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**Review of Evidence Regarding  
Claimed Exceptional Events  
Leading to 24-hour PM<sub>2.5</sub>  
Exceedances**

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**Shasta County, CA**

- June 23, 2008
- July 23, 2008

**Plumas County, CA**

- June 23, 2008
  - June 26, 2008
  - July 11, 2008
  - July 19, 2008
  - July 23, 2008
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US Environmental Protection Agency  
Region 9

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March 11, 2010

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## 1.0 Introduction

On March 22, 2007, EPA adopted a final rule, *Treatment of Data Influenced by Exceptional Events*<sup>1</sup> (EER) to govern the review and handling of certain air quality monitoring data for which the normal planning and regulatory processes are not appropriate. Under the rule, EPA may exclude data from use in determinations of National Ambient Air Quality Standard (NAAQS) exceedances and violations if a state demonstrates that an “exceptional event” caused the exceedances. Before EPA can exclude data from these regulatory determinations, the state must flag the data in EPA’s Air Quality System (AQS) database and, after notice and opportunity for public comment, submit a demonstration to justify the exclusion. After considering the weight of evidence provided in the demonstration, EPA decides whether or not to concur with each flag.

On August 28, 2009, California’s Air Resources Board (CARB) submitted a preliminary demonstration for high-PM<sub>10</sub> and PM<sub>2.5</sub> events that occurred at various monitoring locations throughout California on twenty-seven separate days in the summer of 2008. Additional clarification was submitted to EPA via email on January 19, 2010 and January 26, 2010.

This document sets forth the legal and factual basis for EPA’s decision regarding specific wildfire-related events that allegedly caused exceedances of the 24-hour PM<sub>2.5</sub> standard in the summer of 2008 at: the Redding, Shasta County monitor on June 23 and July 23, 2008; the Portola, Plumas County monitor on June 23, June 26, July 11, and July 23, 2008; and the Quincy, Plumas County monitor on June 23 and July 19, 2008.

## 2.0 Summary of the Events

In the summer of 2008, California experienced a confluence of events resulting in one of California’s worst summer fire seasons in history. In June 2008, California’s governor declared a statewide drought, the first time a California statewide drought declaration had ever been made.<sup>2</sup> Then, starting on June 20, 2008, a series of thunderstorms hit California. Lightning strikes ignited hundreds of fires throughout Northern and Central California. On June 28, 2008, the President of the United States declared a state of emergency for seven counties due to emergency conditions resulting from wildfires.<sup>3</sup> On July 4, four more counties were added to the list.<sup>4</sup> All told, the fires burned over one million acres.<sup>5</sup>

Figure 1 is a map noting size, start date, and location of Summer 2008 California fires. It also shows the eleven counties declared emergency areas due to wildfires.

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<sup>1</sup> 13560 Federal Register / Vol. 72, No. 55 / Thursday, March 22, 2007 / Rules and Regulations.

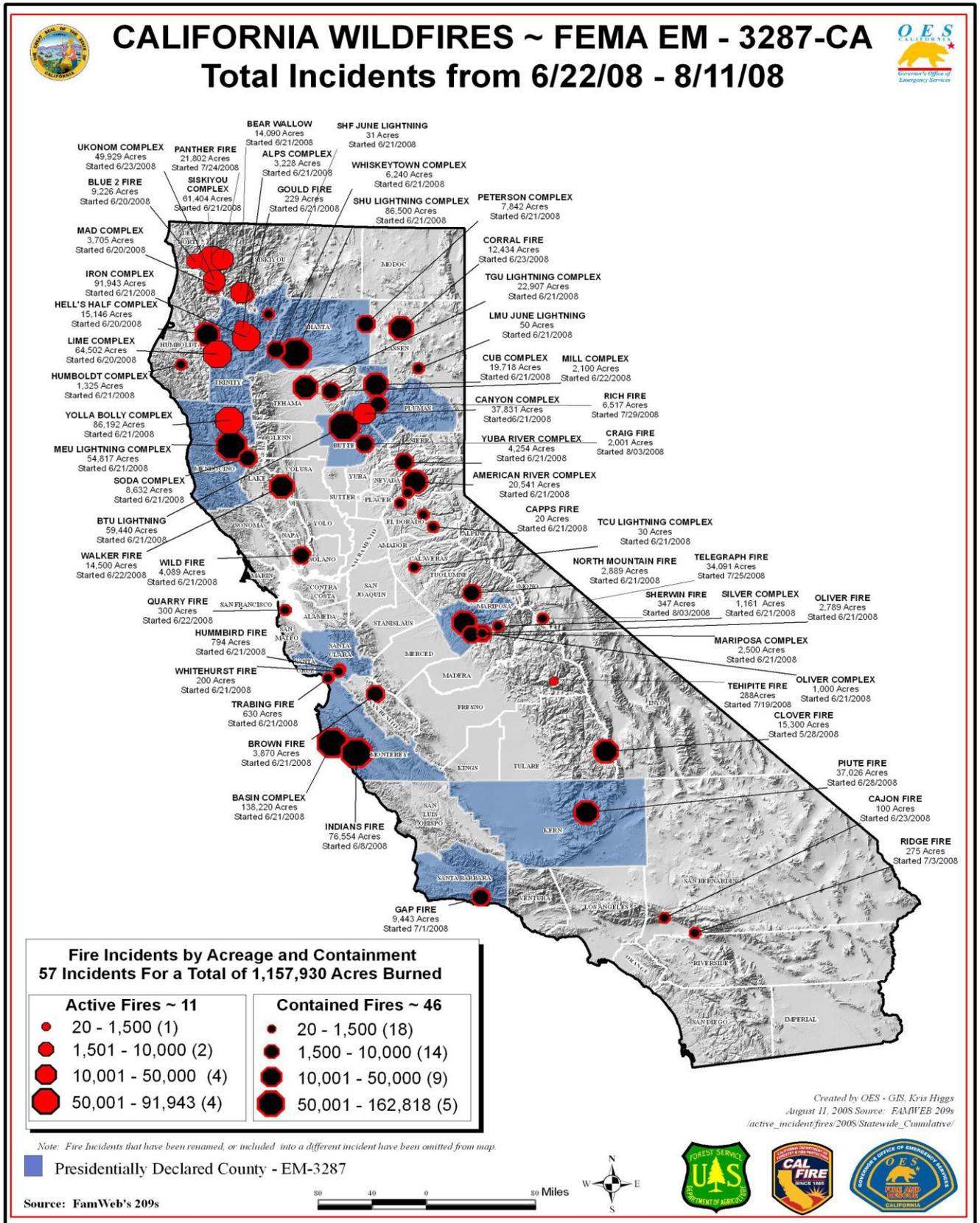
<sup>2</sup> <http://www.water.ca.gov/drought/docs/CalDrought.pdf>. “Recent California Drought,” California Department of Water Resources. Retrieved February 5, 2010.

<sup>3</sup> <http://www.fema.gov/news/newsrelease.fema?id=44432> “President Declares Emergency Disaster for California,” Federal Emergency Management Agency. Retrieved February 5, 2010.

<sup>4</sup> <http://www.fema.gov/news/dfn.fema?id=10853>. “Federal Register Notice for California; Amendment No. 1 to Notice of an Emergency Declaration,” Federal Emergency Management Agency. Retrieved February 5, 2010.

<sup>5</sup> <http://www.bloomberg.com/apps/news?pid=newsarchive&sid=aNDa4mhKUxCU>. “California Fires Ravage Record Acreage, Spare Economy (Update 1),” Bloomberg.com. Retrieved February 5, 2010.

Figure 1: Summer 2008 California Wildfires and Presidentially Declared Emergency Areas.



Smoke contains significant amounts of particulate matter and can adversely impact air quality. CARB operates air monitors throughout California, including Federal Reference Method (FRM) monitors at Portola and Quincy in Plumas County, and Redding in Shasta County. In the summer of 2008, monitors throughout Northern and Central California recorded exceedances of the 24-hour PM<sub>2.5</sub> standard. This document addresses the exceedances listed in Table 1 that occurred at the Portola, Quincy, and Redding monitors. CARB flagged the events listed in Table 1 and requested the data be excluded as exceptional events due to effects of the Summer 2008 wildfires. This document addresses these specific days and monitors, and does not discuss the remaining PM<sub>2.5</sub> or PM<sub>10</sub> Summer 2008 flags. This does not imply that EPA will either concur or not concur on the remaining events.

Table 1: Summer 2008 PM <sub>2.5</sub> Flagged Events Under Review		
Date	Monitor	PM <sub>2.5</sub> (µg/m <sup>3</sup> )
June 23, 2008	Redding Monitor (06-089-0004-01), Shasta County	97.1
“ “	Portola Monitor (06-063-1009-01), Plumas County	41.2
“ “	Quincy Monitor (06-063-1006-01), Plumas County	142.2
June 26, 2008	Portola Monitor (06-063-1009-01), Plumas County	113.5
July 11, 2008	Portola Monitor (06-063-1009-01), Plumas County	56.0
July 19, 2008	Quincy Monitor (06-063-1006-01), Plumas County	133.0
July 23, 2008	Redding Monitor (06-089-0004-01), Shasta County	200.2
“ “	Portola Monitor (06-063-1009-01), Plumas County	68.6

### 3.0 Requirements of the Exceptional Events Rule

Pursuant to 40 CFR §50.14(c)(3)(iii) a request for EPA’s concurrence on an exceptional event flag must be accompanied by a demonstration that:

- (A) The event satisfies all of the criteria set forth in 40 CFR §50.1(j). It:
  - affects air quality;
  - is not reasonably controllable or preventable; and
  - is caused by human activity that is unlikely to recur at a particular location, or is a natural event;
- (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.

The EER also has procedural requirements. 40 CFR §50.14(c)(2)(iii) requires that data claimed to be due to an exceptional event be flagged in the AQS database, and that an initial description of the event

be provided to EPA; both must occur by July 1 of the year following the event. In addition, 40 CFR §50.14(c)(3)(i) requires that the State:

- submit a demonstration to EPA within three years of the calendar quarter of the event or 12 months prior to an EPA regulatory decision;
- provide notice and opportunity for public comment; and
- submit any public comments along with the demonstration.

The following sections evaluate CARB's demonstration for the days and events in question with respect to these requirements.

## **4.0 Criteria Set Forth in 40 CFR § 50.1(j)**

### **4.1 Affects Air Quality**

As stated in the preamble to the EER, the event in question is considered to have affected air quality if it can be shown that there is a clear causal relationship between the monitored exceedance and the event, and that the event is associated with a measured concentration in excess of normal historical fluctuations.<sup>6</sup> These criteria are discussed in detail in sections five and six below.

Smoke is made up of gas and particulate matter, and can adversely affect air quality. In the summer of 2008, Northern California experienced an extreme fire season. From June 20 – July 22, 2008, a series of thunderstorms produced over 6,000 lightning strikes throughout Northern and Central California. These ignited numerous wildfires in over 26 counties that consumed over one million acres before containment on July 29.<sup>7</sup> On June 28, seven counties were declared disaster areas, including Butte, Shasta, and Trinity Counties.<sup>8</sup> By July 4, four more counties were declared disaster areas, including Plumas County.<sup>9</sup>

Figure 2 shows the fires that started between June 20, 2008 and September 7, 2008 as well as CARB's Federal Reference Method (FRM), Federal Equivalent Method (FEM), and Beta Attenuation Method (BAM) PM<sub>2.5</sub> air monitors. The specific fires are listed in Table 2.

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<sup>6</sup> See 72 FR 13569, 72 FR 49051, and 73 FR 14702.

<sup>7</sup> August Natural Events Documentation (NED), p. 5.

<sup>8</sup> <http://www.fema.gov/news/newsrelease.fema?id=44432> "President Declares Emergency Disaster for California," Federal Emergency Management Agency. Retrieved February 5, 2010.

<sup>9</sup> <http://www.fema.gov/news/dfn.fema?id=10853>. "Federal Register Notice for California; Amendment No. 1 to Notice of an Emergency Declaration," Federal Emergency Management Agency. Retrieved February 5, 2010.

Figure 2: Major Federal Wildfires Burning in California June 20 – September 7, 2008, and PM<sub>2.5</sub> (FRM, FEM, and BAM) Monitoring Sites in California.

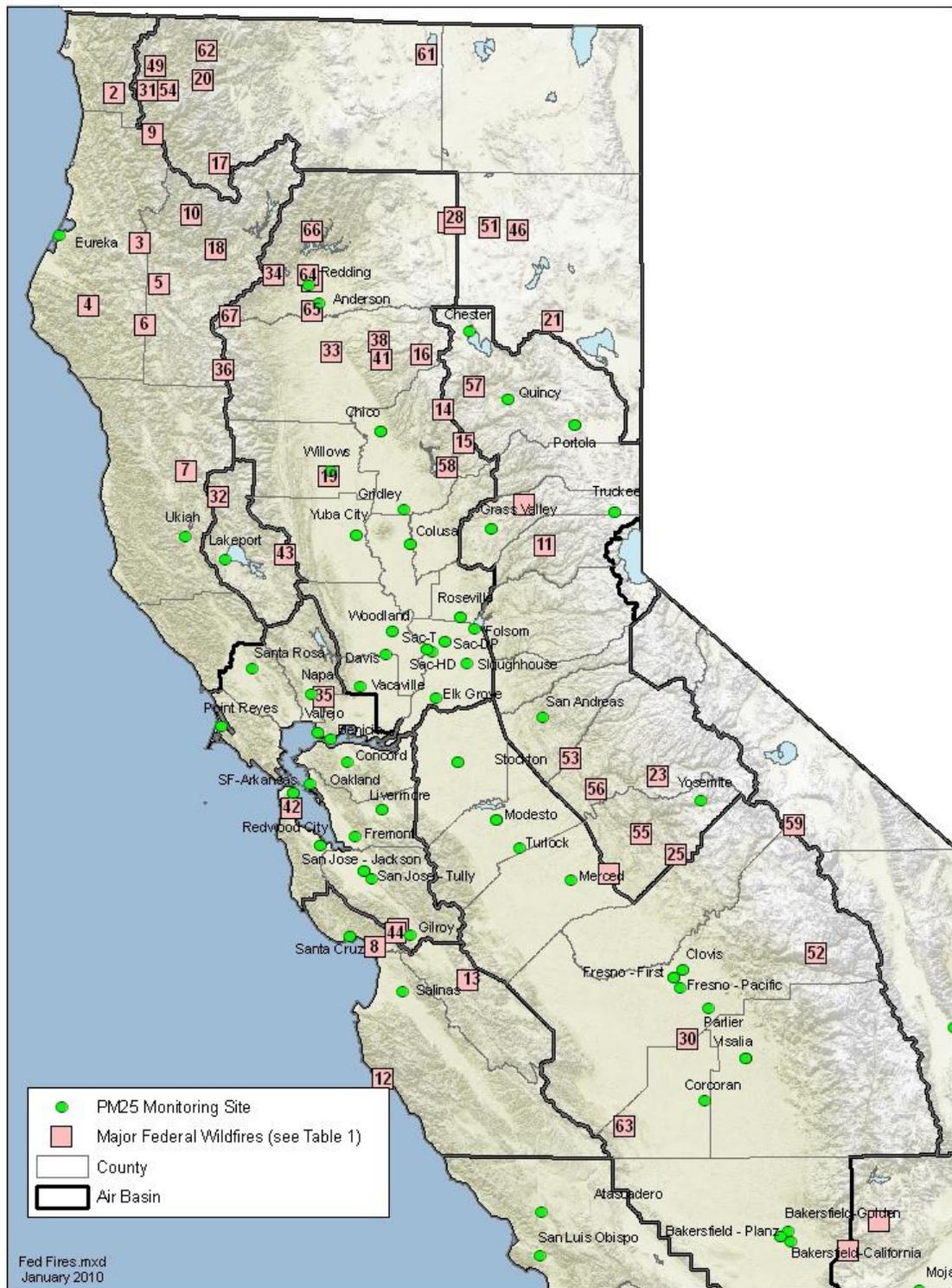


Table 2: Federal Wildland Fire Incidents in Northern California – June 20 to September 7, 2008.

Map Number	Incident Number	Incident Name	Latitude	Longitude	Size (acres)	Start Date	Controlled Date
1	CA-SRF-1057	Blue	41.5664	-123.8217	225	6/20/2008	
2	CA-SRF-1224	Blue 2	41.5664	-123.8217	9,728	6/20/2008	
3	CA-SRF-1123	Hell's Half	40.7511	-123.5956	15,146	6/20/2008	
4	CA-HUU-003384	Humboldt Complex	40.3994	-123.9494	1,325	6/20/2008	
5	CA-SHF-1041	LIME COMPLEX	40.5342	-123.4508	99,585	6/20/2008	
6	CA-SRF-1120	Mad Complex	40.3047	-123.5364	3,705	6/20/2008	
7	CA-MEU-004608	MEU Lightning Complex	39.5139	-123.2083	54,819	6/20/2008	11/4/2008
8	CA-CZU-005581	TRABING	36.9319	-121.8089	630	6/20/2008	6/24/2008
9	CA-SRF-1126	Ukonom-South Complex	41.3547	-123.5364	58,871	6/20/2008	
10	CA-SHF-001079	ALPS COMPLEX	40.9194	-123.2381	1,218	6/21/2008	
11	CA-TNF-1011	American River Complex	39.1439	-120.6725	20,541	6/21/2008	
12	CA-LPF-1649	Basin Complex	36.2103	-121.7394	162,818	6/21/2008	
13	CA-BEU-002390	BROWN	36.7622	-121.1750	3,870	6/21/2008	6/24/2008
14	CA-BTU-007660	BTU Lightning Complex	39.8797	-121.4000	64,995	6/21/2008	10/3/2008
15	CA-PNF-000539	Canyon Complex	39.7039	-121.2483	47,680	6/21/2008	10/1/2008
16	CA-LNF-2713	CUB Complex	40.1808	-121.5622	19,718	6/21/2008	
17	CA-KNF-002970	Gould	41.2003	-123.0464	229	6/21/2008	7/2/2008
18	CA-SHF-1057	Iron & Alps Complexes	40.7325	-123.0539	105,805	6/21/2008	
19	CA-MNF-000579	June ABCD Complex	39.5025	-122.2025	3,000	6/21/2008	
20	CA-KNF-3393	Klamath Theater	41.6600	-123.1850	192,038	6/21/2008	
21	CA-LNF-002729	LNF June Lightning Complex	40.3750	-120.6250	200	6/21/2008	7/3/2008
22	CA-MMU-008048	Mariposa Complex	37.3450	-120.2142	2,500	6/21/2008	6/24/2008
23	CA-STF-1063	North Mountain	37.8833	-119.8792	2,889	6/21/2008	
24	CA-MMU-008107	OLIVER	37.4511	-119.7533	2,789	6/21/2008	
25	CA-SNF-0715	OLIVER COMPLEX	37.4511	-119.7533	1,000	6/21/2008	
26	CA-LNF-002745	Peterson	40.9114	-121.3789	1,200	6/21/2008	
27	CA-LNF-002782	Peterson Complex	40.9000	-121.3333	7,842	6/21/2008	
28	CA-LMU-2725	Popcorn	40.9347	-121.3342	3,000	6/21/2008	
29	CA-SHU-004727	SHU LIGHTNING COMPLEX	40.5708	-122.3558	86,500	6/21/2008	

Map Number	Incident Number	Incident Name	Latitude	Longitude	Size (acres)	Start Date	Controlled Date
30	CA-SNF-718	SILVER COMPLEX	36.4392	-119.6772	1,161	6/21/2008	
31	CA-KNF-002975	Siskiyou / Blue 2 Complex	41.5894	-123.5800	82,186	6/21/2008	
32	CA-MNF-645	SODA COMPLEX	39.3750	-122.9756	8,632	6/21/2008	
33	CA-TGU-4245	TGU LIGHTNING COMPLEX	40.1872	-122.2069	22,907	6/21/2008	7/6/2008
34	CA-WNP-1095	Whiskeytown Complex	40.6000	-122.6333	6,420	6/21/2008	
35	CA-LNU-004790	WILD	38.3000	-122.2044	NR	6/21/2008	6/26/2008
36	CA-MNF-000663	Yolla Bolly Complex	40.0703	-122.9653	NR	6/21/2008	9/15/2008
37	CA-TNF-1015	Yuba River Complex	39.3664	-120.8206	4,254	6/21/2008	
38	CA-LNF-002776	Antelope	40.2519	-121.8664	600	6/22/2008	
39	CA-SCU-3094	HUMMINGBIRD	37.0353	-121.6553	794	6/22/2008	
40	CA-LNF-002777	Mill	40.1503	-121.8475	1,500	6/22/2008	
41	CA-LNF-002781	Mill Complex	40.1503	-121.8475	2,100	6/22/2008	
42	CA-CZU-005708	Quarry	37.6847	-122.4033	300	6/22/2008	6/29/2008
43	CA-LNU-004843	WALKER	39.0714	-122.4947	NR	6/22/2008	7/3/2008
44	CA-SCU-003091	WHITEHURST	37.0100	-121.6692	200	6/22/2008	
45	CA-BDF-6944	CAJON	34.2281	-117.4228	100	6/23/2008	
46	CA-LMU-2759	Corral	40.8681	-120.8825	12,434	6/23/2008	
47	CA-KRN-19301	BENA	35.2725	-118.6128	120	6/27/2008	6/27/2008
48	CA-SQF-001356	PIUTE	35.4308	-118.4011	37,026	6/28/2008	8/31/2008
49	CA-KNF-003204	No Mans	41.7219	-123.5325	200	6/30/2008	7/6/2008
50	CA-LPF-1778	Gap	34.4869	-119.7828	9,443	7/1/2008	
51	CA-LMU-002934	Dixie	40.8853	-121.0844	350	7/2/2008	7/4/2008
52	CA-KNP-0020	Tehipite	36.9047	-118.7986	11,596	7/19/2008	12/10/2008
53	CA-TCU-006881	FRENCH	37.9767	-120.4808	102	7/22/2008	7/26/2008
54	CA-KNF-003624	Panther	41.5919	-123.4308	72,344	7/22/2008	
55	<a href="#">CA-MMU-009779</a>	Telegraph	37.5675	-119.9969	34,091	7/25/2008	
56	<a href="#">CA-TCU-7033</a>	Serpentine	37.8089	-120.3014	162	7/26/2008	7/28/2008
57	<a href="#">CA-PNF-000784</a>	RICH	40.0114	-121.1836	6,112	7/29/2008	12/1/2008
58	<a href="#">CA-BTU-9395</a>	Craig	39.5667	-121.3669	2,001	8/3/2008	8/22/2008
59	<a href="#">CA-INF-000656</a>	SHERWIN	37.6106	-118.9403	347	8/3/2008	
60	<a href="#">CA-LPF-</a>	Santa Lucia	34.9678	-120.1297	244	8/15/2008	9/2/2008

Map Number	Incident Number	Incident Name	Latitude	Longitude	Size (acres)	Start Date	Controlled Date
	<a href="#">002250</a>	Lightning Complex					
61	<a href="#">CA-BNP-0437</a>	Jack	41.8267	-121.5594	6,900	8/17/2008	
62	<a href="#">CA-KNF-004096</a>	Slinkard	41.8164	-123.1653	374	8/17/2008	
63	<a href="#">CA-FKU-009403</a>	Avenal	35.9639	-120.1078	946	8/19/2008	8/20/2008
64	<a href="#">CA-SHU-006888</a>	Lake	40.6031	-122.3819	110	8/26/2008	8/30/2008
65	<a href="#">CA-SHU-6922</a>	Olinda	40.4122	-122.3450	186	8/27/2008	8/30/2008
66	<a href="#">CA-SHF-1949</a>	ELMORE	40.8450	-122.3633	343	9/7/2008	
67	<a href="#">CA-SHF-1944</a>	GULCH	40.3667	-122.9350	2,847	9/7/2008	

The National Oceanic and Atmospheric Administration’s (NOAA) descriptive text narrative for smoke/dust observed in satellite imagery describes dense smoke affecting northern California during this time period. Satellite images as well as numerous news reports and health advisories discussing smoke from the fires were submitted as part of CARB’s package.<sup>10</sup>

Given this evidence and the information presented in sections five and six below, we can reasonably conclude that the event in question had the potential to affect air quality.

#### 4.2 Not Reasonably Controllable or Preventable

Pursuant to 40 CFR § 50.14(c)(3), a state that is requesting exclusion of data affected by an exceptional event must submit a demonstration to EPA to justify the exclusion. One of the justification criteria is a showing that the event was “not reasonably controllable or preventable.” A determination of whether a particular event was reasonably controllable or preventable depends on the specific facts and circumstances surrounding the event. Therefore, EPA addresses this and other criteria of the exceptional events rule on a case by case basis.<sup>11</sup>

The Exceptional Events Rule defines a wildfire as an unplanned, unwanted wildland fire “such as fires caused by lightning...”<sup>12</sup> The Summer 2008 California fires were caused by lightning<sup>13</sup> and therefore qualify as a wildfires.

We conclude that CARB has demonstrated that the events in question were unplanned wildfires ignited by uncontrollable natural events, and were not reasonably controllable or preventable.

#### 4.3 Natural Event

The Exceptional Events Rule states that “both wildfires and wildland fire use fires fall within the meaning of ‘natural events’ as that term is used in CAA § 319. Therefore, ambient particulate matter

<sup>10</sup> August NED, Appendix C, Appendix F, and Appendix G.

<sup>11</sup> 72 FR 13560, 13564

<sup>12</sup> 72 FR 13560, 13566

<sup>13</sup> August NED, Appendix G.

and ozone concentrations due to smoke from a wildland fire will be considered for treatment as an exceptional event if the fire is determined to be either a wildfire or wildland fire use fire.”<sup>14</sup>

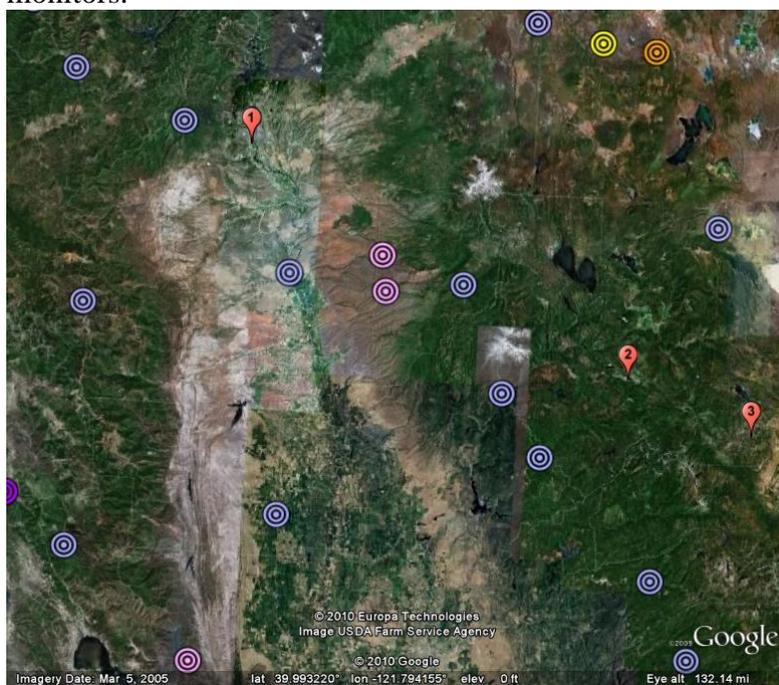
CARB asserts that the exceedances were a direct result of the lightning-ignited June and July wildfires. News reports submitted as part of CARB’s package confirm that the fires were a result of lightning strikes.<sup>15</sup> The events therefore qualify as natural events.

## 5.0 Clear Causal Relationship

Section 319 of the CAA and 40 CFR § 50.14(c)(3)(iii) require the State to demonstrate that there is a clear causal relationship between the measurement under consideration and the event that is claimed to have affected air quality in the area.

As shown in Figure 2 and Table 2 above, a number of fires were ignited primarily along California’s northern coast on June 20<sup>th</sup>. Over the following days and weeks, new fires started further inland. Figure 3 shows the location of the Redding, Quincy, and Portola PM<sub>2.5</sub> monitors and the location of some of the fires that ignited between June 20 – July 23, 2008.

Figure 3: Wildfires Ignited June 20 – July 23, 2008 near the Redding, Portola, and Quincy PM<sub>2.5</sub> monitors.



### PM<sub>2.5</sub> Monitor Icons:

1 = Redding monitor; 2 = Quincy monitor; 3 = Portola monitor

### Fire Icons:

Dark Purple target – Fires started 6/20/2008; Light Purple target – Fires started 6/21/2008;

Pink target – Fires started 6/22/2008; Orange target – Fires started 6/23/2008;

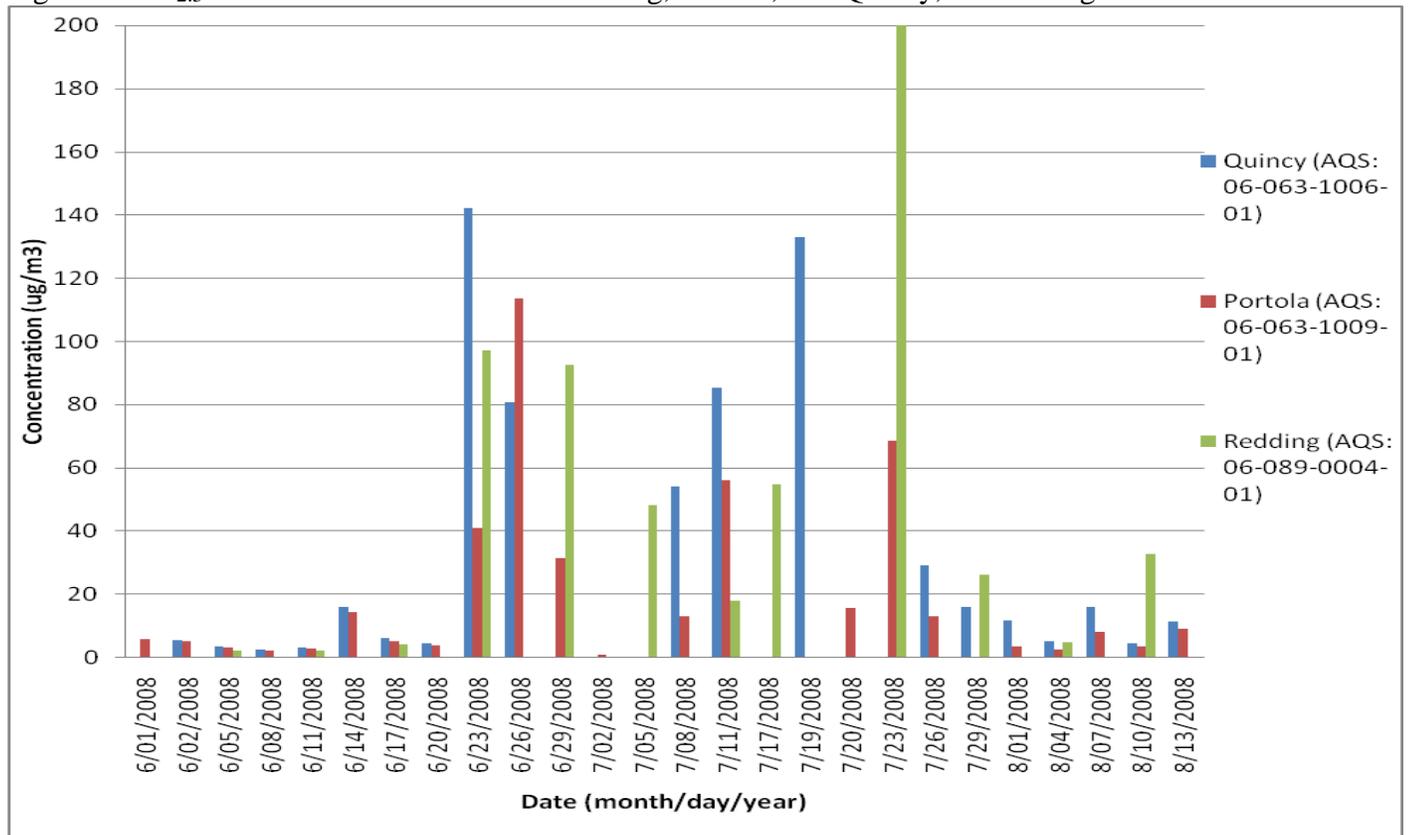
Yellow target – Fires started 7/2/2008.

<sup>14</sup> 72 FR 135660, 13566

<sup>15</sup> August NED, Appendix G.

Wildfire smoke is a mixture of gas and particulate matter, and can adversely affect air quality. The PM<sub>2.5</sub> FRM monitors at Portola and Quincy sampled every three days in the summer of 2008. The Redding monitor sampled once every six days. As shown in Figure 4, Portola, Quincy, and Redding began recording elevated PM<sub>2.5</sub> concentrations on June 23 and measured lower concentrations by July 26, 2008. This is consistent with the fires starting June 20, 2008 and containment by July 29, 2008.

Figure 4: PM<sub>2.5</sub> concentrations recorded at Redding, Portola, and Quincy, June – August 2008.

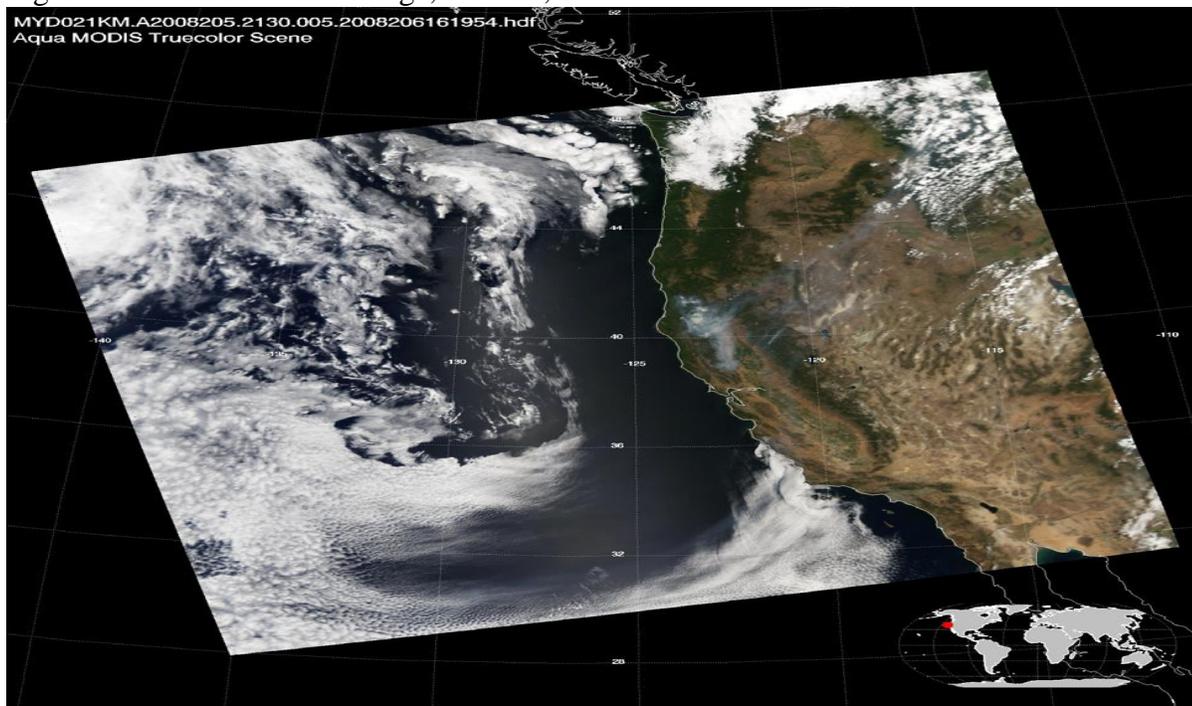


The National Oceanic and Atmospheric Administration’s (NOAA) descriptive text narrative for smoke/dust observed in satellite imagery describes dense smoke affecting northern California on June 23, 2008. The June 26, 2008 narrative describes a large mass of smoke covering much of California extending north. Northern California is described as being covered by heavy, dense smoke on July 11<sup>th</sup>, and moderate to dense smoke on July 19<sup>th</sup>. Finally, on July 23<sup>rd</sup> the northern third of California is described as covered with moderately dense to dense smoke from the wildfires.<sup>16</sup> Satellite images taken by NOAA’s Geostationary Operational Environmental Satellite (GOES) server also show what appear to be smoke plumes disseminating over Shasta and Plumas Counties. The June 23, 2008 satellite image is included below. Additional satellite images as well as numerous news reports and health advisories discussing smoke from the fires were submitted as part of CARB’s package.<sup>17</sup>

<sup>16</sup> August NED, Appendix E.

<sup>17</sup> August NED, Appendix C, Appendix F, and Appendix G.

Figure 5. NOAA Satellite Image, June 23, 2008.



Due to the area's hill and valley terrain, air masses impacting one valley may not impact another neighboring valley. According to CARB's submittal, the Plumas County, Portola monitor sits at an elevation of about 4,895 feet. It is located in a valley, surrounded by hilly terrain. The Plumas County, Quincy monitor is also in a small valley, and is sited at an elevation of approximately 3,422 feet. The Shasta County, Redding monitor is located between the Cascades and the Trinity Alps, at approximately 560 feet.<sup>18</sup>

CARB's January 26, 2010 supplemental information provided hourly wind vector and streamlines for Northern California on June 23, June 26, and July 11, 19, and 23. These show downslope winds moving air down through the valleys.

Limited speciation data was available at Portola during the period under review; no speciation data was available from Redding or Quincy. Speciated levoglucosan data, used to indicate wood smoke, was available at Portola on a once-every-six-days schedule in 2007 and 2008. Some additional samples were also collected at the monitoring agency's discretion. Elevated concentrations were measured in June and July 2008, offering further support that smoke from forest fires was affecting this part of California. (See Table 3.)

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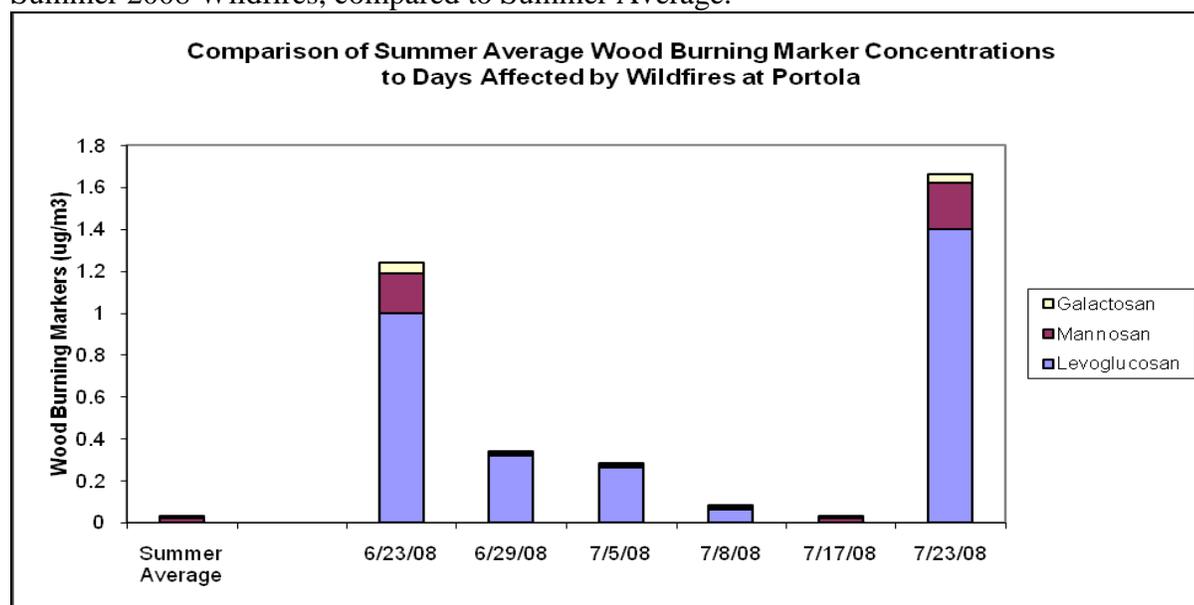
<sup>18</sup> January 19 Natural Events Documentation (NED), p. 5

Table 3. Levoglucosan Levels, Portola - Summer 2007 and 2008

Month	Day	2007 24-hour Concentration ( $\mu\text{g}/\text{m}^3$ )	2008 24-hour Concentration ( $\mu\text{g}/\text{m}^3$ )
June	05	0.01	0.01
June	11	0.01	0.01
June	17	0.01	0.01
June	23	0.01	<b>1.00</b>
June	26	0.01	-
June	29	-	<b>0.32</b>
July	05	0.01	<b>0.26</b>
July	08	-	<b>0.06</b>
July	11	0.01	-
July	17	0.01	<b>0.01</b>
July	23	0.01	<b>1.40</b>
July	29	0.01	0.01
Aug	04	0.01	0.01
Aug	07	0.01	-
Aug	10	-	0.01
Aug	16	0.01	0.01
Aug	19	-	0.01
Aug	22	0.01	-
Aug	28	0.01	0.01

CARB supplied additional wood burning speciation information for Portola. Figure 6 shows wood burning markers levoglucosan, galactosan, and mannosan. The figure compares levels measured at Portola from June 23 through July 23, 2008 to the summer average levels.

Figure 6. Wood Burning Markers (Levoglucosan, Galactosan, Mannosan) at Portola during the Summer 2008 Wildfires, compared to Summer Average.



Speciation data indicates wood smoke affected the Portola monitor between June 23 and July 23. Satellite images and news reports indicate that smoke from numerous fires was impacting Shasta and Plumas Counties between June 23 and July 23, 2008.<sup>19</sup> Monitored values at Portola, Quincy, and Redding indicate increased concentrations consistent with known fire activity. Taken together, the evidence indicates a clear causal relationship between the measurements under consideration and the wildfires.

## 6.0 Concentrations in Excess of Normal Historical Fluctuations

Pursuant to 40 CFR § 50.14(c)(3)(iii)(C), the demonstration must show that “the event is associated with a measured concentration in excess of normal historical fluctuations.” There is no “bright line” or specific threshold test for this requirement, but concentrations in the high percentiles can provide supporting evidence.<sup>20</sup>

PM<sub>2.5</sub> levels in Plumas and Shasta County vary by season. Use of woodburning stoves results in higher wintertime concentrations, while summertime PM<sub>2.5</sub> levels in Plumas and Shasta Counties typically fall between 0-10 µg/m<sup>3</sup>. (See Figures 7, 8 and 9.)

For 2000-2008, these three monitors have a number of summertime fire exceptional events flags entered into the AQS database. From 2000 to 2008, the highest, non-flagged summer value monitored at Portola was 17.0 µg/m<sup>3</sup>. The June 23, June 26, July 11, and July 23, 2008 values are all more than twice this maximum concentration. If one considers both flagged and non-flagged data, these four days fall within or above the 98<sup>th</sup> percentile (see Table 4), and are four of the five highest summer values recorded at Portola from 2000-2008. As shown in Table 4 and Figure 7, values during the four Portola days in question far exceed the normal range of values observed during the summer months in Portola.

Table 4. Portola Monitor: Highest PM<sub>2.5</sub> concentrations, Summers (Jun - Aug) 2000-2008.

Date	PM <sub>2.5</sub> concentration (µg/m <sup>3</sup> )	Data Percentile	AQS flag
June 26, 2008	113.5	100%	rt
July 23, 2008	68.6	100%	rt
July 11, 2008	56	99%	rt
Aug 22, 2000	43	99%	e
June 23, 2008	41.2	98%	rt
July 8, 2007	41	98%	e
June 29, 2008	31.5	97%	rt
<b>June 17, 2000</b>	<b>17</b>	<b>97%</b>	<b>none</b>

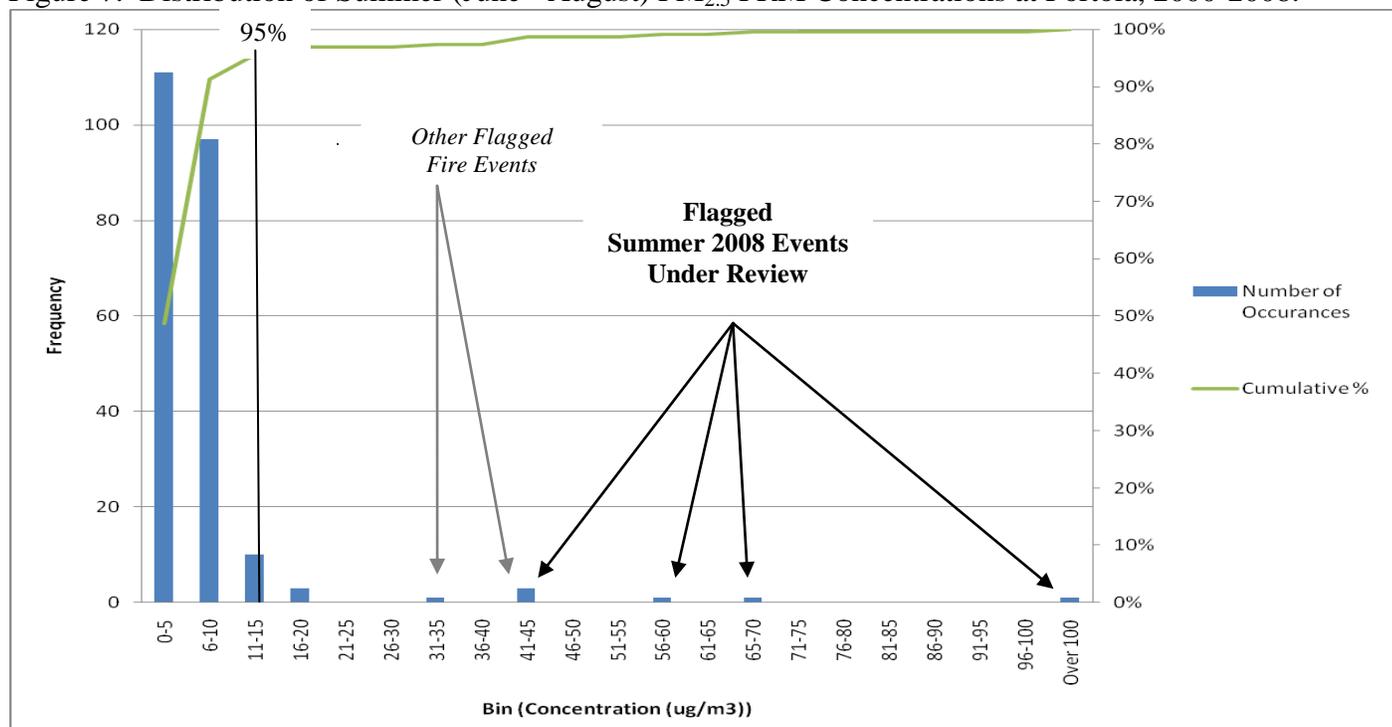
rt = Wildfire-U.S.; e = Forest Fire

\*Uses Parameter Occurrence Code (POC) 07 data for Jun-Aug 2007; uses POC01 data for all other years. No 2002 data available for Portola.

<sup>19</sup> August NED, Appendix C, Appendix E, Appendix G.

<sup>20</sup> Exceptional Events Rulemaking (EER) Preamble, 72 FR 13569

Figure 7. Distribution of Summer (June - August) PM<sub>2.5</sub> FRM Concentrations at Portola, 2000-2008.



\*Uses POC07 data for Jun-Aug 2007; uses POC01 data for all other years. No 2002 data available.

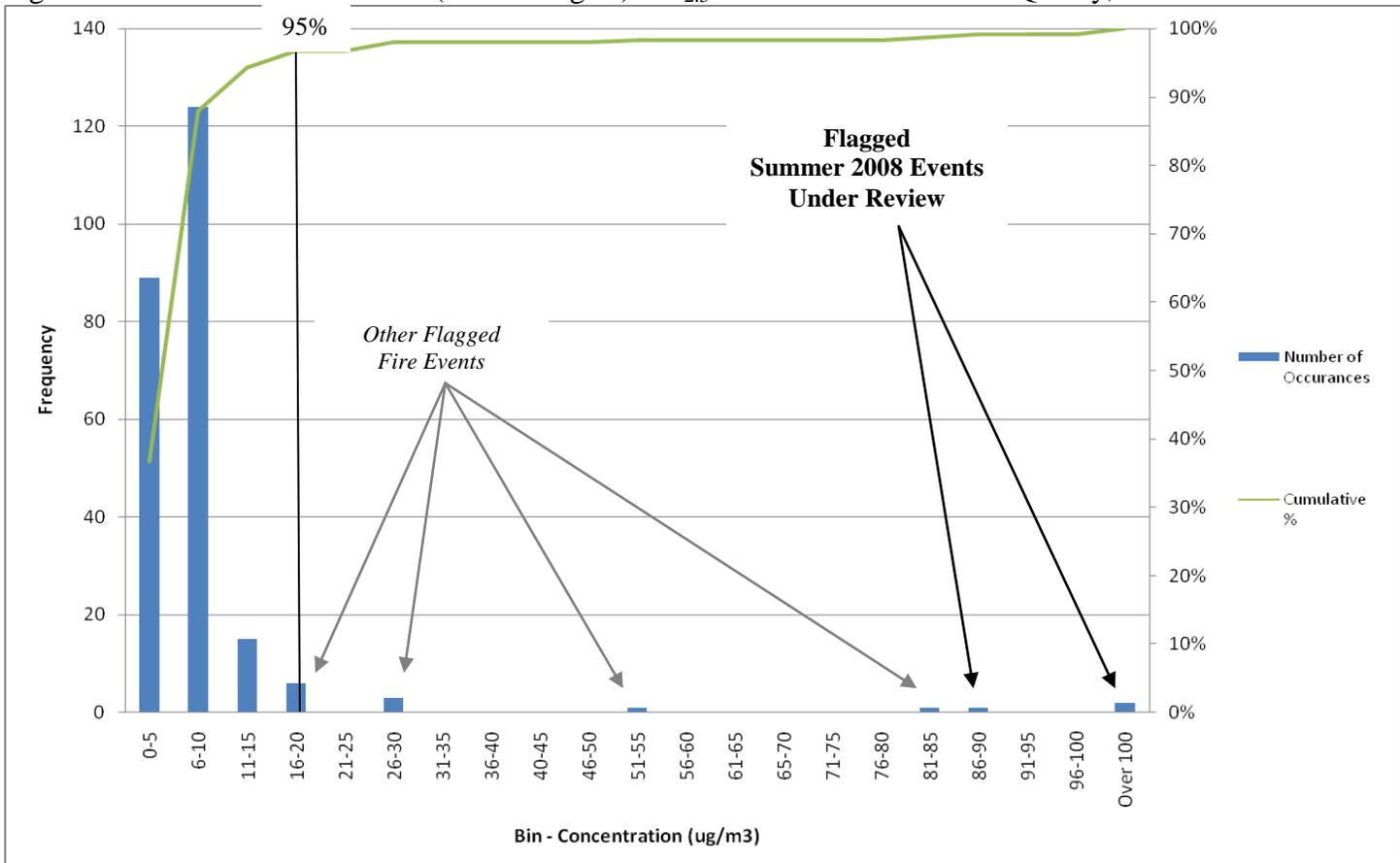
The highest, non-flagged summer value monitored at Quincy from 2000 to 2008 was 16.0 µg/m<sup>3</sup>. At 142.2 and 133 µg/m<sup>3</sup>, respectively, the June 23, 2008 and July 19, 2008 values are well above this maximum concentration. If one considers both flagged and non-flagged data, these two days fall within the 100<sup>th</sup> percentile (see Table 5). These days are the highest recorded at Quincy over the past nine summers. Values during the two Quincy days in question far exceed the normal range of values observed during the summer months in Quincy. (See Table 5 and Figure 8.)

Table 5. Quincy Monitor: Highest PM<sub>2.5</sub> concentrations, Summers (Jun - Aug) 2000-2008.

Date	PM <sub>2.5</sub> concentration (µg/m <sup>3</sup> )	Data Percentile	AQS flag
June 23, 2008	142.2	100%	rt
July 19, 2008	133	100%	rt
July 11, 2008	85.5	99%	rt
June 26, 2008	80.7	99%	rt
July 8, 2008	54.3	98%	rt
July 26, 2008	29.3	98%	rt
June 28, 2006	26	98%	e
July 8, 2007	25	97%	e
Aug 21, 2002	18	97%	e
Aug 1, 2002	17	96%	e
June 14, 2008	16	96%	none

rt = Wildfire-U.S; e = Forest Fire

Figure 8. Distribution of Summer (June – August) PM<sub>2.5</sub> FRM Concentrations at Quincy, 2000-2008.



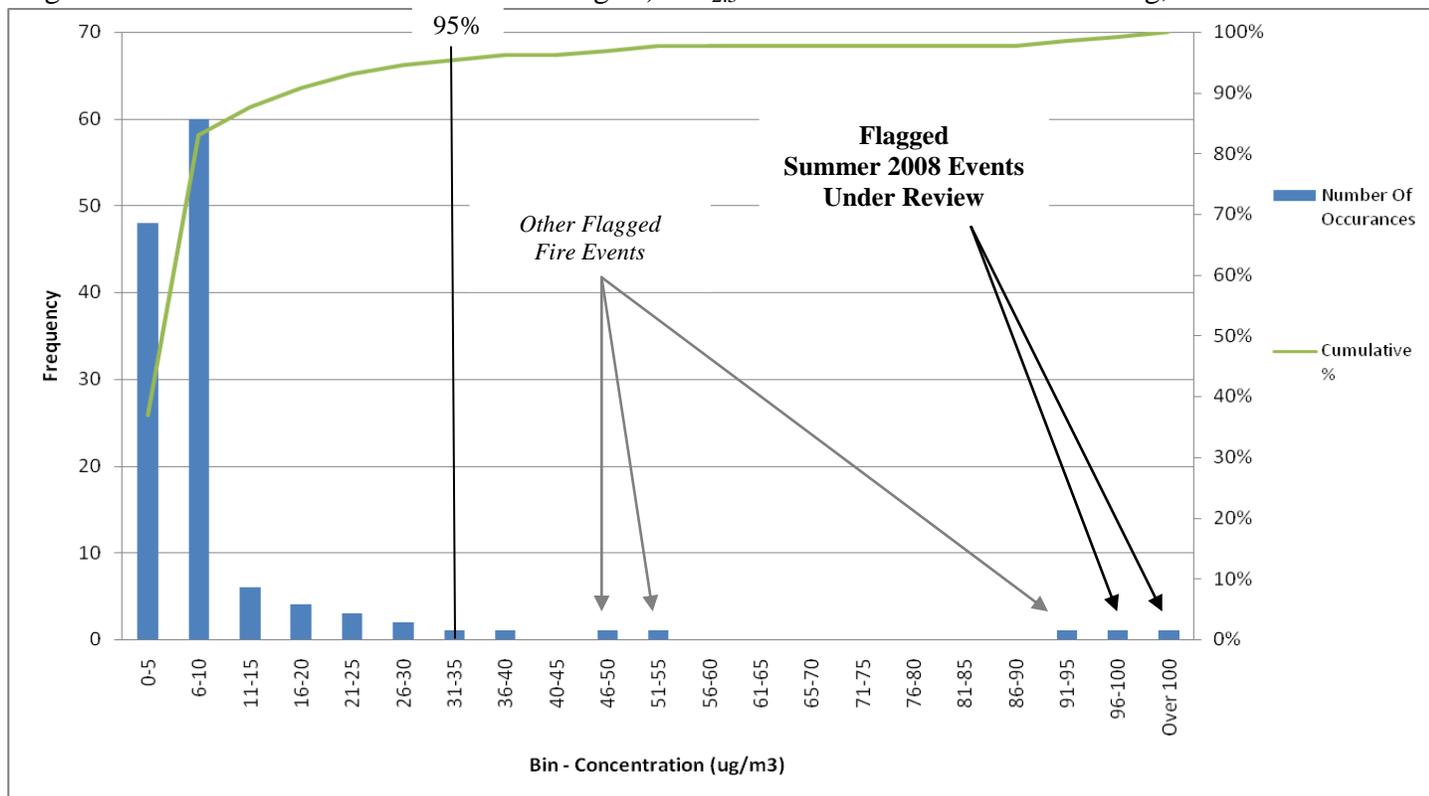
From 2000 to 2008, the highest, non-flagged summer value monitored at Redding was 38.0 µg/m<sup>3</sup>. The July 23, 2008 and June 23, 2008 values of 200.2 and 97.1 µg/m<sup>3</sup> far exceed this maximum concentration. If one considers both flagged and non-flagged data, these are the two highest days recorded at Redding over the past nine summers, and fall within the 99<sup>th</sup> and 100<sup>th</sup> percentile (see Table 6). As shown in Table 6 and Figure 9, values during the two days in question far exceed the normal range of values observed during the summer months in Redding.

Table 6. Redding Monitor: Highest PM<sub>2.5</sub> concentrations, Summers (Jun - Aug) 2000-2008.

Date	PM <sub>2.5</sub> concentration (µg/m <sup>3</sup> )	Data Percentile	AQS flag
July 23, 2008	200.2	100%	rt
June 23, 2008	97.1	99%	rt
June 29, 2008	92.4	98%	rt
July 17, 2008	54.8	98%	rt
July 5, 2008	48.3	97%	rt
<b>Aug 18, 2002</b>	<b>38</b>	<b>96%</b>	<b>none</b>

rt = Wildfire-U.S.

Figure 9. Distribution of Summer (June – August) PM<sub>2.5</sub> FRM Concentrations at Redding, 2000-2008.



These values are evidence that the summer 2008 concentrations under review at Portola, Quincy, and Redding are in excess of normal historical fluctuations and are clear outliers for their respective monitors.

### 7.0 No Exceedance But For the Event

Pursuant to 40 CFR §50.14(c)(3)(iii)(D), the demonstration must show that “there would have been no exceedance or violation but for the event.” The weight of evidence in a demonstration does not require a precise estimate of the estimated air quality impact from the event,<sup>21</sup> though that could be useful. Concentrations on days with similar emissions but without the influence of the event are rough evidence of what the concentration on the event day would have been but for the event. Comparison to otherwise similar days may provide one kind of evidence in the demonstration that the exceedance would not have occurred but for the event.

The following three figures show summer concentrations for Portola, Quincy, and Redding, measured from 2000-2008. Although Portola did not measure PM<sub>2.5</sub> during the summer of 2002, all other years are represented for each monitor.

Meteorological conditions during this nine year period would be expected to include multiple days with meteorology similar to conditions seen on the days under review. The two 2008 values under review at Quincy are well above values recorded at any other time during summers 2000-2008. (See Figure 10.) Except for other summer 2008 days also associated with the 2008 wildfires, the two

<sup>21</sup> EER Preamble 72 FR 23570

Redding values under review far exceed any summer concentrations measured 2000-2008. (See Figure 11.) 2008 values at Portola are also well above recorded values, with the exception of one day in 2000 and one day in 2007, both of which are flagged in AQS as fire events. (See Figure 12.)

Figure 10. Quincy PM<sub>2.5</sub> Concentrations: June – August, 2000-2008.

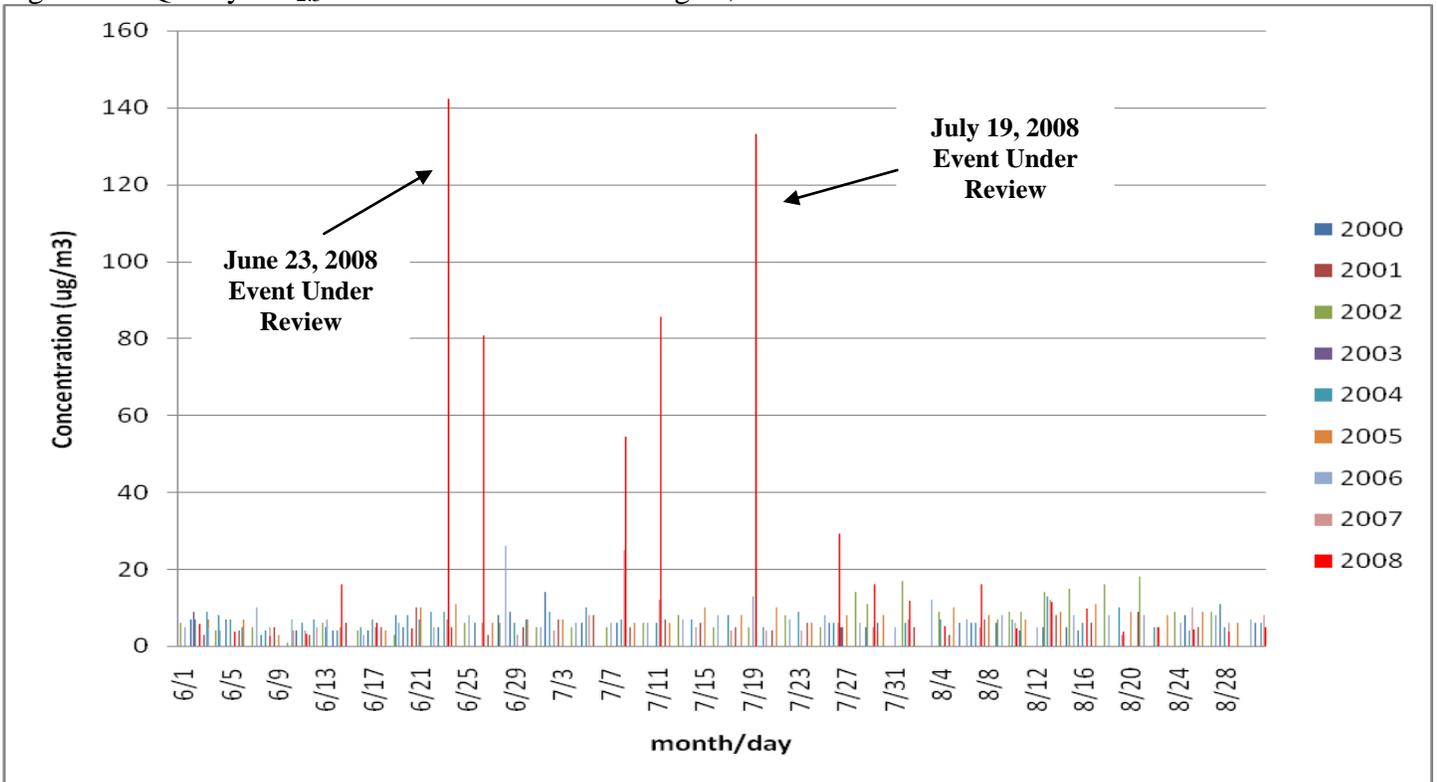


Figure 11. Redding PM<sub>2.5</sub> Concentrations: June – August, 2000-2008.

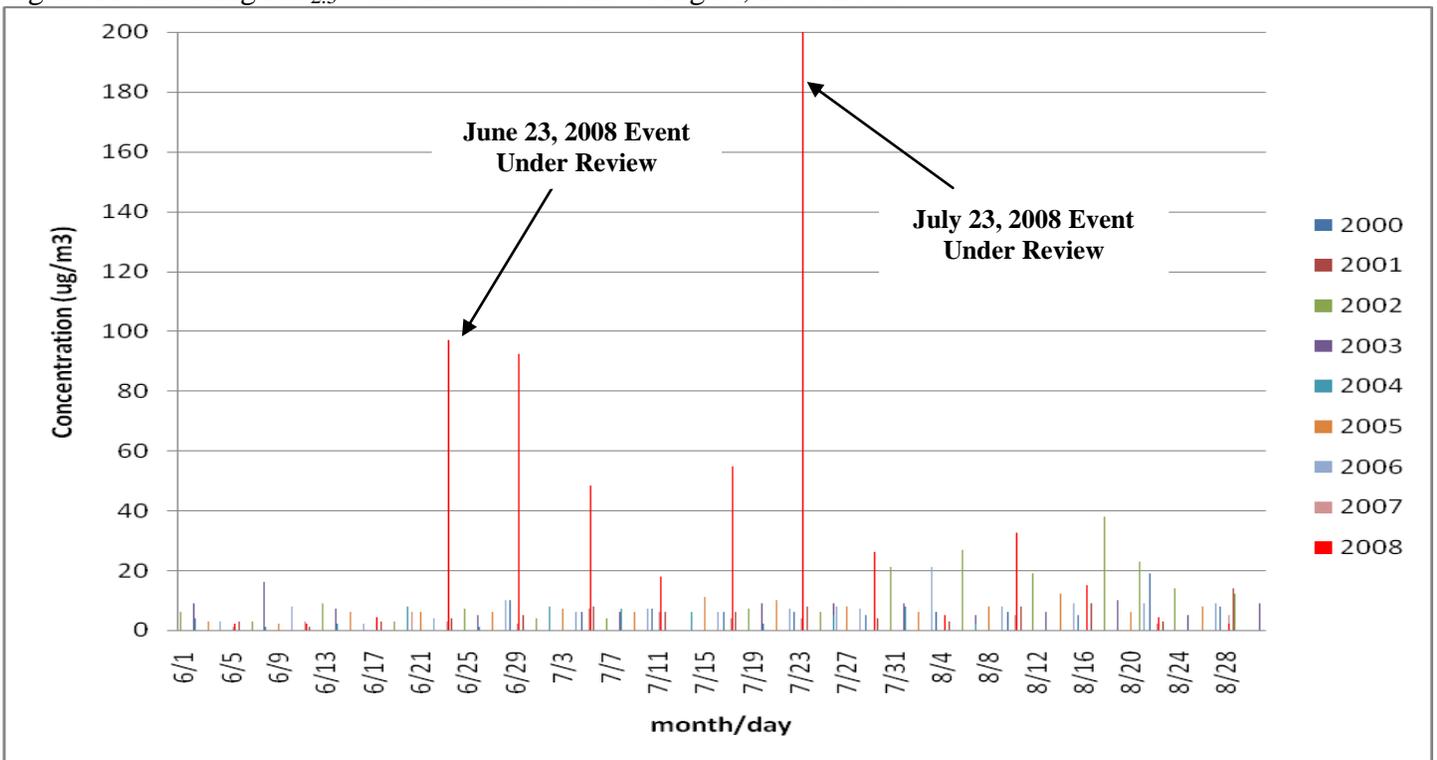
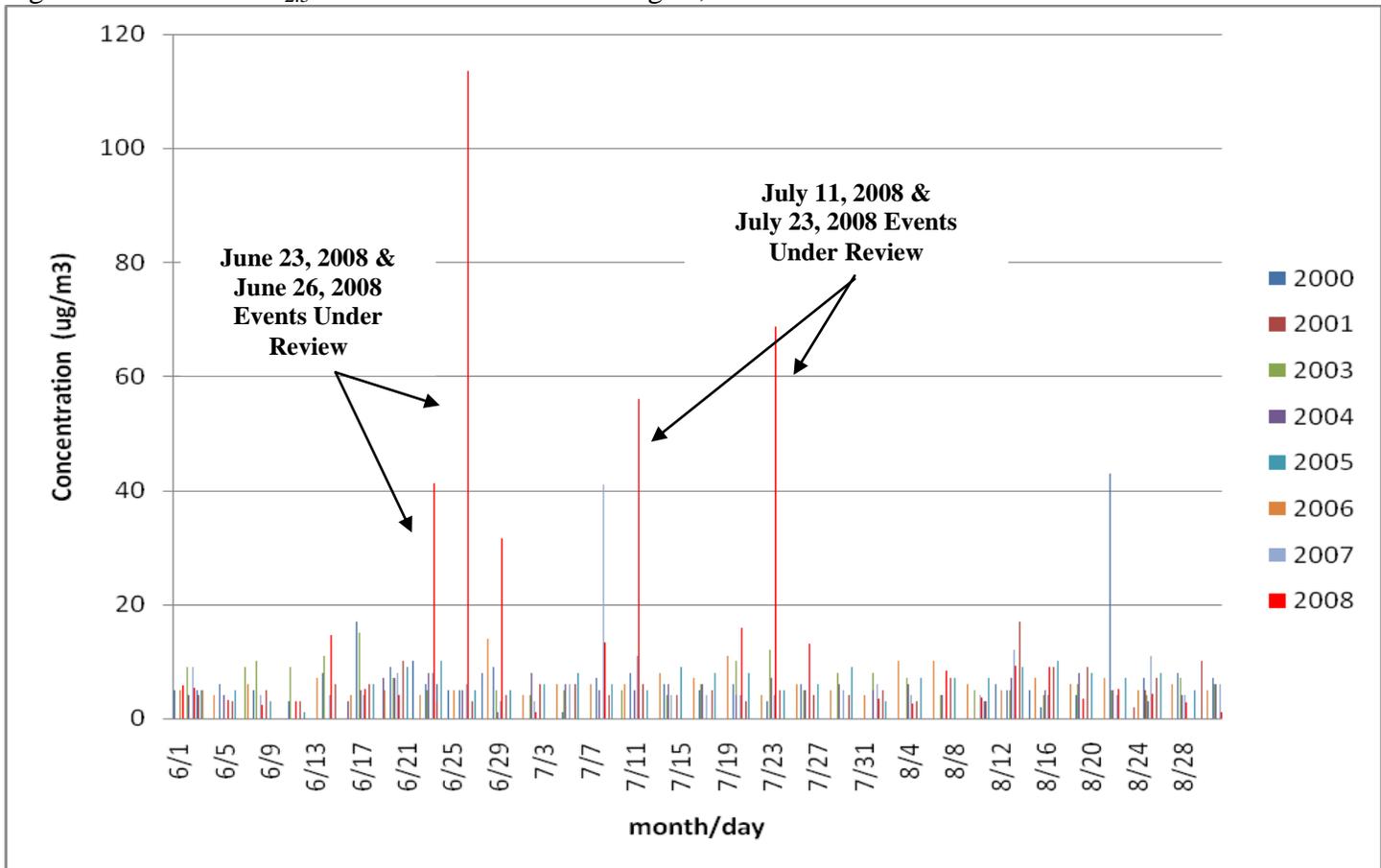


Figure 12. Portola PM<sub>2.5</sub> Concentrations: June – August, 2000-2008.



The presence and extent of the wildfires, coupled with the speciation data, satellite images, news reports discussed in Section 5, and the uniqueness of the values over the past nine summers supports the conclusion that there would not have been exceedances on the days in question but for the wildfires.

## 8.0 Procedural Requirements

The EER at 40 CFR §50.14(c) requires that data claimed to be due to an exceptional event must be flagged in the AQS database, that an initial description of the event be provided to EPA by July 1 of the year following the event, and the State must submit a demonstration to EPA within three years of the event.

CARB flagged the events in AQS in accordance with 40 CFR §50.14. On August 28, 2009, CARB submitted their package for the Summer 2008 PM<sub>2.5</sub> events. CARB sent additional clarification to EPA via email on January 19, 2010, and January 26, 2010.

40 CFR §50.14(c)(3)(i) also requires notice and opportunity for public comment. 40 CFR §50.14(c)(3)(i) requires that any public comments be submitted along with the demonstrations. CARB public noticed the Summer 2008 PM<sub>2.5</sub> Events package beginning July 20, 2009. The package was

posted on the CARB website, and air districts and public listserv recipients were notified. No public comments were received.<sup>22</sup>

Numerous health and smoke advisories issued in response to the summer 2008 fires are included as Appendix F in CARB's August 28, 2009 submittal.

## **9.0 Conclusion**

Documentation submitted by CARB claims that smoke from the summer 2008 wildfires caused exceedances of the 24-hour PM<sub>2.5</sub> NAAQS at numerous monitoring stations. This package reviews exceedances at the Portola monitor on June 23, June 26, July 11, and July 23, 2008, exceedances at the Quincy monitor on June 23 and July 19, 2008, and exceedances at the Redding monitor on June 23 and July 23, 2008. All values under review fall above their respective site's 95<sup>th</sup> percentile observed during summer months (June – August), 2000-2008. The values far exceed the expected range of concentrations for unflagged days and fall into or above the 98<sup>th</sup> percentile when considering all data (flagged and unflagged). Speciation data collected at Portola shows evidence of forest fire contributions, and news reports, satellite imagery, and wind field modeling indicate smoke from the wildfires was affecting air quality in Plumas and Shasta Counties. The information and analyses presented in this package and in CARB's submittal documents do not represent the entire suite of possible evidence for exceptional event packages. For other types of events and other pollutants, additional or alternate evidence may be necessary to make an exceptional events determination. In this particular instance, however, given that the events are wildfires affecting 24-hour PM<sub>2.5</sub> concentrations, the weight of evidence is sufficient to satisfy the EER criteria. EPA concurrence is given to the aforementioned Summer 2008 PM<sub>2.5</sub> exceptional event flags for the Portola, Quincy, and Redding monitors.

## **10.0 Citation of Exceptional Event Request Documentation**

### **August NED** August 28, 2009 Natural Event Documentation

“PM<sub>2.5</sub> and PM<sub>10</sub> Natural Event Document: Summer 2008 Northern California Wildfires, June/July/August 2008,” California Air Resources Board, August 28, 2009, with attachments.

Letter from Karen Magliano, Air Resources Board, to Matthew Lakin, U.S. Environmental Protection Agency Region 9, August 28, 2009 requesting exclusion of Summer 2008 exceedances, with enclosures: August NED.

### **January 19 NED** January 19, 2010 Natural Event Documentation

“2008 Northern California Wildfires,” California Air Resources Board, January 19, 2010.

### **January 26 NED** January 26, 2010 Natural Event Documentation

“Wind Fields in Northern California During the 2008 Wild Fires,” California Air Resources Board, January 26, 2010.

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<sup>22</sup> January 19 NED, p. 1.