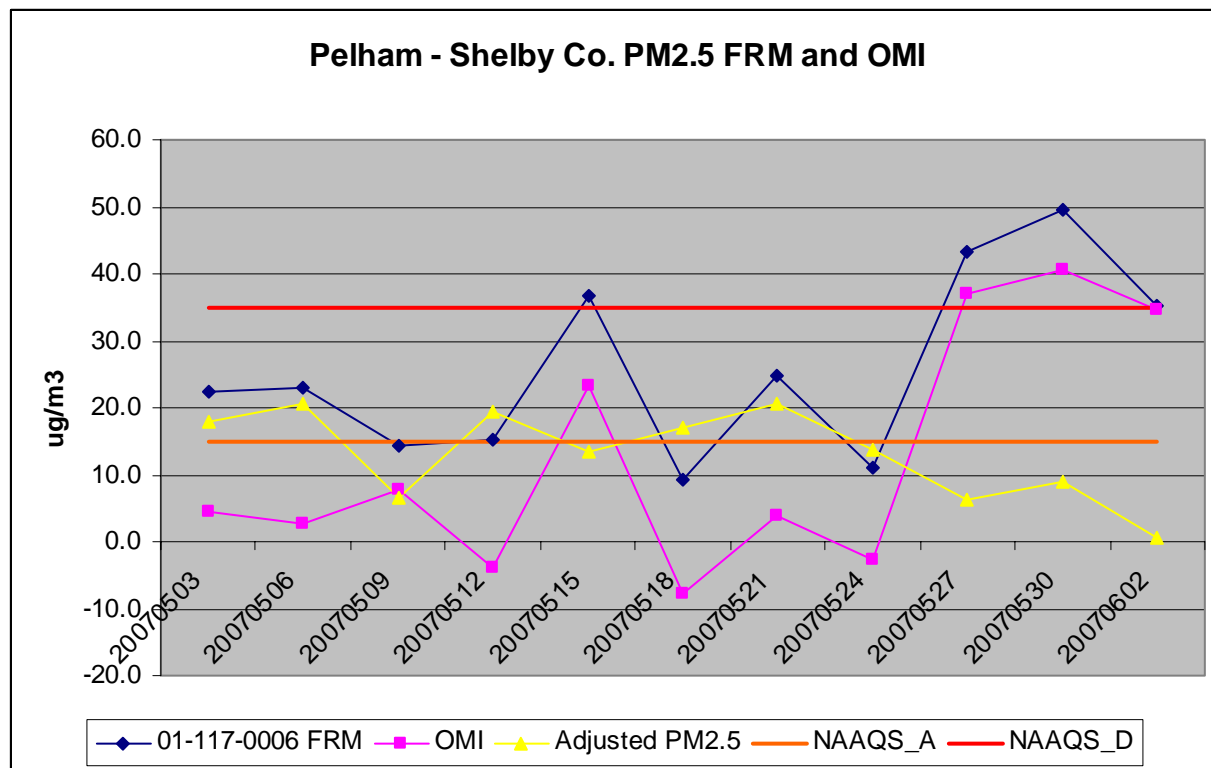
Although there are no speciation data available in Shelby County, this county is a part of the Birmingham MSA where speciation data are available. We will assume that the smoke impacts are similar on these days as wind trajectories show. In order to quantify the impacts of the fire on observed PM2.5 concentrations, speciation data collected at the North Birmingham speciation site on all four days were used to approximate the organic mass increment of the observed PM2.5 mass that was caused by the wildfire. The organic mass increment was calculated using the following equation, adapted from Turpin and Lim (2001).

$$OMI = (OC_{observed} - OC_{average}) \times 2.0 \quad (\text{Eq. 2})$$

Where OMI is the organic mass increment due to smoke from the wildfire,  $OC_{observed}$  is the observed organic carbon mass, and  $OC_{average}$  is the average organic carbon mass observed at the site during the month of May, and separately for June, for 2004-2006. A multiplier of 2.0 is used to approximate the total PM2.5 mass associated with smoke from wildfires (TURPIN AND LIM 2001). In order to approximate the PM2.5 concentration that would have been observed but for the fire, the OMI was subtracted from the observed 24-hr average PM2.5 concentration. This procedure was then repeated for each day that PM2.5 speciation data was collected during these two months to compare impacts of smoke on different days. The results of this analysis are shown in the graph below. This graph shows the calculated OMI and the adjusted PM2.5 mass (Observed PM2.5 – OMI). The graph demonstrates that without the PM2.5 mass emitted by the fire on these four days, the 24-hr average PM2.5 concentration would have been approximately 13.3, 6.3, 8.9, 0.6  $\mu\text{g}/\text{m}^3$ , on May 15, 27, 30 and June 2, 2007 respectively, and thus that there would have been no exceedance but for the wildfire.



The overall body of evidence suggests that there would have been no NAAQS exceedances during this period but for the south Georgia wildfire. EPA concurrence was given to all of the values requested during this event.



**EXCEEDANCE EVENT:** Georgia/Florida Wildfires

**Exceedance Date:** May 15, 27, 30 and June 2, 2007

**MSA:** Tuscaloosa, Tuscaloosa Co., Alabama

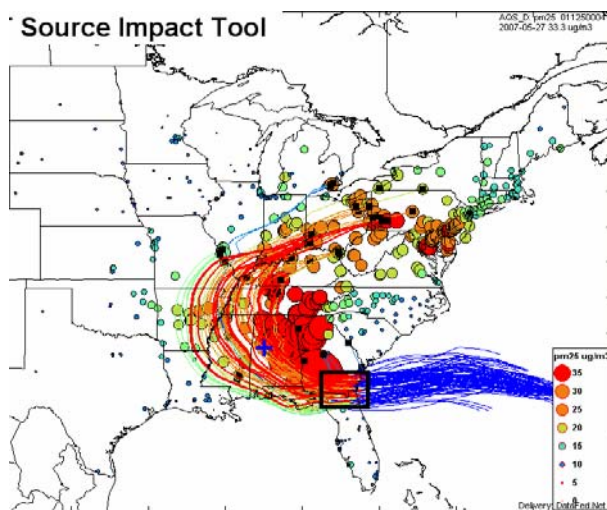
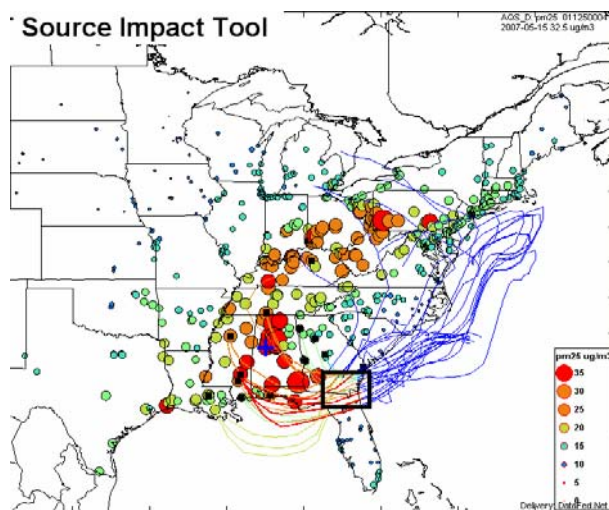
**Event Description:** Georgia/Florida Wildfires

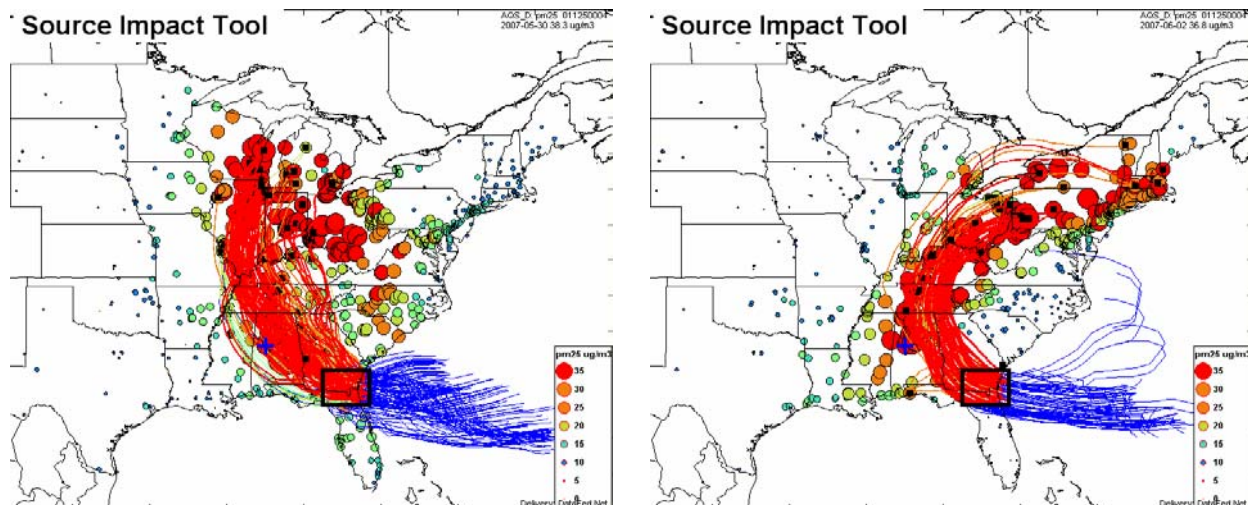
#### Detailed Discussion of Evidence

##### (C) Comparison of background levels

| AQS         | DATE   | Monthly Mean | 84th Percentile | 95th Percentile | Exceedance Concentration | EPA Concurrence |
|-------------|--------|--------------|-----------------|-----------------|--------------------------|-----------------|
| 01-125-0004 | May 15 | 13.9         | 21.0            | 24.1            | 32.5                     | YES             |
|             | May 27 | 13.9         | 21.0            | 24.1            | 33.3                     | YES             |
|             | May 30 | 13.9         | 21.0            | 24.1            | 38.3                     | YES             |
|             | June 2 | 17.3         | 25.1            | 33.3            | 36.8                     | YES             |

The maps shown below depict wind trajectories and measured concentrations. Blue lines indicate air mass movement into the box and the different colored lines indicate where the air mass goes afterwards. A blue "+" identifies the monitor. Figures 1d, 1j, 1m and 1p in the Appendix show the dispersion of PM<sub>2.5</sub> as a result of the measured concentrations. Figures 2a, 2d, 2e, 3a, 3d, and 3e in the appendix show the organic carbon and sulfate impacts, on May 15, 27 and 30, respectively. Unfortunately, the organic carbon and sulfate maps were unavailable for June 2, 2007.



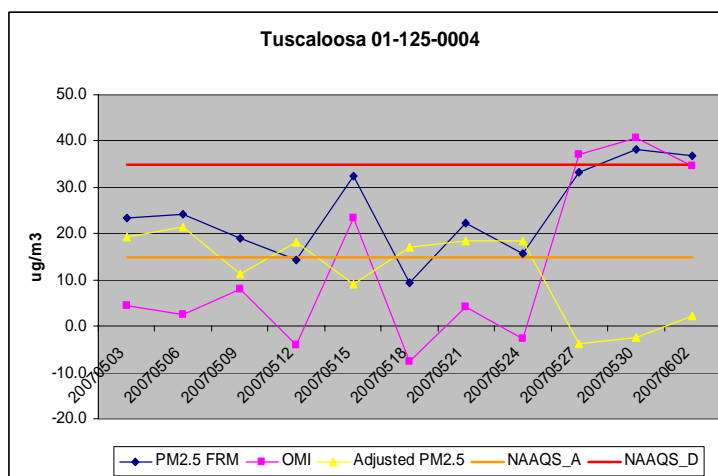


#### D) Demonstration of No Exceedance “But For” the Event

Although there are no speciation data available in Tuscaloosa, the Tuscaloosa MSA is adjacent to the Birmingham MSA where speciation data are available. We will assume that the smoke impacts are similar on these days as wind trajectories show similar impacts on these areas. In order to quantify the impacts of the fire on observed PM2.5 concentrations, speciation data collected at the North Birmingham speciation site on all four days were used to approximate the organic mass increment of the observed PM2.5 mass that was caused by the wildfire. The organic mass increment was calculated using the following equation, adapted from Turpin and Lim (2001).

$$OMI = (OC_{observed} - OC_{average}) \times 2.0 \quad (\text{Eq. 2})$$

Where OMI is the organic mass increment due to smoke from the wildfire,  $OC_{observed}$  is the observed organic carbon mass, and  $OC_{average}$  is the average organic carbon mass observed at the site during the month of May, and separately for June, for 2004-2006. A multiplier of 2.0 is used to approximate the total PM2.5 mass associated with smoke from wildfires (TURPIN AND LIM 2001). In order to approximate the PM2.5



concentration that would have been observed but for the fire, the OMI was subtracted from the observed 24-hr average PM2.5 concentration. This procedure was then

repeated for each day that PM2.5 speciation data was collected during these two months to compare impacts of smoke on different days. The results of this analysis are shown in the graph below. This graph shows the calculated OMI and the adjusted PM2.5 mass (Observed PM2.5 – OMI). The graph demonstrates that without the PM2.5 mass emitted by the fire on these four days, the 24-hr average PM2.5 concentration would have been approximately 9.2, -3.8, -2.4 and 2.3  $\mu\text{g}/\text{m}^3$ , on May 15, 27, 30 and June 2, 2007 respectively, and thus that there would have been no exceedance but for the wildfire.

The overall body of evidence suggests that there would have been no NAAQS exceedances during this period but for the south Georgia wildfire. EPA concurrence was given to all of the values requested during this event.



**EXCEEDANCE EVENT:** Georgia/Florida Wildfires

**Exceedance Date:** May 15, 21, 27, 30 and June 2, 2007

**MSA:** Jasper, Walker Co., Alabama

**Event Description:** Georgia/Florida Wildfires

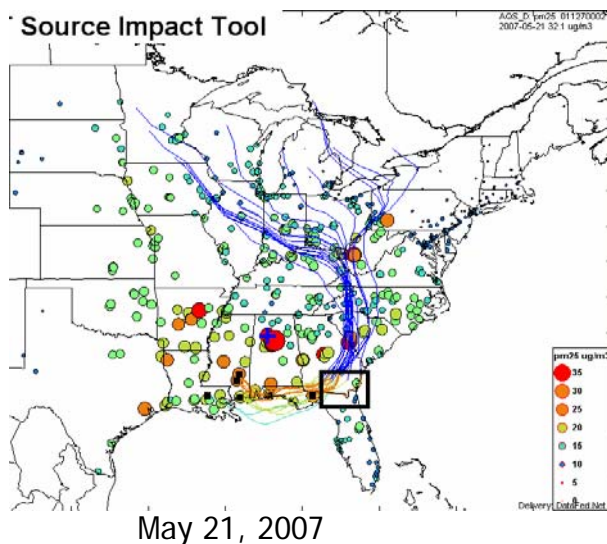
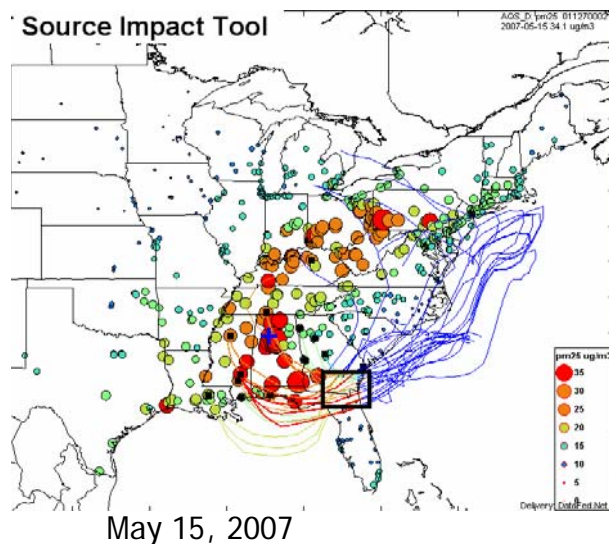
Detailed Discussion of Evidence

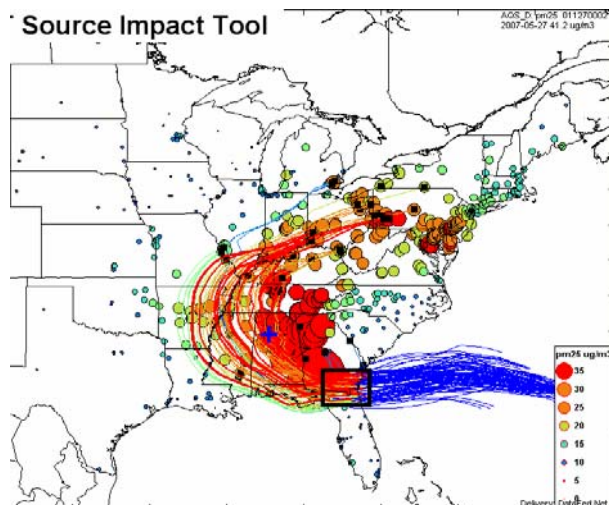
(C) Comparison of background levels

| AQS         | DATE   | Monthly Mean | 84th Percentile | 95th Percentile | Exceedance Concentration | EPA Concurrence |
|-------------|--------|--------------|-----------------|-----------------|--------------------------|-----------------|
| 01-127-0002 | May 15 | 14.4         | 19.7            | 25.6            | 34.1                     | YES             |
|             | May 21 | 14.4         | 19.7            | 25.6            | 32.1                     | NO <sup>1</sup> |
|             | May 27 | 14.4         | 19.7            | 25.6            | 41.2                     | YES             |
|             | May 30 | 14.4         | 19.7            | 25.6            | 37.7                     | YES             |
|             | June 2 | 18.1         | 25.9            | 34.5            | 35.1                     | YES             |

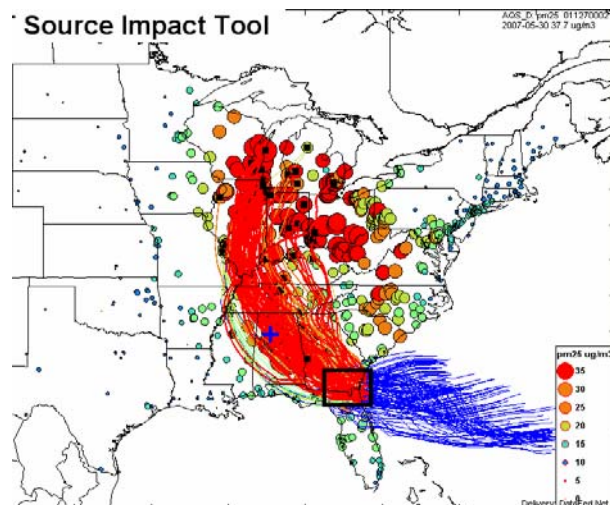
Notes: <sup>1</sup> After subtracting OMI, value still greater than Annual NAAQS

The maps shown below depict wind trajectories and measured concentrations. Blue lines indicate air mass movement into the box and the different colored lines indicate where the air mass goes afterwards. A blue "+" identifies the monitor. Figures 1d, 1e, 1j, 1m and 1p in the Appendix show the dispersion of PM<sub>2.5</sub> as a result of the measured concentrations. Figures 2a, 2b, 2d, 2e, 3a, 3b, 3d, and 3e in the appendix show the organic carbon and sulfate impacts, on May 15, 21, 27 and 30, respectively.

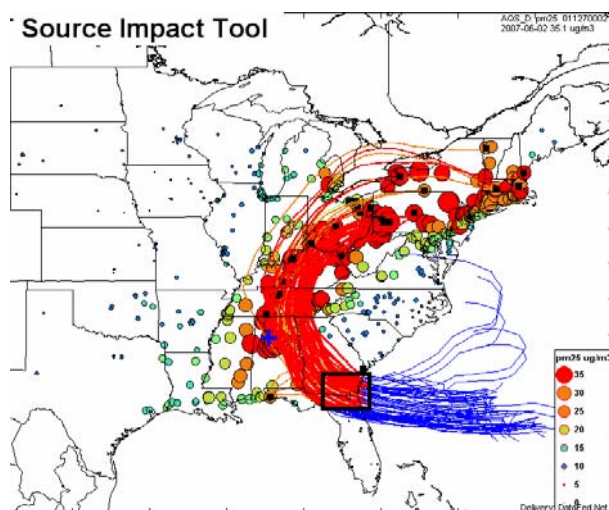




May 27, 2007



May 30, 2007



June 2, 2007

#### D) Demonstration of No Exceedance "But For" the Event

Although there are no speciation data available in Walker County, this county is part of the Birmingham MSA where speciation data are available. We will assume that the smoke impacts are similar on these days as wind trajectories show similar impacts in these areas. In order to quantify the impacts of the fire on observed PM<sub>2.5</sub> concentrations, speciation data collected at the North Birmingham speciation site on all four days were used to approximate the organic mass increment of the observed PM<sub>2.5</sub> mass that was caused by the wildfire. The organic mass increment was calculated using the following equation, adapted from Turpin and Lim (2001).

$$OMI = (OC_{observed} - OC_{average}) \times 2.0 \quad (\text{Eq. 2})$$

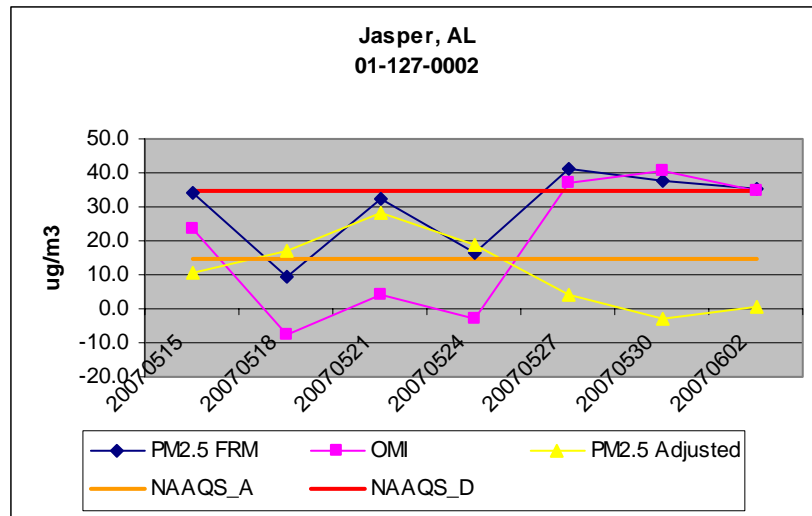
Where OMI is the organic mass increment due to smoke from the wildfire,  $OC_{observed}$  is the observed organic carbon mass, and  $OC_{average}$  is the average organic carbon mass

observed at the site during the month of May, and separately for June, for 2004-2006. A

multiplier of 2.0 is used to approximate the total PM2.5 mass associated with smoke from wildfires (TURPIN AND LIM 2001).

In order to approximate the PM2.5 concentration that would have been observed but for the fire, the OMI was subtracted from the observed 24-hr

average PM2.5 concentration. This procedure was then repeated for each day that PM2.5 speciation data was collected during these two months to compare impacts of smoke on different days. The results of this analysis are shown in the graph below. This graph shows the calculated OMI and the adjusted PM2.5 mass (Observed PM2.5 – OMI). The graph demonstrates that without the PM2.5 mass emitted by the fire on these four days, the 24-hr average PM2.5 concentration would have been approximately 10.8, 4.1, -3.0 and 0.6  $\mu\text{g}/\text{m}^3$ , on May 15, 27, 30 and June 2, 2007 respectively, and thus that there would have been no exceedance but for the wildfire. EPA concurrence was given to all values except May 21, 2007.





Jefferson County Department of Health\*  
Birmingham, Alabama

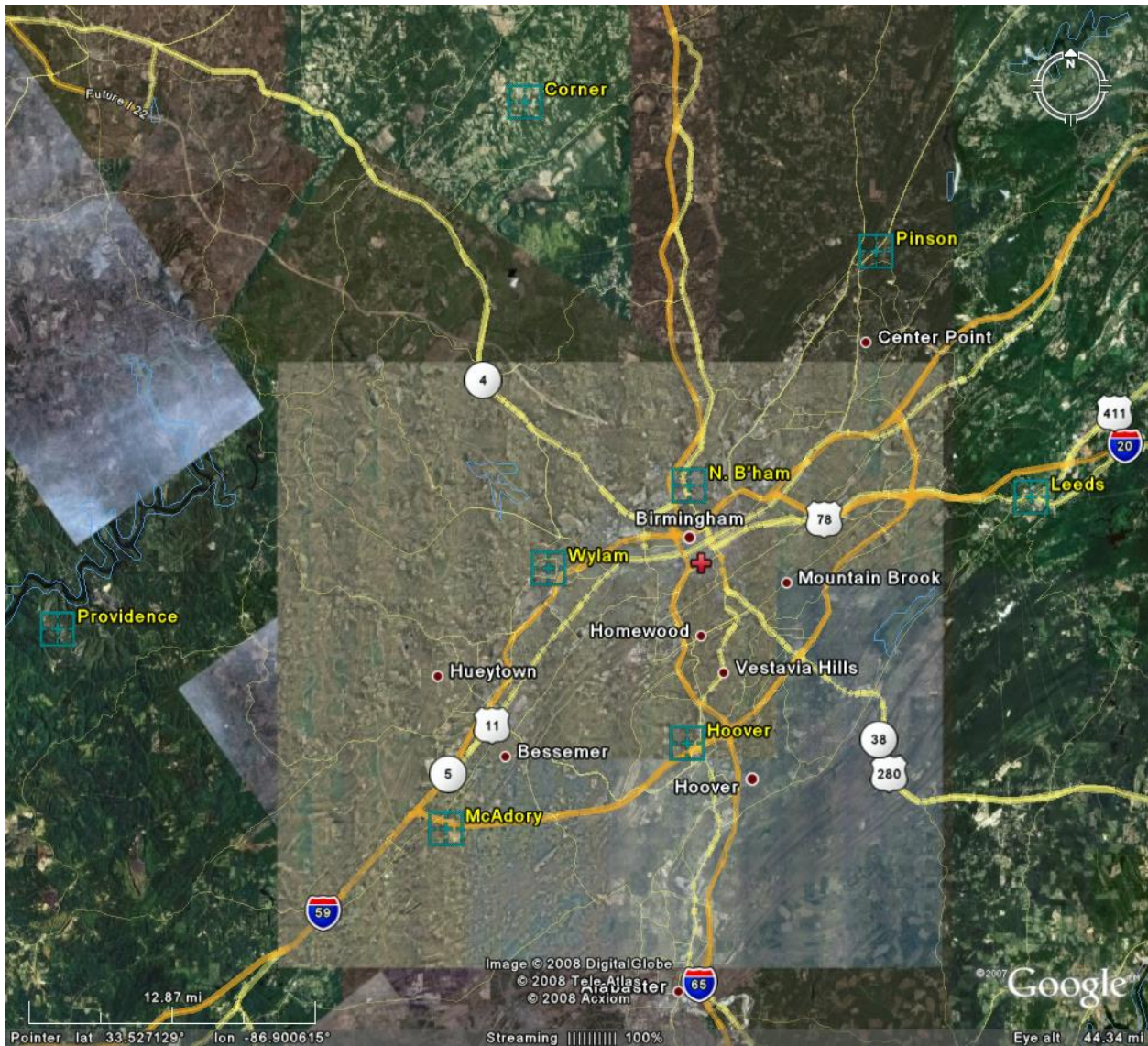


Figure xx. Jefferson Co. Dept of Health PM2.5 Ambient Air Monitoring Network. Site Names in Yellow.

Since we are considering one county, we are assuming that all sites were affected similarly by widespread smoke and/or sulfate. If we determine this is not the case, we will provide additional information as needed. There are two other sites in the MSA, outside of Jefferson County, that were reviewed along with the State's demonstration: Shelby and Walker counties. Those sites are not shown on the map above and will not be discussed here. The following dates will not be approved or discussed further in this document (please refer to page 3 from the demonstration by JCDH): May 17-21, 2007 and May 24-25, 2007.

All sites and days that failed the monthly mean test described in the introduction will receive a non-concurrence by EPA Region 4. These are listed here and there will be no further discussion for these in this document.

| AQS ID        | DATE     | VALUE | Mo. Avg. | 84 <sup>th</sup> Perc | 95 <sup>th</sup> Perc | Approved? |
|---------------|----------|-------|----------|-----------------------|-----------------------|-----------|
| 01-073-0023-1 | 20070514 | 32.5  | 20.1     | 31.5                  | 40.4                  | NO        |
| 01-073-2003-1 | 20070514 | 28    | 18.2     | 25.3                  | 31.6                  | NO        |
| 01-073-5002-1 | 20070515 | 34.2  | 15.9     | 22.4                  | 25.1                  | NO        |
| 01-073-0023-1 | 20070516 | 15.4  | 20.1     | 31.5                  | 40.4                  | NO        |
| 01-073-2003-1 | 20070516 | 17.6  | 18.2     | 25.3                  | 31.6                  | NO        |
| 01-073-0023-1 | 20070531 | 34.3  | 20.1     | 31.5                  | 40.4                  | NO        |
| 01-073-2003-1 | 20070531 | 29.6  | 18.2     | 25.3                  | 31.6                  | NO        |
| 01-073-0023-1 | 20070603 | 21.1  | 21.4     | 32.2                  | 36.9                  | NO        |
| 01-073-2003-1 | 20070603 | 18.3  | 20.1     | 29.7                  | 36.1                  | NO        |

The following Figures will be referenced in this discussion.

Figure B01 – North Birmingham Speciation Data (1 in 3)

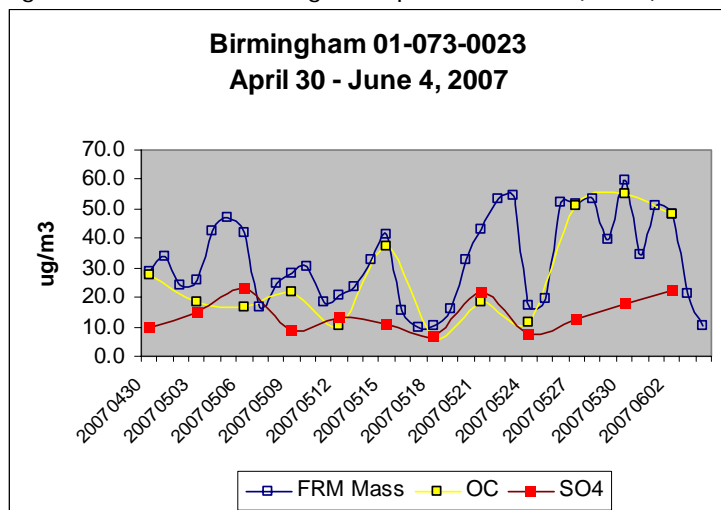


Figure B02 – Wylam Speciation Data (1 in 6)

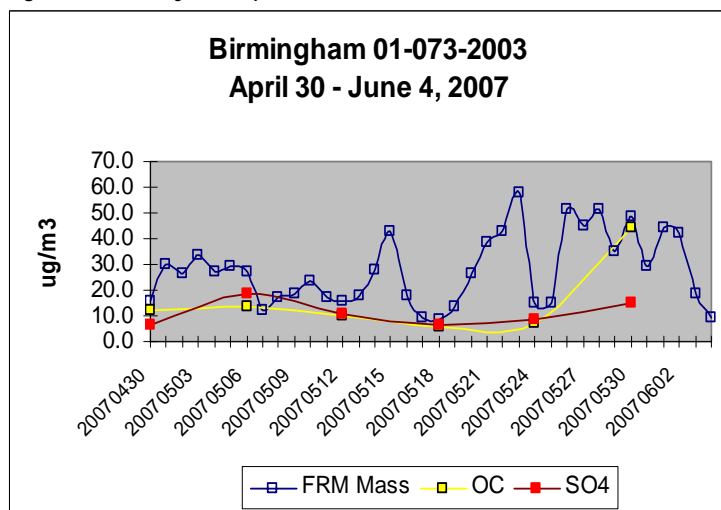




Figure B03

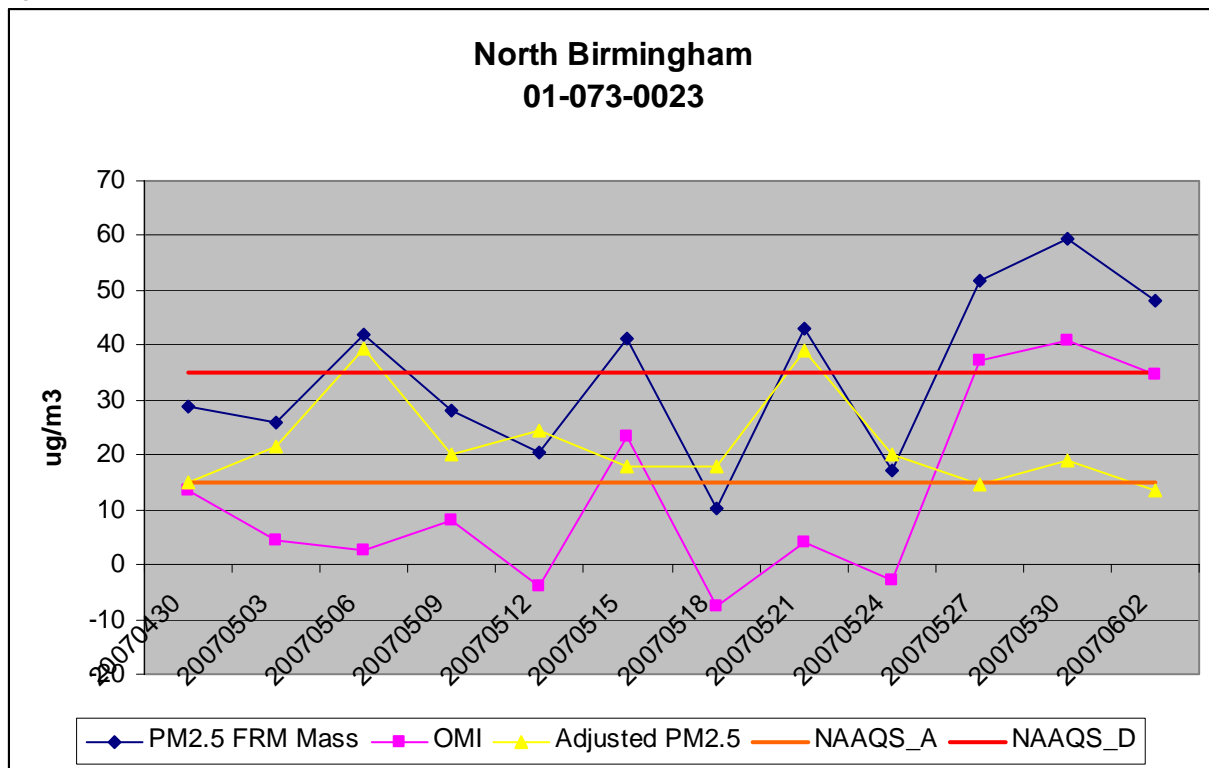


Figure B04

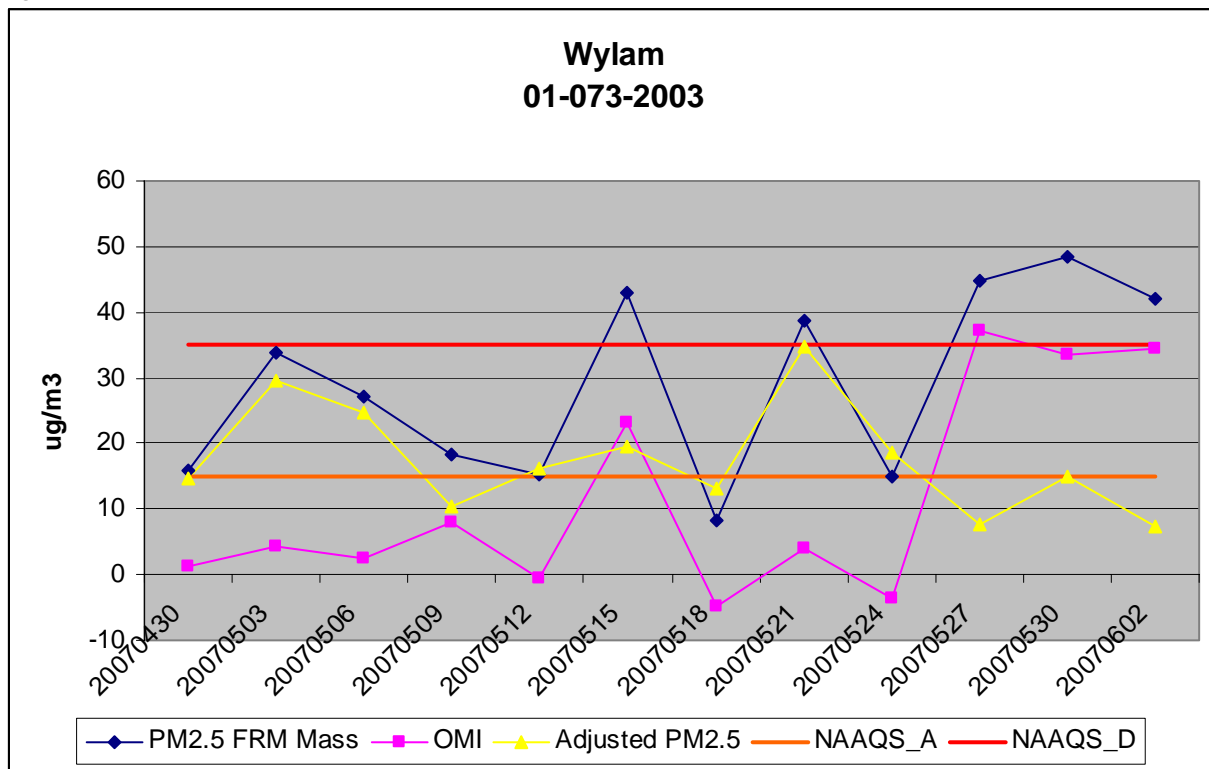


Figure B05

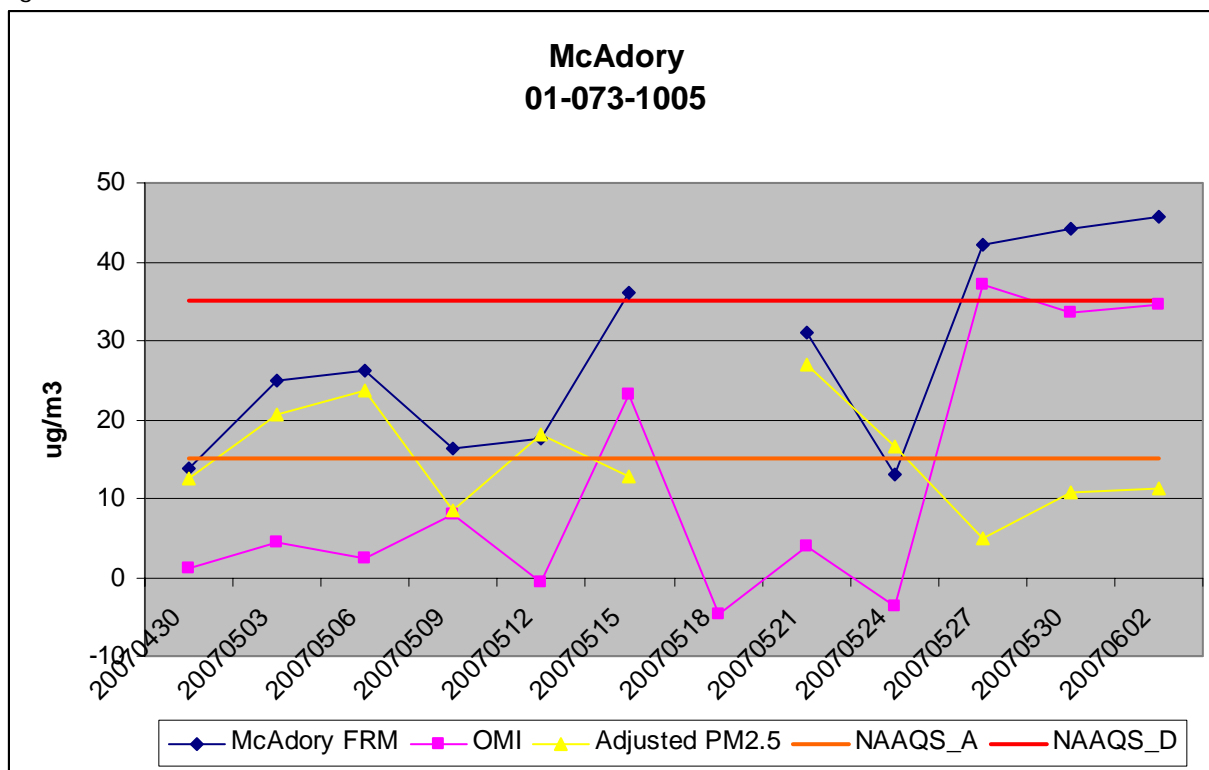


Figure B06

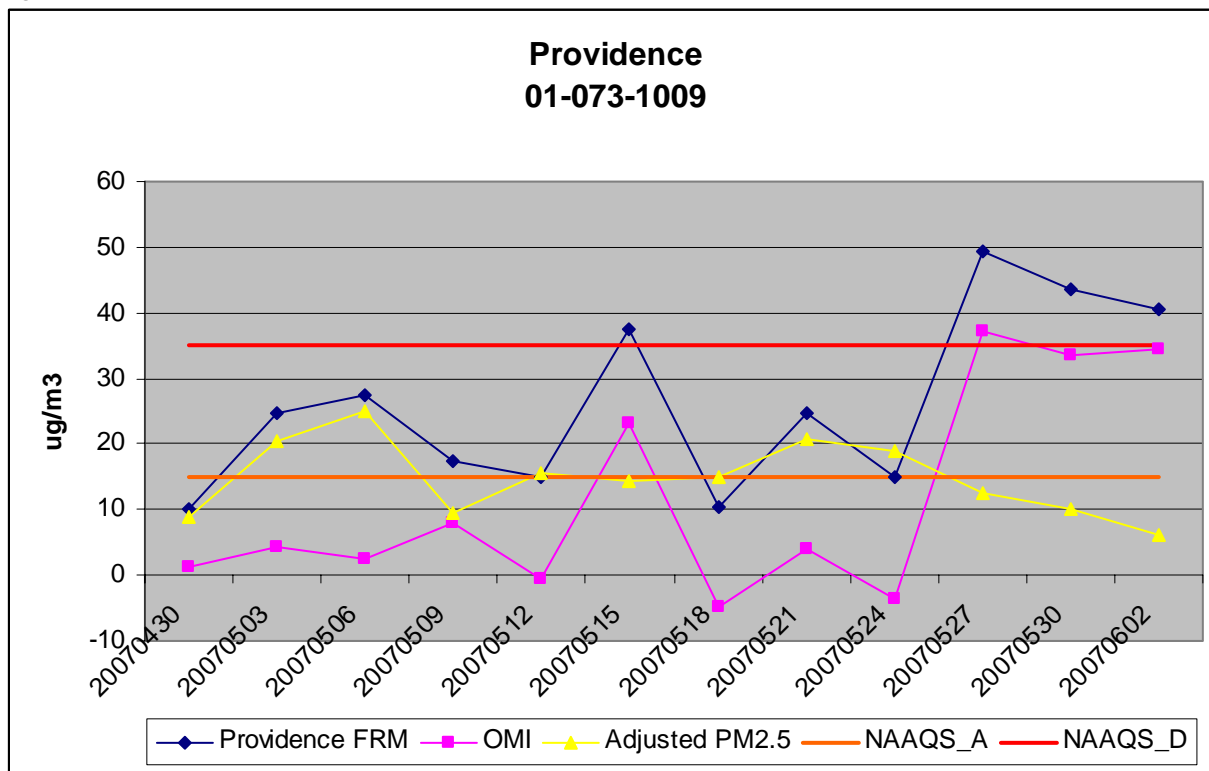


Figure B07

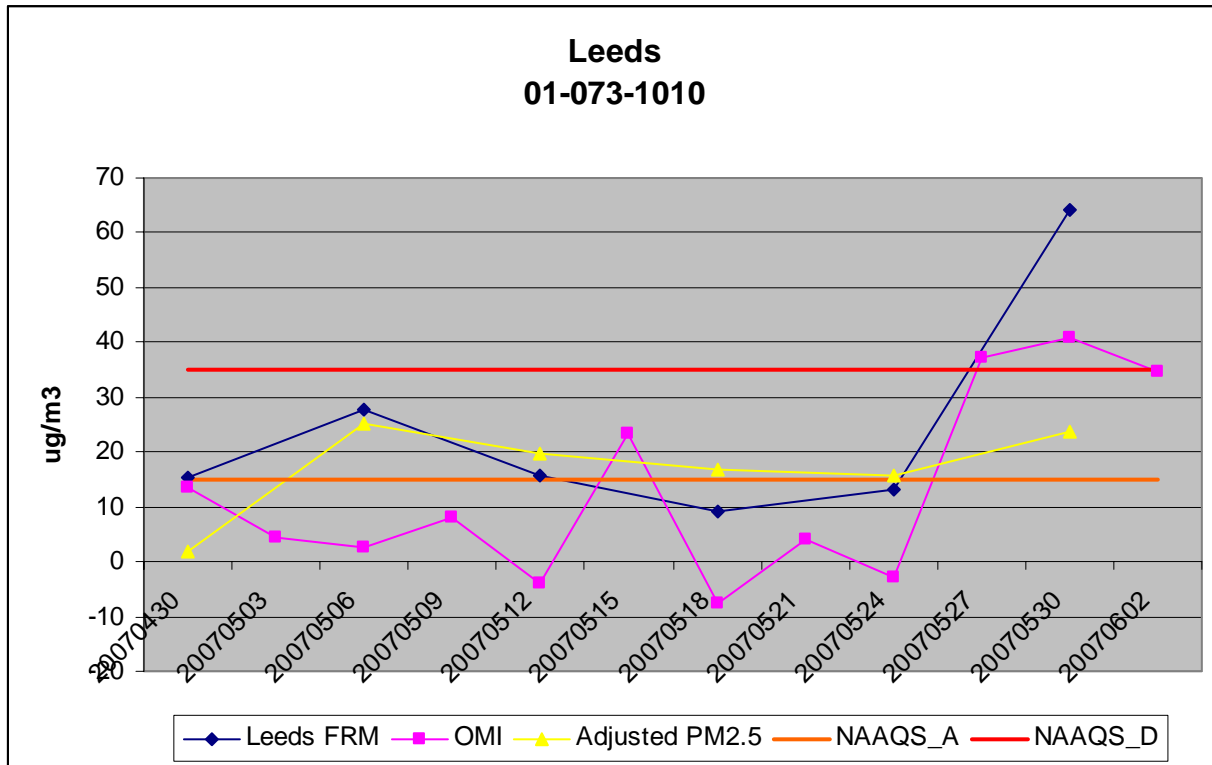


Figure B08

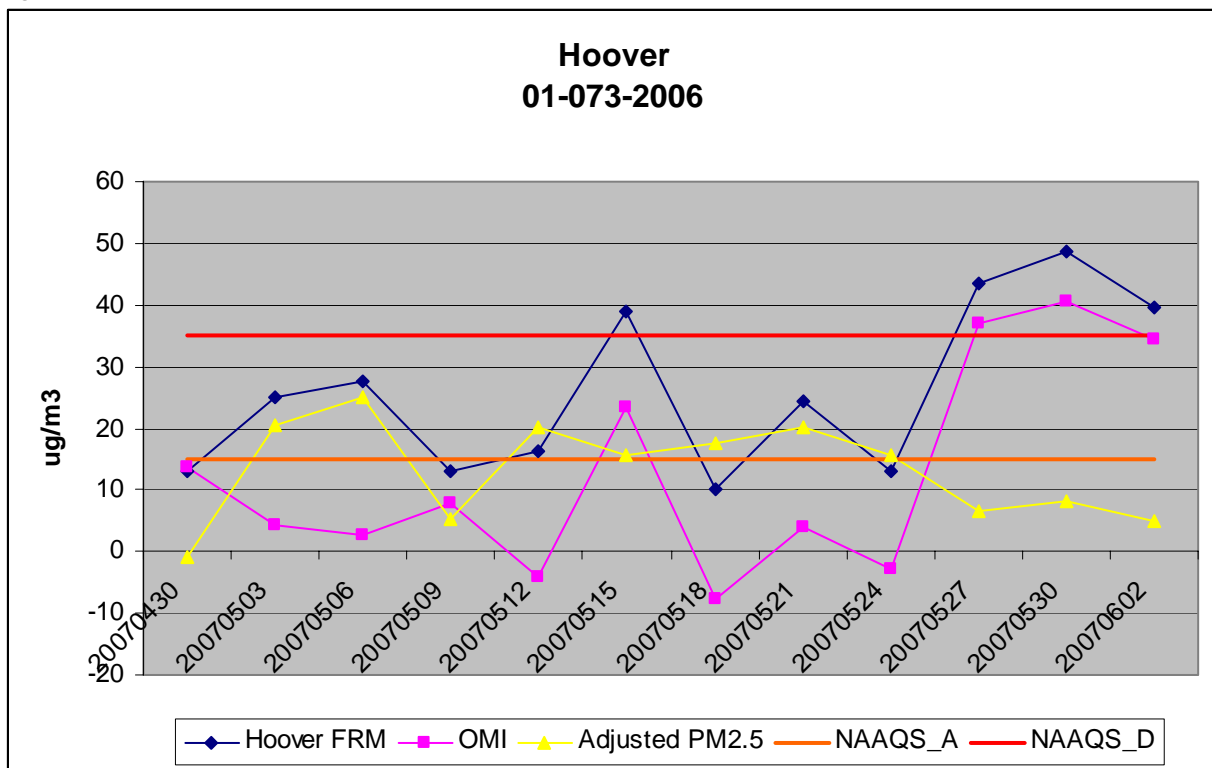


Figure B09

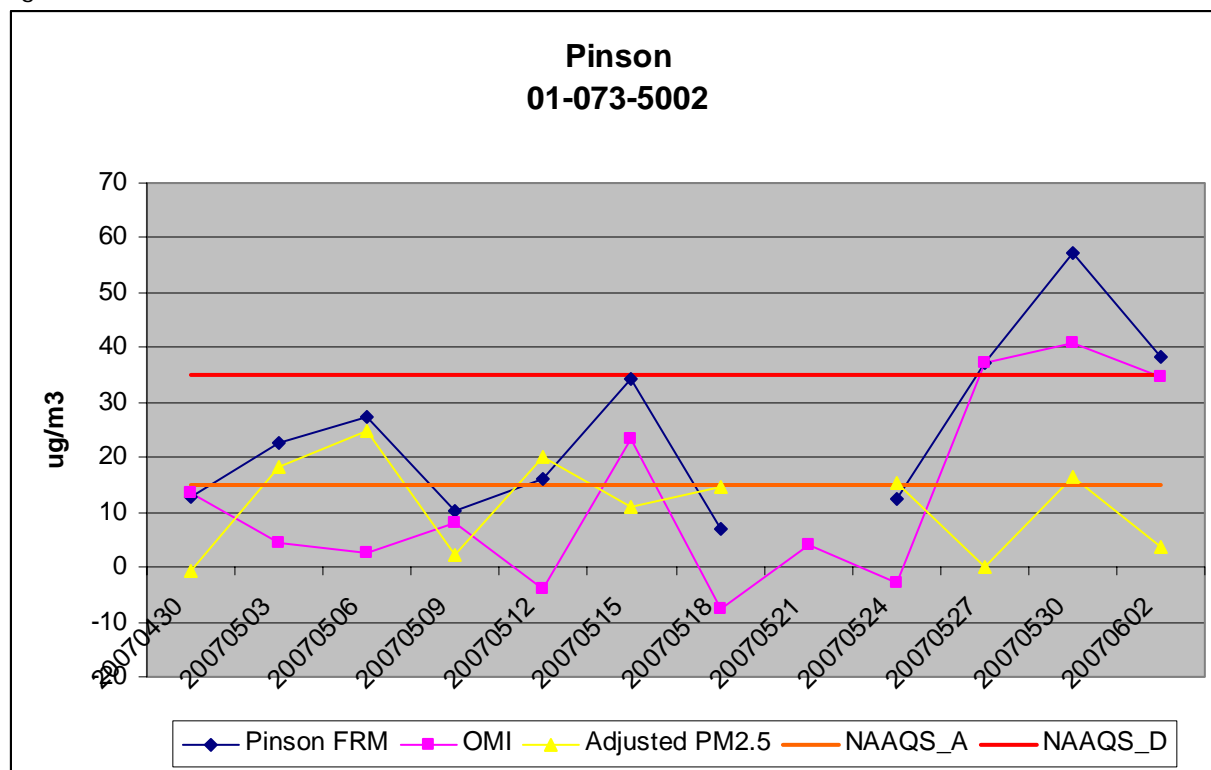
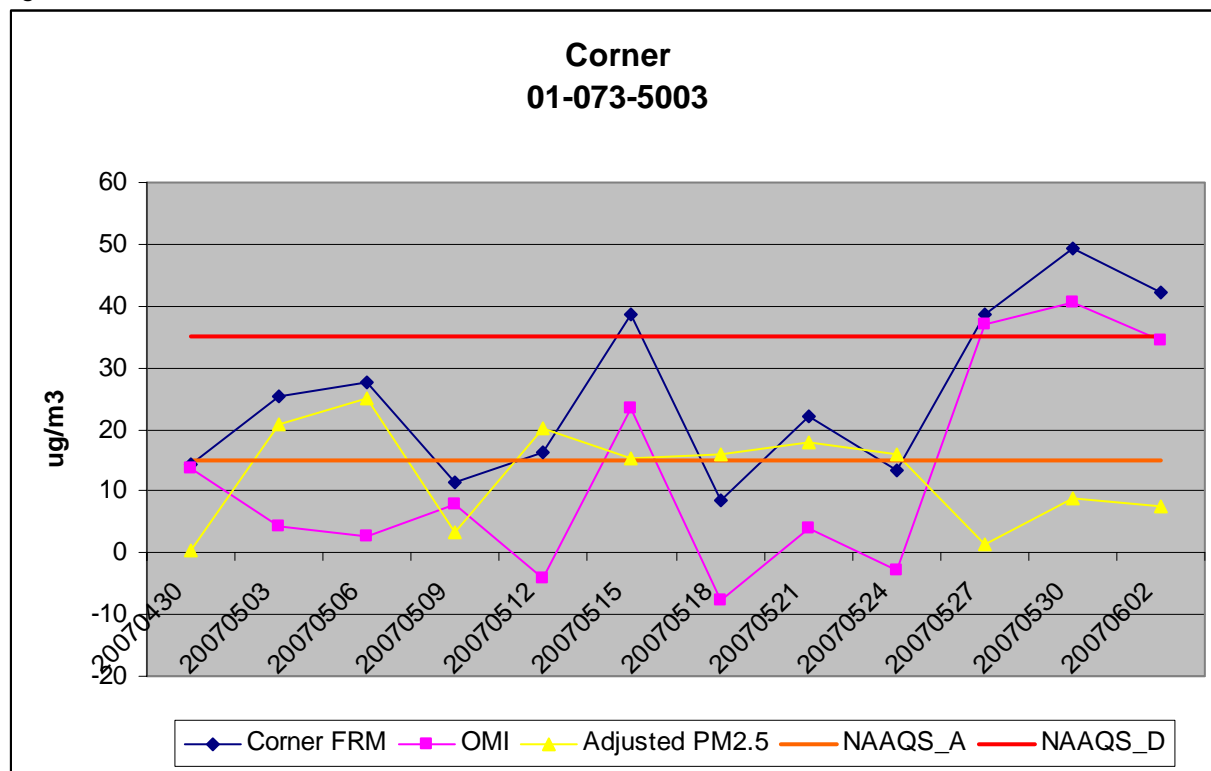


Figure B10



**EXCEEDANCE EVENT:** Georgia/Florida Wildfires

**Exceedance Date:** May 15, May 22-23, May 26-30, June 1-2, 2007

**MSA:** Birmingham, Jefferson Co.\*, Alabama

**Event Description:** Georgia/Florida Wildfires

Detailed Discussion of Evidence

(C) Comparison of background levels

| AQS ID        | DATE   | Monthly<br>Mean | 84 <sup>th</sup><br>Percentile | 95 <sup>th</sup><br>Percentile | Exceedance<br>Concentration | EPA<br>Concurrence |
|---------------|--------|-----------------|--------------------------------|--------------------------------|-----------------------------|--------------------|
| 01-073-0023-1 | May 15 | 20.1            | 31.5                           | 40.4                           | 41.3                        | YES                |
| 01-073-0023-2 | May 15 | 20.5            | 31.0                           | 33.3                           | 41                          | YES                |
| 01-073-1005-1 | May 15 | 16.6            | 24.8                           | 28.3                           | 36.1                        | YES                |
| 01-073-1009-1 | May 15 | 15.8            | 23.0                           | 27.1                           | 37.6                        | YES                |
| 01-073-2003-1 | May 15 | 18.2            | 25.3                           | 31.6                           | 42.9                        | YES                |
| 01-073-2003-2 | May 15 | 17.2            | 23.5                           | 27.3                           | 41.3                        | YES                |
| 01-073-2006-1 | May 15 | 16.3            | 22.7                           | 26.8                           | 38.9                        | YES                |
| 01-073-5003-1 | May 15 | 15.4            | 21.3                           | 26.3                           | 38.5                        | YES                |
| 01-073-0023-1 | May 22 | 20.1            | 31.5                           | 40.4                           | 53.3                        | YES                |
| 01-073-2003-1 | May 22 | 18.2            | 25.3                           | 31.6                           | 42.7                        | YES                |
| 01-073-0023-1 | May 23 | 20.1            | 31.5                           | 40.4                           | 54.6                        | YES                |
| 01-073-2003-1 | May 23 | 18.2            | 25.3                           | 31.6                           | 57.7                        | YES                |
| 01-073-0023-1 | May 26 | 20.1            | 31.5                           | 40.4                           | 52.4                        | YES                |
| 01-073-2003-1 | May 26 | 18.2            | 25.3                           | 31.6                           | 51.3                        | YES                |
| 01-073-0023-1 | May 27 | 20.1            | 31.5                           | 40.4                           | 51.6                        | YES                |
| 01-073-1005-1 | May 27 | 16.6            | 24.8                           | 28.3                           | 42.1                        | YES                |
| 01-073-1009-1 | May 27 | 15.8            | 23.0                           | 27.1                           | 49.5                        | YES                |
| 01-073-2003-1 | May 27 | 18.2            | 25.3                           | 31.6                           | 44.8                        | YES                |
| 01-073-2006-1 | May 27 | 16.3            | 22.7                           | 26.8                           | 43.6                        | YES                |
| 01-073-5002-1 | May 27 | 15.9            | 22.4                           | 25.1                           | 37.2                        | YES                |
| 01-073-5003-1 | May 27 | 15.4            | 21.3                           | 26.3                           | 38.6                        | YES                |
| 01-073-0023-1 | May 28 | 20.1            | 31.5                           | 40.4                           | 53.3                        | YES                |
| 01-073-2003-1 | May 28 | 18.2            | 25.3                           | 31.6                           | 51.4                        | YES                |
| 01-073-0023-1 | May 29 | 20.1            | 31.5                           | 40.4                           | 39.5                        | YES                |
| 01-073-2003-1 | May 29 | 18.2            | 25.3                           | 31.6                           | 35.1                        | YES                |
| 01-073-0023-1 | May 30 | 20.1            | 31.5                           | 40.4                           | 59.6                        | YES                |
| 01-073-0023-2 | May 30 | 20.5            | 31.0                           | 33.3                           | 58.7                        | YES                |
| 01-073-1005-1 | May 30 | 16.6            | 24.8                           | 28.3                           | 44.1                        | YES                |
| 01-073-1005-2 | May 30 | 13.5            | 16.9                           | 22.1                           | 44.2                        | YES                |
| 01-073-1009-1 | May 30 | 15.8            | 23.0                           | 27.1                           | 43.6                        | YES                |
| 01-073-1009-2 | May 30 | 15.9            | 23.4                           | 35.6                           | 42.2                        | YES                |
| 01-073-1010-1 | May 30 | 16.7            | 23.3                           | 25.1                           | 64.3                        | YES                |
| 01-073-1010-2 | May 30 | 16.6            | 23.6                           | 24.9                           | 64.4                        | YES                |
| 01-073-2003-1 | May 30 | 18.2            | 25.3                           | 31.6                           | 48.4                        | YES                |
| 01-073-2003-2 | May 30 | 17.2            | 23.5                           | 27.3                           | 48.8                        | YES                |
| 01-073-2006-1 | May 30 | 16.3            | 22.7                           | 26.8                           | 48.8                        | YES                |
| 01-073-2006-2 | May 30 | 12.1            | 15.9                           | 19.8                           | 49.2                        | YES                |
| 01-073-5002-1 | May 30 | 15.9            | 22.4                           | 25.1                           | 57.2                        | YES                |

\* Exceptional Events claim did not result in attainment



| AQS ID        | DATE    | Monthly Mean | 84 <sup>th</sup> Percentile | 95 <sup>th</sup> Percentile | Exceedance Concentration | EPA Concurrence |
|---------------|---------|--------------|-----------------------------|-----------------------------|--------------------------|-----------------|
| 01-073-5003-1 | May 30  | 15.4         | 21.3                        | 26.3                        | 49.4                     | YES             |
| 01-073-5003-2 | May 30  | 12.0         | 16.4                        | 19.2                        | 49.8                     | YES             |
| 01-073-0023-1 | June 01 | 21.4         | 32.2                        | 36.9                        | 51.3                     | YES             |
| 01-073-2003-1 | June 01 | 20.1         | 29.7                        | 36.1                        | 44.6                     | YES             |
| 01-073-0023-1 | June 02 | 21.4         | 32.2                        | 36.9                        | 48.2                     | YES             |
| 01-073-1005-1 | June 02 | 19.4         | 26.9                        | 33.9                        | 45.7                     | YES             |
| 01-073-1009-1 | June 02 | 18.5         | 27.4                        | 34.9                        | 40.6                     | YES             |
| 01-073-2003-1 | June 02 | 20.1         | 29.7                        | 36.1                        | 41.9                     | YES             |
| 01-073-2006-1 | June 02 | 18.9         | 27.9                        | 30.8                        | 39.5                     | YES             |
| 01-073-5002-1 | June 02 | 19.0         | 28.3                        | 29.6                        | 38.3                     | YES             |
| 01-073-5003-1 | June 02 | 19.8         | 28.6                        | 34.1                        | 42.1                     | YES             |

#### D) Demonstration of No Exceedance “But For” the Event

There are two speciation sites operated by the JCDH. In order to quantify the impacts of the fire on observed PM<sub>2.5</sub> concentrations, speciation data collected at the North Birmingham and Wylam speciation sites on all days were used to approximate the organic mass increment of the observed PM<sub>2.5</sub> mass that was caused by the wildfire. Curiously, the JCDH did not include any information about the SEARCH site data in their county. This information was also helpful in filling in the gaps on days where speciation data from North Birmingham and Wylam were unavailable. This information can be found in the State of Alabama’s Demonstration on page 25.

The organic mass increment was calculated using the following equation, adapted from Turpin and Lim (2001).

$$OMI = (OC_{observed} - OC_{average}) \times 2.0 \quad (\text{Eq. 2})$$

Where OMI is the organic mass increment due to smoke from the wildfire,  $OC_{observed}$  is the observed organic carbon mass, and  $OC_{average}$  is the average organic carbon mass observed at the site during the month of May, and separately for June, for 2004-2006. A multiplier of 2.0 is used to approximate the total PM<sub>2.5</sub> mass associated with smoke from wildfires (TURPIN AND LIM 2001). In order to approximate the PM<sub>2.5</sub> concentration that would have been observed but for the fire, the OMI was subtracted from the observed 24-hr average PM<sub>2.5</sub> concentration. This procedure was then repeated for each day that PM<sub>2.5</sub> speciation data was collected during these two months to compare impacts of smoke on different days. The results of this analysis are shown in the graphs above (Figures B03-B10). These graphs show the calculated OMI and the adjusted PM<sub>2.5</sub> mass (Observed PM<sub>2.5</sub> – OMI). The graphs demonstrate that without the PM<sub>2.5</sub> mass emitted by the fire on these four days, there would not have been an exceedance on those days but for the wildfire. EPA concurrence was given to all values listed above.

## References

Turpin, B.J., Lim, H.J., 2001. Species Contributions to PM<sub>2.5</sub> Mass Concentrations: Revisiting common Assumptions for Estimating Organic Mass; *Aerosol Science and Technology*. Volume 35, Pages 602-610.

# Appendix A

## Common Graphs and Maps

## Section 1: Daily PM2.5 Concentration

Figure 1a - May 3, 2007

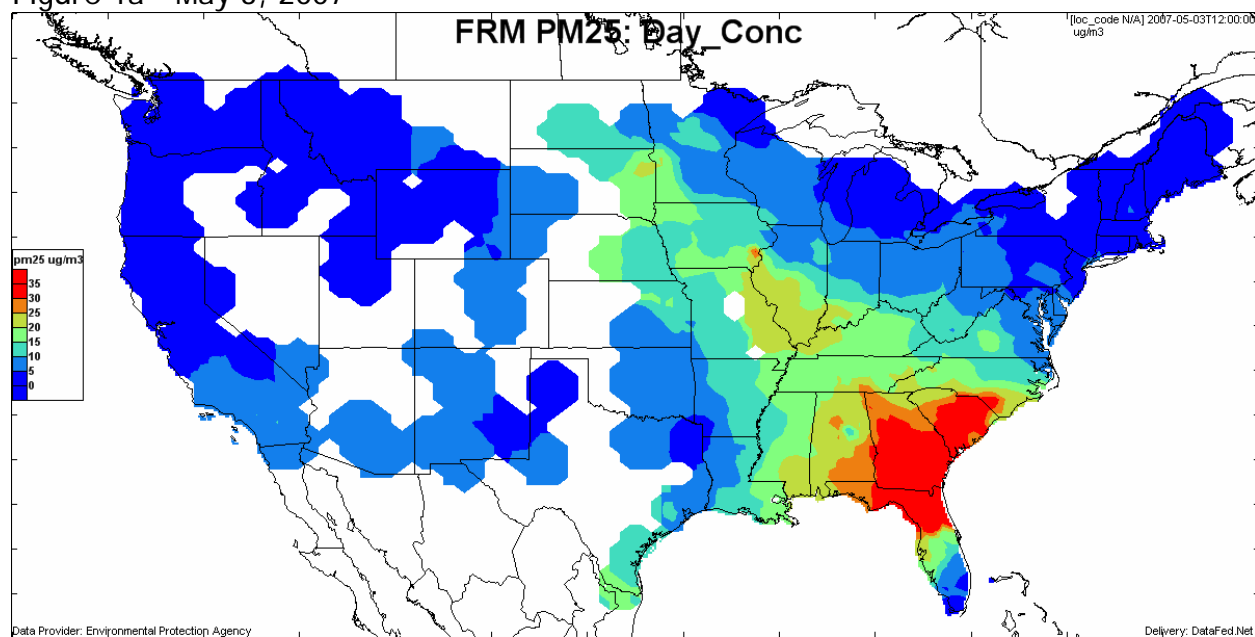


Figure 1b - May 4, 2007

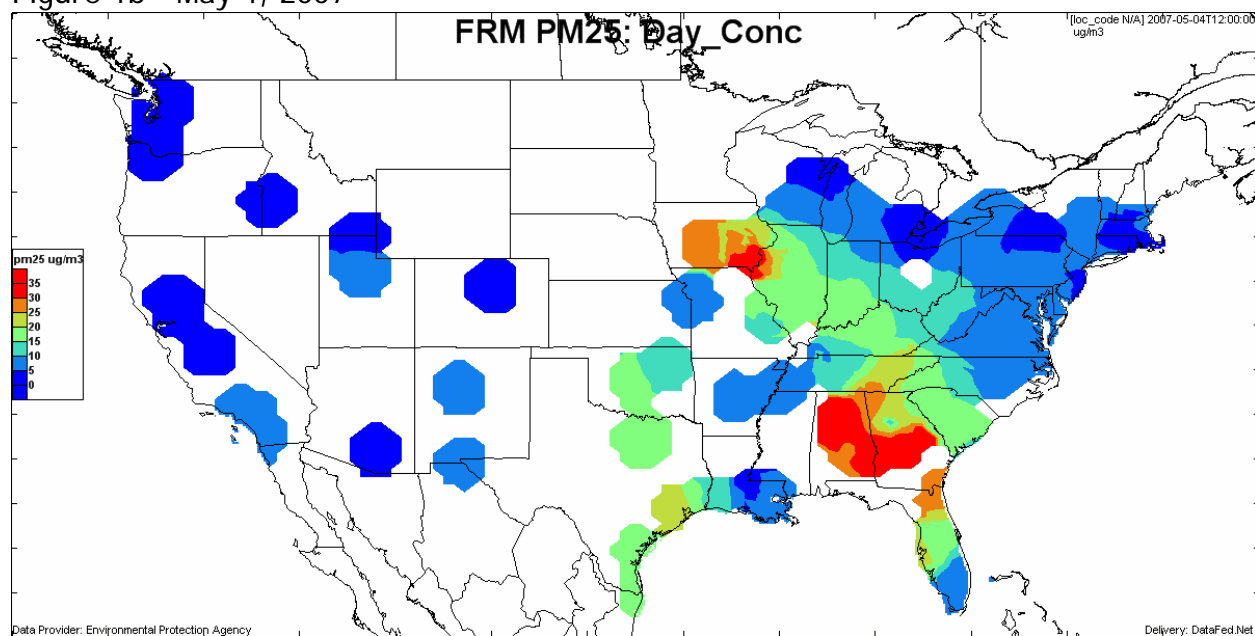


Figure 1c - May 5, 2007

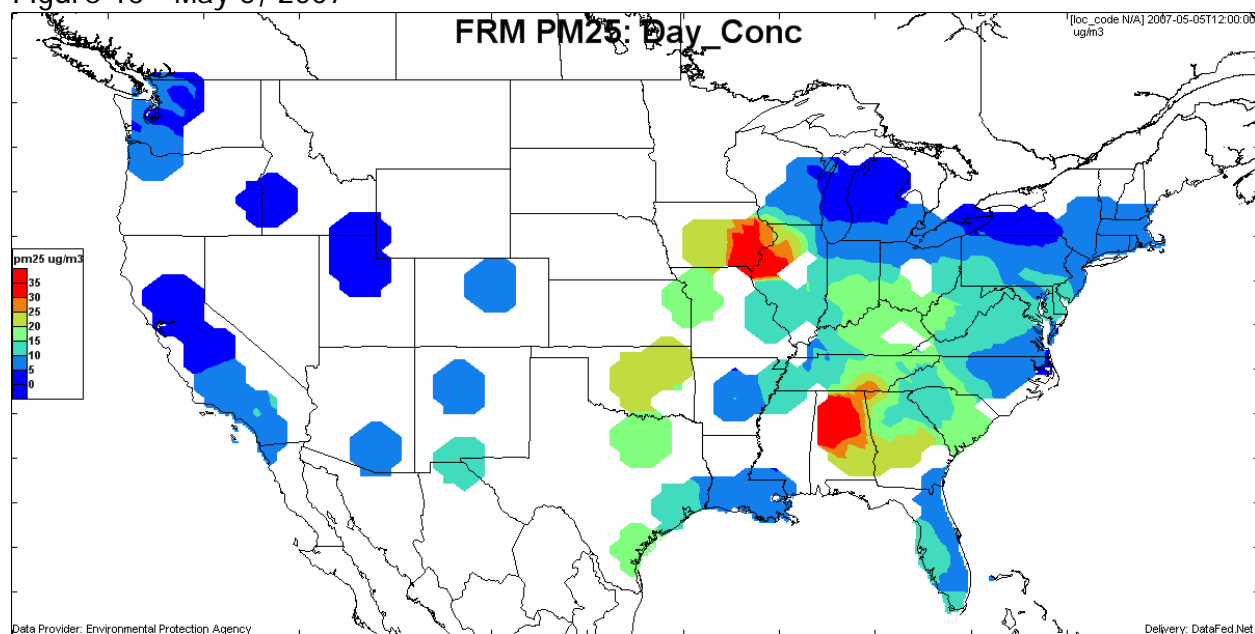


Figure 1d - May 15, 2007

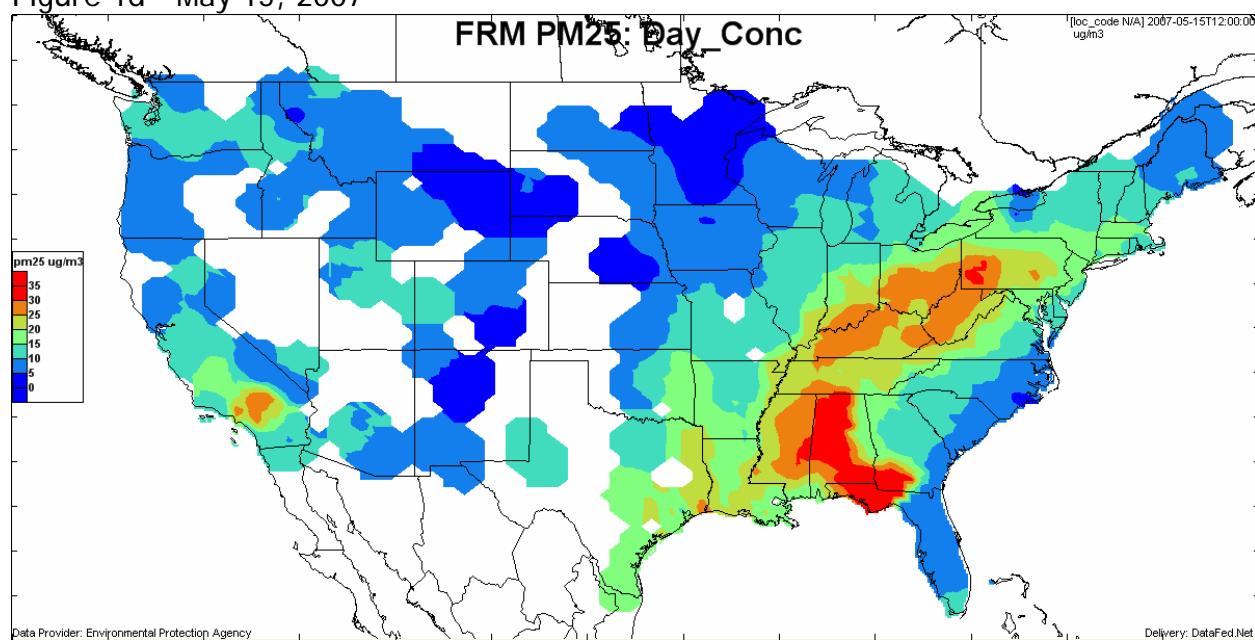




Figure 1e - May 21, 2007

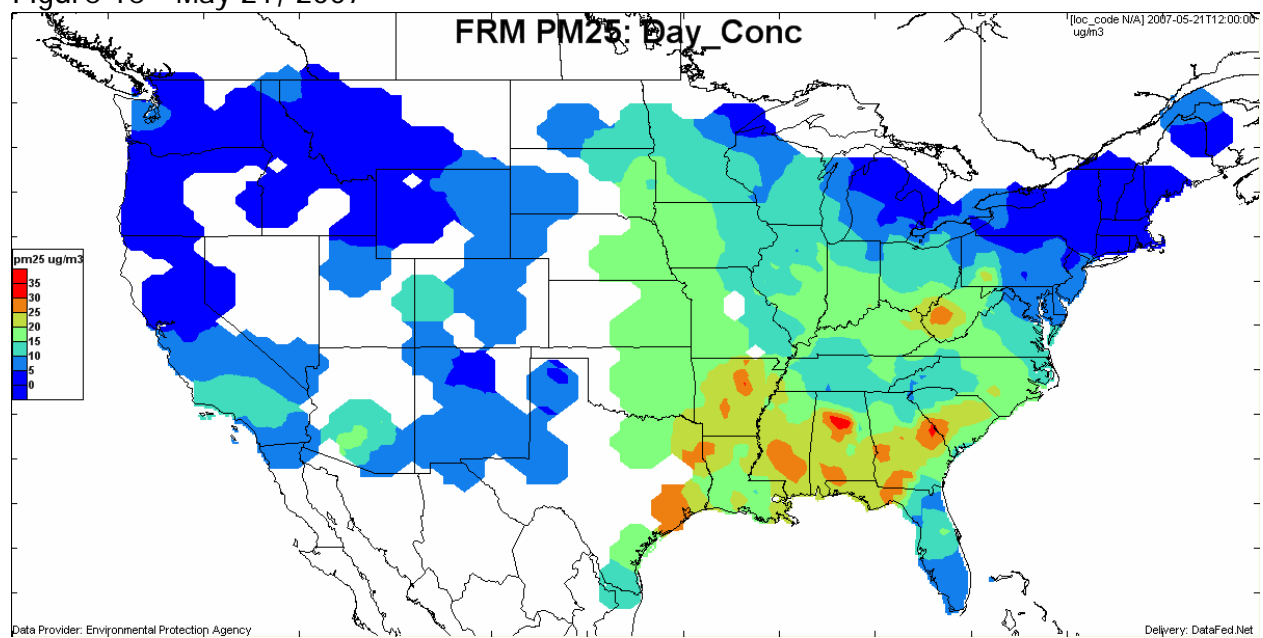


Figure 1f - May 22, 2007

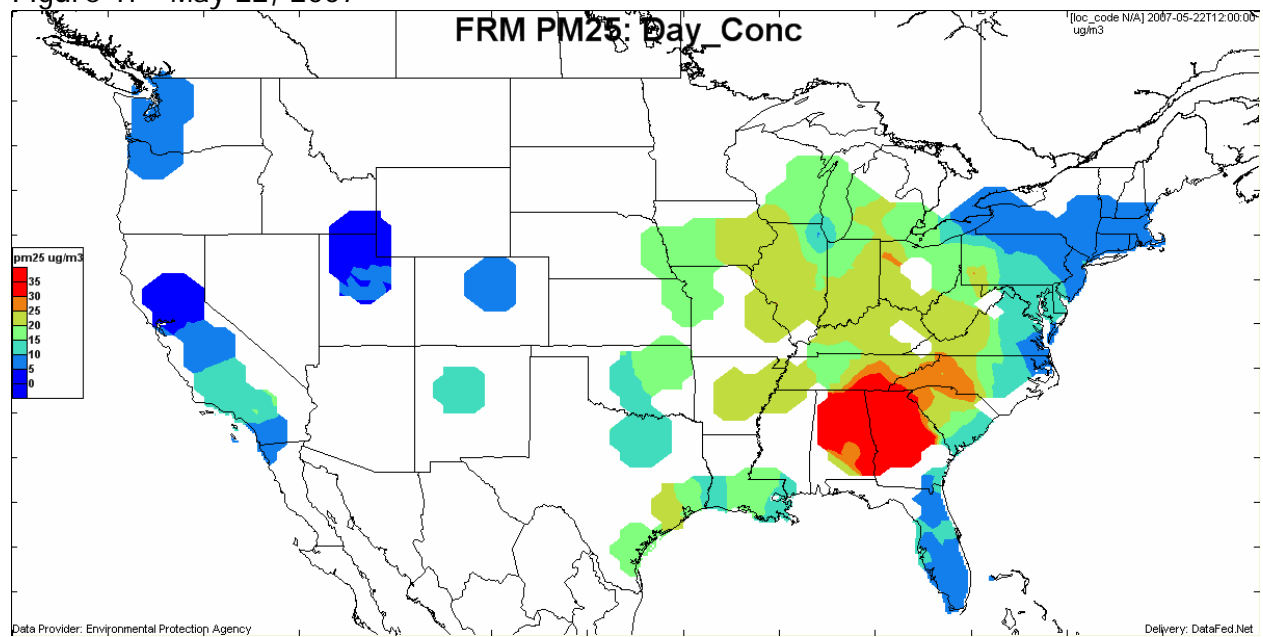


Figure 1g - May 23, 2007

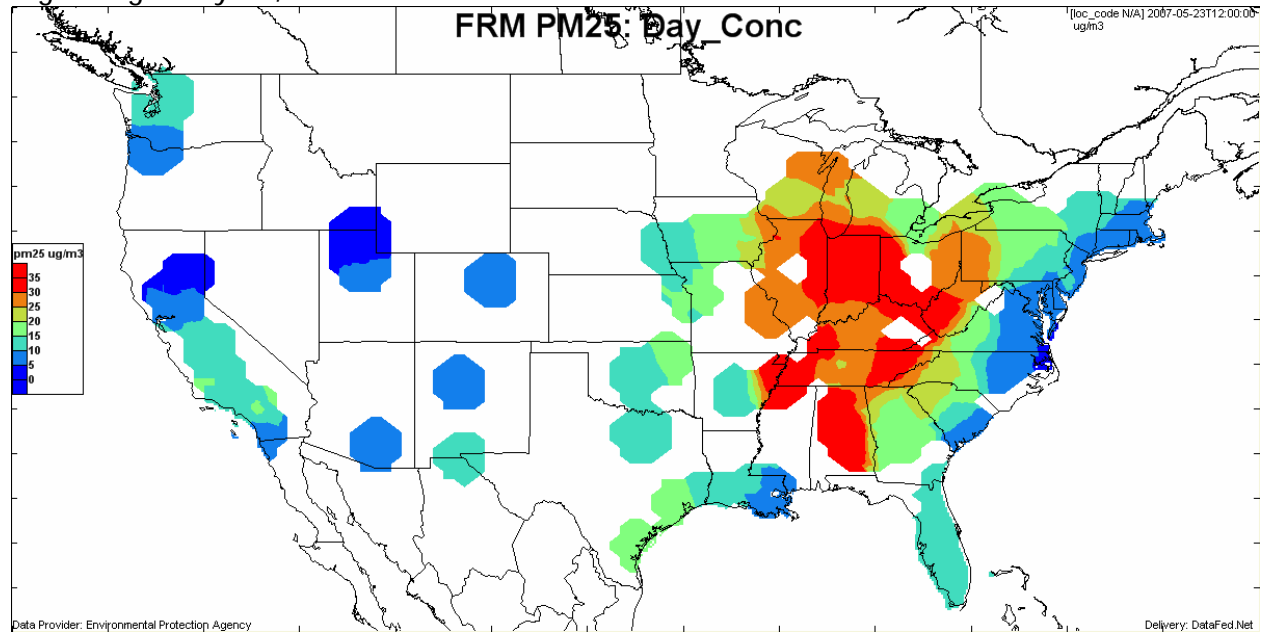


Figure 1h - May 24, 2007

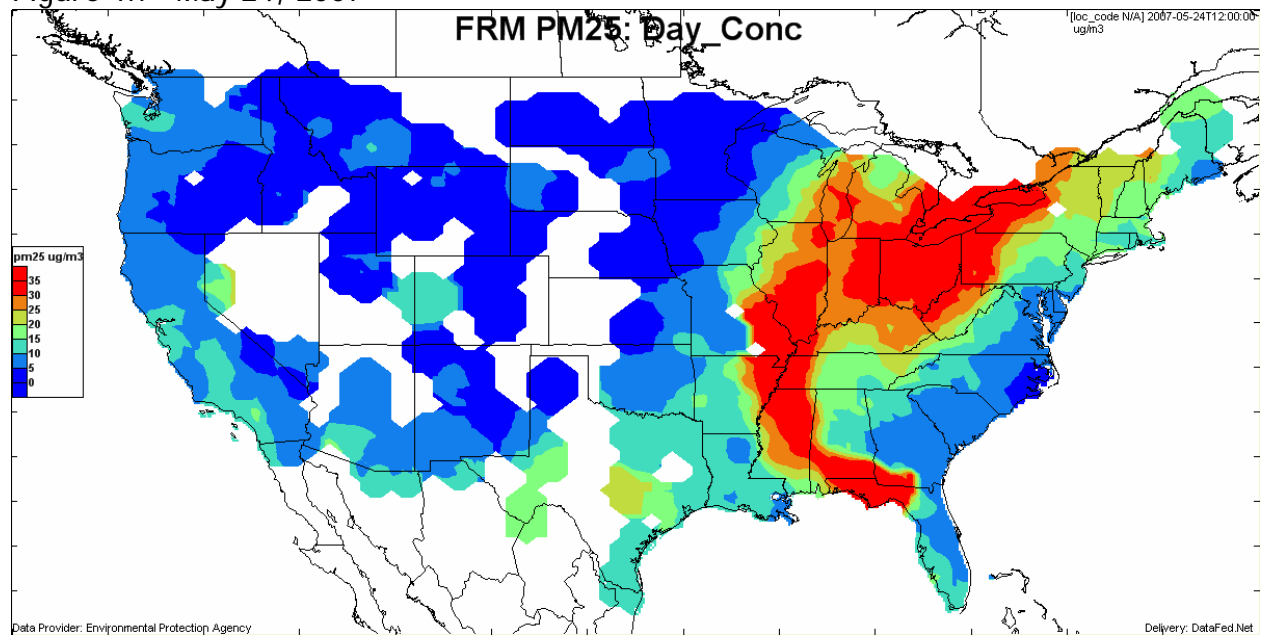


Figure 1i - May 26, 2007

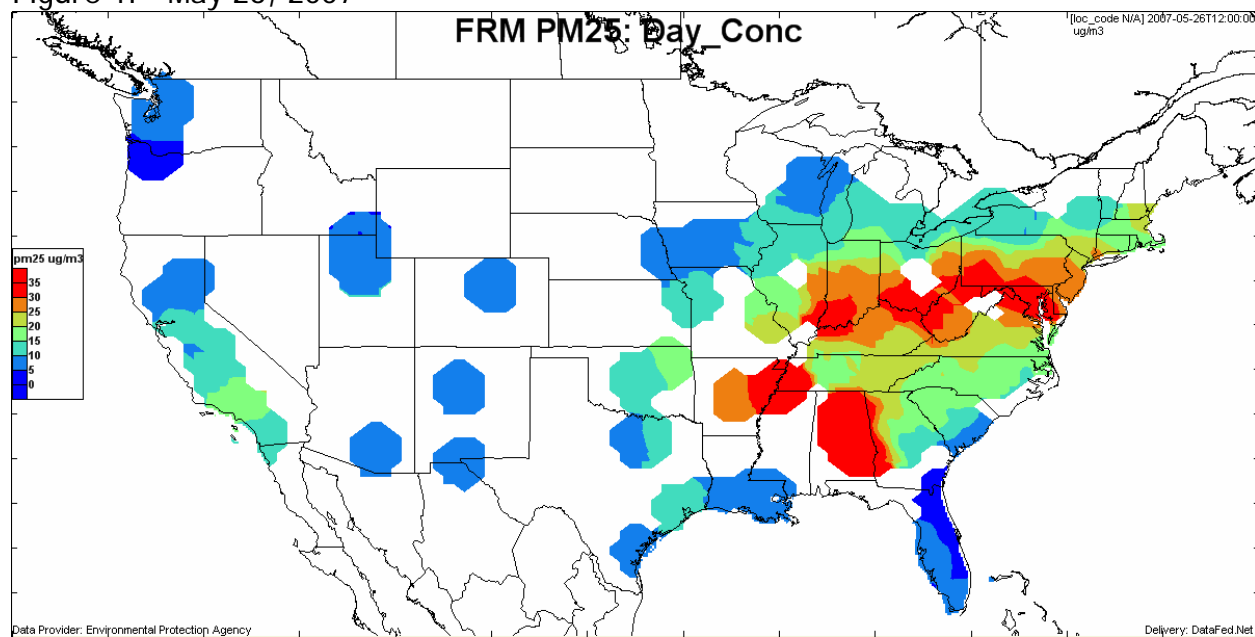


Figure 1j - May 27, 2007

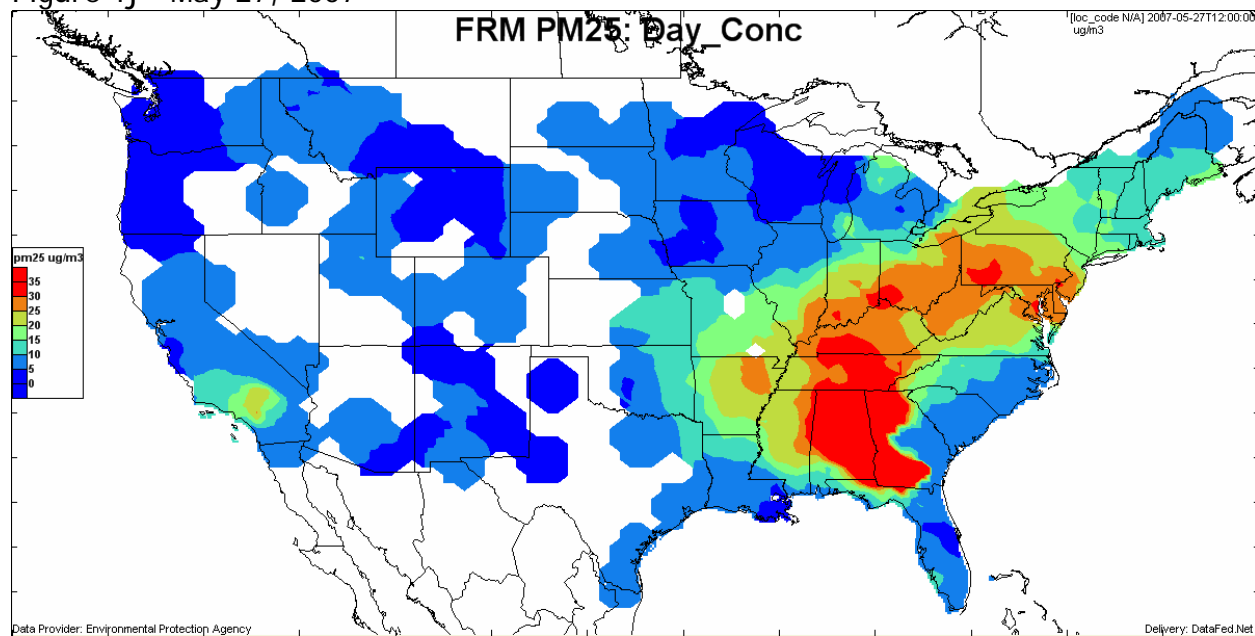


Figure 1k - May 28, 2007

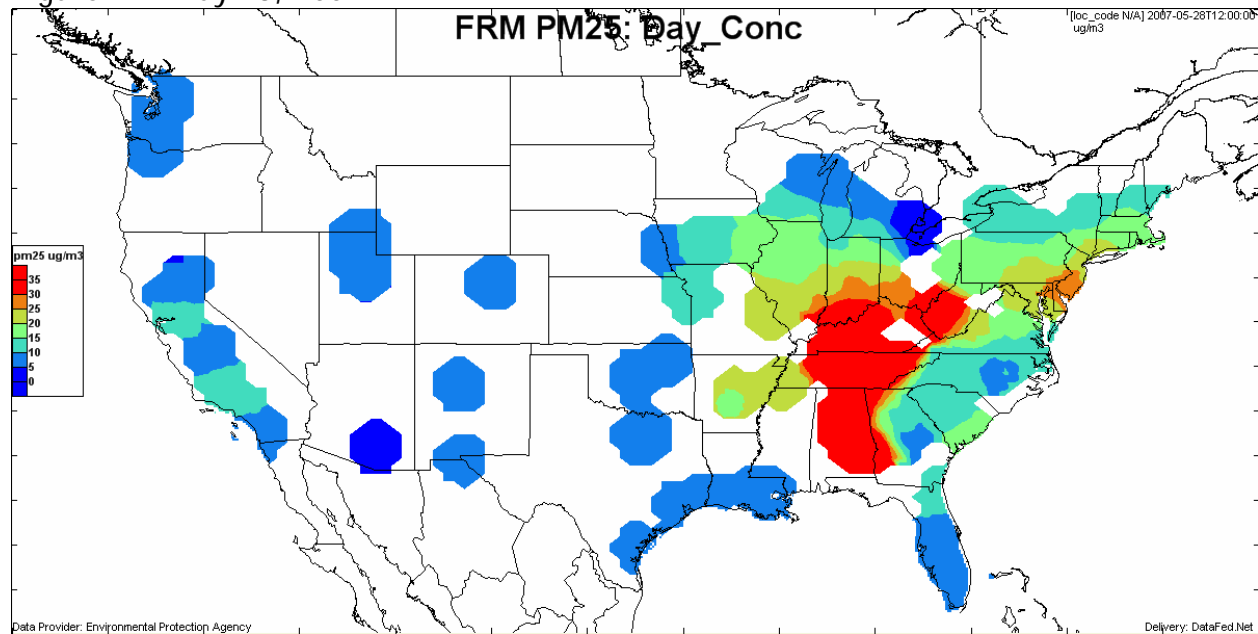


Figure 1l - May 29, 2007

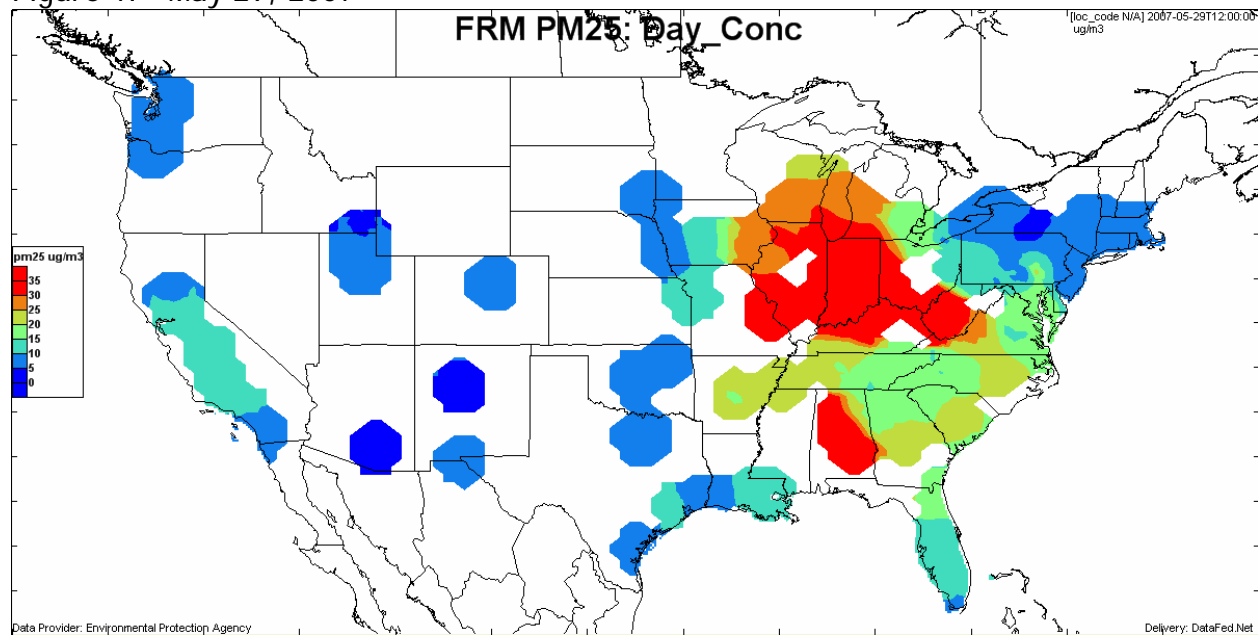


Figure 1m - May 30, 2007

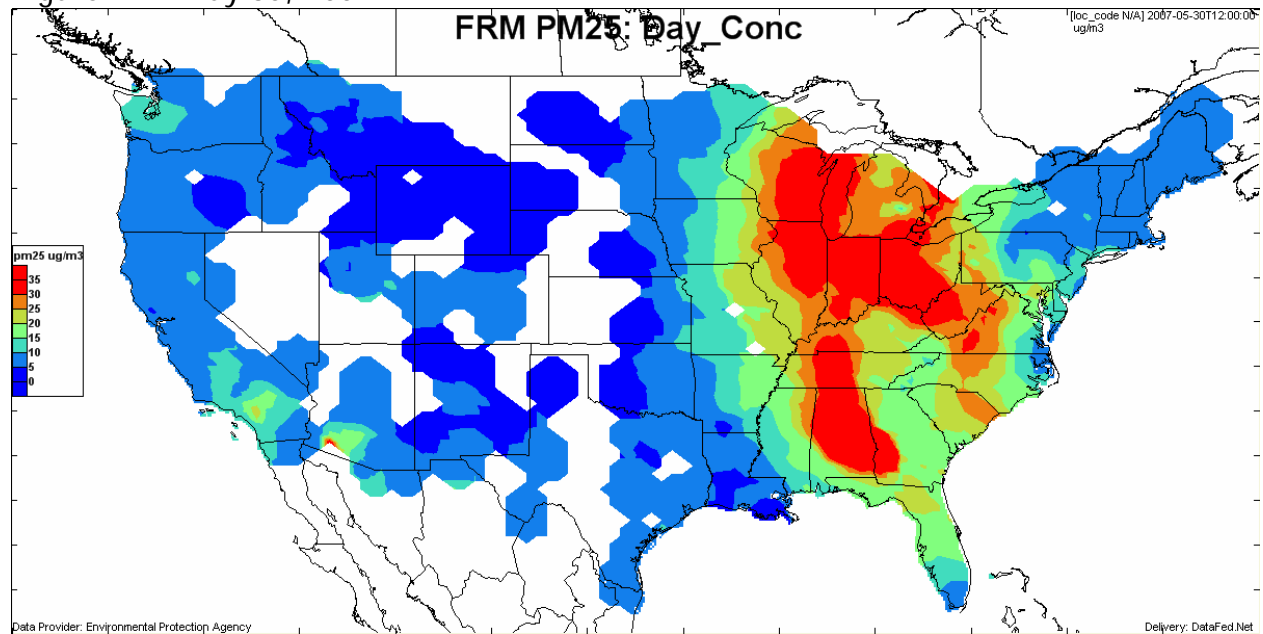


Figure 1n - May 31, 2007

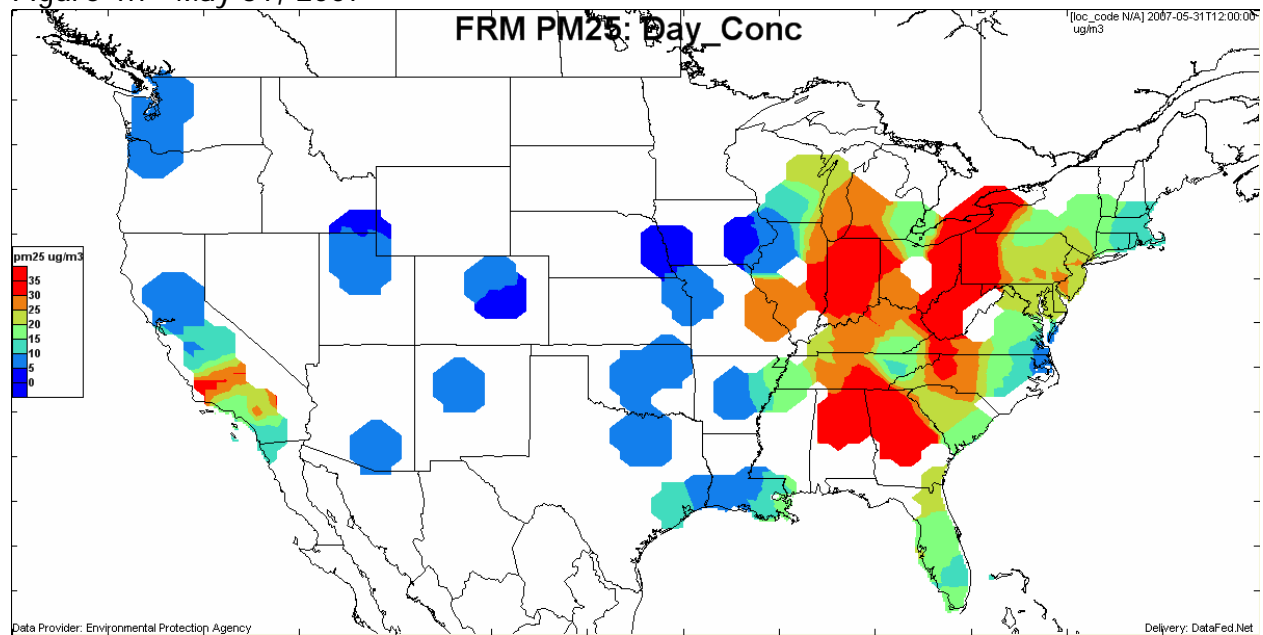




Figure 1o - June 1, 2007

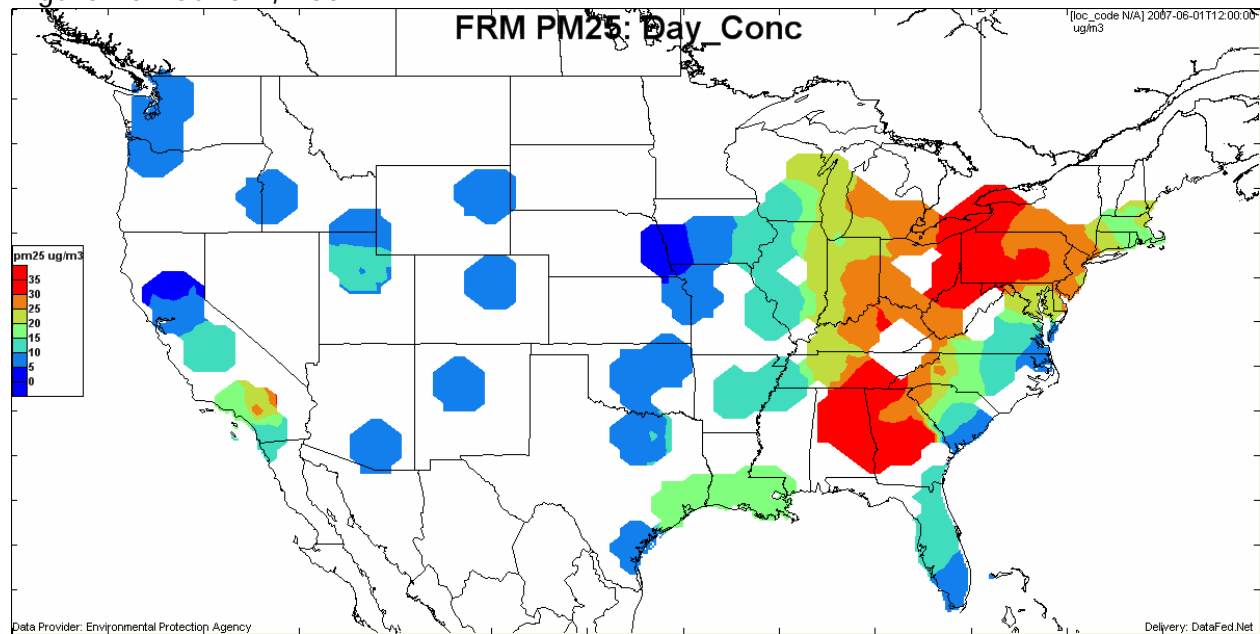
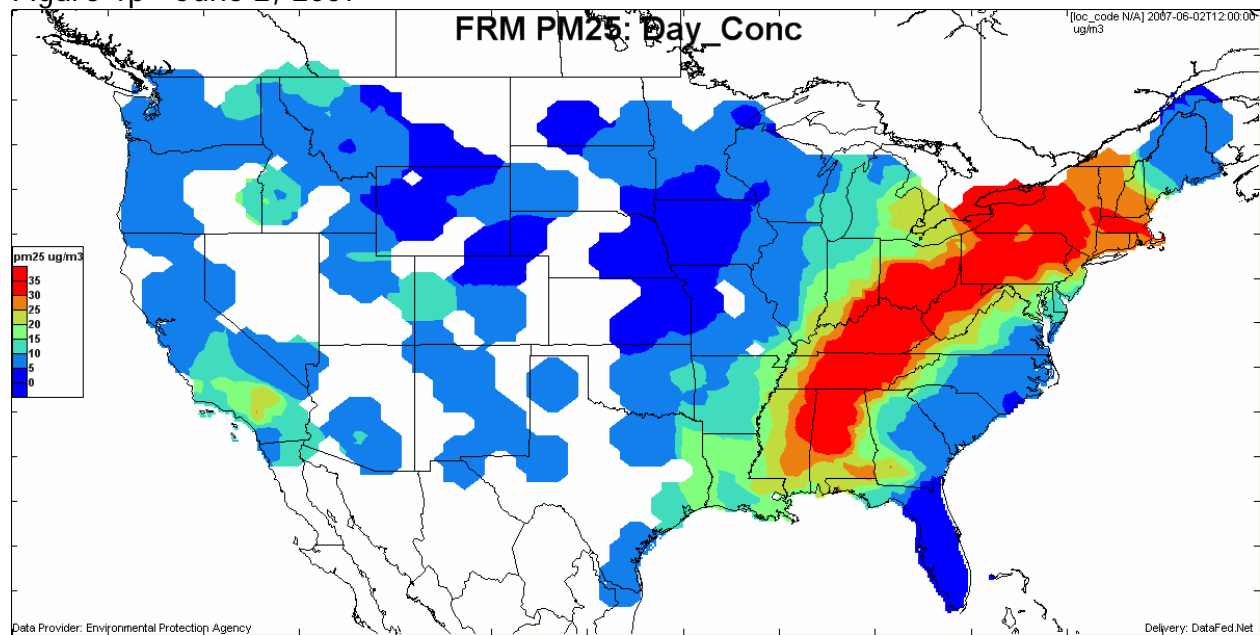


Figure 1p - June 2, 2007



## Section 2: Organic Carbon

Since PM<sub>2.5</sub> speciation data is typically only available on an every 3<sup>rd</sup> day basis, there are 4 days that particularly affected most of the state. If this information is available for other days, it will be included in the discussion for a particular site.

Figure 2a - May 15, 2007

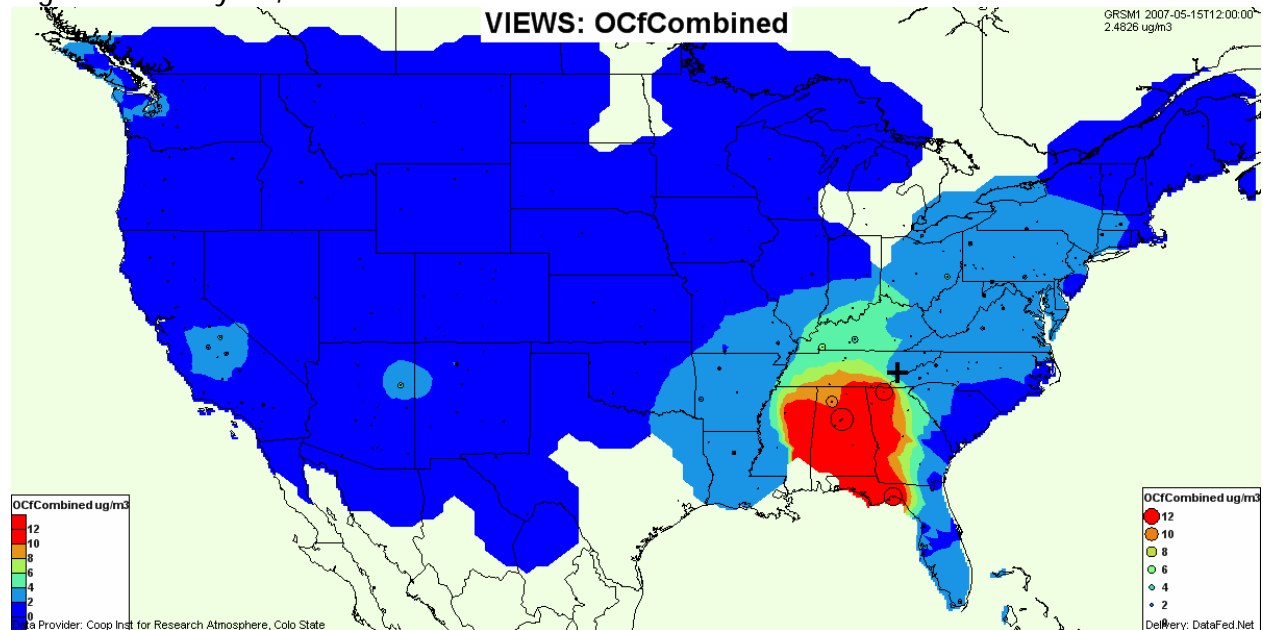


Figure 2b - May 21, 2007

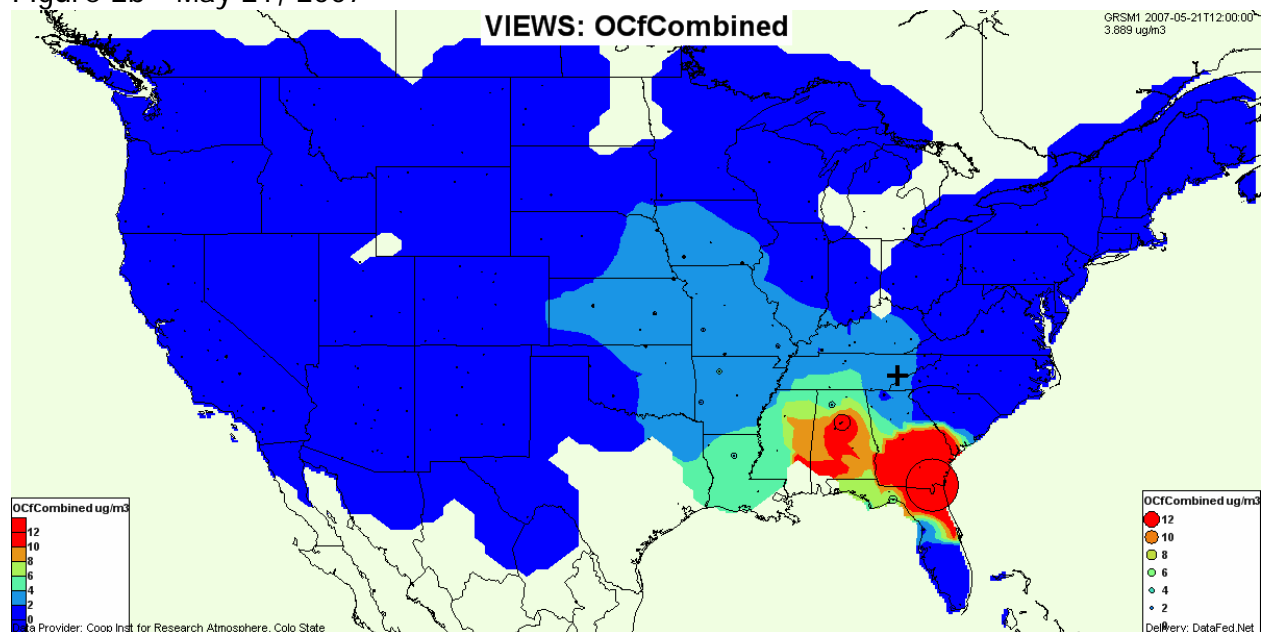


Figure 2c - May 24, 2007

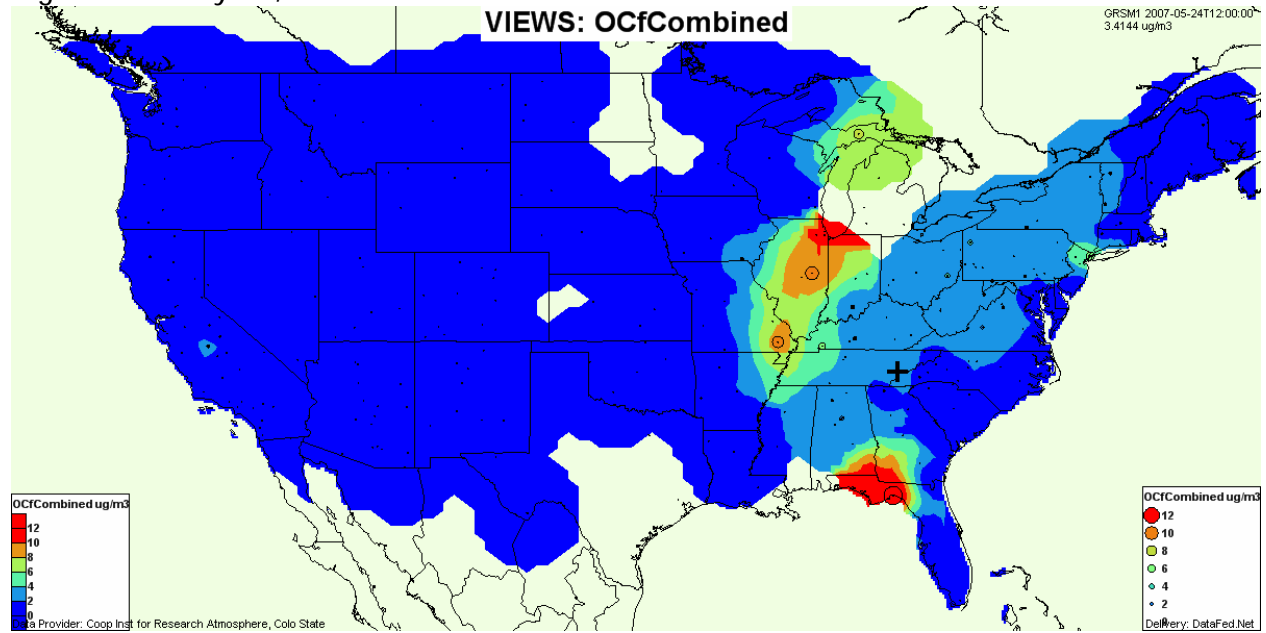


Figure 2d - May 27, 2007

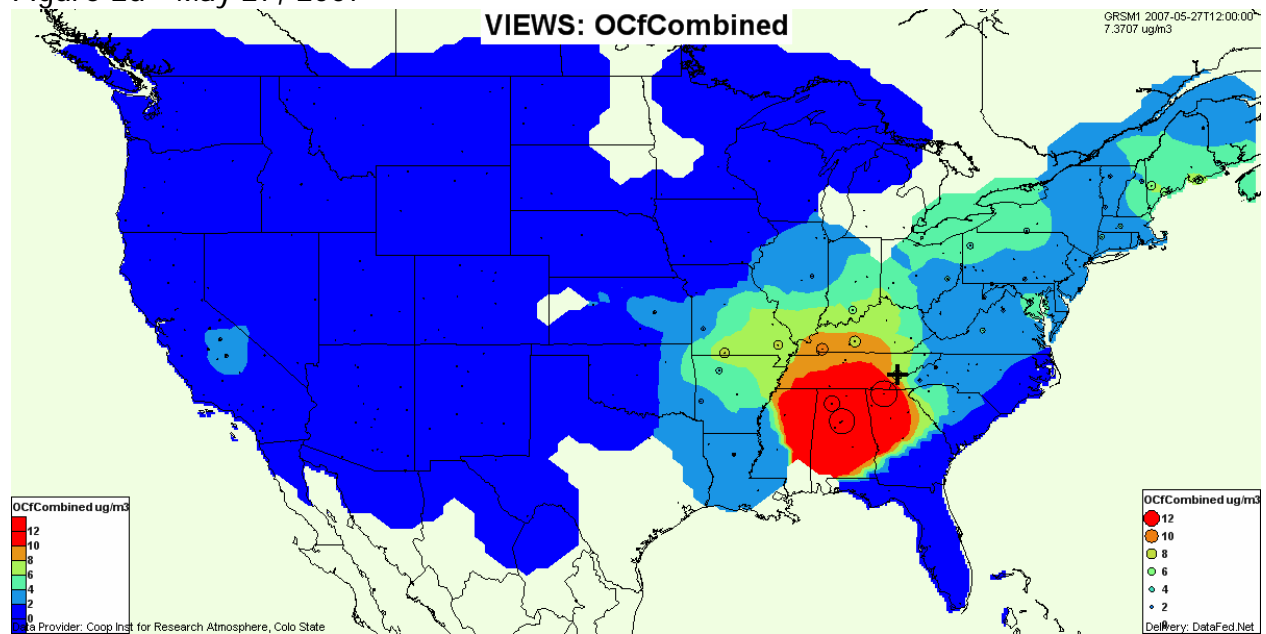
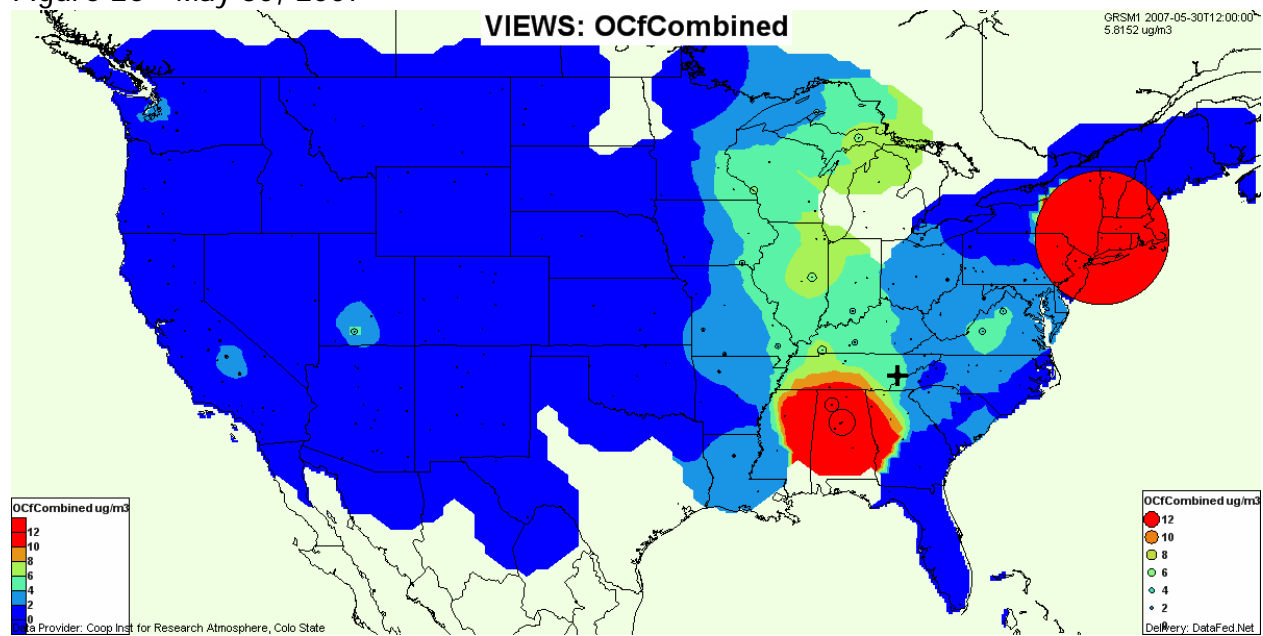


Figure 2e - May 30, 2007



### Section 3: Sulfate

Since PM<sub>2.5</sub> speciation data is typically only available on an every 3<sup>rd</sup> day basis, there are 4 days that particularly affected most of the state. If this information is available for other days, it will be included in the discussion for a particular site.

Figure 3a - May 15, 2007

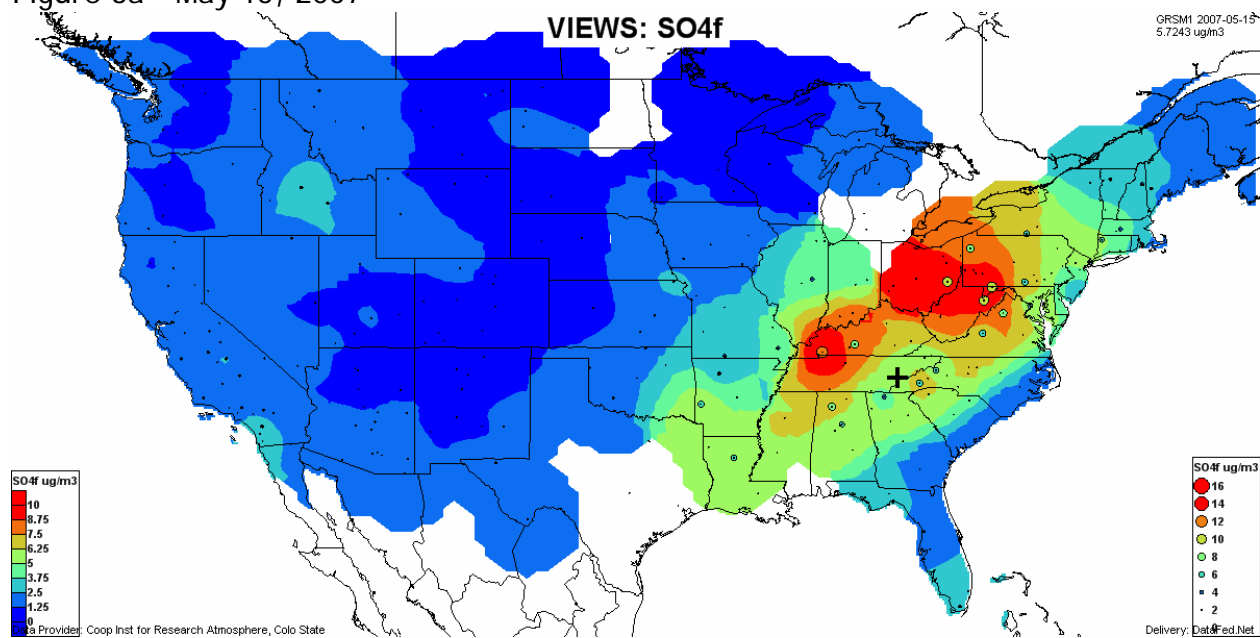


Figure 3b - May 21, 2007

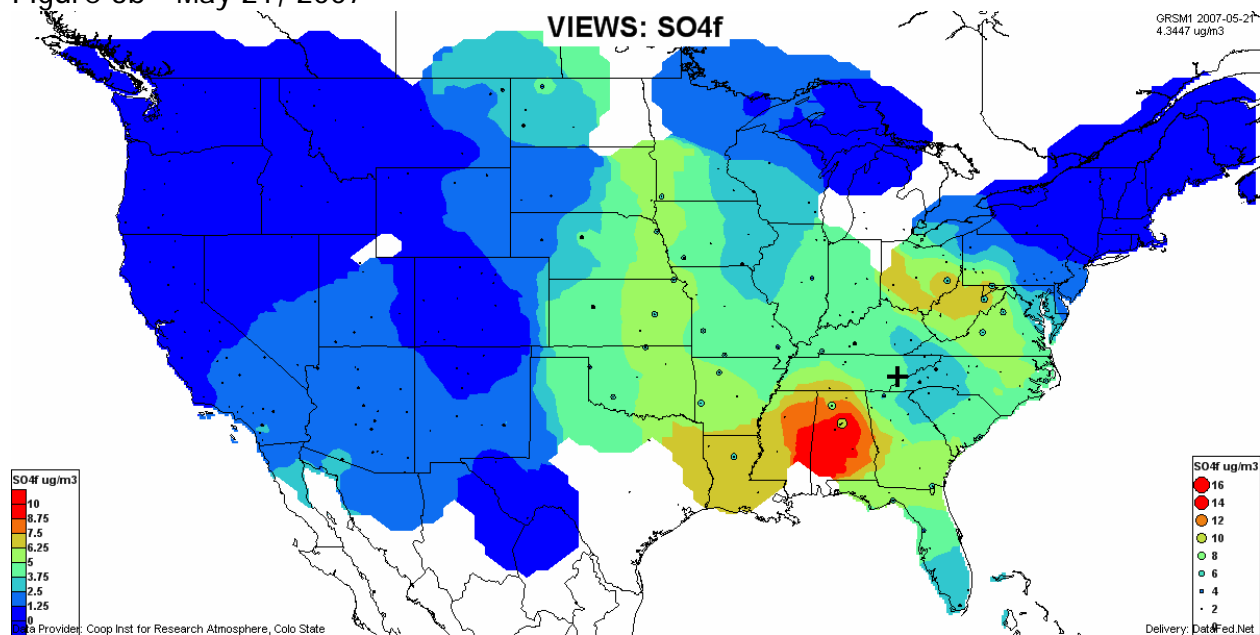


Figure 3c - May 24, 2007

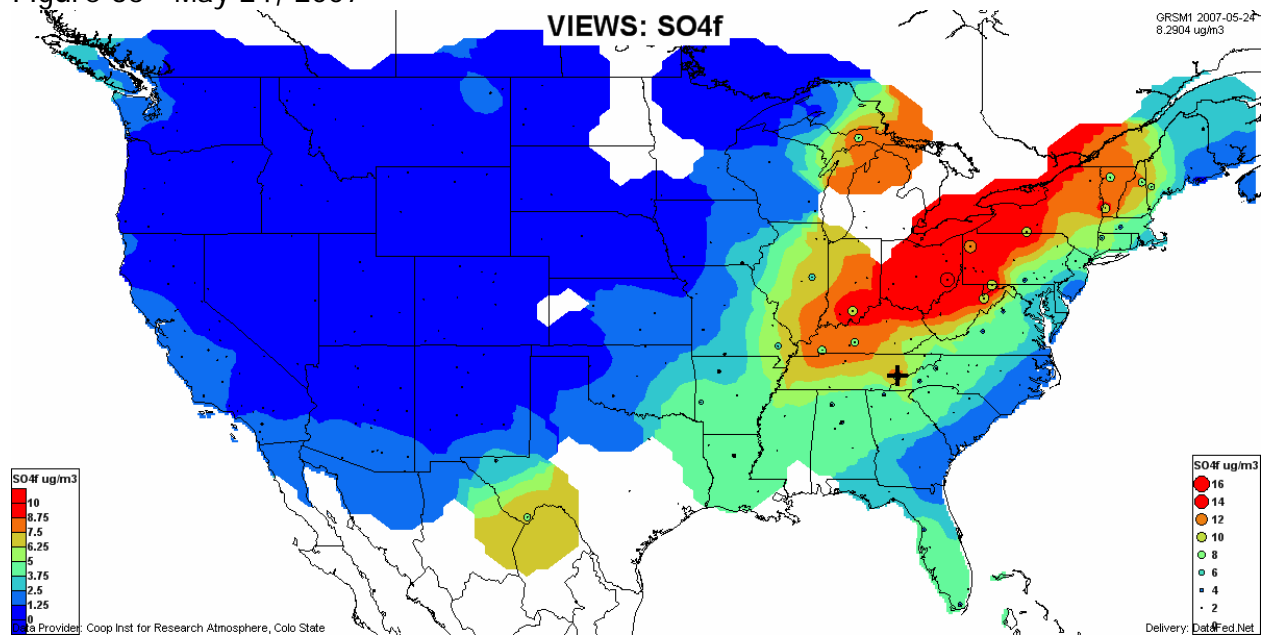


Figure 3d - May 27, 2007

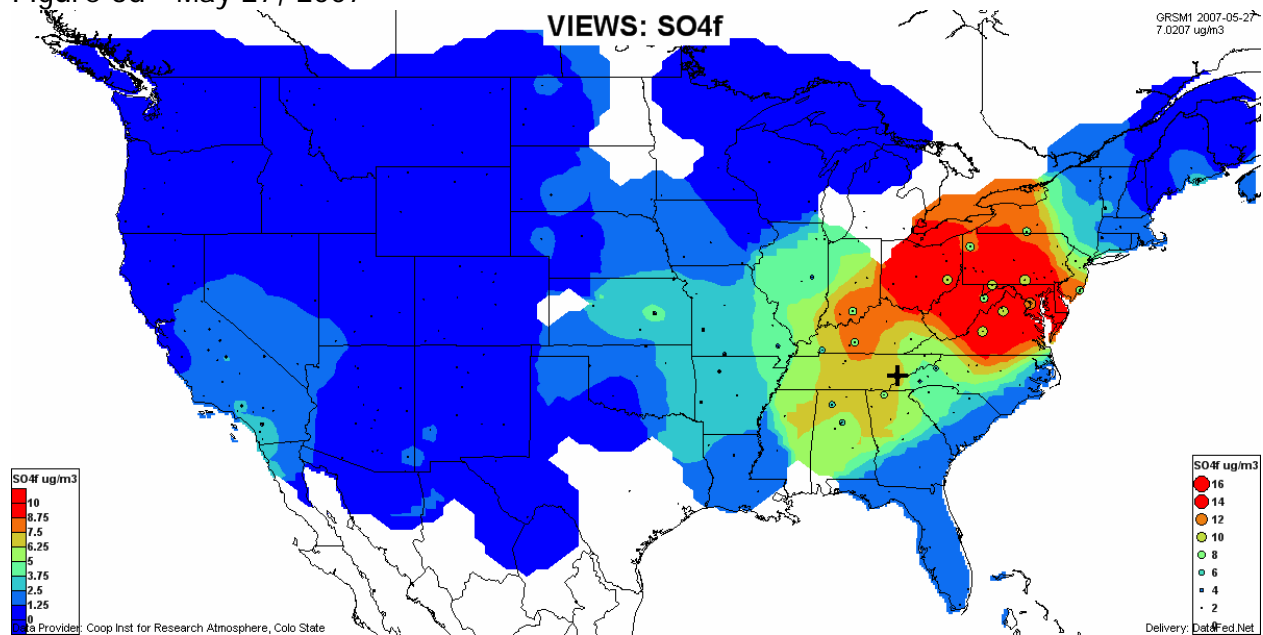
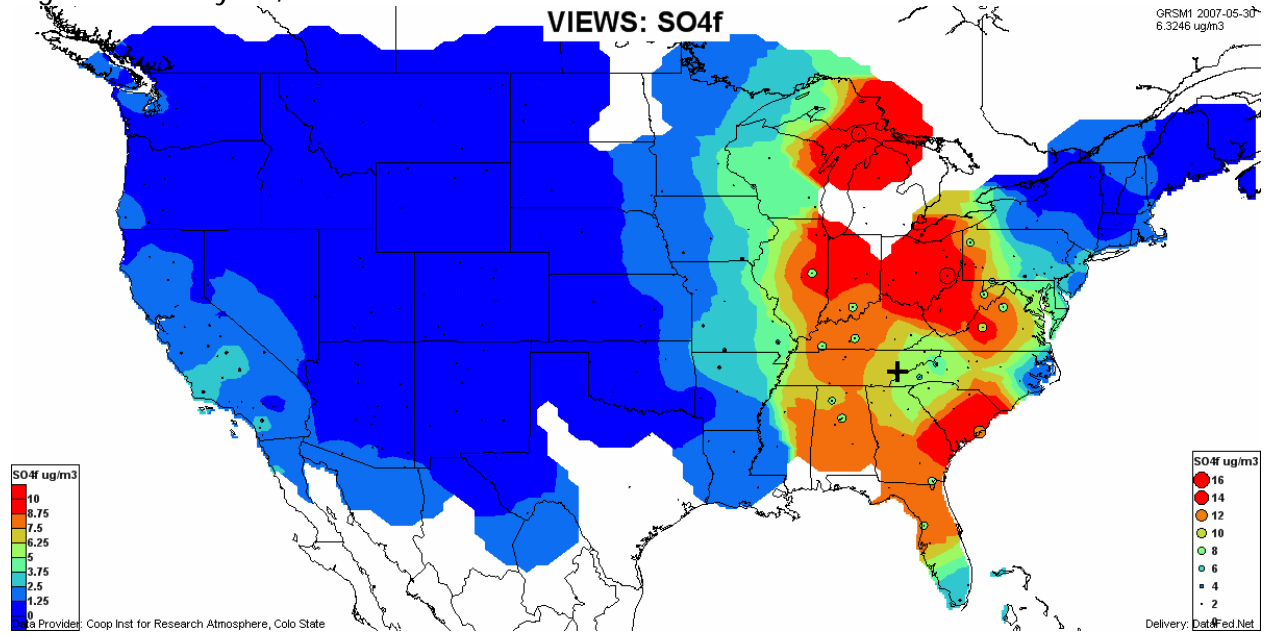




Figure 3e - May 30, 2007



# **APPENDIX B**

## **REVIEW DATA**

| AQS ID        | DATE     | VALUE | Monthly Avg. | 84 <sup>th</sup> Perc | 95 <sup>th</sup> Perc | ug Over 95th | Approved? |
|---------------|----------|-------|--------------|-----------------------|-----------------------|--------------|-----------|
| 01-027-0001-1 | 20070527 | 47.1  | 14.8         | 20.6                  | 22.0                  | 25.1         | YES       |
| 01-027-0001-1 | 20070530 | 46.6  | 14.8         | 20.6                  | 22.0                  | 24.6         | YES       |
| 01-033-1002-1 | 20070515 | 29.3  | 12.8         | 18.2                  | 23.6                  | 5.7          | YES       |
| 01-033-1002-1 | 20070527 | 37.6  | 12.8         | 18.2                  | 23.6                  | 14.0         | YES       |
| 01-033-1002-1 | 20070530 | 28.3  | 12.8         | 18.2                  | 23.6                  | 4.7          | YES       |
| 01-033-1002-1 | 20070602 | 39.8  | 15.6         | 21.7                  | 25.8                  | 14.0         | YES       |
| 01-049-1003-1 | 20070527 | 41.6  | 15.0         | 20.9                  | 24.8                  | 16.8         | YES       |
| 01-049-1003-1 | 20070530 | 27.1  | 15.0         | 20.9                  | 24.8                  | 2.3          | YES       |
| 01-053-0002-1 | 20070515 | 33.4  | 14.5         | 20.9                  | 23.7                  | 9.7          | YES       |
| 01-053-0002-1 | 20070521 | 27.7  | 14.5         | 20.9                  | 23.7                  | 4.0          | YES       |
| 01-053-0002-1 | 20070524 | 50.1  | 14.5         | 20.9                  | 23.7                  | 26.4         | YES       |
| 01-055-0010-1 | 20070505 | 30.1  | 15.4         | 20.9                  | 22.9                  | 7.2          | NO        |
| 01-055-0010-1 | 20070522 | 34.7  | 15.4         | 20.9                  | 22.9                  | 11.8         | NO        |
| 01-055-0010-1 | 20070523 | 24.5  | 15.4         | 20.9                  | 22.9                  | 1.6          | NO        |
| 01-055-0010-1 | 20070526 | 53.4  | 15.4         | 20.9                  | 22.9                  | 30.5         | YES       |
| 01-055-0010-1 | 20070527 | 53.1  | 15.4         | 20.9                  | 22.9                  | 30.2         | YES       |
| 01-055-0010-1 | 20070528 | 45.9  | 15.4         | 20.9                  | 22.9                  | 23.0         | YES       |
| 01-055-0010-1 | 20070530 | 37    | 15.4         | 20.9                  | 22.9                  | 14.1         | YES       |
| 01-055-0010-1 | 20070531 | 30    | 15.4         | 20.9                  | 22.9                  | 7.1          | NO        |
| 01-055-0010-1 | 20070601 | 42.9  | 17.9         | 24.7                  | 25.7                  | 17.2         | YES       |
| 01-055-0010-1 | 20070602 | 30.3  | 17.9         | 24.7                  | 25.7                  | 4.6          | NO        |
| 01-069-0003-1 | 20070503 | 27.1  | 14.1         | 17.4                  | 22.1                  | 5.0          | NO        |
| 01-069-0003-1 | 20070515 | 46.3  | 14.1         | 17.4                  | 22.1                  | 24.2         | YES       |
| 01-069-0003-1 | 20070524 | 69.3  | 14.1         | 17.4                  | 22.1                  | 47.2         | YES       |
| 01-069-0003-1 | 20070527 | 46.5  | 14.1         | 17.4                  | 22.1                  | 24.4         | YES       |
| 01-069-0003-1 | 20070530 | 25.1  | 14.1         | 17.4                  | 22.1                  | 3.0          | YES       |
| 01-069-0003-1 | 20070602 | 29.8  | 16.0         | 22.0                  | 27.6                  | 2.2          | NO        |
| 01-101-0007-1 | 20070504 | 27.9  | 15.8         | 21.7                  | 27.2                  | 0.8          | NO        |
| 01-101-0007-1 | 20070515 | 31.3  | 15.8         | 21.7                  | 27.2                  | 4.2          | NO        |
| 01-101-0007-1 | 20070522 | 24.4  | 15.8         | 21.7                  | 27.2                  | -2.8         | NO        |
| 01-101-0007-1 | 20070523 | 51.5  | 15.8         | 21.7                  | 27.2                  | 24.4         | YES       |
| 01-101-0007-1 | 20070526 | 52.5  | 15.8         | 21.7                  | 27.2                  | 25.4         | YES       |
| 01-101-0007-1 | 20070527 | 59.8  | 15.8         | 21.7                  | 27.2                  | 32.7         | YES       |
| 01-101-0007-1 | 20070528 | 48.5  | 15.8         | 21.7                  | 27.2                  | 21.4         | YES       |
| 01-101-0007-1 | 20070529 | 37.5  | 15.8         | 21.7                  | 27.2                  | 10.4         | YES       |
| 01-101-0007-2 | 20070530 | 68    | 16.1         | 23.8                  | 27.3                  | 40.7         | YES       |
| 01-103-0011-1 | 20070515 | 42.5  | 13.9         | 19.7                  | 24.2                  | 18.3         | YES       |
| 01-103-0011-1 | 20070527 | 33.8  | 13.9         | 19.7                  | 24.2                  | 9.6          | YES       |
| 01-103-0011-1 | 20070530 | 40.3  | 13.9         | 19.7                  | 24.2                  | 16.1         | YES       |
| 01-103-0011-1 | 20070602 | 40.5  | 17.5         | 24.5                  | 31.2                  | 9.3          | YES       |
| 01-113-0001-2 | 20070503 | 28.2  | 16.9         | 21.3                  | 29.9                  | -1.7         | NO        |
| 01-113-0001-2 | 20070521 | 29.4  | 16.9         | 21.3                  | 29.9                  | -0.5         | NO        |
| 01-113-0001-2 | 20070527 | 56.3  | 16.9         | 21.3                  | 29.9                  | 26.4         | YES       |
| 01-113-0001-2 | 20070530 | 78.9  | 16.9         | 21.3                  | 29.9                  | 49.0         | YES       |
| 01-117-0006-1 | 20070602 | 35.1  | 17.5         | 25.1                  | 29.2                  | 5.9          | YES       |
| 01-125-0004-1 | 20070515 | 32.5  | 13.9         | 21.0                  | 24.1                  | 8.4          | YES       |
| 01-125-0004-1 | 20070527 | 33.3  | 13.9         | 21.0                  | 24.1                  | 9.2          | YES       |

| AQS ID        | DATE     | VALUE | Monthly Avg. | 84 <sup>th</sup> Perc | 95 <sup>th</sup> Perc | ug Over 95th | Approved? |
|---------------|----------|-------|--------------|-----------------------|-----------------------|--------------|-----------|
| 01-125-0004-1 | 20070530 | 38.3  | 13.9         | 21.0                  | 24.1                  | 14.2         | YES       |
| 01-125-0004-1 | 20070602 | 36.8  | 17.3         | 25.1                  | 33.3                  | 3.6          | YES       |
| 01-127-0002-1 | 20070521 | 32.1  | 14.3         | 19.7                  | 25.6                  | 6.5          | NO        |
| 01-127-0002-1 | 20070602 | 35.1  | 18.1         | 25.9                  | 34.5                  | 0.6          | YES       |

## Jefferson County Department of Health

| AQS ID        | DATE     | VALUE | Monthly Avg. | 84 <sup>th</sup> Perc | 95 <sup>th</sup> Perc | ug Over 95 <sup>th</sup> | Approved? |
|---------------|----------|-------|--------------|-----------------------|-----------------------|--------------------------|-----------|
| 01-073-0023-1 | 20070514 | 32.5  | 20.1         | 31.5                  | 40.4                  | -7.9                     | NO        |
| 01-073-2003-1 | 20070514 | 28    | 18.2         | 25.3                  | 31.6                  | -3.6                     | NO        |
| 01-073-0023-1 | 20070515 | 41.3  | 20.1         | 31.5                  | 40.4                  | 0.9                      | YES       |
| 01-073-0023-2 | 20070515 | 41    | 20.5         | 31.0                  | 33.3                  | 7.8                      | YES       |
| 01-073-1005-1 | 20070515 | 36.1  | 16.6         | 24.8                  | 28.3                  | 7.8                      | YES       |
| 01-073-1009-1 | 20070515 | 37.6  | 15.8         | 23.0                  | 27.1                  | 10.6                     | YES       |
| 01-073-2003-1 | 20070515 | 42.9  | 18.2         | 25.3                  | 31.6                  | 11.3                     | YES       |
| 01-073-2003-2 | 20070515 | 41.3  | 17.2         | 23.5                  | 27.3                  | 14.0                     | YES       |
| 01-073-2006-1 | 20070515 | 38.9  | 16.3         | 22.7                  | 26.8                  | 12.1                     | YES       |
| 01-073-5002-1 | 20070515 | 34.2  | 15.9         | 22.4                  | 25.1                  | 9.1                      | NO        |
| 01-073-5003-1 | 20070515 | 38.5  | 15.4         | 21.3                  | 26.3                  | 12.3                     | YES       |
| 01-073-0023-1 | 20070516 | 15.4  | 20.1         | 31.5                  | 40.4                  | -25.0                    | NO        |
| 01-073-2003-1 | 20070516 | 17.6  | 18.2         | 25.3                  | 31.6                  | -14.0                    | NO        |
| 01-073-0023-1 | 20070522 | 53.3  | 20.1         | 31.5                  | 40.4                  | 13.0                     | YES       |
| 01-073-2003-1 | 20070522 | 42.7  | 18.2         | 25.3                  | 31.6                  | 11.1                     | YES       |
| 01-073-0023-1 | 20070523 | 54.6  | 20.1         | 31.5                  | 40.4                  | 14.3                     | YES       |
| 01-073-2003-1 | 20070523 | 57.7  | 18.2         | 25.3                  | 31.6                  | 26.1                     | YES       |
| 01-073-0023-2 | 20070524 | 17.7  | 20.5         | 31.0                  | 33.3                  | -15.6                    | NO        |
| 01-073-1009-2 | 20070524 | 13.3  | 15.9         | 23.4                  | 35.6                  | -22.3                    | NO        |
| 01-073-0023-1 | 20070526 | 52.4  | 20.1         | 31.5                  | 40.4                  | 12.1                     | YES       |
| 01-073-2003-1 | 20070526 | 51.3  | 18.2         | 25.3                  | 31.6                  | 19.7                     | YES       |
| 01-073-0023-1 | 20070527 | 51.6  | 20.1         | 31.5                  | 40.4                  | 11.3                     | YES       |
| 01-073-1005-1 | 20070527 | 42.1  | 16.6         | 24.8                  | 28.3                  | 13.8                     | YES       |
| 01-073-1009-1 | 20070527 | 49.5  | 15.8         | 23.0                  | 27.1                  | 22.5                     | YES       |
| 01-073-2003-1 | 20070527 | 44.8  | 18.2         | 25.3                  | 31.6                  | 13.2                     | YES       |
| 01-073-2006-1 | 20070527 | 43.6  | 16.3         | 22.7                  | 26.8                  | 16.8                     | YES       |
| 01-073-5002-1 | 20070527 | 37.2  | 15.9         | 22.4                  | 25.1                  | 12.1                     | YES       |
| 01-073-5003-1 | 20070527 | 38.6  | 15.4         | 21.3                  | 26.3                  | 12.4                     | YES       |
| 01-073-0023-1 | 20070528 | 53.3  | 20.1         | 31.5                  | 40.4                  | 13.0                     | YES       |
| 01-073-2003-1 | 20070528 | 51.4  | 18.2         | 25.3                  | 31.6                  | 19.8                     | YES       |
| 01-073-0023-1 | 20070529 | 39.5  | 20.1         | 31.5                  | 40.4                  | -0.9                     | YES       |
| 01-073-0023-1 | 20070530 | 59.6  | 20.1         | 31.5                  | 40.4                  | 19.3                     | YES       |
| 01-073-0023-2 | 20070530 | 58.7  | 20.5         | 31.0                  | 33.3                  | 25.5                     | YES       |
| 01-073-1005-1 | 20070530 | 44.1  | 16.6         | 24.8                  | 28.3                  | 15.8                     | YES       |
| 01-073-1005-2 | 20070530 | 44.2  | 13.5         | 16.9                  | 22.1                  | 22.1                     | YES       |
| 01-073-1009-1 | 20070530 | 43.6  | 15.8         | 23.0                  | 27.1                  | 16.6                     | YES       |
| 01-073-1009-2 | 20070530 | 42.2  | 15.9         | 23.4                  | 35.6                  | 6.6                      | YES       |
| 01-073-1010-1 | 20070530 | 64.3  | 16.7         | 23.3                  | 25.1                  | 39.2                     | YES       |
| 01-073-1010-2 | 20070530 | 64.4  | 16.6         | 23.6                  | 24.9                  | 39.5                     | YES       |
| 01-073-2003-1 | 20070530 | 48.4  | 18.2         | 25.3                  | 31.6                  | 16.8                     | YES       |
| 01-073-2003-2 | 20070530 | 48.8  | 17.2         | 23.5                  | 27.3                  | 21.5                     | YES       |
| 01-073-2006-1 | 20070530 | 48.8  | 16.3         | 22.7                  | 26.8                  | 22.0                     | YES       |
| 01-073-2006-2 | 20070530 | 49.2  | 12.1         | 15.9                  | 19.8                  | 29.5                     | YES       |
| 01-073-5002-1 | 20070530 | 57.2  | 15.9         | 22.4                  | 25.1                  | 32.1                     | YES       |
| 01-073-5003-2 | 20070530 | 49.8  | 12.0         | 16.4                  | 19.2                  | 30.6                     | YES       |

| AQS ID        | DATE     | VALUE | Monthly Avg. | 84 <sup>th</sup> Perc | 95 <sup>th</sup> Perc | ug Over 95th | Approved? |
|---------------|----------|-------|--------------|-----------------------|-----------------------|--------------|-----------|
| 01-073-2003-1 | 20070531 | 29.6  | 18.2         | 25.3                  | 31.6                  | -2.0         | NO        |
| 01-073-0023-1 | 20070601 | 51.3  | 21.4         | 32.2                  | 36.9                  | 14.4         | YES       |
| 01-073-2003-1 | 20070601 | 44.6  | 20.1         | 29.7                  | 36.1                  | 8.5          | YES       |
| 01-073-0023-1 | 20070602 | 48.2  | 21.4         | 32.2                  | 36.9                  | 11.3         | YES       |
| 01-073-1005-1 | 20070602 | 45.7  | 19.4         | 26.9                  | 33.9                  | 11.8         | YES       |
| 01-073-1009-1 | 20070602 | 40.6  | 18.5         | 27.4                  | 34.9                  | 5.7          | YES       |
| 01-073-2003-1 | 20070602 | 41.9  | 20.1         | 29.7                  | 36.1                  | 5.8          | YES       |
| 01-073-2006-1 | 20070602 | 39.5  | 18.9         | 27.9                  | 30.8                  | 8.7          | YES       |
| 01-073-5002-1 | 20070602 | 38.3  | 19.0         | 28.3                  | 29.6                  | 8.7          | YES       |
| 01-073-5003-1 | 20070602 | 42.1  | 19.8         | 28.6                  | 34.1                  | 8.0          | YES       |
| 01-073-0023-1 | 20070603 | 21.1  | 21.4         | 32.2                  | 36.9                  | -15.8        | NO        |
| 01-073-2003-1 | 20070603 | 18.3  | 20.1         | 29.7                  | 36.1                  | -17.8        | NO        |