

TABLE VI-2.—DPM CONCENTRATIONS ($\mu\text{g}/\text{m}^3$), BY MINE CATEGORY. DPM IS ESTIMATED BY TC/0.8—Continued

	Metal	Stone	Trona	Other N/M
Mean	610.	465.	94.	359.
Std. Error	44.7	36.0	9.4	26.6
95% UCL	699.	537.	113.	412.
95% LCL	522.0	394.	75.	306.

After adjusting for differences in sample types and in occupations sampled, DPM concentrations at the non-trona mines were estimated to be about four to five times the concentrations found at the trona mines. Although there were significant differences between individual mines, the adjusted differences between the general categories of metal, stone, and other N/M mines were not statistically significant.¹ For the 304 valid samples taken at mines other than trona, the mean DPM concentration was $492 \mu\text{g}/\text{m}^3$ (Std. error = 23.0).

Again assuming that submicrometer TC as measured by the SKC sampler comprises 80 percent of DPM, the mean DPM concentration observed was 1019

$\mu\text{g}/\text{m}^3$ at the single mine exhibiting greatest DPM levels. Four of the nine valid samples at this mine exceeded $1487 \mu\text{g}/\text{m}^3$. In contrast, DPM concentrations never exceeded $500 \mu\text{g}/\text{m}^3$ at 8 of the 30 mines with valid samples (2 of the 11 metal mines, 1 of the 3 stone, all 3 trona, and 2 of the 7 other N/M). (Note that $500 \mu\text{g}/\text{m}^3$ is the whole particulate equivalent of the $400 \mu\text{g}/\text{m}^3$ interim standard.) Some individual measurements exceeded $200 \text{DPM } \mu\text{g}/\text{m}^3$ at all but one of the mines sampled.

2. Baseline Data

An analysis of MSHA's baseline sampling appears in Section V, Compliance Assistance, and is used as the basis for this discussion.

Table VI-1 summarizes, by general commodity, the EC levels measured during this sampling. The overall mean eight-hour full shift equivalent EC concentration of samples in this study was $170 \mu\text{g}/\text{m}^3$, and the overall median was $117 \mu\text{g}/\text{m}^3$. Table VI-2 provides a similar summary for estimated DPM levels, using TC/0.8 and $\text{TC} \approx 1.3 \times \text{EC}$.² Under these assumptions, the estimated mean DPM level was $277 \mu\text{g}/\text{m}^3$, and the median was $191 \mu\text{g}/\text{m}^3$. Since the baseline data and the 31-Mine study both showed significantly lower levels at trona mines than at other underground M/NM mines, Tables VI-7 and VI-8 present overall results both including and excluding the three underground trona mines sampled.

TABLE VI-1.—BASELINE EC CONCENTRATIONS

	8-hour full shift equivalent EC concentration—($\mu\text{g}/\text{m}^3$)					
	Metal	Stone	Other N/M	Trona	Total	Total excluding Trona
Number of samples	189	519	151	15	874	859
Maximum	1549	1340	634	149	1549	1549
Median	184	104	99	70	117	120
Mean	227	164	130	69	170	172
Std. Error	14.6	7.5	8.5	10.3	5.8	5.9
95% UCL	256	179	147	92	182	184
95% LCL	198	150	115	47	159	161

TABLE VI-2.—BASELINE DPM CONCENTRATIONS

	Estimated 8-hour full shift equivalent DPM concentration—($\mu\text{g}/\text{m}^3$)					
	Metal	Stone	Other N/M	Trona	Total	Total excluding Trona
Number of samples	189	519	151	15	874	859
Maximum	2518.	2178.	1030.	242.	2518.	2518.
Median	299.	170.	162.	113.	191.	195.
Mean	369.	267.	212.	113.	277.	280.
Std. Error	23.8	12.2	13.8	16.7	9.4	9.5
95% UCL	416.	291.	239.	149.	295.	299.
95% LCL	323.	243.	185.	77.	259.	261.

Baseline EC sample results varied widely between mines within

commodities and also within most mines. Table VI-3 summarizes baseline

EC results for the 19 occupations found to have at least one sample where the

¹ These conclusions derive from an analysis of variance, based on TC measurements, as described in the report of the 31-Mine Study. They depend on an assumption that the ratio of DPM to TC is

uncorrelated with mine category, sample type (*i.e.*, personal or area), and occupation.

² The relationship $\text{DPM} \approx \text{TC}/0.8$ is the same as that assumed in the existing risk assessment. The

relationship $\text{TC} \approx 1.3 \times \text{EC}$ was formulated under the settlement agreement, based on TC:EC ratios observed in the joint 31-Mine Study, as described in the next subsection of this exposure assessment.