UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
RESEARCH TRIANGLE PARK, NC 27711

AUG 29 2003

MEMORANDUM

OFFICE OF
AIR QUALITY PLANNING
AND STANDARDS

SUBJECT: $PM_{2.5}$ concentrations at IMPROVE sites with low annual mean concentrations

FROM: John Langstaff, EPA

TO: PM NAAQS Review Docket (OAR-2001-0017)

For the purpose of providing insight into distributions of daily $PM_{2.5}$ background concentrations, we produced summary statistics of $PM_{2.5}$ concentrations at IMPROVE[1] sites with low annual mean concentrations for the recent five-year period 1997-2001. These results are discussed in Section 2.7 of the August 2003 First Draft PM Staff Paper. Sites were selected for these summaries if their five-year means were below the upper ends of the ranges for annual mean background given in Table 2-6 of the August 2003 First Draft PM Staff Paper. These annual background concentrations were 5 $\mu g/m^3$ in the eastern U.S. and 4 $\mu g/m^3$ in the West. The -99° longitude was used to delineate eastern and western sites, and sites in Alaska and Hawaii were not included. There were 3 such sites in the East and 31 in the West. One of the western sites (Lassen Volcanic National Park) was removed from the analysis since it had anomalously high concentrations. Tables 1 (eastern U.S.) and 2 (western U.S.) list the means, the 25th, 50th, 75th, 95th, 98th, and 99th percentiles, and maxima of the daily $PM_{2.5}$ measurements for these sites.

These summaries were generated using the IMPROVE data file *IMPROVE8802.csv*, downloaded on 3/20/02 from *http://vista.cira.colostate.edu/DatawareHouse/IMPROVE/Data/AEROSOL/Data/Ascii/IMPROVE8802.zip*. This file has 92,968 records and covers the period from March 1988 to January 2002. Only sites with at least 200 days with measurements for the period 1997-2001 were used for this analysis. The number of days with data is reported in Tables 1 and 2 for each site.

[1] The Interagency Monitoring of Protected Visual Environments (IMPROVE) program is a cooperative visibility monitoring effort between the EPA, federal land management agencies, and state air agencies. One of the functions of this program is to monitor visibility and aerosol conditions in Class I areas, and for the most part the IMPROVE monitors are located in rural areas.

Table 1. Distributions of Daily $PM_{2.5}$ Concentrations at Selected IMPROVE Sites in the Eastern U.S. During 1997-2001 ($\mu g/m^3$)

Site	Days	Mean	25th%	50th%	75th%	95th%	98th%	99th%	max
Voyageurs National Park, MN	214	4.2	2.3	3.5	5.6	10.1	12.9	13.7	15.0
Isle Royale National Park, MI	230	4.7	2.1	3.7	6.1	12.2	17.0	18.7	20.3
Boundary Waters Canoe Area, MI	397	4.9	2.4	3.9	6.3	12.6	15.0	16.8	27.8

Table 2. Distributions of Daily $PM_{2.5}$ Concentrations at Selected IMPROVE Sites in the Western U.S. During 1997-2001 ($\mu g/m^3$)

Site	Days	Mean	25th%	50th%	75th%	95th%	98th%	99th%	max
White Pass, WA	204	2.0	0.7	1.5	2.9	5.2	6.1	6.4	9.9
White River National Forest, CO	491	2.3	1.1	2.0	3.0	5.3	6.4	9.4	18.3
Brooklyn Lake, WY	501	2.4	1.3	2.2	3.2	5.0	6.1	7.4	13.9
Crater Lake National Park, OR	343	2.5	1.1	1.9	3.3	6.7	8.8	10.1	21.5
Mount Zirkel Wilderness, CO	469	2.5	1.4	2.3	3.2	5.1	6.5	8.2	26.0
Bridger Wilderness, WY	507	2.6	1.2	2.1	3.3	5.8	7.0	8.7	26.5
Weminuche Wilderness, CO	500	2.8	1.6	2.5	3.5	5.2	7.0	7.7	19.9
Yellowstone National Park 2, WY	463	2.8	1.3	2.2	3.6	6.9	10.0	12.7	20.3
Great Basin National Park, NV	506	2.8	1.6	2.5	3.6	5.8	7.4	8.2	19.1
Bryce Canyon National Park, UT	504	2.8	1.4	2.5	3.6	5.8	7.6	9.9	25.7
Sula Selway Bitteroot Wilderness, MT	509	2.9	1.0	2.0	3.7	7.7	11.4	14.0	52.8
Rocky Mountain National Park, CO	511	3.0	1.2	2.6	4.2	6.4	8.4	9.3	13.3
Salmon National Forest, ID	286	3.0	1.1	2.1	3.3	8.1	13.8	20.9	39.9
Sawtooth National Forest, ID	493	3.0	1.4	2.2	3.8	6.9	10.3	12.8	47.0
Hance Camp, Grand Canyon NP, AZ	401	3.0	1.5	2.8	4.0	6.5	7.8	8.3	10.2
Jarbidge Wilderness, NV	449	3.1	1.2	2.4	4.1	7.9	13.3	15.4	30.3
Three Sisters Wilderness, OR	523	3.1	1.0	2.3	4.3	8.4	11.4	13.6	28.4
Lava Beds, CA	202	3.1	1.4	2.6	4.2	7.2	8.6	10.6	20.5
Craters of the Moon NM, ID	497	3.1	1.7	2.7	3.9	7.3	8.4	9.9	28.6
Canyonlands National Park, UT	512	3.1	2.0	2.9	3.8	6.1	7.0	8.3	24.9
Kalmiopsis, OR	210	3.2	1.7	2.6	4.1	7.2	9.3	11.0	13.5
Bliss State Park (TRPA), CA	349	3.2	1.6	2.8	4.3	7.7	9.9	12.6	17.9
Great Sand Dunes Natnl Monument, CO	529	3.3	2.0	2.8	4.0	6.6	10.4	13.9	19.9
Mesa Verde National Park, CO	494	3.3	2.0	2.9	4.1	6.6	10.2	13.1	37.6
North Cascades, WA	269	3.4	1.3	2.5	5.0	8.9	12.2	13.5	15.1
Petrified Forest National Park, AZ	471	3.5	2.2	3.2	4.4	7.0	8.5	10.5	15.2
Bandelier National Monument, NM	528	3.6	2.3	3.1	4.2	6.5	8.3	9.5	74.3
Scoville, ID	330	3.8	2.3	3.3	4.7	8.1	9.5	12.7	15.9
Snoqualamie Pass, WA	439	3.8	1.7	3.0	5.3	8.8	11.2	12.4	24.4
Death Valley Monument, CA	526	4.0	1.9	3.4	5.6	8.6	10.7	11.9	30.7