Interim Exceptional Events Rule Frequently Asked Questions

United States Environmental Protection Agency

May 2013

Note: This May 14, 2013, document replaces the original document posted on May 13, 2013, to include the inadvertent omission of footnote 16 on page 28. There are no additional changes and document pagination is the same in both versions of this document.

ATTACHMENT 1

Interim Exceptional Events Rule Frequently Asked Questions

The Exceptional Events Rule of 2007[1] superseded the EPA's previous Exceptional Events guidance and policy documents and created a regulatory process codified at 40 CFR parts 50 and 51 (50.1, 50.14 and 51.930). The Exceptional Events Rule (EER) recognizes that each potentially eligible event can have different or unique characteristics, and thus, necessitates a case-by-case demonstration and evaluation. Therefore, the EER adopts a "weight-of-evidence" approach for reviewing each demonstration to justify excluding data affected by an exceptional event. The EPA acknowledges that extreme[2] exceptional events may justify more limited demonstration packages.

Air agencies and other stakeholders have raised technical questions and issues related to implementation since the EPA promulgated the EER. This Question and Answer (Q&A) document is intended to respond to some of these frequently asked questions and to provide guidance and clarification to air agencies[3] implementing the EER. The EPA recognizes the limited resources of the air agencies that prepare and submit exceptional event demonstration packages and of the EPA regional offices that review these demonstration packages. One of the EPA's goals in developing exceptional event implementation guidance is to establish clear expectations to enable affected air agencies to better manage resources as they prepare the documentation required under the EER. Submitters should prepare and submit the appropriate level of supporting documentation, which will vary on a case-by-case basis under the weight-of-evidence approach. The EPA anticipates that the resources needed to prepare (and review) packages will decrease as we continue to identify ways to streamline the process and continue to build our database of example demonstrations and analyses. In addition, as noted above, the EPA acknowledges that extreme exceptional events may justify more limited demonstration packages.

For organizational ease, this document has been divided into the following topical sections:

A. Historical Fluctuations
B. "But For" Test
C. Exceptional Event Data Flagging Schedules
D. General AQS Procedures
E. General Exceptional Events Rule Applicability and Implementation Issues

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[1] "Treatment of Data Influenced by Exceptional Events; Final Rule," 72 FR 13563, March 22, 2007.
[2] Extreme exceptional events may justify a more limited demonstration package. Whether a particular event should be considered "extreme" for this purpose depends on the type and severity of the event, pollutant concentration, spatial extent, temporal extent, and proximity of the event to the violating monitor. Several meteorological phenomena that could be considered extreme events include hurricanes, tornadoes, haboobs, and catastrophic volcanic eruptions. The EPA addresses "extreme" high wind dust events in Question 17a in this document.
[3] References to "air agencies" are meant to include state, local, and tribal air agencies responsible for implementing the EER.

F. Exceptional Event Data Flagging for Air Quality Concentrations that Could Contribute to an Exceedance or Violation of the National Ambient Air Quality Standards

Each section contains related questions. Readers of this document can find additional information at the EPA's Exceptional Events website located at http://www.epa.gov/ttn/analysis/exevents.htm. The EPA's interim guidance documents and the exceptional events website present examples to illustrate specific points. The example analyses and level of rigor are not necessarily needed for all demonstrations.

Disclaimer

The Exceptional Events Rule is the source of the regulatory requirements for exceptional events and exceptional event demonstrations. This interim Q&A document provides guidance and interpretation of the Exceptional Events Rule rather than imposing any new requirements and shall not be considered binding on any party. Note: If and when the EPA takes a regulatory action that hinges on a decision to exclude data under the Exceptional Events Rule, the EPA will consider and appropriately respond to any public comments on any aspect of a supporting exceptional events demonstration submittal.

A. Historical Fluctuations

> *40 CFR 50.14(c)(3)(iv): "The demonstration to justify data exclusion shall provide evidence that:*
> * * *
> *(C) The event is associated with a measured concentration in excess of normal historical fluctuations, including background;*

1. **Question:** Is the Exceptional Events Rule demonstration requirement to provide evidence to support "a measured concentration in excess of normal historical fluctuations, including background" a test that can be "passed" or "failed" based on the outcome of the statistical comparison? For example, must the concentration affected by an event exceed a specific percentile rank in the historical data?

   Answer: The "historical fluctuations" criterion is a test, but there is no specific percentile rank that the EPA will use to determine whether the test has been passed. The EPA will use a weight-of-evidence approach to review each demonstration on a case-by-case basis. The air agency's role in satisfying this element is to provide appropriate analyses and statistics and conclude that the provided data show that the event was in excess of normal historical fluctuations. The EPA will review the information provided by the air agency. "Normal historical fluctuations" will generally be defined by those days without events for the previous years. The EPA acknowledges that natural events can recur and still be eligible for exclusion under the EER; therefore, events do not necessarily have to be rare to satisfy this element.

   The submittal of data showing how the event concentration compared with historical concentrations will help the EPA determine whether the air agency has satisfied the "clear causal relationship," "but for," and "affects air quality" criteria. Air agencies need to satisfy these EER criteria, as well as "not reasonably controllable or preventable," for the EPA to concur on an exceptional event claim. The EPA anticipates that less conclusive historical fluctuation comparisons will likely indicate less conclusive "clear causal relationship" and/or "but for" relationships. However, a demonstration without a historical fluctuations comparison would prevent the EPA from being able to approve exclusion of the data in question.

   The EPA recommends that each "historical fluctuation" demonstration submittal contain a minimum set of statistical analyses described in more detail in Questions 2 and 3. The EPA generally will consider submission of the identified statistical analyses to have met the requirement to "provide evidence."

   It is important to note, however, that there is no outcome of the "historical fluctuation" statistical comparison that, by itself, can guarantee successful demonstration of the clear causal relationship and "but for" elements. The EPA will consider in its weight-of-evidence approach the comparison of the concentrations during event(s) in question with historical concentration data. For example, a uniquely high concentration in an area (and season) with no previous exceedances, with a clear causal connection, and with no

GCT-PL1

Race and Hispanic or Latino: 2010 - State -- Place

2010 Census Redistricting Data (Public Law 94-171) Summary File

NOTE: For information on confidentiality protection, nonsampling error, and definitions, see http://www.census.gov/prod/cen2010/pl94-171.pdf

NOTE: Change to the California,Connecticut,Mississippi,New Hampshire,Virginia, and Washington P. L. 94-171 Summary Files as delivered.

Geography: Missouri

Geographic area	Total population	Race			
		One race			
		Total	White	Black or African American	American Indian and Alaska Native
Missouri	5,988,927	5,864,338	4,958,770	693,391	27,376
Adrian city	1,677	1,661	1,646	3	8
Advance city	1,347	1,337	1,330	1	4
Affton CDP	20,307	20,029	19,163	343	32
Agency village	684	677	661	2	0
Airport Drive village	698	685	668	0	12
Alba city	555	538	524	4	10
Albany city	1,730	1,722	1,698	8	5
Aldrich village	80	80	77	0	1
Alexandria city	159	155	154	1	0
Allendale village	53	53	53	0	0
Allenville village	116	115	115	0	0
Alma city	402	395	391	2	0
Altamont village	204	204	203	0	1
Altenburg city	352	350	349	1	0
Alton city	871	843	833	4	6
Amazonia village	312	310	304	1	3
Amity town	54	54	54	0	0
Amoret city	190	185	179	1	1
Amsterdam city	242	238	233	1	4
Anderson city	1,961	1,904	1,683	8	94
Annada village	29	29	28	1	0
Annapolis city	345	344	342	0	1
Anniston town	232	231	226	5	0
Appleton City city	1,127	1,105	1,091	7	6
Arbela town	41	41	40	0	0
Arbyrd city	509	505	480	0	1
Arcadia city	608	607	602	4	1
Archie city	1,170	1,158	1,134	6	3
Arcola village	55	55	55	0	0
Argyle town	162	162	162	0	0
Arkoe town	68	68	68	0	0
Armstrong city	284	281	270	5	6
Arnold city	20,808	20,527	20,046	116	47
Arrow Point village	86	85	85	0	0
Arrow Rock town	56	55	55	0	0
Asbury city	207	205	199	0	3
Ashburn town	52	52	52	0	0
Ash Grove city	1,472	1,448	1,434	1	9
Ashland city	3,707	3,660	3,584	29	12

Geographic area	Total population	Race			
		One race			
		Total	White	Black or African American	American Indian and Alaska Native
Ashley CDP	90	90	90	0	0
Atlanta city	385	377	374	1	2
Augusta town	253	251	247	0	3
Aullville village	100	99	99	0	0
Aurora city	7,508	7,374	6,933	25	65
Auxvasse city	983	977	925	31	13
Ava city	2,993	2,952	2,920	4	14
Avilla town	125	116	113	0	3
Avondale city	440	424	392	18	5
Bagnell town	93	88	88	0	0
Baker village	3	3	3	0	0
Bakersfield village	246	240	238	0	1
Baldwin Park village	92	91	89	0	1
Ballwin city	30,404	29,881	27,162	748	68
Baring city	132	132	132	0	0
Barnard city	221	221	220	1	0
Barnett city	203	198	190	0	7
Barnhart CDP	5,682	5,620	5,534	29	15
Bates City city	219	218	214	0	0
Battlefield city	5,590	5,455	5,188	82	30
Bella Villa city	729	714	675	11	2
Bell City city	448	438	424	8	6
Belle city	1,545	1,521	1,506	3	2
Bellefontaine Neighbors city	10,860	10,739	2,792	7,892	12
Bellerive village	188	184	103	81	0
Bellflower city	393	382	371	9	2
Bel-Nor village	1,499	1,464	730	696	0
Bel-Ridge village	2,737	2,692	389	2,275	7
Belton city	23,116	22,400	19,800	1,383	146
Bennett Springs CDP	130	126	123	0	0
Benton city	863	857	813	42	0
Benton City village	104	104	103	0	0
Berger city	221	221	220	1	0
Berkeley city	8,978	8,828	1,281	7,346	21
Bernie city	1,958	1,930	1,858	43	12
Bertrand city	821	817	799	15	1
Bethany city	3,292	3,261	3,174	18	15
Bethel village	122	117	114	0	0
Beverly Hills city	574	565	24	532	0
Bevier city	718	711	699	9	0
Biehle CDP	48	48	48	0	0
Bigelow village	27	27	27	0	0
Big Lake village	159	159	155	2	2
Big Spring CDP	167	163	158	0	0
Billings city	1,035	1,023	1,002	3	10
Birch Tree city	679	664	630	2	6
Birmingham village	183	183	173	1	7
Bismarck city	1,546	1,530	1,509	4	14
Blackburn city	249	240	229	8	0
Black Jack city	6,929	6,803	1,129	5,627	5
Blackwater city	162	158	154	3	1
Blairstown city	97	87	87	0	0
Blanchard CDP	22	22	22	0	0
Bland city	539	533	526	0	3
Blodgett village	213	204	198	4	1
Bloomfield city	1,933	1,921	1,910	1	2
Bloomsdale city	521	518	514	3	1

Geographic area	Total population	Race			
		One race			
		Total	White	Black or African American	American Indian and Alaska Native
Blue Eye town	167	163	162	0	1
Blue Springs city	52,575	50,954	46,051	3,257	241
Blythedale village	193	193	193	0	0
Bogard city	164	164	164	0	0
Bolckow city	187	185	184	0	0
Bolivar city	10,325	10,140	9,790	155	54
Bonne Terre city	6,864	6,800	5,464	1,285	23
Boonville city	8,319	8,132	6,915	1,109	33
Bosworth city	305	302	301	0	0
Bourbon city	1,632	1,624	1,611	2	4
Bowling Green city	5,334	5,271	4,236	983	7
Bragg City town	149	145	131	6	3
Brandsville city	161	159	144	0	1
Branson city	10,520	10,242	9,358	207	92
Branson West city	478	459	437	3	0
Brashear city	273	264	261	0	1
Braymer city	878	863	861	0	1
Breckenridge city	383	365	354	2	7
Breckenridge Hills city	4,746	4,566	2,540	1,552	18
Brentwood city	8,055	7,901	7,047	250	8
Brewer CDP	374	373	371	0	2
Bridgeton city	11,550	11,313	8,362	2,162	25
Brimson village	63	63	63	0	0
Bronaugh city	249	241	239	1	0
Brookfield city	4,542	4,448	4,334	60	13
Brooklyn Heights town	100	97	96	0	0
Browning city	265	258	255	1	1
Brownington town	107	105	102	0	3
Brumley town	91	81	71	6	4
Brunswick city	858	842	762	78	1
Bucklin city	467	465	464	0	1
Buckner city	3,076	3,008	2,940	11	12
Buffalo city	3,084	3,036	2,953	9	28
Bull Creek village	603	582	535	8	1
Bunceton city	354	347	331	15	0
Bunker city	407	405	404	0	1
Burgess town	57	56	56	0	0
Burlington Junction city	537	533	532	0	0
Butler city	4,219	4,149	3,985	112	22
Butterfield village	470	454	373	1	8
Byrnes Mill city	2,781	2,753	2,708	7	14
Cabool city	2,146	2,101	2,068	8	10
Cainsville city	290	289	284	0	1
Cairo village	292	287	281	2	2
Caledonia village	130	130	130	0	0
Calhoun city	469	463	458	1	1
California city	4,278	4,223	3,904	33	14
Callao city	292	285	281	3	1
Calverton Park village	1,293	1,265	691	546	2
Camden city	191	189	189	0	0
Camden Point city	474	473	465	3	2
Camdenton city	3,718	3,631	3,531	12	15
Cameron city	9,933	9,833	8,235	1,469	51
Campbell city	1,992	1,966	1,949	2	5
Canalou city	338	332	325	4	3
Canton city	2,377	2,347	2,186	126	5
Cape Girardeau city	37,941	37,029	30,783	4,839	87

Geographic area	Total population	Race			
		One race			
		Total	White	Black or African American	American Indian and Alaska Native
Cardwell city	713	700	687	3	2
Carl Junction city	7,445	7,252	6,947	75	97
Carrollton city	3,784	3,739	3,603	113	5
Carterville city	1,891	1,853	1,782	8	16
Carthage city	14,378	13,895	10,581	222	142
Caruthersville city	6,168	6,065	3,941	2,041	17
Carytown city	271	269	259	0	0
Cassville city	3,266	3,208	3,062	12	54
Castle Point CDP	3,962	3,898	188	3,694	3
Catron town	67	66	56	10	0
Cave town	5	5	5	0	0
Cedar Hill CDP	1,721	1,702	1,681	9	5
Cedar Hill Lakes village	237	235	231	0	1
Center city	508	501	486	7	0
Centertown town	278	274	270	2	0
Centerview city	267	263	252	1	1
Centerville city	191	187	182	4	1
Centralia city	4,027	3,973	3,888	41	16
Chaffee city	2,955	2,917	2,891	15	6
Chain of Rocks village	93	93	93	0	0
Chain-O-Lakes village	126	126	125	0	0
Chamois city	396	395	393	0	1
Champ village	13	13	13	0	0
Charlack city	1,363	1,312	760	483	4
Charleston city	5,947	5,885	2,828	3,000	2
Cherokee Pass CDP	235	235	233	1	0
Chesapeake CDP	49	45	44	1	0
Chesterfield city	47,484	46,841	41,078	1,257	74
Chilhowee town	325	313	310	0	3
Chillicothe city	9,515	9,372	8,896	353	41
Chula city	210	205	196	1	2
Clarence city	813	804	797	4	2
Clark city	298	294	291	1	1
Clarksburg city	334	331	327	0	2
Clarksdale city	271	269	268	0	1
Clarkson Valley city	2,632	2,597	2,444	39	0
Clarksville city	442	436	395	32	0
Clarkton city	1,288	1,260	1,086	65	4
Claycomo village	1,430	1,412	1,360	12	6
Clayton city	15,939	15,556	12,431	1,305	26
Clearmont city	170	168	168	0	0
Cleveland city	661	645	632	1	6
Clever city	2,139	2,096	2,059	7	23
Cliff Village village	40	38	35	0	3
Clifton Hill city	114	111	107	4	0
Climax Springs village	124	124	120	0	0
Clinton city	9,008	8,845	8,566	171	40
Clyde village	82	82	82	0	0
Cobalt village	226	225	225	0	0
Coffey city	166	166	166	0	0
Cole Camp city	1,121	1,108	1,101	0	1
Collins village	159	158	158	0	0
Columbia city	108,500	105,173	85,742	12,217	362
Commerce village	67	67	62	5	0
Conception CDP	210	208	176	1	3
Conception Junction town	198	198	198	0	0
Concord CDP	16,421	16,234	15,771	106	23

Geographic area	Total population	Race			
		One race			
		Total	White	Black or African American	American Indian and Alaska Native
Concordia city	2,450	2,423	2,393	6	5
Coney Island village	75	75	73	1	1
Conway city	788	767	747	3	7
Cool Valley city	1,196	1,167	141	1,011	3
Cooter city	469	468	459	9	0
Corder city	404	394	382	4	3
Corning town	15	15	15	0	0
Cosby village	124	124	123	0	0
Cottleville city	3,075	3,033	2,851	115	6
Country Club village	2,449	2,407	2,330	39	13
Country Club Hills city	1,274	1,265	104	1,158	2
Country Life Acres village	74	74	71	0	0
Cowgill city	188	187	180	1	0
Craig city	248	248	246	0	1
Crane city	1,462	1,441	1,421	1	10
Creighton city	349	347	334	7	6
Crestwood city	11,912	11,713	11,168	191	18
Creve Coeur city	17,833	17,490	14,251	1,278	34
Crocker city	1,110	1,084	1,064	5	9
Cross Timbers city	216	215	215	0	0
Crystal City city	4,855	4,765	4,523	178	18
Crystal Lake Park city	470	466	430	13	0
Crystal Lakes city	358	350	335	1	7
Cuba city	3,356	3,307	3,220	9	22
Curryville city	225	214	205	4	4
Dadeville village	234	228	225	0	2
Dalton town	17	17	12	5	0
Danville CDP	34	34	34	0	0
Dardenne Prairie city	11,494	11,306	10,423	404	17
Darlington village	121	113	112	0	1
Dawn CDP	128	128	127	0	1
Dearborn city	496	487	478	2	1
Deepwater city	433	430	428	0	2
Deerfield village	81	79	77	0	1
Defiance CDP	155	155	146	5	0
De Kalb town	220	219	218	1	0
Dellwood city	5,025	4,939	904	3,978	23
Delta city	438	421	421	0	0
Dennis Acres village	76	71	58	0	1
Denver village	39	39	37	2	0
Des Arc village	177	172	168	3	1
Desloge city	5,054	4,983	4,921	39	12
De Soto city	6,400	6,310	6,131	103	26
Des Peres city	8,373	8,273	7,894	79	14
De Witt city	124	119	112	7	0
Dexter city	7,864	7,751	7,639	38	39
Diamond town	902	878	848	6	13
Diehlstadt village	161	159	159	0	0
Diggins village	299	295	292	1	0
Dixon city	1,549	1,513	1,464	14	4
Doe Run CDP	915	893	876	11	0
Doniphan city	1,997	1,976	1,930	3	11
Doolittle city	630	620	614	0	4
Dover town	103	103	93	5	0
Downing city	335	328	327	0	0
Drexel city	965	952	939	9	3
Dudley city	232	231	231	0	0

Geographic area	Total population	Race			
		One race			
		Total	White	Black or African American	American Indian and Alaska Native
Duenweg city	1,121	1,052	1,005	9	17
Duquesne village	1,763	1,722	1,621	25	29
Dutchtown village	94	90	88	2	0
Eagle Rock CDP	199	195	192	0	3
Eagleville town	316	312	310	1	1
East Lynne city	303	297	295	1	1
Easton city	234	227	223	0	3
East Prairie city	3,176	3,139	3,039	74	12
Edgar Springs city	208	199	199	0	0
Edgerton city	546	541	533	1	2
Edina city	1,176	1,171	1,160	5	5
Edinburg CDP	92	91	91	0	0
Edmundson city	834	790	471	220	13
Eldon city	4,567	4,478	4,379	22	25
El Dorado Springs city	3,593	3,525	3,450	1	30
Ellington city	987	979	971	2	4
Ellisville city	9,133	9,005	8,371	173	12
Ellsinore city	446	444	442	0	2
Elmer city	80	78	78	0	0
Elmira village	50	46	45	0	0
Elmo city	168	165	163	0	2
Elsberry city	1,934	1,897	1,820	46	20
Emerald Beach village	228	225	221	0	3
Eminence city	600	583	571	0	11
Emma city	233	229	229	0	0
Eolia village	522	516	475	30	4
Essex city	472	467	463	3	1
Ethel town	62	61	61	0	0
Eureka city	10,189	10,011	9,671	83	25
Evergreen village	28	27	26	1	0
Everton city	319	310	302	3	5
Ewing city	456	446	442	1	0
Excello CDP	49	48	43	3	1
Excelsior Estates village	147	141	138	0	3
Excelsior Springs city	11,084	10,822	10,267	313	83
Exeter city	772	754	731	3	3
Fairdealing CDP	676	666	661	2	2
Fairfax city	638	634	628	4	0
Fair Grove city	1,393	1,380	1,357	4	4
Fair Play city	475	467	460	0	3
Fairview town	383	374	351	3	11
Farber city	322	307	299	5	2
Farley village	269	266	261	0	0
Farmington city	16,240	16,056	14,658	1,160	52
Fayette city	2,688	2,632	2,244	350	7
Fenton city	4,022	3,968	3,841	15	8
Ferguson city	21,203	20,782	6,206	14,297	80
Ferrelview village	451	432	405	16	3
Festus city	11,602	11,377	10,843	389	25
Fidelity town	257	254	249	1	4
Fillmore city	184	182	181	0	1
Fisk city	342	340	340	0	0
Fleming city	128	128	126	0	2
Flemington village	148	146	144	0	2
Flint Hill city	525	523	520	2	0
Flordell Hills city	822	808	48	746	2
Florida village	0	0	0	0	0

Geographic area	Total population	Race			
		One race			
		Total	White	Black or African American	American Indian and Alaska Native
Florissant city	52,158	50,956	36,148	13,957	117
Foley city	161	159	155	0	0
Fordland city	800	786	770	3	8
Forest City city	268	265	256	0	3
Foristell city	505	495	471	18	1
Forsyth city	2,255	2,215	2,168	7	20
Fortescue town	32	32	32	0	0
Fort Leonard Wood CDP	15,061	14,344	10,627	2,487	157
Foster village	117	116	115	1	0
Fountain N' Lakes village	165	161	158	0	0
Frankclay CDP	221	221	221	0	0
Frankford city	323	316	307	6	2
Franklin city	95	95	94	1	0
Fredericktown city	3,985	3,948	3,842	11	22
Freeburg village	437	435	432	0	0
Freeman city	482	475	469	2	1
Freistatt village	163	162	146	0	7
Fremont CDP	129	129	124	0	5
Fremont Hills city	826	816	805	2	3
Frohna city	254	254	253	0	1
Frontenac city	3,482	3,440	3,137	92	5
Fulton city	12,790	12,497	10,668	1,531	62
Gainesville city	773	761	746	1	11
Galena city	440	437	430	0	4
Gallatin city	1,786	1,759	1,750	6	2
Galt city	253	247	240	4	1
Garden City city	1,642	1,627	1,599	3	15
Gasconade city	223	222	221	1	0
Gentry village	72	71	71	0	0
Gerald city	1,345	1,334	1,312	3	11
Gerster town	25	25	24	1	0
Gibbs village	107	102	98	2	2
Gideon city	1,093	1,087	1,086	1	0
Gilliam city	197	196	189	6	1
Gilman City city	383	381	381	0	0
Ginger Blue village	61	60	54	1	0
Gladstone city	25,410	24,513	21,805	1,316	156
Glasgow city	1,103	1,081	990	87	1
Glasgow Village CDP	5,429	5,309	842	4,442	5
Glenaire city	545	538	527	2	2
Glen Allen town	85	83	82	1	0
Glendale city	5,925	5,857	5,732	44	2
Glen Echo Park village	160	160	13	147	0
Glenwood village	196	195	195	0	0
Golden CDP	280	278	275	0	2
Golden City city	765	756	735	1	13
Goodman town	1,248	1,206	1,098	1	24
Goodnight village	18	18	18	0	0
Gordonville village	391	389	388	1	0
Goss town	0	0	0	0	0
Gower city	1,526	1,511	1,501	6	1
Graham town	171	171	169	2	0
Grain Valley city	12,854	12,552	11,904	327	73
Granby city	2,134	2,075	1,973	7	59
Grand Falls Plaza town	114	112	108	0	4
Grandin city	243	243	242	0	1
Grand Pass village	66	66	66	0	0

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Grandview city	24,475	23,486	11,834	9,997	131
Granger village	34	34	34	0	0
Grant City town	859	857	845	3	1
Grantwood Village town	863	861	854	5	0
Gravois Mills town	144	139	134	2	2
Grayhawk CDP	525	523	517	0	6
Grayridge CDP	127	126	116	10	0
Gray Summit CDP	2,701	2,660	2,567	30	7
Greencastle city	275	274	274	0	0
Green City city	657	645	613	2	5
Greendale city	651	639	182	446	0
Greenfield city	1,371	1,344	1,310	11	15
Green Park city	2,622	2,563	2,425	36	1
Green Ridge city	476	464	454	1	0
Greentop city	442	441	437	0	0
Greenville city	511	503	499	1	2
Greenwood city	5,221	5,130	4,786	265	18
Guilford town	85	85	85	0	0
Gunn City village	118	108	106	1	0
Hale city	419	409	407	0	2
Halfway village	173	165	162	0	0
Hallsville city	1,491	1,466	1,444	13	2
Halltown village	173	173	173	0	0
Hamilton city	1,809	1,788	1,779	0	4
Hanley Hills village	2,101	2,061	252	1,792	2
Hannibal city	17,916	17,435	15,917	1,264	39
Hardin city	569	565	558	0	6
Harris town	61	60	60	0	0
Harrisburg town	266	260	258	1	1
Harrisonville city	10,019	9,849	9,518	115	69
Hartsburg town	103	102	97	3	1
Hartville city	613	607	600	3	2
Hartwell CDP	16	16	16	0	0
Harviell CDP	106	103	95	8	0
Harwood village	47	47	45	0	2
Hawk Point city	669	643	629	9	1
Hayti city	2,939	2,894	1,535	1,326	9
Hayti Heights city	626	624	7	616	1
Hayward CDP	131	130	130	0	0
Haywood City village	206	199	11	186	0
Hazelwood city	25,703	25,061	16,484	7,835	69
Henrietta city	369	368	345	20	2
Herculaneum city	3,468	3,428	3,310	61	10
Hermann city	2,431	2,398	2,358	14	3
Hermitage city	467	457	451	2	2
Higbee city	568	552	550	2	0
Higginsville city	4,797	4,707	4,383	252	7
High Hill city	195	194	187	0	2
Highlandville city	911	898	887	1	10
High Ridge CDP	4,305	4,262	4,166	17	17
Hillsboro city	2,821	2,785	2,667	79	12
Hillsdale village	1,478	1,453	33	1,418	2
Hoberg village	56	54	51	0	0
Holcomb city	635	632	607	11	0
Holden city	2,252	2,200	2,130	31	11
Holland town	229	222	213	0	1
Holliday village	137	137	135	1	1

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Hollister city	4,426	4,343	4,093	42	53
Holt city	447	430	413	3	7
Holts Summit city	3,247	3,179	2,991	128	10
Homestead village	185	183	178	3	2
Homestown city	151	149	4	144	1
Hopkins city	532	530	519	9	0
Horine CDP	821	808	799	1	4
Hornersville city	663	653	643	0	8
Houston city	2,081	2,041	2,005	4	13
Houstonia city	220	219	215	1	1
Houston Lake city	235	229	221	1	0
Howardville city	383	380	22	354	0
Hughesville village	183	182	182	0	0
Humansville city	1,048	1,022	1,012	1	6
Hume town	336	328	322	1	0
Humphreys village	118	116	116	0	0
Hunnewell city	184	183	182	0	1
Hunter CDP	168	164	164	0	0
Huntleigh city	334	324	305	3	0
Huntsdale town	31	31	31	0	0
Huntsville city	1,564	1,539	1,449	81	2
Hurdland city	163	159	159	0	0
Hurley city	178	177	176	0	1
Iatan village	45	44	41	3	0
Iberia city	736	724	705	6	8
Imperial CDP	4,709	4,671	4,589	12	12
Independence city	116,830	113,049	100,112	6,498	736
Indian Point village	528	520	509	0	7
Innsbrook village	552	548	539	8	0
Ionia town	88	87	82	1	0
Irena village	18	18	18	0	0
Irondale city	445	435	434	0	1
Iron Mountain Lake city	737	727	709	0	16
Ironton city	1,460	1,437	1,404	25	5
Irwin CDP	69	68	68	0	0
Jackson city	13,758	13,570	13,182	227	37
Jacksonville village	151	149	148	1	0
Jameson town	133	121	117	0	3
Jamesport city	524	506	503	0	1
Jamestown town	386	378	378	0	0
Jasper city	931	913	903	3	2
Jefferson City city	43,079	42,117	33,599	7,263	142
Jennings city	14,712	14,546	1,256	13,210	21
Jerico Springs village	228	220	220	0	0
Jonesburg city	768	742	724	6	2
Joplin city	50,150	48,352	43,954	1,657	911
Josephville village	376	374	363	4	3
Junction City village	327	320	317	2	0
Kahoka city	2,078	2,061	2,046	5	3
Kansas City city	459,787	445,206	272,305	137,540	2,331
Kearney city	8,381	8,233	8,061	32	34
Kelso village	586	583	578	1	0
Kennett city	10,932	10,750	8,752	1,766	24
Keytesville city	471	471	464	3	2
Kidder city	323	315	313	0	0
Kimberling City city	2,400	2,383	2,354	5	10
Kimmswick city	157	154	142	2	0

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King City city	1,013	1,004	997	1	1
Kingdom City village	128	127	119	8	0
Kingston city	348	345	266	20	0
Kingsville city	269	264	258	2	2
Kinloch city	298	295	10	282	1
Kirbyville village	207	204	183	1	0
Kirksville city	17,505	17,154	16,160	389	38
Kirkwood city	27,540	27,112	24,634	1,927	36
Kissee Mills CDP	1,109	1,085	1,077	1	7
Knob Noster city	2,709	2,595	2,168	247	17
Knox City city	216	212	212	0	0
Koshkonong town	212	199	194	1	3
LaBarque Creek CDP	1,558	1,550	1,528	5	7
La Belle city	660	650	613	37	0
Laclede city	345	344	339	2	3
Laddonia city	513	512	507	2	3
La Due village	28	25	24	0	0
Ladue city	8,521	8,404	8,020	84	7
La Grange city	931	902	806	90	3
Lake Annette city	100	93	92	0	1
Lake Lafayette city	327	321	311	8	2
Lake Lotawana city	1,939	1,908	1,877	8	5
Lake Mykee Town village	350	344	339	2	0
Lake Ozark city	1,586	1,565	1,531	3	11
Lake St. Louis city	14,545	14,380	13,415	555	37
Lakeshire city	1,432	1,411	1,342	41	3
Lakeside city	0	0	0	0	0
Lake Tapawingo city	730	715	702	5	4
Lake Tekakwitha village	254	250	247	0	0
Lake Viking CDP	483	478	475	0	3
Lake Waukomis city	870	849	832	0	0
Lake Winnebago city	1,131	1,120	1,105	2	1
Lamar city	4,532	4,388	4,282	31	28
Lamar Heights city	178	176	176	0	0
Lambert village	34	34	34	0	0
La Monte city	1,140	1,093	828	5	1
Lanagan town	419	383	345	2	20
Lancaster city	728	720	715	0	0
La Plata city	1,366	1,343	1,318	3	0
Laredo city	198	197	197	0	0
La Russell city	114	112	109	0	3
Lathrop city	2,086	2,050	1,986	25	24
La Tour CDP	62	61	61	0	0
Laurie city	945	930	924	2	3
Lawson city	2,473	2,438	2,409	3	17
Leadington city	422	411	404	1	1
Leadwood city	1,282	1,277	1,269	1	2
Leasburg village	338	335	333	0	1
Leawood village	682	668	647	4	9
Lebanon city	14,474	14,120	13,625	188	89
Lee's Summit city	91,364	89,178	78,634	7,632	289
Leeton city	566	557	546	2	7
Leisure Lake CDP	160	160	160	0	0
Lemay CDP	16,645	16,361	15,581	288	49
Leonard village	61	61	61	0	0
Leslie village	171	166	165	0	1
Levasy city	83	81	81	0	0

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Lewis and Clark Village town	132	132	132	0	0
Lewistown town	534	532	526	6	0
Lexington city	4,726	4,565	4,125	286	22
Liberal city	759	732	713	4	13
Liberty city	29,149	28,391	26,649	1,038	135
Licking city	3,124	3,111	2,283	801	18
Lilbourn city	1,190	1,170	761	406	3
Lincoln city	1,190	1,179	1,161	1	10
Linn city	1,459	1,448	1,420	6	15
Linn Creek city	244	243	241	0	0
Linneus city	278	278	274	3	0
Lithium village	89	89	88	0	0
Livonia village	74	74	74	0	0
Loch Lloyd village	600	597	568	19	0
Lock Springs village	57	57	57	0	0
Lockwood city	936	925	904	3	11
Lohman city	163	159	159	0	0
Loma Linda town	725	709	645	19	34
Lone Jack city	1,050	1,031	990	21	9
Longtown town	102	102	101	0	0
Louisburg village	122	116	115	0	1
Louisiana city	3,364	3,278	3,023	159	8
Lowry City city	640	632	625	1	6
Lucerne village	85	85	84	0	0
Ludlow town	137	131	127	4	0
Lupus town	33	32	32	0	0
Luray village	99	99	98	1	0
McBaine town	10	10	10	0	0
McCord Bend village	297	289	285	1	2
McFall city	93	93	93	0	0
Mackenzie village	134	133	133	0	0
McKittrick town	61	61	61	0	0
Macks Creek city	244	238	237	0	0
Macon city	5,471	5,337	4,965	305	14
Madison city	554	550	546	0	1
Maitland city	343	343	340	0	1
Malden city	4,275	4,191	3,050	1,074	12
Malta Bend town	250	248	241	3	0
Manchester city	18,094	17,714	15,842	565	29
Mansfield city	1,296	1,285	1,265	8	5
Maplewood city	8,046	7,767	5,966	1,384	20
Marble Hill city	1,477	1,456	1,424	0	15
Marceline city	2,233	2,205	2,188	6	3
Marionville city	2,225	2,167	2,143	0	8
Marlborough village	2,179	2,122	1,744	178	9
Marquand city	203	203	203	0	0
Marshall city	13,065	12,674	10,347	1,024	52
Marshfield city	6,633	6,520	6,401	26	51
Marston city	503	494	403	89	1
Marthasville city	1,136	1,122	1,108	2	3
Martinsburg town	304	303	298	3	0
Maryland Heights city	27,472	26,794	20,122	3,262	64
Maryville city	11,972	11,827	11,052	369	29
Matthews city	628	626	610	12	3
Maysville city	1,114	1,100	1,087	5	6
Mayview city	212	209	190	16	0
Meadville city	462	461	458	1	0

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Mehlville CDP	28,380	27,938	26,227	856	45
Memphis city	1,822	1,808	1,794	3	9
Mendon city	171	171	169	2	0
Mercer town	318	315	314	0	1
Merriam Woods village	1,761	1,704	1,657	5	21
Merwin village	58	57	56	0	0
Meta city	229	224	224	0	0
Metz town	49	49	46	0	3
Mexico city	11,543	11,271	9,933	960	45
Miami city	175	173	171	1	0
Middletown town	167	157	156	0	1
Milan city	1,960	1,936	1,465	11	7
Milford village	26	26	26	0	0
Millard village	89	87	86	0	0
Miller city	699	695	682	2	2
Mill Spring village	189	186	183	2	0
Milo village	90	90	87	0	3
Mindenmines city	365	343	315	0	24
Mine La Motte CDP	348	346	340	0	2
Miner city	984	964	908	31	2
Mineral Point town	351	343	323	16	1
Miramiguoa Park village	120	119	118	0	0
Missouri City city	267	254	240	11	2
Moberly city	13,974	13,613	12,076	1,357	49
Mokane city	185	182	181	0	1
Moline Acres city	2,442	2,416	154	2,249	6
Monett city	8,873	8,700	7,705	68	77
Monroe City city	2,531	2,479	2,268	184	9
Montgomery City city	2,834	2,792	2,625	101	7
Monticello village	98	97	93	1	3
Montier CDP	98	98	96	0	2
Montrose city	384	382	377	5	0
Mooresville village	91	91	91	0	0
Morehouse city	973	955	933	8	3
Morley city	697	673	662	8	3
Morrison city	139	139	139	0	0
Morrisville town	388	374	366	4	3
Mosby city	190	189	185	2	0
Moscow Mills city	2,509	2,431	2,299	94	3
Mound City city	1,159	1,152	1,114	2	28
Moundville town	124	122	121	0	0
Mountain Grove city	4,789	4,714	4,617	16	49
Mountain View city	2,719	2,687	2,653	2	14
Mount Leonard town	87	75	73	1	0
Mount Moriah town	87	87	87	0	0
Mount Vernon city	4,575	4,486	4,361	18	58
Murphy CDP	8,690	8,520	8,279	81	42
Napoleon city	222	220	220	0	0
Naylor city	632	599	591	2	5
Neck City city	186	178	174	0	4
Neelyville city	483	466	400	60	4
Nelson city	192	184	176	6	1
Neosho city	11,835	11,513	9,970	118	186
Nevada city	8,386	8,256	7,976	91	67
Newark village	94	88	85	2	1
New Bloomfield city	669	652	630	7	6
Newburg city	470	466	464	0	1

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New Cambria city	195	195	184	0	1
New Florence city	769	755	743	7	1
New Franklin city	1,089	1,065	1,027	17	14
New Hampton city	291	283	278	0	5
New Haven city	2,089	2,055	1,986	15	13
New London city	974	956	891	62	1
New Madrid city	3,116	3,068	2,253	796	7
New Melle city	475	475	462	3	0
Newtonia town	199	196	189	1	1
Newtown town	183	176	156	0	14
Niangua city	405	404	394	2	6
Nixa city	19,022	18,611	17,955	175	131
Noel city	1,832	1,767	1,037	91	44
Norborne city	708	696	675	15	5
Normandy city	5,008	4,904	1,069	3,493	16
North Kansas City city	4,208	4,062	3,230	452	32
North Lilbourn village	49	49	7	42	0
Northmoor city	325	325	312	11	1
Northwoods city	4,227	4,177	183	3,971	8
Norwood city	665	652	639	6	6
Norwood Court town	959	947	39	903	1
Novelty village	139	136	134	1	0
Novinger city	456	453	450	0	3
Oak Grove city	7,795	7,656	7,379	87	63
Oak Grove Village village	509	497	491	2	2
Oakland city	1,381	1,366	1,329	30	1
Oak Ridge town	243	236	229	1	6
Oaks village	129	128	126	1	0
Oakview village	375	363	322	8	9
Oakville CDP	36,143	35,767	34,680	296	35
Oakwood village	185	185	180	0	3
Oakwood Park village	188	181	169	0	0
Odessa city	5,300	5,162	5,025	73	23
O'Fallon city	79,329	77,877	71,315	3,164	197
Old Appleton town	85	85	85	0	0
Old Jamestown CDP	19,184	18,833	8,045	10,302	27
Old Monroe city	265	262	257	1	1
Olean town	128	123	116	7	0
Olivette city	7,737	7,538	4,715	1,848	18
Olympian Village city	774	765	753	3	2
Oran city	1,294	1,284	1,264	20	0
Oregon city	857	851	843	0	4
Oronogo city	2,381	2,290	2,189	7	47
Orrick city	837	826	818	2	3
Osage Beach city	4,351	4,305	4,071	46	24
Osborn city	423	420	416	0	3
Osceola city	947	920	892	16	7
Osgood village	48	47	31	0	7
Otterville city	454	446	437	6	3
Overland city	16,062	15,587	11,770	2,628	49
Owensville city	2,676	2,647	2,620	5	5
Oxly CDP	200	199	194	0	5
Ozark city	17,820	17,455	16,957	150	97
Ozora CDP	183	182	179	0	3
Pacific city	7,002	6,900	6,192	590	39
Pagedale city	3,304	3,231	112	3,087	8
Palmyra city	3,595	3,545	3,418	94	4

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Paris city	1,220	1,206	1,142	60	1
Parkdale village	170	169	164	1	0
Park Hills city	8,759	8,633	8,351	172	41
Parkville city	5,554	5,415	4,971	220	7
Parkway village	439	438	421	9	0
Parma city	713	704	481	210	1
Parnell city	191	191	190	0	0
Pasadena Hills city	930	913	261	635	4
Pasadena Park village	470	461	165	285	0
Pascola village	108	106	105	0	0
Passaic town	34	34	34	0	0
Pattonsburg city	348	345	331	9	5
Paynesville village	77	75	64	11	0
Peaceful Village village	9	9	9	0	0
Peculiar city	4,608	4,541	4,374	94	20
Pendleton village	43	43	43	0	0
Penermon village	64	62	6	56	0
Perry city	693	685	677	0	1
Perryville city	8,225	8,120	7,841	62	32
Pevely city	5,484	5,377	5,277	56	17
Phelps City CDP	24	24	24	0	0
Phillipsburg village	202	200	200	0	0
Pickering town	160	160	160	0	0
Piedmont city	1,977	1,956	1,907	10	5
Pierce City city	1,292	1,275	1,239	0	10
Pierpont village	76	75	74	1	0
Pilot Grove city	768	757	741	10	3
Pilot Knob city	746	728	704	10	11
Pine Lawn city	3,275	3,228	49	3,157	10
Pineville city	791	778	728	1	37
Pinhook village	30	30	1	29	0
Plato village	109	109	104	2	2
Platte City city	4,691	4,557	4,172	215	23
Platte Woods city	385	378	366	2	2
Plattsburg city	2,319	2,261	2,094	139	12
Pleasant Hill city	8,113	7,974	7,734	57	40
Pleasant Hope city	614	601	586	0	5
Pleasant Valley city	2,961	2,880	2,653	136	16
Plevna CDP	21	21	21	0	0
Pocahontas town	114	114	113	1	0
Pollock village	89	88	84	1	0
Polo city	575	552	547	2	0
Pomona CDP	511	503	493	0	4
Pontiac CDP	175	171	170	0	0
Poplar Bluff city	17,023	16,539	14,434	1,698	90
Portage Des Sioux city	328	325	323	0	0
Portageville city	3,228	3,164	2,538	612	2
Potosi city	2,660	2,617	2,531	58	10
Powersville village	60	59	59	0	0
Prairie Home city	280	279	277	1	0
Prathersville village	124	122	118	0	2
Preston village	223	223	218	1	4
Princeton city	1,166	1,164	1,153	4	2
Purcell city	408	400	385	6	9
Purdin city	190	189	189	0	0
Purdy city	1,098	1,060	899	0	14
Puxico city	881	868	855	1	10

Geographic area	Total population	Race			
		One race			
		Total	White	Black or African American	American Indian and Alaska Native
Queen City city	598	595	592	0	3
Quitman town	45	45	45	0	0
Qulin city	458	449	445	0	3
Randolph village	52	52	51	0	0
Ravanna CDP	98	97	97	0	0
Ravenwood town	440	439	438	1	0
Raymondville town	363	354	351	1	0
Raymore city	19,206	18,743	16,870	1,506	81
Raytown city	29,526	28,481	20,000	7,421	135
Rayville village	223	218	217	1	0
Rea city	50	50	50	0	0
Redings Mill village	151	149	148	1	0
Reeds town	95	91	83	3	3
Reeds Spring city	913	896	870	1	15
Renick village	172	172	171	1	0
Rensselaer village	228	228	228	0	0
Republic city	14,751	14,459	14,103	97	85
Revere town	79	75	74	0	0
Rhineland town	142	137	136	0	0
Richards town	96	92	92	0	0
Rich Hill city	1,396	1,351	1,333	3	6
Richland city	1,863	1,806	1,754	21	7
Richmond city	5,797	5,685	5,430	183	23
Richmond Heights city	8,603	8,450	7,030	1,002	17
Ridgely village	104	104	104	0	0
Ridgeway city	464	462	457	1	1
Risco city	346	338	334	4	0
Ritchey town	82	81	79	0	2
River Bend village	10	10	10	0	0
Riverside city	2,937	2,844	2,295	307	34
Riverview village	2,856	2,793	772	1,996	6
Riverview Estates village	82	79	79	0	0
Rives town	63	63	63	0	0
Rocheport city	239	234	218	9	5
Rockaway Beach city	841	830	808	6	8
Rock Hill city	4,635	4,500	3,271	1,064	13
Rock Port city	1,318	1,299	1,294	0	4
Rockville city	166	161	159	1	0
Rogersville city	3,073	2,991	2,919	12	23
Rolla city	19,559	19,059	16,960	803	84
Roscoe village	124	122	122	0	0
Rosebud city	409	405	397	0	1
Rosendale city	143	143	141	0	1
Rothville village	99	98	98	0	0
Rush Hill village	151	145	145	0	0
Rushville town	303	303	301	0	0
Russellville city	807	801	782	14	1
Rutledge town	109	109	109	0	0
Saddlebrooke village	202	194	184	0	3
Saginaw village	297	293	280	1	10
St. Ann city	13,020	12,660	9,052	2,879	45
St. Charles city	65,794	64,518	57,557	3,889	182
St. Clair city	4,724	4,659	4,579	48	15
St. Clement CDP	78	75	75	0	0
St. Cloud village	41	40	36	3	1
Ste. Genevieve city	4,410	4,348	4,224	70	17
St. Elizabeth village	336	333	333	0	0

Geographic area	Total population	Race			
		One race			
		Total	White	Black or African American	American Indian and Alaska Native
St. Francisville CDP	179	176	168	0	1
St. George city	1,337	1,315	1,286	7	6
St. James city	4,216	4,148	4,052	40	28
St. John city	6,517	6,302	4,391	1,583	23
St. Joseph city	76,780	74,731	67,384	4,585	347
St. Louis city	319,294	311,732	140,267	157,160	838
St. Martins city	1,140	1,122	1,087	13	3
St. Mary city	360 (r40487)	351	330	17	1
St. Paul city	1,829	1,823	1,805	6	4
St. Peters city	52,575	51,644	48,196	1,939	96
St. Robert city	4,340	4,049	2,653	958	17
St. Thomas town	263	262	261	1	0
Salem city	4,950	4,859	4,749	26	56
Salisbury city	1,618	1,603	1,558	34	8
Sappington CDP	7,580	7,454	7,097	112	8
Sarcoxie city	1,330	1,301	1,268	2	18
Savannah city	5,057	5,015	4,942	18	15
Schell City city	249	247	243	0	4
Scotsdale town	222	221	221	0	0
Scott City city	4,565	4,517	4,425	31	12
Sedalia city	21,387	20,743	18,246	1,103	115
Sedgewickville village	173	173	173	0	0
Seligman city	851	837	807	4	16
Senath city	1,767	1,746	1,356	19	3
Seneca city	2,336	2,208	1,992	8	187
Seymour city	1,921	1,880	1,834	6	20
Shelbina city	1,704	1,695	1,684	9	1
Shelbyville city	552	546	543	2	1
Sheldon city	543	525	512	1	5
Shell Knob CDP	1,379	1,367	1,351	0	12
Sheridan town	195	191	186	0	0
Shoal Creek Drive village	337	334	320	2	6
Shoal Creek Estates village	96	94	92	2	0
Shrewsbury city	6,254	6,167	5,655	226	10
Sibley village	357	347	344	0	3
Sikeston city	16,318	15,990	11,415	4,275	24
Silex village	187	187	183	4	0
Silver Creek village	623	613	594	0	13
Skidmore city	284	283	282	0	1
Slater city	1,856	1,823	1,672	118	3
Smithton city	570	560	541	8	1
Smithville city	8,425	8,278	8,084	57	41
South Fork CDP	241	241	232	1	4
South Gifford village	50	49	49	0	0
South Gorin town	91	91	91	0	0
South Greenfield village	90	90	87	0	3
South Lineville town	28	28	28	0	0
Southwest City town	970	935	558	1	36
Spanish Lake CDP	19,650	19,194	3,882	15,116	46
Sparta city	1,756	1,726	1,697	4	12
Spickard city	254	251	250	0	0
Spokane CDP	177	175	175	0	0
Springfield city	159,498	154,454	141,526	6,524	1,233
Stanberry city	1,185	1,180	1,174	2	2
Stark City town	139	131	122	2	2
Steele city	2,172	2,138	1,684	406	10
Steelville city	1,642	1,629	1,578	16	19

Geographic area	Total population	Race			
		One race			
		Total	White	Black or African American	American Indian and Alaska Native
Stella town	158	158	142	0	8
Stewartsville city	750	738	726	4	1
Stockton city	1,819	1,790	1,765	2	14
Stotesbury town	18	18	18	0	0
Stotts City city	220	215	205	2	1
Stoutland city	192	192	190	0	0
Stoutsville village	36	34	34	0	0
Stover city	1,094	1,081	1,056	0	6
Strafford city	2,358	2,298	2,259	12	19
Strasburg city	141	141	141	0	0
Sturgeon city	872	864	844	4	6
Sugar Creek city	3,345	3,260	3,039	82	18
Sullivan city	7,081	7,013	6,899	16	26
Summersville city	502	491	486	0	4
Sumner town	102	102	102	0	0
Sundown CDP	48	47	46	0	0
Sunrise Beach village	431	418	408	1	7
Sunset Hills city	8,496	8,376	7,992	129	17
Sweet Springs city	1,484	1,450	1,399	26	5
Sycamore Hills village	668	645	553	82	0
Syracuse city	172	170	170	0	0
Tallapoosa city	168	167	164	0	3
Taneyville village	396	389	383	0	0
Taos city	878	873	867	0	4
Tarkio city	1,583	1,576	1,549	13	6
Tarrants village	22	22	22	0	0
Terre du Lac CDP	2,320	2,301	2,278	2	6
Thayer city	2,243	2,198	2,162	2	21
Theodosia village	243	238	238	0	0
Thomasville CDP	68	68	68	0	0
Three Creeks village	6	6	6	0	0
Tightwad village	69	68	68	0	0
Tina village	157	154	154	0	0
Tindall town	77	77	77	0	0
Tipton city	3,262	3,233	2,674	522	14
Town and Country city	10,815	10,646	9,494	280	12
Tracy city	208	206	205	0	0
Trenton city	6,001	5,932	5,762	50	31
Trimble city	646	637	631	4	0
Triplett city	41	41	38	3	0
Troy city	10,540	10,288	9,751	324	43
Truesdale city	732	707	642	41	7
Truxton village	91	91	91	0	0
Turney village	148	148	147	0	1
Tuscumbia town	203	203	190	8	4
Twin Oaks village	392	389	382	3	0
Umber View Heights village	48	47	47	0	0
Union city	10,204	10,036	9,767	110	57
Union Star town	437	430	429	0	0
Unionville city	1,865	1,840	1,810	7	4
Unity Village village	99	94	85	7	0
University City city	35,371	34,426	17,954	14,535	89
Uplands Park village	445	445	9	429	5
Urbana city	417	411	409	0	2
Urich city	505	501	489	6	5
Utica village	269	267	265	0	1
Valley Park city	6,942	6,780	5,905	275	26

Geographic area	Total population	Race			
		One race			
		Total	White	Black or African American	American Indian and Alaska Native
Van Buren town	819	802	786	0	7
Vandalia city	3,899	3,829	3,174	611	17
Vandiver village	71	71	71	0	0
Vanduser village	267	258	243	8	1
Velda City city	1,420	1,404	42	1,355	1
Velda Village Hills village	1,055	1,048	9	1,039	0
Verona town	619	605	422	0	9
Versailles city	2,482	2,417	2,293	70	19
Viburnum city	693	688	680	3	4
Vienna city	610	605	600	1	4
Village of Four Seasons village	2,217	2,206	2,163	19	12
Villa Ridge CDP	2,636	2,605	2,542	34	11
Vinita Park city	1,880	1,838	566	1,220	10
Vinita Terrace village	277	267	63	202	0
Vista village	54	54	54	0	0
Waco city	87	80	80	0	0
Walker city	270	266	261	0	3
Walnut Grove city	665	659	649	1	9
Wardell town	427	423	407	15	1
Wardsville village	1,506	1,494	1,471	9	5
Warrensburg city	18,838	18,251	16,065	1,408	93
Warrenton city	7,880	7,738	7,402	162	47
Warsaw city	2,127	2,108	2,049	21	23
Warson Woods city	1,962	1,950	1,920	9	3
Washburn city	435	415	409	0	4
Washington city	13,982	13,818	13,521	96	20
Wasola CDP	113	107	107	0	0
Watson village	100	100	100	0	0
Waverly city	849	842	802	18	2
Wayland city	533	529	525	1	0
Waynesville city	4,830	4,516	3,556	600	51
Weatherby town	107	107	106	0	1
Weatherby Lake city	1,723	1,699	1,639	13	9
Weaubleau city	418	411	407	1	3
Webb City city	10,996	10,664	9,975	178	160
Webster Groves city	22,995	22,649	20,664	1,522	42
Weingarten CDP	133	133	133	0	0
Weldon Spring city	5,443	5,402	5,200	75	5
Weldon Spring Heights town	91	90	81	0	0
Wellington city	812	797	779	8	2
Wellston city	2,313	2,273	55	2,207	3
Wellsville city	1,217	1,207	1,163	34	6
Wentworth village	147	147	143	1	3
Wentzville city	29,070	28,532	26,122	1,738	76
West Alton city	522	520	515	3	2
Westboro city	141	141	141	0	0
West Line village	97	96	96	0	0
Weston city	1,641	1,613	1,590	6	2
Westphalia city	389	382	380	0	0
West Plains city	11,986	11,767	11,391	101	76
West Sullivan town	119	119	117	0	0
Westwood village	278	274	256	6	0
Wheatland city	371	365	349	6	2
Wheaton city	696	677	625	1	5
Wheeling city	271	271	268	1	1
Whiteman AFB CDP	2,556	2,430	2,077	237	10
Whiteside village	75	73	72	0	0

Geographic area	Total population	Race			
		One race			
		Total	White	Black or African American	American Indian and Alaska Native
Whitewater town	125	124	124	0	0
Wilbur Park village	471	463	453	1	0
Wildwood city	35,517	34,982	32,740	588	68
Willard city	5,288	5,195	5,097	45	30
Williamsville city	342	338	336	1	1
Willow Springs city	2,184	2,137	2,099	3	9
Wilson City village	115	115	3	112	0
Winchester city	1,547	1,506	1,432	19	7
Windsor city	2,901	2,860	2,808	4	33
Windsor Place village	309	298	285	4	0
Winfield city	1,404	1,386	1,362	6	0
Winigan CDP	44	44	42	0	2
Winona city	1,335	1,309	1,294	1	11
Winston village	259	258	252	3	1
Wood Heights city	717	708	693	11	1
Woodson Terrace city	4,063	3,934	2,782	844	13
Wooldridge village	61	61	59	0	1
Worth village	63	63	54	5	4
Wortham CDP	275	274	273	1	0
Worthington village	81	81	81	0	0
Wright City city	3,119	3,024	2,712	177	5
Wyaconda city	227	223	223	0	0
Wyatt city	319	317	269	48	0
Zalma village	122	122	122	0	0

Geographic area	Race				Hispanic or Latino (of any race)
	One race			Two or More Races	
	Asian	Native Hawaiian and Other Pacific Islander	Some Other Race		
Missouri	98,083	6,261	80,457	124,589	212,470
Adrian city	0	0	4	16	11
Advance city	2	0	0	10	9
Affton CDP	417	3	71	278	419
Agency village	6	0	8	7	20
Airport Drive village	4	0	1	13	24
Alba city	0	0	0	17	13
Albany city	8	0	3	8	10
Aldrich village	0	0	2	0	2
Alexandria city	0	0	0	4	0
Allendale village	0	0	0	0	0
Allenville village	0	0	0	1	0
Alma city	1	0	1	7	2
Altamont village	0	0	0	0	0
Altenburg city	0	0	0	2	0
Alton city	0	0	0	28	12
Amazonia village	0	0	2	2	3
Amity town	0	0	0	0	0
Amoret city	0	0	4	5	9
Amsterdam city	0	0	0	4	3
Anderson city	12	10	97	57	191
Annada village	0	0	0	0	0
Annapolis city	0	0	1	1	3
Anniston town	0	0	0	1	0
Appleton City city	0	0	1	22	8
Arbela town	0	0	1	0	1
Arbyrd city	0	0	24	4	42
Arcadia city	0	0	0	1	8
Archie city	2	3	10	12	23
Arcola village	0	0	0	0	1
Argyle town	0	0	0	0	1
Arkoe town	0	0	0	0	0
Armstrong city	0	0	0	3	0
Arnold city	185	5	128	281	455
Arrow Point village	0	0	0	1	0
Arrow Rock town	0	0	0	1	0
Asbury city	0	2	1	2	3
Ashburn town	0	0	0	0	0
Ash Grove city	1	0	3	24	27
Ashland city	19	1	15	47	54
Ashley CDP	0	0	0	0	0
Atlanta city	0	0	0	8	1
Augusta town	1	0	0	2	2
Aullville village	0	0	0	1	0
Aurora city	13	8	330	134	563
Auxvasse city	5	0	3	6	11
Ava city	7	0	7	41	30
Avilla town	0	0	0	9	6
Avondale city	2	1	6	16	31
Bagnell town	0	0	0	5	0
Baker village	0	0	0	0	0
Bakersfield village	0	0	1	6	4
Baldwin Park village	1	0	0	1	0
Ballwin city	1,704	8	191	523	733
Baring city	0	0	0	0	0

Geographic area	Race				Hispanic or Latino (of any race)
	One race			Two or More Races	
	Asian	Native Hawaiian and Other Pacific Islander	Some Other Race		
Barnard city	0	0	0	0	3
Barnett city	1	0	0	5	7
Barnhart CDP	25	2	15	62	122
Bates City city	0	1	3	1	4
Battlefield city	115	0	40	135	152
Bella Villa city	14	0	12	15	31
Bell City city	0	0	0	10	1
Belle city	0	0	10	24	21
Bellefontaine Neighbors city	18	1	24	121	54
Bellerive village	0	0	0	4	0
Bellflower city	0	0	0	11	3
Bel-Nor village	33	0	5	35	35
Bel-Ridge village	10	1	10	45	35
Belton city	197	28	846	716	1,874
Bennett Springs CDP	2	0	1	4	1
Benton city	0	0	2	6	13
Benton City village	0	0	1	0	1
Berger city	0	0	0	0	0
Berkeley city	33	5	142	150	312
Bernie city	2	0	15	28	28
Bertrand city	1	0	1	4	16
Bethany city	9	2	43	31	99
Bethel village	0	0	3	5	3
Beverly Hills city	1	0	8	9	16
Bevier city	3	0	0	7	1
Biehle CDP	0	0	0	0	0
Bigelow village	0	0	0	0	0
Big Lake village	0	0	0	0	0
Big Spring CDP	5	0	0	4	0
Billings city	2	0	6	12	10
Birch Tree city	5	0	21	15	47
Birmingham village	0	0	2	0	5
Bismarck city	1	0	2	16	10
Blackburn city	0	0	3	9	7
Black Jack city	25	1	16	126	51
Blackwater city	0	0	0	4	3
Blairstown city	0	0	0	10	2
Blanchard CDP	0	0	0	0	0
Bland city	3	0	1	6	3
Blodgett village	1	0	0	9	6
Bloomfield city	2	0	6	12	16
Bloomsdale city	0	0	0	3	0
Blue Eye town	0	0	0	4	3
Blue Springs city	654	82	669	1,621	2,618
Blythedale village	0	0	0	0	5
Bogard city	0	0	0	0	6
Bolckow city	1	0	0	2	1
Bolivar city	64	4	73	185	259
Bonne Terre city	14	7	7	64	93
Boonville city	47	3	25	187	158
Bosworth city	0	0	1	3	9
Bourbon city	6	0	1	8	16
Bowling Green city	18	2	25	63	94
Bragg City town	5	0	0	4	1
Brandsville city	0	0	14	2	20

Geographic area	Race				Hispanic or Latino (of any race)
	One race			Two or More Races	
	Asian	Native Hawaiian and Other Pacific Islander	Some Other Race		
Branson city	159	13	413	278	928
Branson West city	2	0	17	19	57
Brashear city	2	0	0	9	0
Braymer city	1	0	0	15	2
Breckenridge city	0	0	2	18	3
Breckenridge Hills city	29	6	421	180	742
Brentwood city	547	1	48	154	223
Brewer CDP	0	0	0	1	4
Bridgeton city	288	2	474	237	743
Brimson village	0	0	0	0	0
Bronaugh city	1	0	0	8	4
Brookfield city	13	0	28	94	93
Brooklyn Heights town	0	0	1	3	5
Browning city	0	0	1	7	18
Brownington town	0	0	0	2	0
Brumley town	0	0	0	10	5
Brunswick city	0	0	1	16	2
Bucklin city	0	0	0	2	9
Buckner city	3	6	36	68	104
Buffalo city	6	7	33	48	98
Bull Creek village	4	5	29	21	61
Bunceton city	0	0	1	7	3
Bunker city	0	0	0	2	4
Burgess town	0	0	0	1	3
Burlington Junction city	0	0	1	4	5
Butler city	9	1	20	70	98
Butterfield village	9	0	63	16	126
Byrnes Mill city	8	1	15	28	39
Cabool city	12	0	3	45	55
Cainsville city	0	4	0	1	3
Cairo village	2	0	0	5	0
Caledonia village	0	0	0	0	1
Calhoun city	3	0	0	6	2
California city	22	7	243	55	447
Callao city	0	0	0	7	4
Calverton Park village	12	0	14	28	37
Camden city	0	0	0	2	1
Camden Point city	0	0	3	1	6
Camdenton city	20	0	53	87	138
Cameron city	47	4	27	100	197
Campbell city	1	0	9	26	42
Canalou city	0	0	0	6	2
Canton city	11	4	15	30	42
Cape Girardeau city	718	17	585	912	1,046
Cardwell city	0	0	8	13	24
Carl Junction city	73	3	57	193	217
Carrollton city	9	3	6	45	67
Carterville city	7	0	40	38	73
Carthage city	146	92	2,712	483	3,685
Caruthersville city	12	7	47	103	145
Carytown city	0	0	10	2	15
Cassville city	11	0	69	58	150
Castle Point CDP	11	0	2	64	22
Catron town	0	0	0	1	0
Cave town	0	0	0	0	0

Geographic area	Race				Hispanic or Latino (of any race)
	One race			Two or More Races	
	Asian	Native Hawaiian and Other Pacific Islander	Some Other Race		
Cedar Hill CDP	7	0	0	19	20
Cedar Hill Lakes village	3	0	0	2	3
Center city	6	1	1	7	5
Centertown town	1	0	1	4	2
Centerview city	5	0	4	4	10
Centerville city	0	0	0	4	0
Centralia city	8	0	20	54	65
Chaffee city	3	0	2	38	37
Chain of Rocks village	0	0	0	0	0
Chain-O-Lakes village	1	0	0	0	0
Chamois city	0	0	1	1	4
Champ village	0	0	0	0	0
Charlack city	20	0	45	51	98
Charleston city	19	0	36	62	106
Cherokee Pass CDP	1	0	0	0	0
Chesapeake CDP	0	0	0	4	0
Chesterfield city	4,091	15	326	643	1,323
Chilhowee town	0	0	0	12	4
Chillicothe city	33	1	48	143	143
Chula city	2	0	4	5	11
Clarence city	0	0	1	9	11
Clark city	1	0	0	4	4
Clarksburg city	0	0	2	3	6
Clarksdale city	0	0	0	2	4
Clarkson Valley city	93	4	17	35	57
Clarksville city	0	0	9	6	13
Clarkton city	0	0	105	28	126
Claycomo village	8	2	24	18	71
Clayton city	1,722	5	67	383	488
Clearmont city	0	0	0	2	0
Cleveland city	6	0	0	16	14
Clever city	1	0	6	43	53
Cliff Village village	0	0	0	2	0
Clifton Hill city	0	0	0	3	0
Climax Springs village	0	0	4	0	5
Clinton city	25	1	42	163	177
Clyde village	0	0	0	0	0
Cobalt village	0	0	0	1	4
Coffey city	0	0	0	0	0
Cole Camp city	3	0	3	13	10
Collins village	0	0	0	1	4
Columbia city	5,628	69	1,155	3,327	3,729
Commerce village	0	0	0	0	0
Conception CDP	14	0	14	2	33
Conception Junction town	0	0	0	0	0
Concord CDP	275	4	55	187	231
Concordia city	5	3	11	27	51
Coney Island village	0	0	0	0	0
Conway city	1	1	8	21	22
Cool Valley city	5	0	7	29	3
Cooter city	0	0	0	1	2
Corder city	1	0	4	10	6
Corning town	0	0	0	0	0
Cosby village	0	0	1	0	1
Cottleville city	46	0	15	42	54

Geographic area	Race				Hispanic or Latino (of any race)
	One race			Two or More Races	
	Asian	Native Hawaiian and Other Pacific Islander	Some Other Race		
Country Club village	14	1	10	42	77
Country Club Hills city	0	0	1	9	2
Country Life Acres village	3	0	0	0	1
Cowgill city	1	0	5	1	6
Craig city	0	0	1	0	2
Crane city	3	0	6	21	18
Creighton city	0	0	0	2	7
Crestwood city	280	7	49	199	229
Creve Coeur city	1,800	3	124	343	461
Crocker city	1	0	5	26	31
Cross Timbers city	0	0	0	1	0
Crystal City city	31	1	14	90	49
Crystal Lake Park city	22	0	1	4	7
Crystal Lakes city	7	0	0	8	5
Cuba city	6	0	50	49	114
Curryville city	1	0	0	11	4
Dadeville village	1	0	0	6	5
Dalton town	0	0	0	0	0
Danville CDP	0	0	0	0	0
Dardenne Prairie city	404	5	53	188	234
Darlington village	0	0	0	8	0
Dawn CDP	0	0	0	0	0
Dearborn city	0	0	6	9	13
Deepwater city	0	0	0	3	7
Deerfield village	1	0	0	2	0
Defiance CDP	0	0	4	0	3
De Kalb town	0	0	0	1	1
Dellwood city	21	0	13	86	40
Delta city	0	0	0	17	2
Dennis Acres village	0	1	11	5	14
Denver village	0	0	0	0	0
Des Arc village	0	0	0	5	0
Desloge city	8	0	3	71	55
De Soto city	27	1	22	90	51
Des Peres city	262	2	22	100	112
De Witt city	0	0	0	5	1
Dexter city	19	2	14	113	148
Diamond town	1	0	10	24	17
Diehlstadt village	0	0	0	2	0
Diggins village	0	0	2	4	3
Dixon city	9	14	8	36	73
Doe Run CDP	0	0	6	22	19
Doniphan city	16	0	16	21	34
Doolittle city	2	0	0	10	0
Dover town	1	0	4	0	4
Downing city	1	0	0	7	2
Drexel city	1	0	0	13	7
Dudley city	0	0	0	1	2
Duenweg city	1	0	20	69	36
Duquesne village	30	1	16	41	59
Dutchtown village	0	0	0	4	0
Eagle Rock CDP	0	0	0	4	9
Eagleville town	0	0	0	4	5
East Lynne city	0	0	0	6	5
Easton city	1	0	0	7	11

Geographic area	Race				Hispanic or Latino (of any race)
	One race			Two or More Races	
	Asian	Native Hawaiian and Other Pacific Islander	Some Other Race		
East Prairie city	2	0	12	37	45
Edgar Springs city	0	0	0	9	2
Edgerton city	5	0	0	5	5
Edina city	1	0	0	5	7
Edinburg CDP	0	0	0	1	1
Edmundson city	13	1	72	44	100
Eldon city	17	15	20	89	65
El Dorado Springs city	18	0	26	68	79
Ellington city	2	0	0	8	11
Ellisville city	392	0	57	128	223
Ellsinore city	0	0	0	2	5
Elmer city	0	0	0	2	2
Elmira village	0	0	1	4	4
Elmo city	0	0	0	3	0
Elsberry city	0	0	11	37	39
Emerald Beach village	1	0	0	3	2
Eminence city	1	0	0	17	5
Emma city	0	0	0	4	4
Eolia village	0	0	7	6	15
Essex city	0	0	0	5	5
Ethel town	0	0	0	1	1
Eureka city	194	6	32	178	204
Evergreen village	0	0	0	1	0
Everton city	0	0	0	9	5
Ewing city	3	0	0	10	13
Excello CDP	0	0	1	1	3
Excelsior Estates village	0	0	0	6	9
Excelsior Springs city	53	13	93	262	369
Exeter city	4	0	13	18	39
Fairdealing CDP	1	0	0	10	1
Fairfax city	2	0	0	4	0
Fair Grove city	7	0	8	13	30
Fair Play city	1	0	3	8	9
Fairview town	1	0	8	9	19
Farber city	0	0	1	15	2
Farley village	5	0	0	3	5
Farmington city	130	7	49	184	247
Fayette city	13	3	15	56	59
Fenton city	84	7	13	54	76
Ferguson city	103	4	92	421	260
Ferrelview village	2	6	0	19	28
Festus city	93	5	22	225	141
Fidelity town	0	0	0	3	4
Fillmore city	0	0	0	2	0
Fisk city	0	0	0	2	1
Fleming city	0	0	0	0	1
Flemington village	0	0	0	2	7
Flint Hill city	0	0	1	2	5
Flordell Hills city	1	0	11	14	14
Florida village	0	0	0	0	0
Florissant city	398	20	316	1,202	1,029
Foley city	4	0	0	2	8
Fordland city	1	0	4	14	25
Forest City city	0	0	6	3	6
Foristell city	1	0	4	10	4

Geographic area	Race				Hispanic or Latino (of any race)
	One race			Two or More Races	
	Asian	Native Hawaiian and Other Pacific Islander	Some Other Race		
Forsyth city	9	0	11	40	68
Fortescue town	0	0	0	0	0
Fort Leonard Wood CDP	385	111	577	717	2,200
Foster village	0	0	0	1	4
Fountain N' Lakes village	0	0	3	4	4
Frankclay CDP	0	0	0	0	0
Frankford city	0	0	1	7	3
Franklin city	0	0	0	0	1
Fredericktown city	23	2	48	37	73
Freeburg village	1	2	0	2	3
Freeman city	0	0	3	7	4
Freistatt village	1	0	8	1	16
Fremont CDP	0	0	0	0	2
Fremont Hills city	5	0	1	10	7
Frohna city	0	0	0	0	0
Frontenac city	196	0	10	42	51
Fulton city	148	6	82	293	270
Gainesville city	0	0	3	12	13
Galena city	0	0	3	3	16
Gallatin city	1	0	0	27	12
Galt city	1	1	0	6	0
Garden City city	4	0	6	15	28
Gasconade city	0	0	0	1	0
Gentry village	0	0	0	1	0
Gerald city	7	0	1	11	6
Gerster town	0	0	0	0	0
Gibbs village	0	0	0	5	1
Gideon city	0	0	0	6	3
Gilliam city	0	0	0	1	1
Gilman City city	0	0	0	2	3
Ginger Blue village	0	1	4	1	4
Gladstone city	440	148	648	897	1,848
Glasgow city	3	0	0	22	16
Glasgow Village CDP	5	0	15	120	51
Glenaire city	5	0	2	7	8
Glen Allen town	0	0	0	2	0
Glendale city	56	2	21	68	92
Glen Echo Park village	0	0	0	0	2
Glenwood village	0	0	0	1	3
Golden CDP	1	0	0	2	8
Golden City city	2	0	5	9	11
Goodman town	6	44	33	42	49
Goodnight village	0	0	0	0	0
Gordonville village	0	0	0	2	2
Goss town	0	0	0	0	0
Gower city	3	0	0	15	6
Graham town	0	0	0	0	0
Grain Valley city	80	17	151	302	632
Granby city	23	0	13	59	36
Grand Falls Plaza town	0	0	0	2	1
Grandin city	0	0	0	0	5
Grand Pass village	0	0	0	0	1
Grandview city	263	18	1,243	989	2,379
Granger village	0	0	0	0	0
Grant City town	1	0	7	2	9

Geographic area	Race				Hispanic or Latino (of any race)
	One race			Two or More Races	
	Asian	Native Hawaiian and Other Pacific Islander	Some Other Race		
Grantwood Village town	2	0	0	2	7
Gravois Mills town	0	0	1	5	7
Grayhawk CDP	0	0	0	2	7
Grayridge CDP	0	0	0	1	0
Gray Summit CDP	22	0	34	41	56
Greencastle city	0	0	0	1	4
Green City city	2	0	23	12	45
Greendale city	5	0	6	12	12
Greenfield city	1	2	5	27	33
Green Park city	91	2	8	59	44
Green Ridge city	0	0	9	12	13
Greentop city	3	0	1	1	4
Greenville city	1	0	0	8	6
Greenwood city	27	0	34	91	175
Guilford town	0	0	0	0	0
Gunn City village	0	1	0	10	1
Hale city	0	0	0	10	1
Halfway village	0	0	3	8	6
Hallsville city	0	1	6	25	24
Halltown village	0	0	0	0	0
Hamilton city	2	0	3	21	18
Hanley Hills village	9	0	6	40	27
Hannibal city	115	16	84	481	324
Hardin city	1	0	0	4	9
Harris town	0	0	0	1	0
Harrisburg town	0	0	0	6	1
Harrisonville city	64	4	79	170	265
Hartsburg town	1	0	0	1	2
Hartville city	2	0	0	6	12
Hartwell CDP	0	0	0	0	0
Harviell CDP	0	0	0	3	1
Harwood village	0	0	0	0	0
Hawk Point city	0	0	4	26	39
Hayti city	9	0	15	45	29
Hayti Heights city	0	0	0	2	2
Hayward CDP	0	0	0	1	0
Haywood City village	0	0	2	7	3
Hazelwood city	353	10	310	642	776
Henrietta city	0	0	1	1	17
Herculaneum city	37	0	10	40	31
Hermann city	10	1	12	33	39
Hermitage city	0	0	2	10	3
Higbee city	0	0	0	16	2
Higginsville city	24	3	38	90	106
High Hill city	4	0	1	1	2
Highlandville city	0	0	0	13	4
High Ridge CDP	33	0	29	43	81
Hillsboro city	13	1	13	36	56
Hillsdale village	0	0	0	25	17
Hoberg village	0	0	3	2	6
Holcomb city	0	0	14	3	26
Holden city	2	8	18	52	57
Holland town	0	0	8	7	13
Holliday village	0	0	0	0	0
Hollister city	23	8	124	83	283

Geographic area	Race				Hispanic or Latino (of any race)
	One race			Two or More Races	
	Asian	Native Hawaiian and Other Pacific Islander	Some Other Race		
Holt city	5	0	2	17	19
Holts Summit city	15	2	33	68	73
Homestead village	0	0	0	2	1
Homestown city	0	0	0	2	0
Hopkins city	2	0	0	2	4
Horine CDP	0	0	4	13	8
Hornersville city	0	0	2	10	36
Houston city	9	0	10	40	25
Houstonia city	2	0	0	1	1
Houston Lake city	0	0	7	6	11
Howardville city	4	0	0	3	2
Hughesville village	0	0	0	1	3
Humansville city	1	0	2	26	40
Hume town	3	0	2	8	15
Humphreys village	0	0	0	2	1
Hunnewell city	0	0	0	1	4
Hunter CDP	0	0	0	4	1
Huntleigh city	7	0	9	10	7
Huntsdale town	0	0	0	0	1
Huntsville city	4	0	3	25	19
Hurdland city	0	0	0	4	1
Hurley city	0	0	0	1	0
Iatan village	0	0	0	1	0
Iberia city	0	0	5	12	22
Imperial CDP	51	1	6	38	58
Independence city	1,143	815	3,745	3,781	8,999
Indian Point village	1	0	3	8	11
Innsbrook village	0	0	1	4	3
Ionia town	0	0	4	1	7
Irena village	0	0	0	0	0
Irondale city	0	0	0	10	4
Iron Mountain Lake city	1	0	1	10	14
Ironton city	1	0	2	23	22
Irwin CDP	0	0	0	1	1
Jackson city	79	1	44	188	170
Jacksonville village	0	0	0	2	3
Jameson town	0	0	1	12	4
Jamesport city	2	0	0	18	3
Jamestown town	0	0	0	8	4
Jasper city	5	0	0	18	5
Jefferson City city	755	25	333	962	1,103
Jennings city	24	0	35	166	90
Jerico Springs village	0	0	0	8	5
Jonesburg city	1	0	9	26	17
Joplin city	801	154	875	1,798	2,241
Josephville village	1	0	3	2	2
Junction City village	0	1	0	7	6
Kahoka city	5	0	2	17	15
Kansas City city	11,399	861	20,770	14,581	45,953
Kearney city	33	8	65	148	274
Kelso village	0	1	3	3	3
Kennett city	63	7	138	182	388
Keytesville city	2	0	0	0	0
Kidder city	0	0	2	8	2
Kimberling City city	12	0	2	17	30

Geographic area	Race				Hispanic or Latino (of any race)
	One race			Two or More Races	
	Asian	Native Hawaiian and Other Pacific Islander	Some Other Race		
Kimmswick city	10	0	0	3	2
King City city	3	0	2	9	11
Kingdom City village	0	0	0	1	1
Kingston city	3	0	56	3	61
Kingsville city	0	0	2	5	7
Kinloch city	2	0	0	3	0
Kirbyville village	5	0	15	3	14
Kirksville city	413	13	141	351	473
Kirkwood city	394	5	116	428	507
Kissee Mills CDP	0	0	0	24	12
Knob Noster city	84	20	59	114	184
Knox City city	0	0	0	4	0
Koshkonong town	0	0	1	13	3
LaBarque Creek CDP	7	0	3	8	30
La Belle city	0	0	0	10	14
Laclede city	0	0	0	1	1
Laddonia city	0	0	0	1	2
La Due village	1	0	0	3	0
Ladue city	263	8	22	117	120
La Grange city	1	0	2	29	8
Lake Annette city	0	0	0	7	2
Lake Lafayette city	0	0	0	6	2
Lake Lotawana city	10	1	7	31	34
Lake Mykee Town village	3	0	0	6	5
Lake Ozark city	13	3	4	21	19
Lake St. Louis city	310	14	49	165	305
Lakeshire city	7	2	16	21	47
Lakeside city	0	0	0	0	0
Lake Tapawingo city	4	0	0	15	13
Lake Tekakwitha village	3	0	0	4	1
Lake Viking CDP	0	0	0	5	6
Lake Waukomis city	11	0	6	21	29
Lake Winnebago city	2	4	6	11	18
Lamar city	15	1	31	144	85
Lamar Heights city	0	0	0	2	2
Lambert village	0	0	0	0	0
La Monte city	4	2	253	47	408
Lanagan town	0	0	16	36	45
Lancaster city	4	0	1	8	5
La Plata city	2	7	13	23	18
Laredo city	0	0	0	1	0
La Russell city	0	0	0	2	0
Lathrop city	8	0	7	36	25
La Tour CDP	0	0	0	1	0
Laurie city	0	0	1	15	6
Lawson city	4	0	5	35	27
Leadington city	3	0	2	11	9
Leadwood city	0	2	3	5	11
Leasburg village	0	1	0	3	0
Leawood village	8	0	0	14	12
Lebanon city	102	10	106	354	380
Lee's Summit city	1,535	114	974	2,186	3,529
Leeton city	2	0	0	9	6
Leisure Lake CDP	0	0	0	0	1
Lemay CDP	278	6	159	284	517

Geographic area	Race				Hispanic or Latino (of any race)
	One race			Two or More Races	
	Asian	Native Hawaiian and Other Pacific Islander	Some Other Race		
Leonard village	0	0	0	0	0
Leslie village	0	0	0	5	4
Levasy city	0	0	0	2	3
Lewis and Clark Village town	0	0	0	0	0
Lewistown town	0	0	0	2	0
Lexington city	44	31	57	161	173
Liberal city	1	0	1	27	14
Liberty city	285	30	254	758	1,188
Licking city	6	1	2	13	69
Lilbourn city	0	0	0	20	3
Lincoln city	4	1	2	11	13
Linn city	4	1	2	11	14
Linn Creek city	0	2	0	1	4
Linneus city	1	0	0	0	0
Lithium village	0	0	1	0	1
Livonia village	0	0	0	0	1
Loch Lloyd village	7	0	3	3	9
Lock Springs village	0	0	0	0	0
Lockwood city	7	0	0	11	12
Lohman city	0	0	0	4	0
Loma Linda town	8	2	1	16	20
Lone Jack city	5	1	5	19	13
Longtown town	0	0	1	0	2
Louisburg village	0	0	0	6	1
Louisiana city	11	1	76	86	137
Lowry City city	0	0	0	8	12
Lucerne village	1	0	0	0	0
Ludlow town	0	0	0	6	0
Lupus town	0	0	0	1	0
Luray village	0	0	0	0	0
McBaine town	0	0	0	0	0
McCord Bend village	1	0	0	8	8
McFall city	0	0	0	0	0
Mackenzie village	0	0	0	1	1
McKittrick town	0	0	0	0	0
Macks Creek city	0	0	1	6	6
Macon city	34	2	17	134	69
Madison city	1	0	2	4	9
Maitland city	0	0	2	0	2
Malden city	15	0	40	84	82
Malta Bend town	0	0	4	2	5
Manchester city	1,079	3	196	380	525
Mansfield city	7	0	0	11	12
Maplewood city	279	11	107	279	307
Marble Hill city	12	0	5	21	26
Marceline city	3	0	5	28	31
Marionville city	10	0	6	58	34
Marlborough village	146	0	45	57	121
Marquand city	0	0	0	0	1
Marshall city	92	157	1,002	391	1,723
Marshfield city	10	2	30	113	114
Marston city	0	1	0	9	2
Marthasville city	1	0	8	14	21
Martinsburg town	1	0	1	1	4
Maryland Heights city	2,696	13	637	678	1,233

Geographic area	Race				Hispanic or Latino (of any race)
	One race			Two or More Races	
	Asian	Native Hawaiian and Other Pacific Islander	Some Other Race		
Maryville city	324	3	50	145	193
Matthews city	0	0	1	2	2
Maysville city	1	1	0	14	4
Mayview city	1	0	2	3	2
Meadville city	0	0	2	1	6
Mehlville CDP	587	12	211	442	825
Memphis city	1	0	1	14	4
Mendon city	0	0	0	0	0
Mercer town	0	0	0	3	2
Merriam Woods village	2	0	19	57	59
Merwin village	0	0	1	1	1
Meta city	0	0	0	5	1
Metz town	0	0	0	0	0
Mexico city	88	6	239	272	474
Miami city	0	0	1	2	3
Middletown town	0	0	0	10	0
Milan city	6	7	440	24	888
Milford village	0	0	0	0	0
Millard village	0	0	1	2	1
Miller city	3	0	6	4	20
Mill Spring village	0	0	1	3	1
Milo village	0	0	0	0	1
Mindenmines city	1	0	3	22	3
Mine La Motte CDP	0	0	4	2	4
Miner city	6	0	17	20	43
Mineral Point town	1	0	2	8	3
Miramiguoa Park village	0	0	1	1	2
Missouri City city	1	0	0	13	6
Moberly city	81	2	48	361	299
Mokane city	0	0	0	3	3
Moline Acres city	1	0	6	26	19
Monett city	87	9	754	173	1,686
Monroe City city	11	1	6	52	37
Montgomery City city	4	0	55	42	74
Monticello village	0	0	0	1	3
Montier CDP	0	0	0	0	0
Montrose city	0	0	0	2	3
Mooresville village	0	0	0	0	0
Morehouse city	1	0	10	18	19
Morley city	0	0	0	24	12
Morrison city	0	0	0	0	2
Morrisville town	0	0	1	14	7
Mosby city	1	0	1	1	3
Moscow Mills city	11	1	23	78	49
Mound City city	8	0	0	7	13
Moundville town	0	0	1	2	3
Mountain Grove city	19	1	12	75	105
Mountain View city	9	1	8	32	50
Mount Leonard town	1	0	0	12	0
Mount Moriah town	0	0	0	0	4
Mount Vernon city	22	0	27	89	98
Murphy CDP	56	4	58	170	208
Napoleon city	0	0	0	2	1
Naylor city	0	0	1	33	6
Neck City city	0	0	0	8	3

Geographic area	Race				Hispanic or Latino (of any race)
	One race			Two or More Races	
	Asian	Native Hawaiian and Other Pacific Islander	Some Other Race		
Neelyville city	2	0	0	17	2
Nelson city	1	0	0	8	2
Neosho city	103	284	852	322	1,337
Nevada city	66	3	53	130	167
Newark village	0	0	0	6	1
New Bloomfield city	4	0	5	17	8
Newburg city	1	0	0	4	5
New Cambria city	10	0	0	0	6
New Florence city	1	0	3	14	6
New Franklin city	1	1	5	24	14
New Hampton city	0	0	0	8	1
New Haven city	6	0	35	34	44
New London city	2	0	0	18	8
New Madrid city	8	0	4	48	25
New Melle city	4	1	5	0	11
Newtonia town	5	0	0	3	3
Newtown town	0	0	6	7	18
Niangua city	1	0	1	1	7
Nixa city	156	14	180	411	595
Noel city	2	54	539	65	910
Norborne city	0	0	1	12	9
Normandy city	281	0	45	104	78
North Kansas City city	140	12	196	146	485
North Lilbourn village	0	0	0	0	0
Northmoor city	0	1	0	0	4
Northwoods city	12	0	3	50	10
Norwood city	0	0	1	13	9
Norwood Court town	1	0	3	12	4
Novelty village	1	0	0	3	1
Novinger city	0	0	0	3	1
Oak Grove city	56	9	62	139	286
Oak Grove Village village	1	0	1	12	9
Oakland city	6	0	0	15	14
Oak Ridge town	0	0	0	7	3
Oaks village	1	0	0	1	10
Oakview village	5	0	19	12	25
Oakville CDP	633	5	118	376	518
Oakwood village	0	0	2	0	11
Oakwood Park village	3	3	6	7	10
Odessa city	22	1	18	138	114
O'Fallon city	2,499	44	658	1,452	2,159
Old Appleton town	0	0	0	0	0
Old Jamestown CDP	338	11	110	351	275
Old Monroe city	0	0	3	3	5
Olean town	0	0	0	5	4
Olivette city	826	3	128	199	258
Olympian Village city	4	0	3	9	12
Oran city	0	0	0	10	19
Oregon city	4	0	0	6	2
Oronogo city	14	0	33	91	95
Orrick city	1	0	2	11	19
Osage Beach city	50	9	105	46	209
Osborn city	0	0	1	3	5
Osceola city	1	0	4	27	29
Osgood village	0	0	9	1	10

Geographic area	Race				Hispanic or Latino (of any race)
	One race			Two or More Races	
	Asian	Native Hawaiian and Other Pacific Islander	Some Other Race		
Otterville city	0	0	0	8	5
Overland city	518	2	620	475	1,027
Owensville city	12	1	4	29	29
Oxly CDP	0	0	0	1	3
Ozark city	96	18	137	365	572
Ozora CDP	0	0	0	1	0
Pacific city	35	2	42	102	135
Pagedale city	5	0	19	73	45
Palmyra city	12	3	14	50	43
Paris city	2	0	1	14	8
Parkdale village	4	0	0	1	1
Park Hills city	36	11	22	126	111
Parkville city	169	14	34	139	205
Parkway village	6	0	2	1	3
Parma city	0	4	8	9	20
Parnell city	1	0	0	0	0
Pasadena Hills city	9	0	4	17	11
Pasadena Park village	6	0	5	9	4
Pascola village	0	0	1	2	1
Passaic town	0	0	0	0	1
Pattonsburg city	0	0	0	3	10
Paynesville village	0	0	0	2	0
Peaceful Village village	0	0	0	0	0
Peculiar city	12	6	35	67	125
Pendleton village	0	0	0	0	0
Penermon village	0	0	0	2	0
Perry city	0	0	7	8	24
Perryville city	74	6	105	105	221
Pevely city	18	1	8	107	66
Phelps City CDP	0	0	0	0	0
Phillipsburg village	0	0	0	2	1
Pickering town	0	0	0	0	0
Piedmont city	19	0	15	21	28
Pierce City city	3	0	23	17	60
Pierpont village	0	0	0	1	0
Pilot Grove city	3	0	0	11	8
Pilot Knob city	3	0	0	18	12
Pine Lawn city	3	1	8	47	40
Pineville city	0	0	12	13	25
Pinhook village	0	0	0	0	0
Plato village	0	0	1	0	5
Platte City city	65	8	74	134	228
Platte Woods city	8	0	0	7	14
Plattsburg city	2	2	12	58	53
Pleasant Hill city	43	6	94	139	298
Pleasant Hope city	2	0	8	13	21
Pleasant Valley city	10	30	35	81	139
Plevna CDP	0	0	0	0	0
Pocahontas town	0	0	0	0	0
Pollock village	0	0	3	1	6
Polo city	1	0	2	23	11
Pomona CDP	1	0	5	8	16
Pontiac CDP	0	0	1	4	3
Poplar Bluff city	152	11	154	484	376
Portage Des Sioux city	0	0	2	3	6

Geographic area	Race				Hispanic or Latino (of any race)
	One race			Two or More Races	
	Asian	Native Hawaiian and Other Pacific Islander	Some Other Race		
Portageville city	6	0	6	64	28
Potosi city	11	0	7	43	42
Powersville village	0	0	0	1	0
Prairie Home city	1	0	0	1	2
Prathersville village	1	0	1	2	3
Preston village	0	0	0	0	0
Princeton city	2	0	3	2	9
Purcell city	0	0	0	8	3
Purdin city	0	0	0	1	5
Purdy city	17	0	130	38	285
Puxico city	1	1	0	13	13
Queen City city	0	0	0	3	8
Quitman town	0	0	0	0	0
Qulin city	0	0	1	9	5
Randolph village	1	0	0	0	1
Ravanna CDP	0	0	0	1	1
Ravenwood town	0	0	0	1	1
Raymondville town	1	0	1	9	3
Raymore city	160	10	116	463	624
Raytown city	301	61	563	1,045	1,513
Rayville village	0	0	0	5	3
Rea city	0	0	0	0	0
Redings Mill village	0	0	0	2	3
Reeds town	1	0	1	4	0
Reeds Spring city	7	0	3	17	21
Renick village	0	0	0	0	3
Rensselaer village	0	0	0	0	1
Republic city	81	1	92	292	320
Revere town	1	0	0	4	1
Rhineland town	1	0	0	5	1
Richards town	0	0	0	4	1
Rich Hill city	1	0	8	45	20
Richland city	9	4	11	57	52
Richmond city	22	10	17	112	121
Richmond Heights city	359	2	40	153	197
Ridgely village	0	0	0	0	0
Ridgeway city	3	0	0	2	4
Risco city	0	0	0	8	2
Ritchey town	0	0	0	1	0
River Bend village	0	0	0	0	0
Riverside city	89	17	102	93	251
Riverview village	9	0	10	63	20
Riverview Estates village	0	0	0	3	1
Rives town	0	0	0	0	0
Rocheport city	2	0	0	5	2
Rockaway Beach city	0	5	3	11	17
Rock Hill city	115	0	37	135	128
Rock Port city	0	0	1	19	25
Rockville city	1	0	0	5	4
Rogersville city	13	4	20	82	108
Rolla city	1,115	17	80	500	512
Roscoe village	0	0	0	2	3
Rosebud city	4	1	2	4	7
Rosendale city	0	0	1	0	1
Rothville village	0	0	0	1	3

Geographic area	Race				Hispanic or Latino (of any race)
	One race			Two or More Races	
	Asian	Native Hawaiian and Other Pacific Islander	Some Other Race		
Rush Hill village	0	0	0	6	6
Rushville town	0	0	2	0	2
Russellville city	0	2	2	6	3
Rutledge town	0	0	0	0	1
Saddlebrooke village	1	0	6	8	9
Saginaw village	0	1	1	4	6
St. Ann city	287	1	396	360	745
St. Charles city	1,673	47	1,170	1,276	2,759
St. Clair city	3	2	12	65	59
St. Clement CDP	0	0	0	3	0
St. Cloud village	0	0	0	1	3
Ste. Genevieve city	28	1	8	62	52
St. Elizabeth village	0	0	0	3	6
St. Francisville CDP	7	0	0	3	4
St. George city	14	0	2	22	18
St. James city	12	0	16	68	66
St. John city	117	5	183	215	443
St. Joseph city	674	183	1,558	2,049	4,414
St. Louis city	9,291	74	4,102	7,562	11,130
St. Martins city	8	0	11	18	14
St. Mary city	0	0	3	9	7
St. Paul city	2	0	6	6	8
St. Peters city	971	33	409	931	1,319
St. Robert city	250	38	133	291	477
St. Thomas town	0	0	0	1	0
Salem city	8	4	16	91	58
Salisbury city	1	0	2	15	4
Sappington CDP	206	3	28	126	146
Sarcoxie city	6	1	6	29	18
Savannah city	26	0	14	42	79
Schell City city	0	0	0	2	4
Scotsdale town	0	0	0	1	1
Scott City city	11	0	38	48	66
Sedalia city	146	22	1,111	644	1,931
Sedgewickville village	0	0	0	0	3
Seligman city	3	0	7	14	23
Senath city	2	0	366	21	488
Seneca city	10	2	9	128	52
Seymour city	5	1	14	41	53
Shelbina city	1	0	0	9	18
Shelbyville city	0	0	0	6	7
Sheldon city	0	0	7	18	37
Shell Knob CDP	2	0	2	12	24
Sheridan town	3	0	2	4	3
Shoal Creek Drive village	2	0	4	3	17
Shoal Creek Estates village	0	0	0	2	5
Shrewsbury city	243	1	32	87	146
Sibley village	0	0	0	10	14
Sikeston city	138	7	131	328	378
Silex village	0	0	0	0	0
Silver Creek village	0	0	6	10	12
Skidmore city	0	0	0	1	0
Slater city	8	0	22	33	48
Smithton city	1	0	9	10	15
Smithville city	56	3	37	147	220

Geographic area	Race				Hispanic or Latino (of any race)
	One race			Two or More Races	
	Asian	Native Hawaiian and Other Pacific Islander	Some Other Race		
South Fork CDP	0	0	4	0	4
South Gifford village	0	0	0	1	0
South Gorin town	0	0	0	0	0
South Greenfield village	0	0	0	0	0
South Lineville town	0	0	0	0	0
Southwest City town	1	16	323	35	493
Spanish Lake CDP	75	6	69	456	244
Sparta city	5	0	8	30	46
Spickard city	0	0	1	3	4
Spokane CDP	0	0	0	2	1
Springfield city	3,015	267	1,889	5,044	5,851
Stanberry city	0	0	2	5	11
Stark City town	2	0	3	8	3
Steele city	8	0	30	34	47
Steelville city	7	0	9	13	29
Stella town	8	0	0	0	1
Stewartsville city	0	1	6	12	15
Stockton city	7	1	1	29	26
Stotesbury town	0	0	0	0	0
Stotts City city	0	0	7	5	13
Stoutland city	0	0	2	0	11
Stoutsville village	0	0	0	2	1
Stover city	1	2	16	13	24
Strafford city	6	0	2	60	44
Strasburg city	0	0	0	0	0
Sturgeon city	5	0	5	8	9
Sugar Creek city	19	21	81	85	236
Sullivan city	30	0	42	68	157
Summersville city	1	0	0	11	7
Sumner town	0	0	0	0	0
Sundown CDP	0	0	1	1	1
Sunrise Beach village	0	0	2	13	13
Sunset Hills city	199	2	37	120	139
Sweet Springs city	6	1	13	34	25
Sycamore Hills village	5	0	5	23	28
Syracuse city	0	0	0	2	6
Tallapoosa city	0	0	0	1	4
Taneyville village	0	0	6	7	12
Taos city	2	0	0	5	9
Tarkio city	6	0	2	7	16
Tarrants village	0	0	0	0	1
Terre du Lac CDP	7	1	7	19	38
Thayer city	8	1	4	45	37
Theodosia village	0	0	0	5	1
Thomasville CDP	0	0	0	0	1
Three Creeks village	0	0	0	0	0
Tightwad village	0	0	0	1	0
Tina village	0	0	0	3	0
Tindall town	0	0	0	0	0
Tipton city	15	1	7	29	44
Town and Country city	812	10	38	169	189
Tracy city	1	0	0	2	7
Trenton city	32	2	55	69	146
Trimble city	0	0	2	9	6
Triplett city	0	0	0	0	0

Geographic area	Race				Hispanic or Latino (of any race)
	One race			Two or More Races	
	Asian	Native Hawaiian and Other Pacific Islander	Some Other Race		
Troy city	79	4	87	252	313
Truesdale city	4	3	10	25	24
Truxton village	0	0	0	0	0
Turney village	0	0	0	0	1
Tuscumbia town	0	0	1	0	12
Twin Oaks village	2	0	2	3	4
Umber View Heights village	0	0	0	1	0
Union city	43	3	56	168	146
Union Star town	1	0	0	7	1
Unionville city	13	0	6	25	23
Unity Village village	2	0	0	5	6
University City city	1,504	10	334	945	979
Uplands Park village	0	0	2	0	5
Urbana city	0	0	0	6	3
Urich city	0	0	1	4	2
Utica village	0	0	1	2	6
Valley Park city	438	0	136	162	272
Van Buren town	0	0	9	17	24
Vandalia city	14	1	12	70	72
Vandiver village	0	0	0	0	0
Vanduser village	0	0	6	9	9
Velda City city	1	0	5	16	7
Velda Village Hills village	0	0	0	7	0
Verona town	0	1	173	14	283
Versailles city	7	0	28	65	77
Viburnum city	0	0	1	5	8
Vienna city	0	0	0	5	3
Village of Four Seasons village	8	0	4	11	25
Villa Ridge CDP	13	1	4	31	44
Vinita Park city	4	0	38	42	88
Vinita Terrace village	1	0	1	10	3
Vista village	0	0	0	0	0
Waco city	0	0	0	7	0
Walker city	0	0	2	4	7
Walnut Grove city	0	0	0	6	5
Wardell town	0	0	0	4	3
Wardsville village	4	5	0	12	7
Warrensburg city	520	40	125	587	590
Warrenton city	55	5	67	142	288
Warsaw city	5	1	9	19	68
Warson Woods city	13	0	5	12	25
Washburn city	0	1	1	20	20
Washington city	76	10	95	164	299
Wasola CDP	0	0	0	6	1
Watson village	0	0	0	0	0
Waverly city	2	0	18	7	52
Wayland city	2	0	1	4	3
Waynesville city	164	26	119	314	390
Weatherby town	0	0	0	0	0
Weatherby Lake city	25	1	12	24	55
Weaubleau city	0	0	0	7	0
Webb City city	101	9	241	332	543
Webster Groves city	345	3	73	346	365
Weingarten CDP	0	0	0	0	0
Weldon Spring city	105	0	17	41	52

Geographic area	Race				Hispanic or Latino (of any race)
	One race			Two or More Races	
	Asian	Native Hawaiian and Other Pacific Islander	Some Other Race		
Weldon Spring Heights town	0	0	9	1	9
Wellington city	0	0	8	15	22
Wellston city	5	0	3	40	9
Wellsville city	0	1	3	10	9
Wentworth village	0	0	0	0	0
Wentzville city	356	1	239	538	788
West Alton city	0	0	0	2	5
Westboro city	0	0	0	0	3
West Line village	0	0	0	1	2
Weston city	6	0	9	28	39
Westphalia city	2	0	0	7	3
West Plains city	102	6	91	219	265
West Sullivan town	0	0	2	0	2
Westwood village	10	0	2	4	6
Wheatland city	0	7	1	6	6
Wheaton city	10	0	36	19	52
Wheeling city	0	0	1	0	2
Whiteman AFB CDP	45	13	48	126	233
Whiteside village	0	0	1	2	2
Whitewater town	0	0	0	1	0
Wilbur Park village	9	0	0	8	2
Wildwood city	1,434	10	142	535	830
Willard city	4	4	15	93	95
Williamsville city	0	0	0	4	3
Willow Springs city	16	0	10	47	45
Wilson City village	0	0	0	0	0
Winchester city	22	2	24	41	68
Windsor city	6	6	3	41	57
Windsor Place village	7	0	2	11	6
Winfield city	4	1	13	18	18
Winigan CDP	0	0	0	0	0
Winona city	1	0	2	26	20
Winston village	0	0	2	1	2
Wood Heights city	0	0	3	9	15
Woodson Terrace city	60	1	234	129	429
Wooldridge village	0	0	1	0	7
Worth village	0	0	0	0	0
Wortham CDP	0	0	0	1	4
Worthington village	0	0	0	0	0
Wright City city	14	1	115	95	224
Wyaconda city	0	0	0	4	0
Wyatt city	0	0	0	2	1
Zalma village	0	0	0	0	1

(r40487) This count has been revised.
Revised count: **362**
Revision date: **08-23-2012**
For more information, see 2010 Census Count Question Resolution.

Source: U.S. Census Bureau, 2010 Census.
2010 Census Redistricting Data (Public Law 94-171) Summary File, Tables P1 and P2

evidence of any other plausible explanation would be a case in which the weight-of-evidence would generally indicate that the "but for" criterion has been demonstrated. In contrast, if the event-affected concentration does not stand out much from normally occurring exceedance concentrations for the same place and season, the statistical comparison generally will not by itself provide much support for "but for" in the weight-of-evidence consideration.

2. **Question:** What evidence does the EPA want included in the demonstration as part of a comparison of a measured concentration with normal historical fluctuations, including background?

   Answer: The EPA would prefer an analysis showing how the observed concentration compares to the distribution of historical concentrations. To aid the EPA's review, reduce requests for additional information, and facilitate the EPA's understanding of the air agency's position, a submitting air agency can consider providing some of the following types of statistics, graphics, and explanatory text:

   - Comparison of concentrations on the claimed event day with past historical data (see Question 3 for additional detail). The historical comparisons can be made on an annual and/or seasonal basis, depending on which is more appropriate. For example, if PM or ozone data at the location show clear seasonality (i.e., exceedances are nonexistent or extremely rare in some seasons but not others, or concentrations vary according to season due to meteorological conditions), discussing that information in the demonstration is likely appropriate. In contrast, if exceedances are likely throughout the year, analysis of annual data may be more appropriate. For seasonal comparisons, the EPA recommends using all available seasonal data from 3-5 years (or more, if available). The analysis should discuss the seasonal nature of pollution for the location being evaluated. Depending on the quantity of data, it may be appropriate to present monthly maximums; however, generally it is not appropriate to present monthly-averaged daily data or any other average of the daily data as this masks high values. Regardless of whether seasonal or annual data are presented, data are most helpful when provided in the form relevant to the standard that is being considered for data exclusion (see Question 30). Specific examples of analyses of annual and seasonal data, as well as analyses of historical speciated $PM_{2.5}$ fluctuations and spatial distribution fluctuations are included in the presentation located at http://www.epa.gov/ttn/analysis/docs/IdeasforShowingEEEvidence.ppt. Examples of graphics are also included in the response to Question 3.

   Additionally, it may be useful for the comparison of concentrations on the claimed event day with past historical data to label appropriate data points as being associated with concurred exceptional events, suspected exceptional events, or other unusual occurrences. As additional evidence to use in interpreting the data, it may also be useful to include comparisons omitting such points. The intent of these comparisons is to present a time series of concentration data for the event area, thereby fully and accurately portraying the historical context for the claimed event day.

- Comparison of concentrations on the claimed event day with a narrower set of similar days: Similar days could include neighboring days (*e.g.,* a time series of two weeks) and/or other days with similar meteorological conditions (possibly from other years). This type of comparison could demonstrate that the event caused higher concentrations than would be expected for given meteorological and/or local emissions conditions.

- Percentile rank of concentration relative to annual data. The percentile rank of the event-day concentration should be provided for the event day relative to all measurement days over the previous 3-5 years. To ensure statistical robustness, the EPA generally recommends that submitting agencies include a minimum of 300 data points in this calculation. The daily statistic (e.g., 24-hour average, maximum 8-hour average, or maximum 1-hour) should be appropriate for the form of the standard being considered for data exclusion (see Question 30).

- Percentile rank of concentration relative to seasonal data. The percentile rank of the event-day concentration should be provided for the event day relative to all measurement days for the season (or appropriate alternative 3-month period) of the event over the previous 3-5 years. It is generally appropriate to use the same time horizon as used for the percentile rank calculated relative to annual data.

(Note: The use of percentile ranks is illustrative and should not be seen as a bright line to be passed or failed when comparing observed concentrations with historical values.)

3. **Question:** How will the EPA consider the submitted "historical fluctuations" evidence when assessing whether the "but for" and "clear causal relationship" criteria are met?

   Answer: The EPA will review the submitted analyses showing how the observed concentration compares to the distribution of historical concentrations to determine whether the event is associated with a measured concentration in excess of normal historical fluctuations and will assess the other criteria, in part, based on this historical fluctuations comparison. When the observed concentration is higher than all or nearly all normal historical concentrations (i.e., concentrations when there was not an event), the EPA may need less additional evidence to demonstrate the "but for" finding. When the concentration is similar to or lower than a large number of normal historical values, the EPA may want additional evidence (*e.g.,* PM or VOC speciation data) to support the "but for" and "clear causal relationship" demonstration requirements. The additional evidence will help differentiate the concentration increment caused by the event in question from other, non-event causes.

   Stated another way, the EPA's intended use of the data is to review the historical fluctuations prong, which may influence how much information of other types is needed to successfully meet the other demonstration criteria (i.e., "but for" and "clear causal relationship") of 40 CFR § 50.14 based, in part, on the degree to which the measured concentration is in excess of normal historical fluctuations.

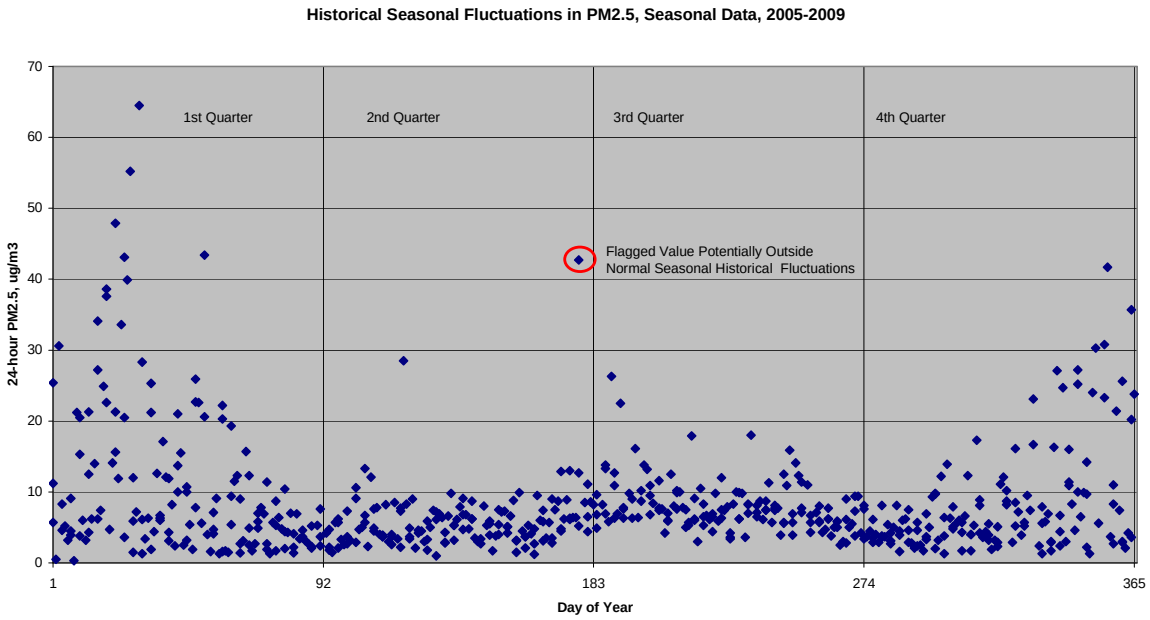
Submitting agencies are encouraged to discuss available historical fluctuation evidence with the appropriate EPA regional office prior to submitting the event demonstration package to determine if specific information might assist in the review process.

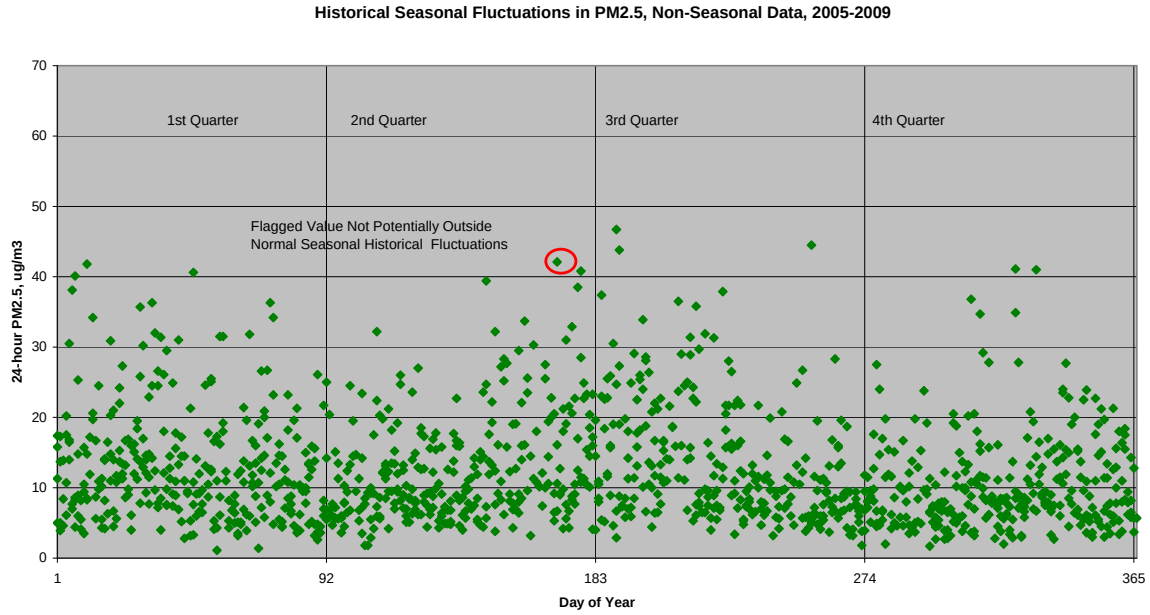
Additional Examples and Explanation Concerning "Historical Fluctuations" Evidence

(Note: The discussion and graphics that follow illustrate the type of analyses and discussion that are described in this question and in Question 2 and that an air agency might include in a submittal showing that an event is associated with a measurement "in excess of normal historical fluctuations.")

The evidence comparing the event-affected concentration with historical concentrations is most helpful to an air agency's demonstration if it shows that the event-affected concentration is high compared to all, or nearly all, historical concentrations generated by normal emissions and ambient conditions. This scenario makes it more plausible that the event caused the observed excess concentration rather than that some other causal event occurred on the same day as the known event. If similar events have been very rare in the past, it may be possible to make this point by labeling appropriate data points as being associated with concurred exceptional events, suspected exceptional events, or other unusual occurrences. To facilitate the EPA's understanding of the influence of these events, air agencies may also include comparisons omitting such points.

The following figures demonstrate the concept of seasonal emissions fluctuations. The first figure shows an exceedance level $PM_{2.5}$ value in late spring that is outside the range of the 3 to 5-year historical data set for non-wintertime $PM_{2.5}$, while the second figure shows a similar data value for a different part of the country where similar exceedance concentrations occur throughout the year, suggesting that some non-event process(es) can cause high concentrations all during the year. In the first case, a seasonal assessment of historical fluctuations generally would be appropriate, while annualized data analysis might be more appropriate for the second case to provide the most robust yet also representative historical data set.





4. **Question:** The Preamble to the EER states that less documentation or evidence may be needed to demonstrate that an event affected air quality for flagged data > 95th percentile than for values > 75th percentile. For ozone, PM_{10} and 24-hour $PM_{2.5}$, in areas near the standard, exceedances are often near or above the 95th percentile of historical data. In these cases, will the EPA accept less documentation to demonstrate that an event affected air quality simply because an event-affected concentration is above the 95th percentile of the historical concentrations?

   Answer: The preamble statement paraphrased in the question above was intended to address National Ambient Air Quality Standards (NAAQS) that are based on averaging

periods of many days, such as annual, quarterly and/or 3-month rolling average NAAQS. NAAQS with 1-hour, 8-hour or 24-hour averaging periods only allow a small percentage of days to have concentrations above the level of the NAAQS. Flagging and excluding data falling at around the 75th percentile point of the historical concentrations are extremely unlikely to influence an area's attainment status with respect to such a short-term NAAQS. Data around the 75th percentile point can, however, affect compliance with NAAQS having a quarterly average, 3-month average, or annual average standard. For the annual $PM_{2.5}$ NAAQS, it is true that showing that the Exceptional Events Rule criteria are met will be more difficult for values near the 75th percentile point than for values near the 95th percentile point because it is more likely that values near the 75th percentile point are related to non-event causes.

Other questions and answers in this Q&A document address situations involving NAAQS with short averaging periods.

5. **Question:** Some pollutant demonstrations do not (or poorly) characterize the historical fluctuations of the observed concentrations at the monitor affected by the event. How can one judge whether the demonstration is adequate in this regard?

   Answer: As previously stated in the response to the historical fluctuations question, the EPA will review the submitted analyses showing how the observed concentration compares to the distribution of historical concentrations to assess whether the event is associated with a measured concentration in excess of normal historical fluctuations, and when assessing the exceptional event demonstration criteria of "affects air quality," "clear causal relationship," and "but for" causation. Because the "historical fluctuations" showing is not a statistical demonstration with any defined bright line, air agencies should consider submitting (with appropriate descriptions and discussion) the type of statistical analyses described in the responses to Questions 2 and 3. The EPA will review these analyses and look at both the relationship between the claimed concentration and historical concentrations and the strength of the data set to help inform the evidence needed to demonstrate the clear causal relationship and "but for" criteria.

   In the response to Question 2, we identified that air agencies completing historical fluctuation analyses should consider using 3 to 5 years of data to ensure a representative dataset. We recognize, however, that these data may not be available for all monitors and/or all pollutants. If data are not available, please consult with the reviewing EPA regional office.

B. "But For" Test

Section 319 of the Clean Air Act requires that "a clear causal relationship must exist between the measured exceedances of a national ambient air quality standard and the exceptional event to demonstrate that the exceptional event caused a specific air pollution concentration at a particular air quality monitoring location…" and that [States] can petition [EPA] to "[E]xclude data that is directly due to exceptional events from use in determinations…with respect to exceedances or violations."

The implementing language in the EER at 40 CFR 50.14(c)(3)(iv) states: "The demonstration to justify data exclusion shall provide evidence that:
* * *
(D) There would have been no exceedance or violation but for the event.

6. **Question:** What types of evidence can air agencies include in a demonstration that ozone exceedances would not have occurred but for the effect of a fire event?

   Answer: Air Agencies may include any evidence that they consider relevant to the "but for" requirement recognizing that the effects of a fire on ozone are complex. Fire can generate ozone precursors, but it can also reduce solar radiation needed to drive ozone formation. Also, fire plumes containing ozone and ozone precursors can pass over a monitoring site without mixing down to ground level and affecting the monitored concentration. Additionally, wildfires often occur during the same seasons that exhibit high ozone caused by anthropogenic precursor emissions making it difficult to separate the wildfire contribution from a high ozone event that would have occurred without the fire.

   Examples of relevant evidence follow. The EPA recognizes that the following example analyses have limitations and may not conclusively or quantitatively demonstrate the "but for" criterion. For this reason, the EPA considers "but for" evidence using a weight-of-evidence approach on a case-by-case event basis.

   - Statistical evidence that shows that for the place, time of year, and prevailing weather conditions at the time of the event, past ozone data show no history of exceedances on days that were not affected by a fire event, or shows that exceedances were so infrequent as to make the fire at issue the more likely cause of the observed exceedance.
   - Unusual diurnal patterns of hourly or minute-by-minute ozone concentrations, such as a spike or peak other than at the normal time of day. This could be demonstrated by comparing the event pattern to the range of diurnal patterns exhibited on typical high ozone days.
   - Evidence that the normally good correlation between the affected monitor and a monitor clearly outside the area of influence of the fire was disrupted on the day of the fire event in a manner not seen on non-fire days.
   - Evidence that there were no known unusual emission releases from non-fire sources at the time of the fire event, such as from traffic due to a sports or entertainment event or source non-compliance.
   - Evidence that the plume from the fire passed over the location of the monitoring site and mixed down to ground level. This can include satellite images, wind data including HYSPLIT trajectories, visual smoke observations, and chemical analysis of PM filters showing elements and compounds that are markers for biomass burning.

- Altered pollutant amounts, ratios, or patterns that indicate the influence of the event rather than non-event sources. This information could include the level, timing and patterns of CO and PM; PM size distribution or composition; indicators of precursor composition and "age," such as oxygenated VOCs, radicals, sulfates, and timing and pattern of NO_2 and NO; and pollutant ratios, such as CO/NO_x, CO/PM_{10}, Elemental Carbon (EC)/Organic Carbon (OC), O_3/NO_y and O_3/CO.
- A prediction that the "normal" ozone concentration would have been below the level of the NAAQS. "Normal" ozone concentrations can be predicted using statistical methods based on previous-day ozone and same-day weather variables (like methods used for air quality advisories in some areas) or using air quality models. The EPA asks that demonstration packages using these predictive techniques also include an easily understandable narrative describing the application of the technique and information on the uncertainty of the prediction methods (i.e., information on its past success in predicting normal ozone levels).
- A prediction based on air quality/photochemical modeling of the incremental ozone concentration due to the emissions from the fire, from comparing modeling results with and without the emissions from the fire. A demonstration that includes such evidence should address the uncertainties in the emission estimates for the fire including the speciation of the VOC and NO_x emissions, and the uncertainties due to other aspects of the modeling platform such as grid cell size, etc.

The EPA is currently developing a separate guidance document for preparing a demonstration for wildfire events that are believed to have affected ozone concentrations. In addition, the EPA will post on its exceptional events website example demonstration packages that illustrate the type and scope of analyses that constitute complete submittals for ozone-related exceptional events.[4]

C. Exceptional Event Data Flagging Schedules

Note: "Flag" is the common terminology for a data qualifier code in the EPA's AQS (Air Quality System). Unless explicitly noted, the process of "flagging" data refers to adding Request Exclusion ("R") data qualifier codes to selected data in AQS. "R" flags are the only AQS flags that satisfy the EER requirement for initial data flagging. The EPA can act/concur only on an "R" flag.

7. **Question:** When the EPA revises the National Ambient Air Quality Standards, how will it notify air agencies of the schedules and deadlines for flagging and documenting exceptional event data for designations purposes?

   Answer: When the EPA promulgated 40 CFR § 50.14, "Treatment of Air Quality Monitoring Data Influenced by Exceptional Events," in March 2007, the EPA was mindful that designations would be occurring under the then-recently revised $PM_{2.5}$ NAAQS. Exceptions to the generic deadline of July 1 of the calendar year following the

[4] http://www.epa.gov/ttn/analysis/exevents.htm

datum year (see 40 CFR § 50.14(c)(2)(iii)) were included for $PM_{2.5}$ in the rule. The EPA was also mindful that similar issues would arise for subsequent new or revised NAAQS. The Exceptional Events Rule at section 50.14(c)(2)(vi) indicates "when EPA sets a NAAQS for a new pollutant, or revises the NAAQS for an existing pollutant, it may revise or set a new schedule for flagging data for initial designation of areas for those NAAQS." See as examples, the data flagging schedule identified in the 2012 SO_2 NAAQS final rule at 75 FR 35592, the data flagging schedule identified in the 2010 NO_2 NAAQS final rule at 75 FR 6531, or the data flagging schedule identified in the 2012 $PM_{2.5}$ NAAQS final rule at 78 FR 3086.

D. General AQS Procedures

8. **Question:** What is the difference between the "R" series flags and the "I" series flags, and how should they be used?

   Answer: Within AQS, monitoring agencies can use two types of data validation, or data qualifier, codes: the *Request Exclusion* flags ("R") and the *Informational Only* flags ("I"). Agencies should use the "I" series flags when identifying informational data and the "R" series flags to identify data points for which the agency intends to request an exceptional event exclusion and the EPA's concurrence. As an example, air agencies may use an "I" series flag to initially identify values they believe were affected by an event. Once the air agency collects additional supporting data, it may change the flag to an "R" series flag and submit an initial event description. Or, the air agency may find that additional information does not support flagging the data as an exceptional event, and the air agency may, therefore, delete the flag or retain the "I" series flag. Air agencies may also use the "I" series flags simply to note activities or conditions occurring on the data collection day that are unrelated to exceptional events.

   The EPA does not intend to review or concur on the "I" series flags. Air agencies must submit "R" flags by July 1 of the calendar year following the year in which the flagged measurement occurred or by the other deadlines identified with individual NAAQS revisions (see Question 7). Air agencies intending to change "I" flagged data to "R" flagged data should be aware of the EER flagging and initial event description deadline of July 1 of the year following the sample measurement. Air agencies should change the flag status from "I" to "R" BEFORE the July 1 deadline. Normally, air agencies should not modify the flag status after this date and, therefore, if they went beyond July 1, they may not be able to meet the EER initial flagging and event description deadlines.

9. **Question:** May an air agency flag any data in AQS?

   Answer: Yes, but the EPA asks air agencies to use the "R" flags to identify data that might have a regulatory consequence and for which an air agency intends to request exclusion and submit an approvable demonstration. Air agencies should use the "I" series flags to identify values for informational purposes (see Question 8). AQS only allows the EPA to place concurrence flags on data identified with an "R" flag. "I" flags never affect regulatory summary statistics (e.g., design values, number of exceedances, 98th percentile

values) generated by AQS for NAAQS determinations purposes. "R" flags will not affect the regulatory summary statistics unless or until they are concurred by the EPA.

Further, while the EER does not prohibit air agencies from flagging individual concentration values below the level of the NAAQS, in general, air agencies can only request exclusion for data that contribute to a violation or an exceedance of the NAAQS. See Questions 29-31 for more information, including clarifications and examples, particularly for $PM_{2.5}$ and PM_{10}, in which flagging individual concentration values below the level of the NAAQS is acceptable.

10. **Question:** The EPA requires air agencies to provide an initial description for data flagged with an "R" data qualifier code. Is it possible for an initial description to be inadequate (for example, "fires in surrounding states")?

    Answer: Although the EPA is not specifying pass/fail criteria for the initial description associated with "R" flagged data, it is possible for an air agency to enter inadequate initial descriptions in AQS. The preamble to the Exceptional Events Rule explains: "At the time the [request exclusion] flag is inserted into the AQS database, the State must also provide an initial description of the event in the AQS comment field. This initial description *should include such information as the direction and distance from the event to the air quality monitor in question, as well as the direction of the wind on the day in question.*" 72 FR 13568 (emphasis added). AQS maintains event definitions, including their initial descriptions, in fields separate from the raw data flagging fields. As a result, air agencies can enter more detailed event descriptions either before or after the raw data measurements are flagged. Regardless of precise timing, the intent of this initial description is to initially explain why the flagged data warrant consideration as exceptional events. Although the initial description is not likely to provide enough information to assist the EPA with exceptional event planning and prioritization, the act of providing the initial description encourages air agencies to review and identify data having regulatory consequence and for which they are likely to submit an approvable demonstration. To facilitate the EPA's review of the initial event description, the EPA suggests that air agencies notify the appropriate regional office after the air agency creates the event description. This allows the air agency and the EPA to discuss and, if necessary, develop a mutually agreed-upon description. This initial discussion and the *optional* letter of intent (see Question 27) can assist the EPA and air agencies with exceptional event review and prioritization.

11. **Question:** The "j" flag was "Construction/Demolition." The new "IE/RE" flag is demolition; can it also be used for construction?

    Answer: The "j" flag is obsolete and can no longer be used. The "IE/RE" flag should <u>not</u> be used for construction.

    Generally, construction activity is not considered to be exceptional. Reasonable and appropriate controls capable of preventing localized NAAQS exceedances should be available during most construction events. In some cases, however, construction activities

may involve very high-energy, emissions-generating physical processes, such as explosive excavation. Dust control measures may not be adequate to prevent exceedances / violations in the vicinity of this type of activity.

If an agency wishes to "flag" data related to exceedances caused by some construction activity, the agency should use the *Other* ("IL/RL") exceptional events flag. Air agencies should use the "IE/RE" flag only when an exceptional demolition event occurred and the air agency wishes to flag the data for exclusion as an exceptional event. Air agencies using either the "IE/RE" flag or the "IL/RL" flag to identify an exceptional event should show in a demonstration submittal that all reasonable and appropriate controls were in place during the construction / demolition activity, and that those controls proved inadequate to prevent NAAQS exceedances. The demonstration would also need to meet all other requirements of the Exceptional Events Rule.

11a. **Question:** What flags does AQS use to describe fires?

Answer: Land Management Agencies modified their fire-related definitions after the EPA promulgated the Exceptional Events Rule. The EPA has incorporated the fire-related terminology in the exceptional events guidance documents to ensure consistency (see also Question 20a). These definitional changes result in corresponding changes to fire-related flags in AQS. The EPA eliminated from AQS the Wildland Fire Use Fire – United States ("IU") and ("RU") flags and the Forest Fire ("E") flag. The EPA continues to use the following flags to describe fires:

- IF – Fire – Canadian (Informational Only)
- IG – Fire – Mexico/Central America (Informational Only)
- IM – Prescribed Fire (Informational Only)
- IP – Structural Fire (Informational Only)
- IT – Wildfire – US (Informational Only)
- RF – Fire – Canadian (Request Exclusion)
- RG – Fire – Mexico/Central America (Request Exclusion)
- RM – Prescribed Fire (Request Exclusion)
- RP – Structural Fire (Request Exclusion)
- RT – Wildfire – US (Request Exclusion)

The EPA believes it is appropriate to retain the Fire – Canadian ("IF/RF") and Fire – Mexico/Central America ("IG/RG") flags because these flags indicate the jurisdictional origin of the fire (i.e., outside of the submitting state/outside of the United States). Emissions from fires originating outside of the United States that affect air quality concentrations in the United States may qualify for regulatory treatment under the international transport provisions of 40 CFR part 179(b) of the Clean Air Act.

12. **Question:** The National Park Service operates ozone monitors in some locations that meet all requirements of 40 CFR part 58. Can an air agency request exclusion of data from such monitors under the EER, and exclusion of other data not collected by the air agency itself that may lead to a nonattainment finding?

Answer: Yes. However, air agencies should take special steps with regard to data handling within AQS. To maintain data integrity, AQS is generally designed so that only the agency updating a monitoring site may enter or alter data for that site. Under normal circumstances, an air agency will not have access rights to apply event flags to data from monitors operated by other entities, such as the National Park Service or other state, local, or tribal agencies. When an air agency believes that an exceptional event affected the concentration recorded by monitors operated by other agencies, the air agency should contact the agency operating the monitor and request that the operating agency flag the identified data range for exclusion. The affected air agency should also develop and forward to the operating agency an initial event description that the operating agency can enter in AQS as it enters the appropriate "R" series flags (see Question 10). If an air agency is unsuccessful in requesting that another agency apply the appropriate "R" series flags and initial event description, the air agency should contact the EPA regional office. If the EPA regional office is aware of the request, and if the request was prior to July 1st of the year following the datum year, the EPA will generally still consider the affected air agency's request. Air agencies should notify the EPA regional office of such an instance as soon as possible.

Regardless of whether the monitor operator flags the data in question or the air agency notifies the regional office that a flag is needed, it is the air agency's responsibility to develop an initial event description, prepare the demonstration, and submit it to the EPA under the applicable schedule. The agency operating the monitor may choose to assist in this process.

13. **Question:** Events can make an air concentration significantly higher than it would have been in the absence of the event contribution, and elevate the 3-year design value for a NAAQS pollutant. Depending on the magnitude of the effect and how the "normal" concentration compares to the NAAQS, the "but for" test may not be satisfied in that there may have been a violation with or without the event. Thus, it appears that data associated with the event cannot be handled as an exceptional event. However, retaining such data in the calculation of a design value for a nonattainment area can make it seem that the area needs more emissions reduction to attain the NAAQS than is actually the case. How will the EPA deal with such a situation when reviewing an attainment demonstration? How, if at all, should AQS be used to flag such data?

Answer: *(See also Question 19 for a related question regarding PM_{10}.)* The question reflects a proper understanding that not every natural or infrequent anthropogenic event that affects air quality is a true "exceptional event" under the definition of that term in the Exceptional Event Rule. Ambient data affected by an event that does not meet the "but for" criterion cannot be excluded under the authority of the Exceptional Events Rule even if in all other respects the event meets the definition of an exceptional event. When the available evidence indicates that there would have been an exceedance of a NAAQS even in the absence of the event, for example when a wildfire makes a summer-time ozone exceedance worse than it otherwise would have been, the event is not a true "exceptional event" under the EER. The Exceptional Events Rule does not address data handling

associated with events that are not considered "exceptional" under the EER, and does not provide the EPA with authority to exclude such data. Yet as the question points out, this event-related concentration could still impact design values. An air agency incorporating the event-related concentration in a design value used for a prospective attainment demonstration might seem to need more emission reductions to attain the NAAQS by its attainment deadline than is actually the case.

However, the EPA intends to achieve much the same effect as if such data were excludable under the Exceptional Events Rule, by addressing this topic in future guidance on the preparation of attainment demonstrations in required SIPs for areas designated as nonattainment. The first pollutant and NAAQS that the EPA will address this way will be the 2008 ozone NAAQS. The EPA plans to more formally describe its intention to develop such ozone guidance in the preamble of a soon-to-be-proposed rulemaking on SIP requirements for areas designated nonattainment for the 2008 ozone NAAQS. Until the planned guidance for a pollutant and NAAQS of interest is issued, air agencies should consult with their EPA regional office if they face this situation. To avoid confusion, air agencies should use AQS informational-only "I" flags on such data, rather than "R" flags.

In the remainder of this response to the question, the EPA describes in more detail the differences between the event scenario described in the question and a true "exceptional event" under the Exceptional Events Rule, for the purpose of clarifying why the planned guidance on attainment demonstrations and the SIP approval process, rather than the Exceptional Event Rule and the associated AQS data flagging, demonstration submittal, and review process, will apply to such an event scenario.

To illustrate an attainment demonstration scenario using the 2006 24-hour $PM_{2.5}$ NAAQS of 35 $\mu g/m^3$, assume that the three annual 98th percentile 24-hour $PM_{2.5}$ concentrations for a monitoring site for 2006-2008 are 44, 31, and 37 $\mu g/m^3$ for each respective year, with a resulting 3-year design value of 37 $\mu g/m^3$, which is a violation. Also, assume that the next highest concentration in 2006 below the 44 $\mu g/m^3$ was 40 $\mu g/m^3$. The 44 $\mu g/m^3$ concentration in 2006 was affected by a one-day wildfire, and the air agency was able to show that the concentration would have been 41 $\mu g/m^3$ without the fire. Because both 44 $\mu g/m^3$ and 41 $\mu g/m^3$ are exceedances, the event on that day does not meet the "but for" test when viewed from an "exceedance" perspective. Moreover, from a "violations" perspective, the 2006 value also would not meet the "but for" test, because the "no event" concentration value of 41 $\mu g/m^3$ for the event day in 2006 would still be the 98th percentile concentration and would still result in a 3-year design value of 36 $\mu g/m^3$ which is a violation. Thus, the 2006 wildfire does not meet the definition of an exceptional event.

E. General Exceptional Events Rule Applicability and Implementation Issues

14. **Question:** The Preamble to the Exceptional Events Rule states that the EPA headquarters or the EPA regional office will make its decision on demonstrations public. See 72 FR 13574 ("The EPA regional offices will work with the States, Tribes, and local agencies to ensure that proper documentation is submitted to justify data exclusion. EPA

will make the response and associated explanation publicly available."). What method does the EPA plan to use to make the explanation "publicly available?"

Answer: The EPA posts example demonstration packages and decisions (consisting of air agency demonstration submittals, the EPA responses, and the EPA technical support documents) on the EPA regional office websites and/or the Technology Transfer Network website.[5] In certain instances, the EPA's concurrence or non-concurrence determination may be a factor in a rulemaking that includes a public comment period. In these cases, the same information that is posted on the EPA websites, and any additional supporting correspondence, will also be posted in the relevant rulemaking docket. Further, the EPA plans to make the demonstrations and the EPA's concurrence decisions available to interested parties upon request.

14a. **Question:** At what point in the exceptional event development and review process is public notice and opportunity for comment required? How does the EPA determine the need for public comment?

Answer: The EER requires that air agencies offer notice and opportunity for public comment as part of the demonstration development process (see 40 CFR 50.14(c)(3)(i) and 40 CFR 50.14(c)(3)(v)). The EPA must also provide notice and opportunity for public comment prior to taking a final Agency action, such as acting on an air agency's request for area redesignation, that may rely upon air quality monitoring data including exceptional event claims. In addition, an air agency may need to provide an additional opportunity for public comment if the EPA requests and/or if the air agency provides supplemental information not included in the original documentation made available for public comment. The EPA will make a case-by-case decision regarding supplemental opportunities for public comment during the demonstration preparation, submittal, and review process. As part of this decision, the EPA may consider potential impact and/or expressed public interest in the claimed event, data uncertainty, historical application of demonstration approach, etc.

When the EPA concurs based on the weight-of-evidence that the air agency has successfully made the demonstrations referred to in 40 CFR 50.14(a)(2) and (b)(1) to the EPA's satisfaction, the EPA generally will exclude the affected data from the following types of calculations and activities:

- The EPA's AQS will not count these days as exceedances when generating user reports, and will not include them in design values estimates, unless the AQS user specifically indicates that they should be included.[6]
- The EPA will accept the exclusion of these data for the purposes of selecting appropriate background concentrations for New Source Review (NSR) air quality analyses.[7]

[5] http://www.epa.gov/ttn/analysis/exevents.htm

[6]Due to the complexity of the AQS software, inadvertent errors may occur. The EPA asks that agencies provide the EPA with information if/when AQS outputs seem inconsistent with the EPA's intention to exclude concurred upon data.

- The EPA will accept the exclusion of these data for the purposes of selecting appropriate background concentrations for transportation conformity hot spot analyses.[8]
- The data will continue to be publically available, but the EPA's publications and public information statements on the status of air quality in the affected area generally will not reflect these data in any summary statistic of potential regulatory application, unless such inclusion is specifically noted.[9]

In addition, some proposed regulatory actions (e.g., proposed designation, classification, attainment demonstration, or finding as to whether the area has met the applicable NAAQS) will rely on design values that exclude data that the EPA has determined meet the exceptional event weight-of-evidence requirements. These regulatory actions require the EPA to provide an opportunity for public comment prior to taking a final Agency action. If the EPA pursues one of these actions for a given area, the EPA will open a new comment period during which the public may comment on the exceptional event submission and/or the EPA's determinations. The EPA must consider and respond to received comments before taking final regulatory action.

15. **Question:** It is possible for events to affect more than one state. Each state/air agency must then submit its own exceptional events demonstration package, which may result in redundant work. Could the EPA take on multi-state/agency demonstrations?

    Answer: The primary responsibility for developing demonstrations lies with state, local, and tribal air agencies. The EPA encourages states and air agencies to coordinate with each other in compiling demonstration packages, and these agencies may submit some of the same data and analyses when a single event affects multiple jurisdictions. Each NAAQS exceedance, however, will likely have some unique properties (e.g., unique monitoring locations, different surrounding and potentially contributing sources with varying levels of control, different historical concentration patterns, etc.). States/agencies need to address these unique characteristics in individual submittal packages. Similarly, where a single event results in exceedances of multiple NAAQS (e.g., annual and 24-hour PM), the submitting agency needs to address the unique features of each NAAQS exceedance or violation (e.g., potentially different monitoring locations, different historical concentration patterns). An air agency could submit a single demonstration package for a single event affecting multiple NAAQS provided the air agency clearly identifies the unique characteristics of each NAAQS.

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[7] If the EPA is the permitting authority, the EPA will propose permits on this basis. If the EPA is commenting on another permitting authority's proposed action, the EPA's comments will be consistent with the determinations in this guidance document and any applicable NSR permitting and/or modeling guidance.
[8] Applicable only to PM_{10} and $PM_{2.5}$. See "Transportation Conformity Guidance for Quantitative Hot-spot Analyses in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas," EPA-420-B-10-040, US EPA Office of Transportation and Air Quality, December 2010, page 98.
[9] These data may be included in statistics intended to describe current status and trends in actual air quality in the area for public information purposes including reporting of the Air Quality Index.

For example, if multiple states or jurisdictions are affected by a Saharan dust plume, they could collaborate and submit a common demonstration component (e.g., the same or very similar information in multiple submittals) for the "not reasonably controllable or preventable" and "human activity unlikely to occur or natural event" elements. Because the actual event-related exceedance would have been measured by different monitors located in different regions with possibly different contributing factors (e.g., rural monitor affected by both dust from feedlots and Saharan dust and urban monitor affected by both nearby industrial sources and Saharan dust), the "clear causal relationship," "but for," and "historical fluctuations" elements are likely to differ from one submittal to another.

16. **Question:** Does the EER address scenarios in which temporary activities (e.g., multi-month or multi-year road construction / demolition projects) significantly influence measured concentrations at a long-sited monitor such that the nature of the monitor changes from "area-wide" to "unique"?

    Answer: Generally, all monitoring data, if meeting applicable CFR regulations, are comparable to the NAAQS. There are special provisions applicable only to the $PM_{2.5}$ NAAQS, which provide that monitors must be representative of area-wide air quality to be comparable to the annual NAAQS, and that monitors representative of unique micro- or middle-scale impact sites are comparable only to the 24-hour $PM_{2.5}$ NAAQS. *See* 40 CFR 58.30. In the provided example, the affected air agency may believe that site meets the criteria for data to be comparable only to the 24-hour $PM_{2.5}$ NAAQS for the period of the construction. The affected air agency could request this type of change through updates to its annual monitoring network plan or in a separate request, subject to review and approval by the EPA regional office.

    The EER does not specifically address temporary, but multi-day or multi-year, anthropogenic emission sources such as construction projects. However, neither does the EER explicitly place a limit on the duration of a single event. A submitting agency could make a showing that a claimed event (e.g., a multi-year road construction project) is not likely to recur at the location in question. If the remaining exceptional event criteria and demonstration criteria are met, including the requirement that the event (including the emissions from the project) is not reasonably controllable, the activity might qualify as being an exceptional event.

    Air agencies not wishing to develop exceptional event demonstration packages for the described scenario can request agreement from the EPA regional office to relocate a monitor that no longer meets monitoring objectives. This process is, however, time consuming and resource intensive, so air agencies usually "monitor through" the disruption or ask their regional offices to support a temporary shut-down. When the EPA regional office approves a temporary shut-down, the operating air agency should assign a Null Data Code in AQS for "construction/repairs in area" (AC) to identify and invalidate data associated with periods of local construction.

16a. **Question:** Are policy relevant background (PRB) ozone concentrations and exceptional events related?

Answer: PRB ozone concentrations and exceptional events can include partially overlapping concepts. The 2007 Staff Paper[10] defines policy relevant background ozone "as the distribution of [ozone] concentrations that would be observed in the U.S. in the absence of anthropogenic (man-made) emissions of precursor emissions (e.g., VOC, NOx, and CO) in the U.S., Canada, and Mexico." In the current ozone review process, the EPA has more broadly considered background ozone by assessing three separate definitions of background: natural, North American, and U.S. background.[11] As before, each background is defined as the ozone that would be observed in the absence of specific categories of emissions. For example, North American background (NAB) is equivalent to PRB. An exceptional event is a natural event (excluding stagnations, inversions, high temperatures, or precipitation) or an anthropogenic event that is unlikely to recur in the same location. Both exceptional events and North American background can involve emissions from natural events like forest wildfires or stratospheric ozone intrusions. However, exceedances due to natural emissions that occur every day and contribute to policy relevant background, such as biogenic emissions, do not meet the definition of an exceptional event and are thus not eligible for exclusion under the EER. Routine anthropogenic emissions outside of the U.S. contribute to policy relevant background, but are not exceptional events. Air agency preparation of a demonstration package and the EPA's subsequent review of the demonstration package is case-by-case based on a weight-of-evidence approach and does not explicitly consider whether the event type might contribute to North American background, or any other background definition. However, if a natural event that contributes to background ozone causes an observed concentration that meets the statutory definition of an exceptional event and fulfills all of the exceptional event criteria, the EPA would consider the event to be an exceptional event.

17. **Question:** Volcanoes on Hawaii are causing 1-hour and 24-hour SO_2 exceedances, which are clearly volcanic exceptional events. Section 319 of the Clean Air Act and CFR require the EPA to provide air agencies with a method to flag and petition the EPA for exclusion of exceptional events data. When will the EPA provide the method for SO_2?

Answer: AQS has been modified to allow flags on all criteria pollutant data. The specific schedule for exceptional event flagging and documentation submission for data to be used in designations decisions is identified in the final primary SO_2 NAAQS rule

[10] Environmental Protection Agency, Review of the national ambient air quality standards for ozone: assessment of scientific and technical information. OAQPS staff paper. (Updated Final) July 2007. Research Triangle Park, NC: Office of Air Quality Planning and Standards. EPA-452/R-07-007, available online at: http://epa.gov/ttn/naaqs/standards/ozone/s_o3_cr_sp.html.

[11] Environmental Protection Agency, Integrated Science Assessment for Ozone and Related Photochemical Oxidants. (Third External Review Draft) June 2012. Research Triangle Park, NC: National Center for Environmental Assessment – RTP Division, Office of Research and Development. EPA-600/R-10-076C, available online at: http://cfpub.epa.gov/ncea/isa/recordisplay.cfm?deid=242490#Download.

(see preamble at 75 FR 35585-35586 and regulatory text at 75 FR 35592). The correct flag to use for a volcanic eruption event is "RS."

17a. **Question:** The EPA acknowledges that extreme exceptional events may justify more limited demonstration packages. How might the EPA decide whether to consider a particular high wind dust event "extreme" when reviewing a limited demonstration package?

Answer: While many dust storms could qualify as exceptional events, the EPA believes that most events that are conventionally referred to as "dust storms" should not be considered "extreme" events for this purpose. The National Weather Service (NWS) defines a "dust storm" as a severe weather condition characterized by strong winds and dust-filled air over an extensive area, but does not include any quantified criteria for the spatial extent or the concentration of the dust. In contrast, a haboob is of the magnitude that could be considered an extreme event. Haboobs are often caused by severe weather (e.g., severe thunderstorm activity, cold frontal passages) and are typically characterized as "solid walls" of dust that can rise up to 2,000 meters and travel hundreds of miles.

Generally, the EPA would consider sustained wind speed, spatial extent, visibility, and PM concentrations in determining whether an event is an extreme event. An example of an event that could be considered an exceptional event but not an extreme event would be the Santa Ana winds blowing at 25-30 mph, creating an exceedance at one monitor, with maximum hourly PM_{10} levels of less than 800 $\mu g/m^3$. In contrast, a haboob that occurred in Phoenix in 2011 had downburst winds of 70 mph, with a wall of dust moving at 30-40 mph for 150 miles; hourly PM_{10} levels of 50,000 $\mu g/m^3$ were monitored during this event. Both of these events could be considered for exclusion under the EER. The South Coast Air Quality Management District prepared a 49-page demonstration package (plus an appendix with additional supporting information) for the Santa Ana winds event, parts of which have been used as examples in the High Winds guidance document. However, the EPA anticipates that much more limited documentation for an event like the haboob would be sufficient to convince the EPA (and all other parties) that the event meets the several criteria for data exclusion (clear causal connection, not reasonably controllable or preventable, etc.).

18. **Question:** Carbon monoxide (CO) flags are in AQS for exceedances caused by fires, but the CO NAAQS (40 CFR 50.8) does not reference the Exceptional Event Rule. What is the EPA's approach for the treatment of CO data affected by exceptional events?

Answer: CO flagging, including the option for the EPA's concurrence, has been enabled in AQS. CO flags from structural fires and wildfires that qualify as exceptional events have been allowed in historic EPA guidance. The EER Preamble (72 FR 13563) explains the EPA's position with respect to exceptional event flagging for pollutants for which the statement of the NAAQS in 40 CFR part 50 does not explicitly reference the Exceptional Events Rule: "In the interim, where exceptional events result in exceedances or violations of NAAQS that do not currently provide for special treatment of the data, we intend to use our discretion as outlined under section 107(d)(3) not to redesignate affected areas as

nonattainment based on these events." Therefore, air agencies may flag CO data in AQS and the EPA may apply the same process and approval criteria as in the Exceptional Events Rule.

On August 12, 2011, the EPA issued a decision to retain the current suite of CO standards without revision (see 76 FR 54294). Because the EPA made no revisions to the CO standards, it promulgated no related changes to the Exceptional Events Rule.

19. **Question:** The limited maintenance plan requirements for PM_{10} require a demonstration that the area design value is less than or equal to 98 $\mu g/m^3$. Flagging of values between 98 $\mu g/m^3$ and the NAAQS are therefore relevant for this regulatory decision. Can air agencies flag and request/receive the EPA's concurrence on these values, which are not exceedances and do not contribute to violations?

Answer: Yes. The May 7, 2009, memorandum from William T. Harnett to Regional Air Division Directors states the following regarding the PM_{10} limited maintenance plan option: "In determining eligibility for the limited maintenance plan option, the EPA will treat 24-hour average air quality data between 98 $\mu g/m^3$ and 155 $\mu g/m^3$ in a manner analogous to the treatment of exceedance data under the Exceptional Events Rule, provided the impacted data meet the general definition and criteria for exceptional events (natural event, or exceptional event that is not reasonable controllable or expected to recur)." This memorandum is posted on the EPA website at http://www.epa.gov/ttn/oarpg/t1/memoranda/lmp_final_harnett.pdf

19a. **Question:** What does the EPA mean when we say we will review exceptional event demonstration submittals using a "weight-of-evidence" approach?

Answer: In using the term "weight-of-evidence," the EPA believes we should consider all relevant evidence and qualitatively "weigh" this evidence based on its relevance to the EER criterion being addressed, the degree of certainty, its persuasiveness, and other considerations appropriate to the individual pollutant and the nature and type of event.

20. **Question:** Exactly which section(s) of the preamble to the final Exceptional Event Rule has been declared a "legal nullity" by the court, and what does that mean?

Answer: In *NRDC v. EPA,* No. 07-1151 (D.C. Cir. 3/20/09), the DC Circuit Court states that

> "In one section of the preamble, EPA refers to its 'final rule concerning high wind events', which 'states that ambient particulate concentrations due to dust being raised by unusually high winds will be treated as due to uncontrollable natural events' when certain conditions apply (72 Fed. Reg. 13576). There is no such final rule. The final rule [language in 40 CFR 50 and 40 CFR 51.930] does not mention high wind events or anything about 'ambient particulate matter concentrations.' EPA calls this a drafting error. In light of the error, the high wind events section of the preamble is a legal nullity."

The EPA considers the "high wind events section of the preamble" to which the court referred to be the section titled "*B. High Wind Events*" beginning on 72 FR 13576. This does not necessarily mean that these passages do not reflect the EPA's interpretation of what might be appropriate under the EER. Rather, it means that implementing air agencies and other stakeholders should rely on other parts of the preamble and other EPA guidance instead of statements in these passages of the final rule preamble, which should be treated as not having been published.

20a. **Question:** What fire-related definitions should air agencies use in their exceptional event documentation?

Answer: Land Management Agencies modified their fire-related definitions after the EPA promulgated the Exceptional Events Rule. The EPA is using the following fire-related terminology in the interim exceptional events guidance documents to ensure consistency:

Prescribed fire - Any fire intentionally ignited by management under an approved plan to meet specific objectives.

Wildfire – Any fire started by an unplanned ignition caused by lightning; volcanoes; unauthorized activity; accidental, human-caused actions; and escaped prescribed fires.

20b. **Question:** How should air agencies support a claim that emissions from wildfires are "not reasonably controllable or preventable"?

Answer: The Clean Air Act and the EER apply the "not reasonably controllable or preventable" requirement to any event that an air agency wishes to be treated as an exceptional event, and thus it applies to wildfires. The current United States Forest Service (USFS) definitions of "wildfire" and "prescribed fire" define these events in terms of purpose and deliberateness of ignition (See definitions in response to Question 20a). Based on the USFS definitions, a wildfire is a fire that has started from an unintentional ignition or an unintentional escape of a prescribed fire. The initiation of a wildfire is thus by definition unplanned, but the concepts of reasonable prevention and control should not be overlooked in an exceptional event demonstration. The EPA recognizes that wildfires and emissions from wildfires are generally not reasonable to prevent or control.

When documenting the "not reasonably controllable or preventable" criterion in their wildfire exceptional event demonstration submittal, air agencies should identify the origin and evolution of the wildfire, describe local efforts to prevent fires due to unauthorized activity or accidental human-caused actions (if relevant given the origin of the fire)[12], and explain how any efforts to limit the duration or extent (and thus the

[12] Prevention/control efforts could include posting High Fire Danger signs to make people more careful and prevent accidental fires, and/or taking reasonable action to contain a fire once it has started.

emissions) from the wildfire were reasonable. During wildfires, fire management resources deployed to the fire event give first priority to protecting life and property. Because wildfires are, by definition, unplanned and unwanted, fire management resources often have limited advance notice of ignition and location, which generally limits preparation time and reasonable efforts to limit the duration or extent of a wildfire. In light of these considerations, the EPA believes that it will generally be sufficient for air agencies to provide a statement such as the following to document the "not reasonably controllable or preventable" criterion for wildfires: "Based on the documentation provided in [section X] of this submittal, [lightning] caused the unplanned, unwanted wildfire event. The responsible agencies did their reasonable best to control the extent of and extinguish the fire by taking the following actions [insert list or description of actions taken]. Therefore, emissions from this wildfire were 'not reasonably controllable or preventable.'" For fires that could have been suppressed or contained but which fire management officials allowed to burn for resource management purposes, air agencies can generally reference or paraphrase a previously adopted resource management plan to support the "not reasonably controllable or preventable" criterion.

21. **Question:** The Exceptional Event Rule allows for exclusion of data affected by a prescribed fire if the usual requirements of the rule are satisfied and if the air agency has adopted and is implementing a Smoke Management Program (SMP) or if the air agency has ensured that the burner employed basic smoke management practices. Are there minimum requirements for a Smoke Management Program? What are "basic smoke management practices?"

    Answer: The preamble to the Exceptional Events Rule at 72 FR 13567 describes an SMP as establishing a basic framework of procedures and requirements for managing smoke from a prescribed fire managed for resource benefits. Further, the EPA's "Report to Congress on Black Carbon"[13]describes the intent of SMPs as "mitigat[ing] the public health and welfare impacts from prescribed fires and promot[ing] communication and coordination of prescribed burning among land owners." The Report to Congress also states that basic smoke management practices could "…include, among other practices, steps to minimize air pollutant emissions during and after the burn, evaluate dispersion conditions to minimize exposure of sensitive populations, and identify procedures to ensure that burners are using basic smoke management practices." The EPA intends to develop separate guidance to address this issue, which will be issued at a later date following an opportunity for stakeholder input.

22. **Question:** Is there a tie between the requirements of 40 CFR 51.930 Mitigation of Exceptional Events and the EPA's approval for exclusion of data affected by an exceptional event?

[13] Report to Congress on Black Carbon, EPA-450/R-12-001, US EPA, March 2012, page 230. Available at http://www.epa.gov/blackcarbon/.

Answer: The EPA encourages the submittal of mitigation measures with the demonstration package, particularly for those events likely to recur. The Exceptional Events Rule was promulgated pursuant to Section 319 of the Clean Air Act which contains a provision that each air agency "must take necessary measures to safeguard public health regardless of the source of the air pollution..." This provision was the basis for the mitigation requirements in 40 CFR §51.930 and the requirement in the EER at 40 CFR §50.14(c)(1)(i) that all air agencies must "notify the public promptly whenever an event occurs or is reasonably anticipated to occur which may result in the exceedance of an applicable air quality standard." The language at 40 CFR §51.930 requires that:

> "(a) A State requesting to exclude air quality data due to exceptional events must take appropriate and reasonable actions to protect public health from exceedances or violations of the national ambient air quality standards. At a minimum, the State must:
>
> (1) Provide for prompt public notification whenever air quality concentrations exceed or are expected to exceed an applicable ambient air quality standard;
>
> (2) Provide for public education concerning actions that individuals may take to reduce exposures to unhealthy levels of air quality during and following an exceptional event; and
>
> (3) Provide for the implementation of appropriate measures to protect public health from exceedances or violations of ambient air quality standards caused by exceptional events."

Although the language at 40 CFR §51.930 does not require air agencies to prepare or submit a mitigation plan, it does require that air agencies develop and implement processes and measures that could easily become the elements of a formal, written plan. The mitigation criteria focus on specific measures and actions to protect public health, rather than on measures that control or prevent emissions associated with a specific event. So, a mitigation plan may include measures that apply to emissions sources in general (e.g., dust suppression or covering techniques for mineral processing) rather than those measures or controls that might be discussed in the "not reasonably controllable or preventable" portion of an event demonstration (e.g., controls/measures X, Y, and Z were in place on sources A, B, and C during the time of the event). A mitigation plan may also include procedures and responsibilities for public alerts and sheltering advisories. Because having a mitigation plan in place will help air agencies meet the EER requirements at 40 CFR §50.14(c)(1)(i) related to public notification more systematically, the EPA encourages the development and submittal of a mitigation plan with the demonstration package if one has not already been adopted.

23. **Question:** Need a state (or tribe) make an argument or submit evidence about control measures for events that took place in other states or countries, on federally-owned and managed land, or on tribal (or state) lands not subject to state (or tribal) regulation?

Answer: Under the Clean Air Act, the EPA generally considers a state (not including areas of Indian country) to be a single responsible actor. Accordingly, neither the EPA nor the Exceptional Events Rule provides special considerations for intrastate scenarios when an event in one county affects air quality in another county in the same state, assuming that the event occurs on land subject to state authority (versus tribal government authority). For cases involving intrastate transport, the state or local air agency should evaluate whether emissions from neighboring (or contributing) counties are not reasonably controllable or preventable. As discussed in greater detail in the overview guidance document and the interim High Winds Guidance document, the assessment of "not reasonably controllable or preventable" is based on the existing level of required control, attainment status, and, for high wind dust events, wind speed and other factors. States and tribes should consult with their EPA regional office early in the development of an exceptional event demonstration package if they believe that emissions from sources on federally-owned and managed land (e.g., national parks within the state) have been affected by an event in a way that raises issues of reasonable control.

Interstate and international transport events are different than intrastate events. The EPA believes that generally it is not reasonable to expect the downwind state (i.e., the state submitting the demonstration) to require the upwind country or state to have implemented controls on sources sufficient to limit event-related air concentrations in the downwind state. As with any demonstration submittal, the submitting (downwind) state should sufficiently identify all natural and anthropogenic contributing sources of emissions (both in-state and out-of-state) to show the causal connection between an event and the affected air concentration values. A submitting state may provide a less detailed characterization of sources in the upwind state or country than of sources within its jurisdiction. After completing the source characterization, the submitting state should assess whether emissions from sources within its jurisdiction (i.e., in-state sources) were not reasonably controllable or preventable. Although the submitting state should also provide available information on the status of control measures for emissions from out-of-state sources, the submitting state may determine based on available information that the "not reasonably controllable or preventable" criterion is satisfied in light of the state's inability to require controls of the upwind state. When assessing emissions transported from other states or countries, the submitting state can say that it characterized the out of state sources, determined that these sources contributed to the noted exceedance or violation, and determined, based on jurisdictional boundaries and other available information, that contributing emissions from the upwind state or country were not reasonably controllable or preventable. Submitting states are further required to submit evidence/statements supporting the other exceptional event criteria (i.e., clear causal relationship, but for, human activity unlikely to recur or a natural event, affects air quality, and historical fluctuations).

The EPA recommends a similar approach to significant out-of-state anthropogenic sources in the case of a mixed natural/anthropogenic event that the submitting state wishes to consider a natural event of the grounds that all significant anthropogenic sources were reasonably controlled.

As with all exceptional event demonstrations, the EPA will evaluate the information on a case-by-case basis based on the facts of a particular exceptional event including any information and arguments presented in public comments received by the state in its public comment process or by the EPA in a notice-and-comment regulatory action that depends on the data exclusion. This response is not intended to discourage states from working cooperatively to plan and apply controls on both sides of a state boundary for their mutual benefit.

In addition to the provisions in the EER, the Clean Air Act provides mechanisms in sections 110(a)(2)(D) and 126 to address interstate transport issues and mechanisms in section 179(b) to address international transport issues.

24. **Question:** Need an air agency make an argument or submit evidence about control measures for air quality impacts from wind-blown dust from desert land in its natural state?

    Answer: While the EPA's position is generally that impacts from wind-blown dust from undisturbed natural deserts are inherently not reasonable to control, the air agency would need to state this and provide appropriate supporting documentation in its demonstration package. The supporting documentation could include descriptions of the geographic area (with maps or available visuals) and a discussion of the historical land use, including prior disturbances, water diversions and other historical practices which may have occurred on the land, even if the land seems or is considered to be "undisturbed" at present. Submitting agencies should also identify all sources contributing to an event and identify appropriate control strategies for each anthropogenic source.

25. **Question:** Is there a template or example for preparing a demonstration document?

    Answer: The guidance document, "Interim Guidance on the Preparation of Demonstrations in Support of Requests to Exclude Ambient Air Quality Data Affected by High Winds Under the Exceptional Event Rule" (the High Winds guidance document) provides this type of advice for demonstrations for high wind dust events. While the High Winds guidance document speaks specifically to high wind dust events, the EPA believes that many of the principles discussed therein to extend to all types of exceptional events. The EPA has also developed a presentation entitled, "Presenting Evidence to Justify Data Exclusion as an Exceptional Event: Ideas based on how the EPA has recently documented events to support regulatory decisions." Interested parties can download this presentation from the following site: http://www.epa.gov/ttn/analysis/docs/IdeasforShowingEEEvidence.ppt. Additionally, the EPA is currently developing separate guidance to address the preparation of demonstrations to support wildfire-related ozone event claims.

26. **Question:** Where can an air agency find examples of demonstrations from other air agencies that have been approved by the EPA?

Answer: The EPA has posted examples of approved demonstrations at http://www.epa.gov/ttn/analysis/exevents.htm.

27. **Question:** How quickly will the EPA review the demonstration document and provide feedback to the air agency on the approval, or on any suggested improvements?

Answer: The EPA generally intends to conduct its initial review of a submitted exceptional event demonstration package within 120 days of receipt. Following this initial review, the EPA will generally send a letter to the submitting agency that includes a completeness determination and/or a request for additional information, a date by which the supplemental information should be submitted (if applicable)[14], and an indicator of the timing of the EPA's final review. The EPA will generally prioritize exceptional event determinations that affect near-term regulatory decisions.[15]

To promote early communication, the EPA suggests that air agencies provide a letter of intent to submit a demonstration package for flagged data in AQS as soon as possible, if possible within 12 months from the event occurrence, after the agency identifies the event(s) as being significant. A letter of intent is an *option* for the air agency to use in situations where it may help communication and prioritization.[16] This initial notification can assist both the air agency and the EPA in the planning and prioritization process. The EPA intends to respond to such a letter within 60 days of receipt. The EPA response will provide the regional office's best assessment of the priority that can be given to the submission once received and any case-specific advice the EPA may have to offer for the preparation of the demonstration.

The EPA intends to make a decision regarding concurrence with an air agency's flag as expeditiously as necessary if required by a near-term regulatory action, but no later than 18 months following submittal of a complete package. The EPA intends to communicate with the submitting agency, as needed, during the demonstration review period.

Submitting air agencies that believe their demonstration packages are tied to near-term regulatory actions should submit their demonstration packages well in advance of the regulatory deadline. Air agencies should also identify the relationship between the exceptional event-related flagged data and the anticipated regulatory action in the cover letter that accompanies their initial submittal package to the reviewing EPA regional office.

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[14] The EPA will generally ask that air agencies provide supplemental information within 60 days from receipt of the letter from the EPA. The EPA recognizes that air agencies may need more than 60 days to prepare and submit some types of supplemental information. The EPA is willing to work with agencies on supplemental timeframes; however, the mandatory timing of the EPA's actions may limit the response time the EPA allows.
[15] "Regulatory decisions" include findings as to whether the area has met the applicable NAAQS, classification determinations, attainment demonstrations, the development of Limited Maintenance Plans, clean data findings.
[16] The Letter of Intent is an optional step and the EPA recognizes that air agencies may need additional time to prepare and submit demonstration packages particularly where the basis of the exclusion is violating an annual standard or a 3-year design value. Similarly, an air agency could consider submitting an annual letter of intent if annual submittal makes sense for resource planning or for historically seasonal events.

28. **Question:** Will the EPA ever perform and consider additional data analysis itself before deciding whether to approve an air agency-submitted demonstration in support of data exclusion?

Answer: In general, the EPA does not prepare analyses or additional arguments for inclusion in a submitted demonstration package or to support the EPA's concurrence on a demonstration package. Rather, the EPA will recommend demonstration package improvements to the submitting agency. However, if a demonstration package is associated with an imminent regulatory action and the public interest will be best served by the EPA's preparing and/or considering additional analyses, the EPA may either assist with or independently prepare supporting analyses that could become part of the submission package or an EPA-prepared technical support document. Analyses prepared by the EPA could support either approval or disapproval of an air agency's request for concurrence on flagged data.

28a. **Question:** Does the Exceptional Events Rule contain a dispute resolution process that air agencies can use to resolve disagreements regarding non-concurrence on submittal packages?

Answer: Several mechanisms currently exist that air agencies can use at various points in the exceptional events process:

- Engage in early dialogue with the appropriate EPA regional office.
- Submit requests for reconsideration to the official who made the determination if a request identifies a clear error or if information submitted by the agency was overlooked
- Elevate the concern within the EPA's chain of command.
- Participate in the public notice and comment process (see Question 14a).
- Challenge in an appropriate court the regulatory decision subsequently made that is based on the EPA's exceptional event determination.

In addition, for complex exceptional events claims or those with significant regulatory or other impacts (e.g., those claims that directly influence proposed designation or redesignation, classifications, and attainment determinations), the EPA regional office staff will generally seek input from other EPA regional offices and/or the EPA headquarters staff.

28b. **Question:** Can air agencies use data from non-regulatory monitors in exceptional events analyses?

Answer: Yes, air agencies can use data from non-regulatory monitors to support their exceptional event demonstrations. Generally, monitoring data used for NAAQS regulatory purposes are collected from Federal Reference Method (FRM), Federal Equivalent Method (FEM), and/or Approved Regional Method (ARM) monitors that are sited and operated in accordance with 40 CFR Part 58. Exceedances or violations

identified as exceptional events originate from these same data from FRM/FEM/ARM monitors. The AQS, the EPA's repository of ambient air quality data, stores data from more than 10,000 monitors, about 5,000 of which are currently active. Although not all of these monitors are FRM/FEM/ARM-approved, data from non-FRM/FEM/ARM monitors can be used in exceptional event analyses. For example, air quality data summaries from non-FRM/ FEM/ARM monitors may be helpful in defining the duration and geographic extent of the event, including the area of exceedance/violation and the area containing sources that contribute to the exceedances/violations. Similarly, chemical speciation data from monitor samples can help characterize the nature of the violation and identify contributing emissions sources.

F. Exceptional Event Data Flagging for Air Quality Concentrations that Could Contribute to an Exceedance or Violation of the National Ambient Air Quality Standards

29. **Question:** Each criteria pollutant except PM_{10} now has multiple NAAQS in effect that differ by averaging period, and/or there is an "original" and a lower "revised" NAAQS level each of which has regulatory significance. If the EPA approves a measurement value for exclusion for one particular NAAQS averaging period and level, does the EPA automatically exclude the same value for all the other NAAQS for that pollutant?

    Answer: No. Air agencies should request and support the exclusion of a measured air concentration separately for each NAAQS that applies to the pollutant. The EPA will similarly provide separate concurrences.

    When initially flagging data, an air agency does not need to identify the specific NAAQS for which it seeks to exclude a measured concentration. The EPA's ambient air quality database, AQS, is designed to allow an air agency to apply a single flag to a measured concentration value, which merely indicates the agency's interest in excluding that value with respect to one or more of the applicable NAAQS. Later, in the request for data exclusion (i.e., the demonstration), the air agency can indicate the specific NAAQS for which it seeks exclusion and for which the demonstration addresses the Exceptional Events Rule criteria. When the EPA makes a decision regarding concurrence with an air agency's flag, it will generally identify in its approval/disapproval letter (or other official notice) all of the NAAQS for which the EPA has concurred on the flag. The EPA will also generally set a flag in AQS indicating concurrence with respect to a specific single NAAQS or a specific combination of NAAQS for that pollutant (e.g., in the case of $PM_{2.5}$, the 24-hour NAAQS only, the annual NAAQS only, or both the 24-hour and the annual average NAAQS). The EPA does this by associating one or more "pollutant standard ID" value with the concurrence.

    Air agencies preparing demonstrations to support requests to exclude 24-hour average values for $PM_{2.5}$ and PM_{10} should flag all 24 1-hour values within a given day. If concurred upon, flagging all 1-hour values will ultimately result in the same available remaining data for regulatory analysis and calculation regardless of whether the 24-hour $PM_{2.5}$ or PM_{10} measurement data are collected from filter-based or continuous monitoring

instruments.[17] The EPA believes flagging all 24 hourly values is appropriate because flagging only peak or selected hours could result in the remaining hourly values still meeting the data completeness requirements. Exclusion of only the high hourly concentrations could result in AQS calculating a valid low (or, potentially high) biased 24-hour concentration under the rules for data interpretation.[18]

The EPA concurrence flags entered into AQS prior to the March 2010 re-engineering of AQS to accommodate the Exceptional Events Rule did not indicate the specific single NAAQS or the specific combination of NAAQS for which the exclusion was approved. These "legacy" concurrence flags have been converted to the new approach using the following defaulting scheme:

- For ozone, all legacy flags were treated as applying to both the 0.08 ppm 8-hour NAAQS and the 0.12 ppm 1-hour NAAQS. This default was chosen because as of March 2010, designations under the 2008 NAAQS of 0.075 ppm had been suspended pending reconsideration of that NAAQS, and AQS staff were not aware of any concurrences already granted with respect to the 0.075 ppm NAAQS.
- For $PM_{2.5}$, all concurrences on events with dates prior to January 1, 2005 (meaning the date of the concentration, not the date of the EPA's concurrence) were presumed to be applicable only to the annual $PM_{2.5}$ NAAQS. This default was chosen because prior to the revision of the 24-hour $PM_{2.5}$ NAAQS in 2006, violations of the 1997 24-hour NAAQS were extremely rare.
- For $PM_{2.5}$, all concurrences on events with dates of January 1, 2005 through March 2010 were presumed to be applicable only to the 24-hour NAAQS because there were no revisions to the annual $PM_{2.5}$ NAAQS during this timeframe, so designations to nonattainment for the annual $PM_{2.5}$ standard were extremely rare. This 24-hour $PM_{2.5}$ NAAQS default was chosen because it was possible for designations under the 2008 24-hour NAAQS to be based on data as early as 2005.
- For PM_{10}, all concurrences were presumed to apply to the 24-hour NAAQS, as the annual PM_{10} NAAQS was revoked in 2006.[19]

[17] Filter based instruments typically record a single value within a 24-hour period while continuous monitors typically collect 24 1-hour measurements. Because AQS can calculate a valid 24-hour average concentration with as few as 18 hours, it may be necessary to exclude hours not actually affected by the event to ensure the same data exclusion outcome as if the measurement had been made with a 24-hour filter.

[18] The form of the 24-hour $PM_{2.5}$ NAAQS of 35 $\mu g/m^3$ is 98^{th} percentile averaged over 3 years. The form of the primary annual $PM_{2.5}$ NAAQS of 12 $\mu g/m^3$ is an annual mean averaged over 3 years. The form of the 24-hour PM_{10} NAAQS of 150 $\mu g/m^3$ is not to be exceeded more than once per year on average over 3 years. Biased concentrations can potentially skew the determination of the 98^{th} percentile and/or the annual mean for $PM_{2.5}$ and the averages for $PM_{2.5}$ or PM_{10} calculated to determine compliance with the relevant NAAQS.

[19] The EPA realizes that many of the defaulted EPA concurrences for pre-2006 PM_{10} concentrations that were below the level of the 24-hour PM_{10} NAAQS actually were applicable to the annual PM_{10} NAAQS, but this approach was the most practical way to ensure that all other concurrences originally intended to be applicable to the 24-hour NAAQS were preserved. Because concentrations below the level of the 24-hour NAAQS have no effect on attainment determinations for the 24-hour NAAQS, no error can come from treating such values as

- For CO, all concurrences were presumed to apply to both the 1-hour and the 8-hour NAAQS. This default was chosen to ensure that the concurrence applied to whichever NAAQS had been exceeded and was the basis for the exclusion request.
- For SO_2, all concurrences were presumed to apply to both the 24-hour and the annual NAAQS. This default was chosen to ensure that the concurrence applied to whichever NAAQS had been exceeded and was the basis for the exclusion request. No flags were assumed to apply to the 1-hour NAAQS because the 1-hour SO_2 standard was not promulgated until June of 2010, after the AQS re-engineering.
- For Pb, all concurrences (if any existed) were presumed to apply to the quarterly average NAAQS of 1.5 $\mu g/m^3$. This default was chosen because March 2010 was prior to the EPA issuing final designations under the 2008 Pb NAAQS of 0.15 $\mu g/m^3$.
- For NO_2, all concurrences were presumed to apply to the annual NAAQS because the 1-hour NO2 standard was not promulgated until February of 2010.

For concurrences on events with dates after the March 2010 re-engineering of AQS, the EPA will specify the NAAQS to which the concurrence applies. If this defaulting scheme does not properly represent the actual concurrence action that was taken by the EPA regional office, the regional office should revise and correct the concurrence flags, if it has not already done so.

Air agencies can find detailed information on the use of events flags in AQS in a tutorial posted at http://www.epa.gov/ttn/airs/airsaqs/manuals/ExceptionalEventTutorial.pdf. The tutorial discusses concurrence flags on page 20.

30. **Question:** For a NAAQS that is defined for a multi-hour or multi-day averaging time, but for which concentrations are measured, reported, and flagged on the basis of a shorter time period, what comparisons between measurements and the NAAQS level should air agencies prepare to satisfy the "but for" test?

Answer: One requirement for data exclusion under the Exceptional Events Rule is that there would have been no exceedance or violation of the NAAQS "but for" the event. In AQS, flagging and concurrence are done for each individual reported measurement. When the averaging period for the NAAQS is the same as the measurement duration period, individual measurements that have event flags attached can be compared directly to the level of the NAAQS. This is the case for the 1-hour ozone, 1-hour CO, 1-hour SO_2, and 1-hour NO_2 NAAQS. This is also the case when 24-hour filter-based PM_{10} or $PM_{2.5}$ concentrations are compared to the respective 24-hour NAAQS.[20] However, a difference

having been concurred. Nevertheless, the EPA regional office may choose to update these concurrence flags as time permits.

[20] Air agencies have for many years reported SO_2 concentrations as hourly averages. While some air agencies have also voluntarily reported 5-minute average concentrations also, either for each of the 12 5-minute blocks in an hour or for the maximum 5-minute average concentrations (block or running) during an hour, it is the hourly concentration averages that should be compared to the 1-hour SO_2 NAAQS. Under a change in SO_2 monitoring

exists for the following NAAQS between the time period for reporting concentrations and the averaging period to which the level of a NAAQS applies.

- Ozone, CO, NO_2, and SO_2 are reported to AQS as 1-hour measurements, but all three have NAAQS defined for longer averaging periods (3-hours, 8-hours, 24-hours, and/or annual). The longer-period concentration values that are compared to these NAAQS are calculated from the submitted hourly values within AQS and cannot have event flags attached to them.
- Pb is reported as 24-hour measurements, but the old and new NAAQS are both for three-month averages (quarterly averages and 3-month rolling averages, respectively). The quarterly and 3-month concentration values that are compared to these NAAQS are calculated from the submitted 24-hour measurements within AQS and cannot have event flags attached to them.
- When using automated/continuous monitoring equipment, $PM_{2.5}$ and PM_{10} data are reported as 1-hour measurements but there are $PM_{2.5}$ and PM_{10} NAAQS with 24-hour averaging periods and a $PM_{2.5}$ NAAQS with an annual averaging period. The 24-hour and annual values compared to the NAAQS are calculated within AQS and cannot have event flags attached to them. As described in more detail in the response to Question 29, to ensure the same data exclusion outcome regardless of whether $PM_{2.5}$ and PM_{10} measurements are made with filter-based or continuous monitoring equipment, the EPA intends to exclude all 24 1-hour measurements in a given day whenever the "but for" criterion (and other exceptional event criterion) are satisfied for that day even if an event only affected discrete hours of the day. The EPA will be able to do this only if the air agency has applied "R" flags to each of those hours.[21]
- When using filter-based monitoring equipment, $PM_{2.5}$ and PM_{10} are reported as 24-hour measurements but there is a $PM_{2.5}$ NAAQS with an annual averaging period. The annual values used in comparisons the NAAQS are calculated within AQS and cannot have event flags attached to them.

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requirements that accompanied the promulgation of the 1-hour SO_2 NAAQS, the EPA now requires that air agencies report the maximum 5-minute block average concentration, as well as the hourly concentration (see 40 CFR § 58.12(g)). Air agencies may satisfy the 5-minute reporting requirement by submitting all twelve 5-minute block averages or by reporting only the maximum 5-minute block average concentration. The EPA's AQS retains the hourly concentration as submitted; AQS does not use 5-minute data to replace the submitted hourly concentration. While 5-minute concentrations may play a role in evaluating whether Exceptional Event criteria are satisfied for a given hour and event, for example to establish a clear causal connection, they are not to be compared to the level of the 1-hour (or any other) NAAQS for SO_2 as part of a "but for" demonstration and should not be flagged for exclusion under the EER. Air agencies may, however, use "I" series flags (Information only) with 5-minute SO_2 data.

[21] Because AQS can calculate a valid 24-hour average concentration with as few as 18 hours, it may be necessary to exclude hours not actually affected by the event to ensure the same data exclusion outcome as if the measurement had been made with a 24-hour filter. Exclusion of only the high hourly concentrations could result in AQS calculating a valid low (or, potentially high) biased 24-hour concentration under the rules for data interpretation.

The mismatches of time periods make this a question with a complex answer. The following paragraphs, summarized in Table Q30-1, explain the general rationale behind the pollutant and NAAQS-specific entries in Table Q30-2.

To satisfy the "but for" criterion, there must have actually been an exceedance or violation of the NAAQS in a time period overlapping with the event and its effects on air quality, and which would not have occurred "but for" the effects of the event.[22] By definition, an exceedance necessarily involves a comparison between an air concentration, averaged over a time period equal in length to the averaging time of the NAAQS, and the level of the NAAQS. For example, it does not make sense to compare an individual 1-hour ozone concentration to the level of the 8-hour NAAQS as part of a test of whether the "but for" criterion is met, because the outcome of the comparison for a single hour does not indicate whether an exceedance or violation of the 8-hour NAAQS occurred, or whether it would not have occurred "but for" the event. Instead, air agencies should consider whether the event made a "but for" difference in the average concentration over the period that is the same as the averaging period for the NAAQS. That is, air agencies making a "but for" argument should compare the average concentration, rather than the individual concentrations comprising the average, to the identified NAAQS.[23] Air agencies should, however, identify in their exceptional event submission those particular measurements that caused the elevated average.

The preamble to the Exceptional Events Rule provides one exception from this formal definitional approach. The preamble states that in the particular case of $PM_{2.5}$, the direct comparison of a single 24-hour average concentration (determined from a single filter-based measurement or by averaging 24 1-hour measurements from a continuous equivalent instrument) to the level of the annual NAAQS can be the basis for meeting the

[22] The EPA interprets the Exceptional Event Rule and its preamble to mean "exceedance or violation" each time that "exceedance" or "violation" occurs in the text, consistent with the obvious intent of the Clean Air Act amendment requiring the EPA to promulgate the Rule. An "exceedance" occurs each time the concentration in the air for the averaging period applicable to the NAAQS is higher than the level of the NAAQS. Most NAAQS allow some such occurrences in a 1-year or 3-year time period (depending on the NAAQS). A "violation" of the NAAQS occurs when there have been enough high-concentration episodes that the statistical form of the particular NAAQS indicates a failure to meet the NAAQS.

[23] A scenario could exist in which the effect of an event on one or more 24-hour $PM_{2.5}$ concentration creates a "but for" difference on the annual concentration even though the actual 24-hour concentration(s) on the day(s) of the event was below the level of the annual NAAQS. This implies that the EPA could concur with the exclusion request for the 24-hour concentration value. However, the Exceptional Events Rule preamble makes clear that only 24-hour $PM_{2.5}$ concentrations that are above the level of the annual NAAQS maybe excluded. Similarly, the EPA generally does not intend to concur with respect to any NAAQS on a flag for a 1-hour NO_2 and SO_2 concentration that is below the level of the respective annual NAAQS, regardless of the outcome of "but for" tests based on comparison of 24-hour or annual average concentrations to their same-period NAAQS. Also, the EPA generally does not intend to concur on flags for a 24-hour Pb measurement below the level of the old (fixed quarterly average) Pb NAAQS or the new (rolling 3-month average) Pb NAAQS. The EPA believes that it is generally appropriate to use the similar restriction for $PM_{2.5}$ stated and explained in the preamble to the Exceptional Event Rule. Moreover, it is highly unlikely that even several hourly concentrations below the level of the annual NO_2 NAAQS of 53 ppb could include an event contribution that when summed with all other hourly concentrations and then divided by 8760 (24 hours times 365 days), could result in the annual average NO_2 concentration crossing from below the level of the annual NAAQS to above the level of the annual NAAQS.

"but for" criterion for exceedances or violations of the annual NAAQS.[24] In context, it is clear that based on this comparison, a 24-hour concentration can be excluded from the calculation of the annual $PM_{2.5}$ NAAQS design value, if other rule criteria are also met. It is therefore not necessary to show that the annual average $PM_{2.5}$ concentration was above 12 or 15 $\mu g/m^3$ with the event and would have been below 12 or 15 $\mu g/m^3$ "but for" the single event at issue. Such a concentration can also be excluded from the calculation of the design value for the 24-hour $PM_{2.5}$ NAAQS, although this is likely to make a difference to meeting the NAAQS only if the actual measured concentration were close to or above 35 $\mu g/m^3$. This special case is reflected in Table Q30-2.

In light of this departure in the preamble from a formal definitional approach in the case of a 24-hour $PM_{2.5}$ measurement and the annual $PM_{2.5}$ NAAQS, Table Q30-2 also provides a parallel special approach for similar comparisons involving Pb, NO_2 and SO_2 that the EPA generally intends to apply. The EPA believes applying this interpretation for Pb, NO_2, and SO_2 is consistent with the interpretation in the preamble for $PM_{2.5}$ and is consistent with the EPA's intent in drafting the Exceptional Events Rule. That is, a 24-hour average concentration of Pb, NO_2, or SO_2 can be compared to the NAAQS level defined for a longer period, for purposes of meeting "but for" with respect to both the 24-hour NAAQS, if applicable, and the NAAQS with the longer averaging period.

Table Q30-1. Principles for General Approach to Satisfying the "But For" Test
Note: The principles identified in this table are presented from the more general and/or self-evident to the more specialized and/or derivative.

	Principle	Application to Specific NAAQS	Exceptions
1	A single measurement may be compared directly to the level of the NAAQS if the averaging times are the same.	• 1-hour NAAQS for CO, SO_2, NO_2, and ozone. • 24-hour filter-based $PM_{2.5}$ or PM_{10} measurements vs. 24-hour NAAQS.	

[24] When the EPA promulgated the Exceptional Events Rule in 2007, the level of the annual $PM_{2.5}$ NAAQS was 15 $\mu g/m^3$. On December 14, 2012, the EPA promulgated a revised annual $PM_{2.5}$ NAAQS of 12 $\mu g/m^3$ (78 FR 3086). Because both standards apply, an air agency can choose the appropriate level of the annual NAAQS (i.e., either 12 $\mu g/m^3$ or 15 $\mu g/m^3$) as the basis for meeting the "but for" criterion. For example, an air agency developing an exceptional events demonstration package that may influence an attainment demonstration for the annual $PM_{2.5}$ NAAQS of 15 $\mu g/m^3$ would likely use 15 $\mu g/m^3$ as the basis for meeting the "but for" criterion while an air agency preparing a demonstration package that may influence initial area designation status for the 2012 annual $PM_{2.5}$ NAAQS of 12 $\mu g/m^3$ would likely use 12 $\mu g/m^3$ as the basis for meeting the "but for" criterion.

	Principle	Application to Specific NAAQS	Exceptions
2	When the measurement time is shorter than the averaging time of the NAAQS (e.g., 1-hour O_3 measurements and the 8-hour O_3 NAAQS), air agencies can compare the average of the multiple measurements within the averaging period of the NAAQS to the level of the NAAQS (e.g., compare the average of eight 1-hour measurements to the 8-hour NAAQS). If this comparison shows that the average is more than the NAAQS but would have been below the NAAQS in the absence of the event, then the "but for" test will have been met for those individual measurements in the longer averaging period that were affected by the event. Air agencies should, however, identify in their exceptional event submission those particular measurements that caused the elevated average.	• 1-hour ozone measurements vs. 8-hour NAAQS. • 1-hour CO measurements vs. 8-hour NAAQS. • 1-hour SO_2 measurements vs. 3-hour, 24-hour, and annual NAAQS. • 1-hour NO_2 measurements vs. annual average .NAAQS. • 1-hour $PM_{2.5}$ measurements vs. 24-hour and annual average NAAQS. • 1-hour PM_{10} measurements vs. 24-hour average NAAQS. • 24-hour $PM_{2.5}$ measurements vs. annual average NAAQS. • 24-hour Pb measurements vs. quarterly average NAAQS. • 24-hour Pb measurements vs. rolling 3-month average NAAQS.	If a measurement value is below the level of the quarterly, rolling 3-month, or annual average NAAQS, it generally will not be considered for exclusion regardless of the outcome of comparing the longer period average to the NAAQS level.
3	When the $PM_{2.5}$ or Pb measurement time is 24 hours (and when hourly $PM_{2.5}$ measurements are used to calculate a 24-hour concentration), it is also permitted to compare the 24-hour concentration to the annual average $PM_{2.5}$ NAAQS or the quarterly or rolling 3-month Pb NAAQS.	• 24-hour $PM_{2.5}$ concentrations vs. the annual average NAAQS (expressly permitted in the preamble to the Exceptional Events Rule). • 24-hour Pb filter measurements vs. the quarterly average and rolling 3-month average NAAQS (suggested by this guidance as a consistent with the intent of the $PM_{2.5}$ provision in the preamble).	
4	1-hour SO_2 measurements may be averaged to 24-hour periods and then compared to the annual average NAAQS. If the "but for" test is supported by this comparison, the showing supports a "but for" finding with respect to the 24-hour NAAQS for those individual 1-hour measurements in the 24-hour averaging period that were affected by the event.	• A comparison of 1-hour SO_2 measurements vs. the annual average NAAQS (where the 30 ppb annual SO_2 NAAQS still applies) is recommended in this guidance to create a reasonable benchmark for judging the excludability of 1-hour SO_2 measurements for the purpose of the annual NAAQS, for cases when the event did not affect the annual average enough to make a "but for" difference relative to the annual average NAAQS.	
5	When there is no NAAQS for the 24-hour averaging period, 1-hour measurements may be compared directly to the annual NAAQS.	• A comparison of 1-hour NO_2 measurements vs. annual average NAAQS is recommended in this guidance to create a reasonable	

	Principle	Application to Specific NAAQS	Exceptions
		benchmark for judging the excludability of 1-hour NO_2 measurements for the purpose of the annual NAAQS, for cases when the event did not affect the annual average enough to make a "but for" difference relative to the annual average NAAQS.	
6	Otherwise, single 1-hour measurements generally may not be compared to the level of the annual average NAAQS.	• Single 1-hour SO_2 measurements generally may not be compared the annual average NAAQS (because there is a 24-hour NAAQS for SO_2 with a defined averaging methodology). • Single 1-hour $PM_{2.5}$ measurements generally may not be compared to the annual average NAAQS (because there is a 24-hour NAAQS for $PM_{2.5}$ with a defined averaging methodology).	

Table Q30-2 identifies the comparisons and conclusions that generally would help satisfy the "no exceedance but for" test for each pollutant, for each current NAAQS. Note that for completeness Table Q30-2 addresses some situations that may be very unlikely to actually occur – for example, that a single event might cause an exceedance of the annual average NO_2 NAAQS. Also, note that Table Q30-2 addresses only the "no exceedance but for" question. As indicated in the answer to Question 31, even if an event cannot be demonstrated to make a "but for" difference in whether an exceedance occurred, it is possible that it makes a "but for" difference in whether a 3-year violation of the NAAQS occurred, for the NAAQS that are defined based on a 3-year average design value concentration. The logic behind Table Q30-2 applies to a "no violation but for" test also. Air agencies may request assistance from the EPA regional office on applying this logic when performing a "no violation but for" test.

Table Q30-2. General Approaches for Satisfying the "No Exceedance But For" Test

	Pollutant	Specific Case: NAAQS level NAAQS averaging period Measurement period	General Approach
1	Ozone	0.12 ppm 1-hour averaging period 1-hour measurement	• If a 1-hour measured concentration was above 0.124 ppm but would have been 0.124 ppm or less in the absence of the event, the 1-hour ozone concentration value meets the "but for" test for purposes of comparison to the 1-hour NAAQS. If other criteria are also met for that hour (e.g., there was a clear causal relationship between the event and that hour's ozone level, among other criteria), then the hour can be flagged and concurred for exclusion.
2	Ozone	0.08 ppm 8-hour averaging period 1-hour measurement	• If the daily maximum 8-hour average of measured concentrations was above 0.084 ppm but would have been 0.084 ppm or less in the absence of the event, those 1-hour concentration values that were affected by the single event meet the "but for" test for purposes of comparison to the 0.08 ppm 8-hour ozone NAAQS. The exclusion of some or all hours of the 8-hour period that was originally the daily maximum 8-hour period may cause another 8-hour period to become the daily maximum. The "but for" comparison can be repeated for this new 8-hour period, which may result in flagging and concurrence for more 1-hour values. It is also possible for additional hourly concentrations that were not included in the original 8-hour block to be excluded as part of a second 8-hour block.
3	Ozone	0.075 ppm 8-hour averaging period 1-hour measurement	• If the daily maximum 8-hour average of measured concentrations was above 0.075 ppm but would have been 0.075 ppm or less in the absence of the event, those 1-hour concentration values that were affected by the single event meet the "but for" test for purposes of comparison to the 0.075 ppm 8-hour ozone NAAQS. The exclusion of some or all hours of the 8-hour period that was originally the daily maximum 8-hour period may cause another 8-hour period to become the daily maximum. The "but for" comparison can be repeated for this new 8-hour period, which may result in flagging and concurrence for more 1-hour values. It is also possible for additional hourly concentrations that were not included in the original 8-hour block to be excluded as part of a second 8-hour block.

Table Q30-2. General Approaches for Satisfying the "No Exceedance But For" Test

	Pollutant	Specific Case: NAAQS level NAAQS averaging period Measurement period	General Approach
4	$PM_{2.5}$	35 µg/m^3 24-hour averaging period 1-hour measurement (Note: Air agencies can use either 15.0 µg/m^3 or 12.0 µg/m^3 as a basis for comparison.)	• If the 24-hour average concentration based on 1-hour measurements was above 35.4 µg/m^3 (after truncating after the first decimal digit, per 40 CFR 50 Appendix N section 3.0(c)) but would have been 35.4 µg/m^3 or less in the absence of the event, those 1-hour concentration values that were affected by the single event meet the "but for" test for purposes of comparison to the 35 µg/m^3 24-hour $PM_{2.5}$ NAAQS. • Also, if the 24-hour average concentration based on 1-hour measurements was above 12.0 / 15.0 µg/m^3 (after truncation after the first decimal digit) but would have been 12.0 / 15.0 µg/m^3 or less in the absence of the event, those 1-hour concentration values that were affected by the single event are eligible to be considered for exclusion for purposes of comparison to the 35 µg/m^3 24-hour $PM_{2.5}$ NAAQS.
5	$PM_{2.5}$	12.0 µg/m^3 Annual averaging period 1-hour measurement (Note: Air agencies preparing demonstrations involving PM concentrations for comparison against the 1997 annual $PM_{2.5}$ standard of 15.0 µg/m^3 should substitute 12.0 µg/m^3 with 15.0 µg/m^3 in the "General Approach" steps in the next column.)	• If the annual average $PM_{2.5}$ concentration was above 12.0 µg/m^3 but would have been equal to or less than 12.0 µg/m^3 (after rounding to one decimal digit) in the absence of the single event's effect on one or more hours, those 1-hour concentration values that were affected by the single event meet the "but for" test for purposes of comparison to 12 µg/m^3 annual $PM_{2.5}$ NAAQS. • Also, if the 24-hour average concentration based on 1-hour measurements was above 12.0 µg/m^3 (after rounding to one decimal digit, per 40 CFR 50 Appendix N section 4.3(a)) but would have been equal to or less than 12.0 µg/m^{3}in the absence of the event, those 1-hour concentration values that were affected by the single event meet the "but for" test for purposes of comparison to 12 µg/m^3 annual $PM_{2.5}$ NAAQS. However, an hourly value must be part of a 24-hour average concentration that is above 12 µg/m^3 (after rounding to one decimal digit) to be excluded from an annual NAAQS calculation.

Table Q30-2. General Approaches for Satisfying the "No Exceedance But For" Test

	Pollutant	Specific Case: NAAQS level NAAQS averaging period Measurement period	General Approach
6	$PM_{2.5}$	35 μg/m^3 24-hour averaging period 24-hour measurement (Note: Air agencies can use either 15.0 μg/m^3 or 12.0 μg/m^3 as a basis for comparison.)	• If the 24-hour average concentration was above 35.4 μg/m^3 (after truncating after the first decimal digit, per 40 CFR 50 Appendix N section 3.0(b)) but would have been 35.4 μg/m^{3}or less in the absence of the event, the 24-hr concentration value meets the "but for" test for purposes of comparison to 35 μg/m^3 24-hour $PM_{2.5}$ NAAQS. • Also, if the 24-hour average concentration was above 12.0 / 15.0 μg/m^3 (after truncating after the first decimal digit, per 40 CFR 50 Appendix N section 3.0(b)) but would have been 12.0 / 15.0 μg/m^{3}or less in the absence of the event, the 24 average concentration meets the "but for" test for purposes of comparison to 35 μg/m^3 24-hour $PM_{2.5}$ NAAQS.
7	$PM_{2.5}$	12 μg/m^3 Annual averaging period 24-hour measurement (Note: Air agencies preparing demonstrations involving PM concentrations for comparison against the 1997 annual $PM_{2.5}$ standard of 15.0 μg/m^3 should substitute 12.0 μg/m^3 with 15.0 μg/m^3 in the "General Approach" steps in the next column.)	• If the annual average $PM_{2.5}$ concentration was above 12.0 μg/m^3 (after rounding to one decimal digit per 40 CFR 50 Appendix N section 4.2(a)) but would have been equal to or less than 12.0 μg/m^3 in the absence of the single event's effect on one or more days, those 24-hour concentration values that were affected by the single event meet the "but for" test for purposes of comparison to 12 μg/m^3 annual $PM_{2.5}$ NAAQS. • Also, if the 24-hour average concentration from the filter-based sampler was above 12.0 μg/m^3 (after truncating after the first decimal digit, per 40 CFR 50 Appendix N section 3.0(b)) but would have been equal to or less than 12.0 μg/m^{3}in the absence of the event, the 24-hour value meets the "but for" test for purposes of comparison to 12 μg/m^3 annual $PM_{2.5}$ NAAQS.
8	PM_{10}	150 μg/m^3 24-hour averaging period 1-hour measurement	• If the 24-hour average concentration based on 1-hour measurements was above 150 μg/m^3 (after rounding to the nearest 10 μg/m^3, per 40 CFR 50 Appendix K section 1.0(b)) but would have been equal to or less than 150 μg/m^3 in the absence of the event, those 1-hour concentration values that were affected by the single event meet the "but for" test for purposes of comparison to the 150 μg/m^3 24-hour PM_{10} NAAQS.

Table Q30-2. General Approaches for Satisfying the "No Exceedance But For" Test

	Pollutant	Specific Case: NAAQS level NAAQS averaging period Measurement period	General Approach
9	PM_{10}	150 μg/m^3 24-hour averaging period 24-hour measurement	• If the 24-hour average concentration from the filter-based sampler was above 150 μg/m^3 (after rounding to the nearest 10 μg/m^3, per 40 CFR 50 Appendix K section 1.0(b)) but would have been equal to or less than 150 μg/m^3 in the absence of the event, the 24-hour value meets the "but for" test for purposes of comparison to the 150 μg/m^3 24-hour PM_{10} NAAQS.
10	CO	35 ppm 1-hour averaging period 1-hour measurement	• If a 1-hour measured concentration was above 35.0 ppm (after rounding to one decimal digit per 40 CFR 50.8(d)) but would have been 35.0 ppm or less in the absence of the event, the 1-hour CO concentration value meets the "but for" test for purposes of comparison to the 1-hour NAAQS.
11	CO	9 ppm 8-hour averaging period 1-hour measurement	• If an 8-hour average of measured concentrations is one of the two highest non-overlapping 8-hour periods of the year and was above 9.0 ppm (after rounding to one decimal digit per 40 CFR 50.8(d)) but would have been equal to or less than 9.0 ppm in the absence of the event, those 1-hour concentration values that were affected by the single event meet the "but for" test for purposes of comparison to the 9 ppm 8-hour CO NAAQS. The exclusion of some or all hours of the 8-hour period that was originally one of the two highest non-overlapping 8-hour periods of the year may cause another 8-hour period to become one of two highest non-overlapping 8-hour periods of the year. The "but for" comparison can be repeated for this new 8-hour period, which may result in flagging and concurrence for more 1-hour values. It is also possible for additional hourly concentrations that were not included in the original 8-hour block to be excluded as part of a second 8-hour block.

Table Q30-2. General Approaches for Satisfying the "No Exceedance But For" Test

	Pollutant	Specific Case: NAAQS level NAAQS averaging period Measurement period	General Approach
12	Pb	1.5 μg/m^3 Quarterly averaging period 24-hour measurement	• If the quarterly mean was above 1.5 μg/m^3 (after rounding to one decimal digit) but would have been equal to or less than 1.5 μg/m^3 in the absence of the single event's effect on some day(s), the 24-hour value(s) affected by the single event meets the "but for" test for purposes of comparison to the 1.5 μg/m^3 quarterly average Pb NAAQS. (Note that given the 1-in-6 sampling schedule for Pb, it will be unusual for a single event to affect multiple sampling days.) • Also, if the 24-hour average concentration from the filter-based sampler was above 1.5 μg/m^3 (after rounding to one decimal digit) but would have been equal to or less than 1.5 μg/m^3in the absence of the event, the 24-hour value meets the "but for" test for purposes of comparison to 1.5 μg/m^3 quarterly average Pb NAAQS. A 24-hour Pb concentration that is equal to or less than 1.5 μg/m^3 will generally not be considered for exclusion.
13	Pb	0.15 μg/m^3 Rolling 3-month averaging period 24-hour measurement	• If a 3-month mean was above 0.15 μg/m^3 (after rounding to two decimal digits) but would have been equal to or less than 0.15 μg/m^3 in the absence of the single event's effect on some day(s), the 24-hour value affected by the single event meets the "but for" test for purposes of comparison to the 0.15 μg/m^3 quarterly average Pb NAAQS. (Note that given the 1-in-6 sampling schedule for Pb, it will be unusual for a single event to affect multiple sampling days.) • Also, if the 24-hour average concentration from the filter-based sampler was above 0.15 μg/m^3 (after rounding to two decimal digits per 40 CFR 50 Appendix R section 5(b)) but would have been equal to or less than 0.15 μg/m^3 in the absence of the event, the 24-hour value meets the "but for" test for purposes of comparison to the 0.15 μg/m^3 quarterly average Pb NAAQS. A 24-hour Pb concentration that is equal to or less than 0.15 μg/m^3 will generally not be considered for exclusion.

Table Q30-2. General Approaches for Satisfying the "No Exceedance But For" Test

	Pollutant	Specific Case: NAAQS level NAAQS averaging period Measurement period	General Approach
14	NO_2	100 ppb 1-hour averaging period 1-hour measurement	• If a 1-hour measured concentration was above 100 ppb (after truncating to a whole number per 40 CFR 50 Appendix S section 4.2(c)) but would have been equal to or less than 100 ppb in the absence of the event, the 1-hour NO_2 concentration value meets the "but for" test for purposes of comparison to the 1-hour NAAQS.
15	NO_2	53 ppb Annual averaging period 1-hour measurement	• If the annual average of all the measured 1-hour concentrations in a year was above 53 ppb (after rounding to a whole number per 40 CFR 50 Appendix S section 4.1(b)) but would have been 53 ppb or less in the absence of the event, those 1-hour values that were affected by the single event meet the "but for" test for purposes of comparison to the 53 ppb annual average NO_2 NAAQS. • If the 1-hour concentration was above 53 ppb (after truncating to a whole number per 40 CFR 50 Appendix S section 4.2(c)) but would have been equal to or less than 53 ppb in the absence of the event meets the "but for" test for purposes of comparison to annual NAAQS. However, a 1-hour NO_2 concentration that is below 53 ppb (after rounding to a whole number) will generally not be considered for exclusion.
16	SO_2	75 ppb 1-hour averaging period 1-hour measurement	• If a 1-hour measured concentration was above 75 ppb (after rounding to a whole number per 40 CFR 50 Appendix T section 4(c)) but would have been equal to or less than 75 ppb in the absence of the event, the 1-hour SO_2 concentration value meets the "but for" test for purposes of comparison to the 1-hour SO_2 NAAQS.

Table Q30-2. General Approaches for Satisfying the "No Exceedance But For" Test

	Pollutant	Specific Case: NAAQS level NAAQS averaging period Measurement period	General Approach
17	SO_2	140 ppb 24-hour averaging period 1-hour measurement	• If the 24-hour average concentration based on 1-hour measurements was above 140 ppb (after rounding to the nearest 10 ppb per 40 CFR 50.4(b)) but would have been equal to or less than 140 ppb in the absence of the event, those 1-hour concentration values that were affected by the single event meet the "but for" test for purposes of comparison to 140 ppb 24-hour SO_2 NAAQS. • Also, if the 24-hour average concentration based on 1-hour measurements was above 30 ppb (after rounding to the nearest 10 ppb per 40 CFR 50.4(b)) but would have been equal to or less than 30 ppb in the absence of the event, those 1-hour concentration values that were affected by the event meet the "but for" test for purposes of comparison to the 140 ppb 24-hour SO_2 NAAQS.
18	SO_2	30 ppb Annual averaging period 1-hour measurement	• If the annual average of measured 1-hour concentrations was above 30 ppb (after rounding to a whole number per 40 CFR 50.4(a))) but would have been 30 ppb or less in the absence of the event, those 1-hour values that were affected by the single event meet the "but for" test for purposes of comparison to the 30 ppb annual average SO_2 NAAQS. If the 30 ppb annual SO_2 NAAQS still applies in the affected area, a 1-hour concentration equal to or below 30 ppb (after rounding to a whole number per 40 CFR 50.4(a)) will generally not be considered for exclusion.
19	SO_2 (secondary)	500 ppb 3-hour averaging period 1-hour measurement	• If the 3-hour average of measured 1-hour concentrations was above 500 ppb (rounded to the nearest 100 ppb per 40 CFR 50.5(a)) but would have been equal to or less than 500 ppb in the absence of the event, those 1-hour values that were affected by the single event meet the "but for" test for purposes of comparison to the 3-hour average secondary SO_2 NAAQS.

31. **Question:** When is it appropriate for air agencies to flag concentration values that are less than the level of the relevant NAAQS? Under what circumstances will the EPA concur on such flags?

Answer: (Please read Q30 before reading this response.)

AQS currently allows an air agency to flag any measured concentration values it chooses, including values below the level of the relevant NAAQS. The EPA does not plan to implement any new technical restrictions through the AQS software. Also, the Exceptional Events Rule does not prohibit air agencies from flagging values below the level of the NAAQS. However, the EPA does not intend to review data flags in AQS for concurrence until the air agency submits its evidence/analysis package demonstrating that exclusion of the flagged values is consistent with the criteria in the Exceptional Events Rule, including the "but for" analysis at 40 CFR 50.14(c)(3)(iv)(D). Air agencies wishing to flag values for informational purposes should use the "I" series flags in AQS.

Air agencies may see an advantage in flagging all values they believe were affected by an event (and contribute to a violation of the NAAQS), for purposes of being able to later identify historical data that have not been affected so that "normal" concentration patterns can be presented as part of meeting the "in excess of historical fluctuations" prong of the exclusion criteria. AQS does not prevent such flagging, but air agencies should be aware that agency flagging by itself does not establish that the concentrations were in fact affected by an event and should be excluded from the "normal" baseline.

Of the flagged cases that appear in both AQS and in demonstration packages, the EPA may find it appropriate to concur with flags for concentrations that are below the NAAQS only in five very narrow conditions described below. If the EPA determines that a flag on a value less than the level of the NAAQS cannot meet the "but for" test, it is likely the EPA would nonconcur or leave the default/null value of the AQS concurrence flag (indicating no EPA action) in place.

Except in cases involving PM_{10} limited maintenance plans[25], the EPA intends to prioritize events that result in a violation or exceedance of a NAAQS or those that otherwise impact a regulatory decision. As described below and in the response to Question 30, there may be specific instances where individual measurements fall below a NAAQS but still contribute to a violating design value. There may also be instances where a shorter averaging time measurement (e.g., 1-hour O_3 measurement of 100 ppb) is not above the level of that averaging time NAAQS (e.g., 1-hour O_3 NAAQS of 120 ppb), but is above a longer averaging time NAAQS (e.g., 8-hour O_3 NAAQS of 80 ppb) and contributes to a violation of the longer averaging time NAAQS. In such cases, although the individual measurement may not exceed the level of the shorter-term NAAQS, it may be possible for air agencies to present sufficient evidence to satisfy the "but-for" criterion for a longer-term NAAQS.

(See Questions 8, 9, 13, and 19 for additional information.)

[25] See May 7, 2009 policy memorandum from William T. Harnett to Regional Air Division Directors at http://www.epa.gov/ttn/oarpg/t1/memoranda/lmp_final_harnett.pdf that allows PM_{10} values between 98 and 154 $\mu g/m^3$ (inclusive) to be flagged, concurred, and excluded for purposes of qualifying an area for reliance on only a limited maintenance plan.

First, PM_{10} values between 98 and 154 $\mu g/m^3$ (inclusive) may be flagged, concurred, and excluded for purposes of qualifying an area for reliance on only a limited maintenance plan (see footnote 24). Because of the expected exceedance form of the PM_{10} NAAQS, concentrations in this range cannot possibly affect whether a site actually meets the NAAQS, so there is no reason for flagging them except when the acceptability of a limited maintenance plan is an issue. The normal AQS flagging and concurrence procedures may be used in this situation.[26]

A second scenario in which the EPA may find it appropriate to concur with flags for concentrations that are below the NAAQS is indicated at 72 FR 13570. If (i) an event has affected air quality on multiple consecutive days, (ii) at least one measured concentration during the episode can be found to meet the "but for" test using the relevant comparison specified in Table Q30-2, and (iii) the air quality impact on each day is "exceptional," measurements for the entire period are eligible for data exclusion regardless of how they compare to the level of the NAAQS. In the context of this provision, "exceptional" encompasses all the requirements of the Exceptional Events Rule other than the "but for" test (e.g., clear causal connection, "in excess of normal historical fluctuations, including background," not reasonably controllable or preventable).

Scenarios in which the measured concentration is greater than a NAAQS with a longer averaging time but less than the level of a NAAQS with a shorter averaging time

Third, applying Table Q30-2 may result in qualifying a 24-hour $PM_{2.5}$ measurement that is greater than the 12 or 15 $\mu g/m^3$ annual $PM_{2.5}$ NAAQS but not greater than the 35 $\mu g/m^3$ 24-hour $PM_{2.5}$ NAAQS for exclusion for the purposes of the 24-hour $PM_{2.5}$ NAAQS. This is the result if the actual 24-hour concentration was between 12 or 15 and 35 $\mu g/m^3$ but would have been below 12 or 15 $\mu g/m^3$ but for the effect of the event. It should be noted that an exclusion made under this very specific provision for the 24-hour $PM_{2.5}$ NAAQS will only affect the outcome of an attainment determination for the 24-hour NAAQS if the concentration value in question is one of the few highest daily concentrations during the year, because only then could it have affected the 3-year design value. When a 24-hour value below the level of the 24-hour NAAQS does affect the 3-year design value, the application of the guidance for the fourth situation (below), which is applicable to all four NAAQS pollutants with multi-year design values, would get to the same result as application of this paragraph.

Fourth, assuming that all other Exceptional Events Rule requirements and conditions are met, the EPA may concur with flags for ozone, $PM_{2.5}$, 1-hour NO_2, and 1-hour SO_2 that are "less than the level of the NAAQS" if adjusting the flagged concentrations for the estimated contribution from the event would change the 3-year design value from being

[26] Values in this range can potentially affect the design value for PM_{10}, but these design values are primarily informational and are not likely to influence designations or regulatory determinations of attainment. The procedure for determining a PM_{10} design value in units of $\mu g/m^3$ is given in section 6.3 of the EPA guidance document "PM_{10} SIP Development Guideline," June 1987, posted at http://www.epa.gov/ttn/oarpg/t1/memoranda/pm10sip_dev_guide.pdf.

above the NAAQS to being equal to or below the NAAQS. However, as indicated in footnote 21, concentrations below certain values generally will not be excluded.

Fifth, a 1-hour measurement of a pollutant that is below the level of the 8-hour, 3-hour, 24-hour, or quarterly NAAQS for that pollutant can be excluded if (1) the event affected the 1-hour measurement, and (2) taking into account the event's effect on all the hours in the longer period the effect of the event on the longer averaging period's concentrations satisfies the "but for" criterion. These situations are described in Table Q30-2 (rows 3, 4, 8, 11, 12, 13, 17, and 19). However, as indicated in Table Q30-2, concentrations below certain values generally will not be excluded.

The following NAAQS-specific discussions provide further explanations regarding some of the situations in which a concentration less than the level of the NAAQS may qualify for exclusion. These discussions are not exhaustive and do not obviate the need to refer to Table Q30-2.

24-hour $PM_{2.5}$

Assume for illustration that the three annual 98th percentile 24-hour $PM_{2.5}$ concentrations for a monitoring site for 2006-2008 are 41, 31, and 37 μg/m^3 for each respective year with a resulting 3-year design value of 36 μg/m^3 which is a violation of the 24-hour $PM_{2.5}$ NAAQS of 35 μg/m^3. Also, assume that the next highest concentration in 2007 below the 31 μg/m^3 was only 20 μg/m^3. The 31 μg/m^3 concentration in 2007 was affected by a one-day wildfire. The air agency has been able to show that the concentration would have been 17 μg/m^3 without the fire. Because neither 20 μg/m^3 nor 31 μg/m^3 exceed the NAAQS, the event on that day does not meet the "but for" test when viewed from an "exceedance" perspective. However, the effect of the fire on the 2007 value determines whether the 3-year design value passes the 24-hour NAAQS. Had there been no fire, the 98th percentile concentration in 2007 would have been 20 μg/m^3 which would result in a 3-year design value of 33 μg/m^3 (i.e., less than the 24-hour $PM_{2.5}$ NAAQS of 35 μg/m^3). Therefore, the 2007 value of 31 μg/m^3 meets the "but for" test when the focus in on NAAQS violations rather than individual exceedances. Assuming other requirements are met, the 31 μg/m^3 concentration would be approved by the EPA for exclusion from the 2006-2008 design value. Note that in doing a "violations-based" "but for" analysis, one does not simply substitute the "no event" concentration for the original 98th percentile day into the design value calculation. Rather, one must re-select the 98th percentile day, which sometimes will result in a different day's actual measured value being used in the design value calculation.[27]

It is conceivable that the effect of an event on a given day is not enough to satisfy the "but for" test with regard to the "violation" perspective explained in the preceding

[27] Note that exclusion of this 24-hour value from design values for the annual average NAAQS is a separate question, the likely answer to which is that the value is not excludable. If the event did not make the 24-hour concentration change from below 12 or 15 to above 12 or 15 μg/m^3 the event does not meet the first condition specified in row 7 of Table Q30-2. It is also very improbable that an event affecting a single day would meet the second condition in row 7 of Table Q30-2.

paragraph for one three-year period, but that it does satisfy it for an earlier or later 3-year period when it is combined with one or two different concentrations to calculate a 3-year design values, since the outcome of the "violations" analysis may change. After the EPA has approved the exclusion of a concentration based on a "violations" analysis for one 3-year period, the EPA will also exclude that concentration when calculating design values and attainment for the other two 3-year periods that include that same year.

For the 24-hour $PM_{2.5}$ NAAQS, it is possible that multiple days with concentrations below the NAAQS within one year are flagged. Excluding just one of these concentrations may not change the annual 98th percentile concentration enough to cause the 3-year design value to change from "violating" to "complying," but excluding several of them may. The outcome for the design value may also depend in part on whether exclusion is granted for some other concentrations that are above the level of the NAAQS. In such cases, the exclusion decisions should first be made for each of the flagged concentrations that are above the NAAQS. All remaining flagged concentrations (those meeting all other requirements and conditions of the Exceptional Events Rule) should then be considered in progressively larger groups ranked by concentration. That is, if excluding the highest one of the flagged concentrations below the level of the NAAQS would cause a switch in whether the 3-year design value violates the NAAQS then if the EPA determines that value is to be excluded then there is no impact to retaining all others and, thus, no need to make determinations for those others. If excluding the two highest such concentrations causes a switch, then there is no impact to determining whether others beyond those two should be retained.

However, the preamble to the Exceptional Events Rule explicitly states that $PM_{2.5}$ concentrations below the level of the annual NAAQS cannot be excluded for purposes of comparisons to the annual NAAQS. (72 FR 13570, bottom of middle column) Even if the conditions described in the preceding paragraph are met, values below 12 or 15 $\mu g/m^3$ cannot be excluded.

Annual $PM_{2.5}$

The preamble to the Exceptional Events Rule explicitly states that $PM_{2.5}$ concentrations below the level of the annual NAAQS cannot be excluded for purposes of comparisons to the annual NAAQS. (72 FR 13570, bottom of middle column)

Ozone (0.075 ppm 8-hour NAAQS)

Assume for illustration that the three annual 4th highest daily 8-hour ozone values in 2006-2008 are 0.077, 0.076, and 0.075 ppm respectively. The 0.075 ppm value in 2008 was affected by an exceptional event. The 3-year average would be 0.076 ppm, a NAAQS violation. If the 0.075 ppm value for 2008 were to be excluded and if, as a result, 2008's new 4th highest value was 0.074 ppm or less, the 3-year average (after Appendix P truncation) would be 0.075 ppm, which is not a NAAQS violation. The 0.075 ppm value may be excluded under these circumstances even though it is not itself an exceedance. Furthermore, the exclusion also applies to the use of this value when

calculating the 2007-2009 and 2008-2010 design values, regardless of whether such exclusion causes those design values to switch from violating to complying with the NAAQS.

For ozone, as for 24-hour $PM_{2.5}$, it is possible that an air agency could flag multiple days within one year with concentrations below the NAAQS. Excluding just one of these concentrations may not change the annual 4th highest concentration enough to cause the 3-year design value to change from "violating" to "complying," but excluding several of them may. Also, the outcome for the design value may depend, in part, on whether exclusion is granted for some other concentrations that are above the level of the NAAQS. In such cases, the exclusion decisions should first be made for each of the flagged concentrations that are above the NAAQS. All remaining flagged concentrations (those meeting all other requirements and conditions of the Exceptional Events Rule) should then be considered in progressively larger groups ranked by concentration. That is, if excluding the highest one of the flagged concentrations below the level of the NAAQS would cause a switch in whether the 3-year design value violates the NAAQS then if the EPA determines that value is to be excluded, all others can be retained without impact. If exclusion of the two highest such concentrations causes a switch, then the EPA may focus first on whether only those are to be excluded.

PM_{10}

The only current PM_{10} NAAQS is the 24-hour NAAQS based on the expected number of exceedances over a 3-year period. Since a concentration below the level of the NAAQS would not be an exceedance and cannot affect compliance with the NAAQS in any way, a concentration below the level of the NAAQS usually cannot be excluded. However, under an EPA policy memo, for the purpose of the EPA approval of a limited maintenance plan PM_{10} values as low as 98 $\mu g/m^3$ can be concurred for exclusion when determining whether an area is eligible for a limited maintenance plan. (See May 7, 2009 memorandum from William T. Harnett to Regional Air Division Directors, http://www.epa.gov/ttn/oarpg/t1/memoranda/lmp_final_harnett.pdf). Because concentrations less than 98 $\mu g/m^3$ would appear to have little regulatory significance, the EPA discourages the flagging of such data.

Pb

The legacy 1.5 $\mu g/m^3$ and current 0.15 $\mu g/m^3$ NAAQS for lead are both based on a maximum three-month average concentration. The 1.5 $\mu g/m^3$ standard is based on the maximum quarterly average, while the 0.15 $\mu g/m^3$ NAAQS is based on the highest rolling 3-month average during a 3-year period. As previously explained, the EPA is not likely to concur on the exclusion of a 24-hour concentration value that is below the level of the NAAQS, and we discourage air agencies from flagging such values.

NO_2

As previously explained, the EPA is not likely to concur on the exclusion of a 1-hour NO_2 concentration that is below the level of the annual NO_2 NAAQS, and we discourage air agencies from flagging such values.

SO_2

As previously explained, the EPA is not likely to concur on the exclusion of a 1-hour SO2 concentration that is below the level of the annual SO_2 NAAQS, and we discourage air agencies from flagging such values.