APPENDIX B

PARTICULATE EMISSION PROFILES FOR DIFFERENT SOURCE CLASSES

This appendix contains the emission profiles needed to compile particulate emission inventories of individual chemical elements. Each profile describes the elemental chemical composition of the particulate emissions from different source types, as a function of particle size. The particular source categories considered are shown in Table B.1 and those profiles used in the emissions inventory for the South Coast Air Basin, presented in Appendix C, are identified by an asterisk (*). Profiles 1-49 were derived from Appendix A of Taback et al. (1979) and, are reproduced here for convenience. The remaining tables were assembled from a variety of different references. Footnotes at the end of each profile table identify either the literature citation, or the particular procedure used to develop the data.

Many different chemical analysis procedures were used in developing the source composition profiles. Some of the techniques used were: X-ray fluorescence for elemental composition, carbon analysis for volatile, carbonate and total carbon content, and wet chemistry for the nitrate and sulfate fractions. While it is beyond the scope of this study to describe each of these methods in detail, Table B.2 lists those elements or ions that could be indentified by the analytical procedures. In the profile tables, the portion of the composition not identified by chemical analysis is listed as 'Other'. For comparison

TABLE B.1

Summary of Particulate Emission Profiles

Profile Number	Title	Used in Inventory
1	Industrial Boilers (Crude and Residual)	*
2	Industrial Boilers (Number 2 Fuel Oil)	*
3	Internal Combustion Engines (Diesel Fuel)	
4	Internal Combustion Engines (Gaseous Fuel)	
5	Wood Waste Boiler	*
6	Utility Boilers (Residual Fuel Oil)	*
7	Rice Dryer	
8	Coffee/Carob Roasting	
9	Steel Heat Treating (Salt Quench)	
10	Steel Abrasive Blasting	
11	Aluminum Foundry	
12	Steel-Sinter Plant	*
13	Steel Open Hearth Furnace	*
14	Calcination of Gypsum	
15	Brick Grinding and Screening	
16	Cement Production	
17	Glass Melting Furnace	
18	Fiber Glass Forming Line	
19	Asphalt Roofing Manufacture	
20	Asphaltic Concrete Batch Plant	
21	Paint Spray Booth (Water Solvent)	
22	Paint Spray Booth (Oil Solvent)	*
23	Boric Acid Manufacture	
24	Chemical Fertilizer (Urea)	*
25	Wood Operation (Resawing)	*
26	Wood Operation (Sanding)	*
27	Petroleum Heaters (Natural Gas Fuel)	*
28	Petroleum - FCC Units/CO Boiler	*
29	Feed and Grain Operations	*
30	Limestone Kilns	
31	Basic Oxygen Furnace (Steel)	*
32	Electric Arc Furnace (Steel)	
33	Rock Crushers	*
34	Rock Screening	
35	Structural Fires	*
36	Residential Natural Gas Combustion	
37	Fireplaces	
38	Tire Attrition Dust	*

TABLE B.1 (Continued)

Summary of Particulate Emission Profiles

Profile Number	Title	Used in Inventory
39	Cigarette Smoke (Side Stream)	*
40	Sea Salt	
41	Brake Lining Attrition	
42	Livestock Dust	
43	Unpaved Road Dust	
44	Road Building and Construction Dust	
45	Agricultural Burning	
46	Forest Fires	
47	Landfill Dust	
48	Agricultural Tillage Dust	
49	Industrial Boiler (Natural Gas Fuel)	
50	Internal Combustion Engine (Digester Gas)	*
51	Residential Fuel Combustion (Natural Gas)	*
52	Diesel Engine	*
53	Light Duty Automobile (Catalyst Equipped)	*
54	Light Duty Automobile (Non catalyst Equipped)	*
55	Jet Aircraft	*
56	Petroleum Production	*
57	Soil Dust	*
58	Street Dust	*
59	Livestock Dust	*
60	Slash Burning	*
61	Simulated Field Burning	*
62	Sea Salt	*
63	Wood Fireplace	*
64	Electric Utility Boiler (Residual Fuel Oil)	*
65	Metallurgical Processing	*
66	Wood Processing	*
67	Miscellaneous Industrial Processes	*
68	Brake Lining Attrition	*
69	Non-Ferrous Metals	*
70	Gray Iron Cupola	*

TABLE B.2

Summary of Species Identified in Source Profiles

Number	Symbol	Species	Molecular Weight	Available From Ambient Monitoring Data	
				NASN	SCAQMD
1	Al	Aluminum	26.98		
2	Sb	Antimony	121.75		
3	As	Arsenic	74.92		
4	Ba	Barium	137.34		
5	Bi	Bismuth	208.98		
6	B	Boron	10.81		
7	Br	Bromine	79.90		
8	Cd	Cadmium	112.40	*	
9	Ca	Calcium	40.08		
10	Cs	Cesium	132.90		
11	Cl	Chlorine	35.43		
12	Cr	Chromium	52.00	*	*
13	Co	Cobalt	58.93	*	
14	Cu	Copper	63.55	*	*
15	Ga	Gallium	69.72		
16	In	Indium	114.82		
17	I	Iodine	126.90		
18	Ir	Iridium	192.22		
19	Fe	Iron	55.85	*	*
20	La	Lanthanum	138.91		
21	Pb	Lead	207.20	*	*
22	Mg	Magnesium	24.31		
23	Mn	Manganese	54.94	*	*
24	Hg	Mercury	200.59		
25	Mo	Molybdenum	95.94		
26	Nd	Neodymium	144.24		
27	Ni	Nickel	58.71		*
28	Nb	Niobium	92.91		
29	Os	Osmium	190.20		
30	Pd	Palladium	106.40		
31	P	Phosphorus	30.97		
32	Pt	Platinum	195.09		
33	K	Potassium	39.10		
34	Pr	Praeseodymium	140.91		

TABLE B.2 (Continued)

Summary of Species Identified in Source Profiles

Number	Symbol	Species	Molecular Weight	Available From Ambient Monitoring Data	
				NASN	SCAQMD
35	Re	Rhenium	186.20		
36	Rb	Rubidium	85.47		
37	Ru	Ruthenium	101.07		
38	Sc	Scandium	44.96		
39	Se	Selenium	78.96		
40	Si	Silicon	28.08		
41	Ag	Silver	107.87		
42	Na	Sodium	22.99		
43	Sr	Strontium	87.62		
44	S	Sulfur	32.06		
45	Ta	Tantalum	180.95		
46	Sn	Tin	118.69	*	
47	Ti	Titanium	47.90	*	
48	W	Tungsten	183.85		
49	V	Vanadium	50.94	*	
50	Y	Yttrium	88.91		
51	Zn	Zinc	65.38		*
52	Zr	Zirconium	91.22		
53	$SO_4^=$	Sulfates		*	*
54	NO_3^-	Nitrates		*	*
55	TC	Total Carbon			
56	VC	Volatile Carbon			
57	CC	Carbonate Carbon			

purposes those species routinely monitored by the National Air Surveillance Network (NASN) and the South Coast Air Quality Management District (SCAQMD) are indicated by an asterisk(*).

Each profile contains the weight per cent of each chemical component present in four different size ranges. In some cases the weight per cent composition is denoted as 0.55%. This serves as an indication that the species was present in trace amounts over a range 0.1% < 1.0%, those species detected at levels less than 0.1% are denoted by entries with a weight percent of 0.05%. In accumulating the totals, volatile carbon and carbonate are contained within the value given for total carbon. Similarly, elemental sulfur is incorporated within the entry for sulfates.

Because of the importance of particle size, the basic data have been segregated into four different size ranges: 0-1, 1-3, 3-10, 10-99 microns. For the purposes of preparing emissions inventories two additional groupings have been developed: 0-10 microns for characterizing the fine particulate matter and the other, 0-100 micron, corresponding to total particulate emissions. Both of these categories were calculated as mass weighted accumulations of the component size ranges.

Source Profile Number - 1

Industrial Boilers (Crude and Residual)

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	100.00	66.00	12.00	9.00	13.00	87.00
Species						
Arsenic	0.00	0.05	0.00	0.00	0.00	0.038
Barium	0.05	0.05	0.05	0.05	0.05	0.05
Calcium	0.55	0.55	0.55	0.55	0.55	0.55
Chromium	0.55	0.55	0.55	0.55	0.55	0.55
Cobalt	0.05	0.05	0.05	0.05	0.05	0.05
Copper	0.05	0.05	0.05	0.05	0.05	0.05
Iron	3.00	4.00	0.55	0.55	0.55	3.167
Manganese	0.05	0.05	0.05	0.05	0.05	0.05
Molybdenum	0.05	0.05	0.05	0.05	0.05	0.05
Nickel	0.55	0.55	0.55	0.55	0.55	0.55
Potassium	0.00	0.55	0.00	0.00	0.00	0.417
Selenium	0.05	0.05	0.05	0.05	0.00	0.05
Strontium	0.05	0.05	0.05	0.05	0.05	0.05
Titanium	0.05	0.05	0.05	0.05	0.05	0.05
Vanadium	0.55	0.55	0.55	0.55	0.55	0.55
Sulfates	44.00	65.00	5.00	3.00	3.00	50.310
Nitrates	0.05	0.05	0.05	0.05	0.05	0.05
Total Carbon	23.00	6.00	70.00	60.00	40.00	20.414
(Volatile Carbon)	0.55	0.55	0.55	0.55	0.55	0.55
(Carbonate Carbon)	0.05	0.05	0.05	0.05	0.05	0.05
Other	27.350	21.750	21.800	33.800	53.850	23.003
Totals	100.00	100.00	100.00	100.00	100.00	100.00

Basis: Taback et al. (1979)

Source Profile Number - 2

Industrial Boilers (Number 2 Fuel Oil)

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	100.00	96.00	0.80	0.80	2.40	97.60
Species						
Arsenic	0.55	0.55	0.05	0.05	0.05	0.542
Cadmium	0.05	0.05	0.05	0.05	0.05	0.05
Chromium	0.55	0.55	0.05	0.05	0.05	0.542
Lead	0.55	0.55	0.55	0.55	0.55	0.55
Nickel	0.55	0.05	0.05	0.05	0.05	0.05
Selenium	0.05	0.05	0.05	0.05	0.05	0.05
Tin	0.05	0.05	0.05	0.05	0.05	0.05
Titanium	0.05	0.05	0.05	0.05	0.05	0.05
Zinc	0.55	0.55	0.55	0.55	0.55	0.55
Sulfates	25.00	25.00	25.00	25.00	25.00	25.00
Nitrates	4.00	4.00	0.55	0.55	0.55	3.943
Total Carbon	15.00	15.00	15.00	15.00	15.00	15.00
(Volatile Carbon)	14.00	14.00	14.00	14.00	14.00	14.00
Other	53.050	53.550	58.00	58.00	58.00	53.623
Totals	100.00	100.00	100.00	100.00	100.00	100.00

Basis: Taback et al. (1979)

Source Profile Number - 3

Internal Combustion Engines (Diesel Fuel)

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	100.00	92.00	2.00	2.00	4.00	96.00
Species						
Calcium	5.00	5.00	5.00	5.00	5.00	5.00
Iron	0.55	0.55	0.55	0.55	0.55	0.55
Silicon	0.55	0.55	0.55	0.55	0.55	0.55
Vanadium	0.55	0.55	0.55	0.55	0.55	0.55
Sulfates	15.00	15.00	15.00	15.00	15.00	15.00
Total Carbon	4.00	4.00	4.00	4.00	4.00	4.00
(Volatile Carbon)	0.05	0.05	0.05	0.05	0.05	0.05
(Carbonate Carbon)	0.55	0.55	0.55	0.55	0.55	0.55
Other	74.350	74.350	74.350	74.350	74.350	74.350
Totals	100.00	100.00	100.00	100.00	100.00	100.00

Basis: Taback et al. (1979)

Source Profile Number - 4

Internal Combustion Engines (Gaseous Fuel)

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	100.00	99.00	0.40	0.20	0.60	99.60
Species						
Bromine	0.05	0.05	0.05	0.05	0.05	0.05
Calcium	0.55	0.55	0.55	0.55	0.55	0.55
Chlorine	7.00	7.00	7.00	7.00	7.00	7.00
Chromium	0.05	0.05	0.05	0.05	0.05	0.05
Cobalt	0.05	0.05	0.05	0.05	0.05	0.05
Copper	0.05	0.05	0.05	0.05	0.05	0.05
Iron	0.05	0.05	0.05	0.05	0.05	0.05
Manganese	0.05	0.05	0.05	0.05	0.05	0.05
Nickel	0.05	0.05	0.05	0.05	0.05	0.05
Potassium	0.55	0.55	0.55	0.55	0.55	0.55
Zinc	0.05	0.05	0.05	0.05	0.05	0.05
Sulfates	45.00	45.00	45.00	45.00	45.00	45.00
Nitrates	0.55	0.55	0.55	0.55	0.55	0.55
Total Carbon	20.00	20.00	20.00	20.00	20.00	20.00
(Volatile Carbon)	18.00	18.00	18.00	18.00	18.00	18.00
Other	25.950	25.950	25.950	25.950	25.950	25.950
Totals	100.00	100.00	100.00	100.00	100.00	100.00

Basis: Taback et al. (1979)

Source Profile Number - 5

Wood Waste Boiler

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	100.00	74.00	21.00	5.00	0.30	100.00
Species						
Arsenic	0.05	0.05	0.00	0.05	0.05	0.040
Barium	0.05	0.05	0.00	0.05	0.05	0.040
Cadmium	0.05	0.05	0.00	0.00	0.00	0.037
Calcium	1.00	1.00	0.55	14.00	7.00	1.556
Chlorine	2.00	2.00	0.00	0.00	0.00	1.480
Chromium	0.05	0.05	0.05	0.05	0.05	0.05
Copper	0.05	0.05	0.05	0.05	0.05	0.05
Iron	1.00	0.05	4.00	5.00	4.00	1.127
Lead	0.05	0.05	0.05	0.00	0.00	0.047
Manganese	0.55	0.55	0.55	0.55	0.55	0.55
Molybdenum	0.55	0.55	0.55	0.55	0.55	0.55
Nickel	0.55	0.55	0.55	0.55	0.55	0.55
Potassium	1.00	1.00	3.00	6.00	3.00	1.670
Rubidium	0.05	0.00	0.05	0.05	0.05	0.013
Selenium	0.05	0.05	0.05	0.00	0.00	0.047
Silicon	10.00	10.00	10.00	10.00	10.00	10.00
Strontium	0.05	0.05	0.05	0.05	0.05	0.05
Titanium	0.05	0.05	0.05	0.55	0.55	0.075
Zinc	0.55	0.55	0.05	0.05	0.05	0.420
Sulfates	3.00	3.00	2.00	0.55	0.55	2.668
Total Carbon	30.00	30.00	30.00	30.00	30.00	30.00
(Volatile Carbon)	10.00	7.00	23.00	7.00	16.00	10.360
(Carbonate Carbon)	0.55	0.55	0.55	7.00	3.00	0.873
Other	49.300	50.300	48.400	31.900	42.900	48.981
Totals	100.00	100.00	100.00	100.00	100.00	100.00

Basis: Taback et al. (1979)

Source Profile Number - 6

Utility Boilers (Residual Fuel Oil)

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	100.00	94.00	2.00	1.00	3.00	97.00
Species						
Arsenic	0.05	0.05	0.05	0.05	0.05	0.05
Barium	0.55	0.55	0.00	0.00	0.55	0.533
Bromine	0.05	0.05	0.00	0.00	0.00	0.048
Cadmium	0.00	0.05	0.05	0.05	0.00	0.05
Calcium	10.00	10.00	0.55	0.55	0.55	9.708
Chromium	0.55	0.55	0.55	0.55	0.55	0.55
Cobalt	0.05	0.05	0.05	0.05	0.05	0.05
Copper	0.05	0.05	0.05	0.05	0.05	0.05
Iron	2.00	2.00	4.00	4.00	4.00	2.062
Lead	0.05	0.05	0.05	0.05	0.05	0.05
Manganese	0.05	0.05	0.05	0.05	0.05	0.05
Molybdenum	0.05	0.05	0.00	0.05	0.05	0.049
Nickel	5.00	5.00	2.00	2.00	2.00	4.907
Potassium	0.55	0.55	0.55	0.55	0.55	0.55
Selenium	0.05	0.05	0.05	0.05	0.05	0.05
Strontium	0.05	0.05	0.05	0.05	0.05	0.05
Titanium	0.05	0.05	0.05	0.05	0.05	0.05
Vanadium	0.55	0.55	0.55	0.55	0.55	0.55
Zinc	0.55	0.55	0.55	0.55	0.55	0.55
Sulfates	28.00	30.00	20.00	20.00	20.00	29.691
Nitrates	0.05	0.05	0.05	0.05	0.05	0.05
Total Carbon	22.00	20.00	30.00	30.00	30.00	20.309
(Volatile Carbon)	15.00	14.00	20.00	20.00	20.00	14.186
Other	29.700	29.650	40.750	40.700	40.200	29.993
Totals	100.00	100.00	100.00	100.00	100.00	100.00

Basis: Taback et al. (1979)

Source Profile Number - 7

Rice Dryer

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	100.00	30.00	12.00	12.00	46.00	54.00
Species						
Arsenic	0.05	0.00	0.00	0.00	0.05	0.00
Barium	0.05	0.00	0.00	0.00	0.05	0.00
Bromine	0.05	0.05	0.05	0.05	0.05	0.05
Calcium	0.55	1.00	1.00	1.00	0.55	1.00
Chlorine	0.55	0.55	0.00	0.00	0.55	0.306
Chromium	0.55	0.55	0.55	0.55	0.55	0.55
Copper	0.05	0.05	0.05	0.05	0.05	0.05
Iron	0.55	5.00	4.00	4.00	0.55	4.556
Manganese	0.55	0.55	0.55	0.55	0.55	0.55
Molybdenum	0.05	0.00	0.00	0.00	0.05	0.00
Nickel	0.55	0.55	0.55	0.55	0.05	0.55
Potassium	0.55	0.55	0.55	3.00	0.55	1.094
Rubidium	0.00	0.00	0.00	0.00	0.55	0.00
Silicon	10.00	5.00	6.00	8.00	11.00	5.889
Strontium	0.05	0.00	0.00	0.00	0.05	0.00
Titanium	0.05	0.00	0.00	0.00	0.05	0.00
Vanadium	0.00	0.00	0.00	0.55	0.00	0.122
Yttrium	0.00	0.55	0.00	0.00	0.00	0.306
Zinc	0.05	0.00	0.00	0.00	0.05	0.00
Sulfates	0.05	0.00	0.00	0.00	0.05	0.00
Nitrates	0.05	0.00	0.00	0.00	0.05	0.00
Total Carbon	12.00	0.00	0.00	0.00	12.00	0.00
(Volatile Carbon)	12.00	0.00	0.00	0.00	12.00	0.00
(Carbonate Carbon)	0.00	0.00	0.00	0.00	0.05	0.00
Other	73.650	85.600	86.700	81.700	72.600	84.978
Totals	100.00	100.00	100.00	100.00	100.00	100.00

Basis: Taback et al. (1979)

Source Profile Number - 8

Coffee/Carob Roasting

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	100.00	60.00	1.00	1.00	38.00	62.00
Species						
Bromine	0.05	0.05	0.05	0.05	0.05	0.05
Cadmium	0.05	0.05	0.00	0.00	0.00	0.048
Calcium	0.05	0.05	0.05	0.05	0.55	0.05
Chromium	0.05	0.00	0.00	0.00	0.05	0.00
Cobalt	0.05	0.05	0.00	0.00	0.00	0.048
Copper	0.05	0.05	0.05	0.05	0.05	0.05
Iron	0.55	0.05	0.05	0.05	0.55	0.05
Manganese	0.00	0.00	0.00	0.00	0.05	0.00
Nickel	0.05	0.05	0.05	0.05	0.05	0.05
Potassium	0.55	0.00	0.00	0.00	0.55	0.00
Selenium	0.05	0.05	0.00	0.00	0.00	0.048
Strontium	0.05	0.05	0.05	0.05	0.05	0.05
Titanium	0.00	0.05	0.00	0.00	0.00	0.048
Zinc	0.05	0.05	0.05	0.05	0.05	0.05
Sulfates	0.55	0.55	0.55	0.05	0.05	0.542
Nitrates	0.55	0.55	0.55	0.55	0.55	0.55
Total Carbon	28.00	24.00	24.00	24.00	34.00	24.00
(Volatile Carbon)	27.00	23.00	23.00	23.00	23.00	23.00
Other	69.300	74.350	74.550	75.050	63.400	74.365
Totals	100.00	100.00	100.00	100.00	100.00	100.00

Basis: Taback et al. (1979)

Source Profile Number - 9

Steel Heat Treating (Salt Quench)

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	100.00	74.00	14.00	8.00	4.00	96.00
Species						
Barium	0.55	0.55	0.55	0.55	2.00	0.55
Bromine	0.05	0.05	0.05	0.05	0.05	0.05
Cadmium	0.05	0.05	0.05	0.05	0.05	0.05
Calcium	0.55	0.55	0.00	0.00	0.00	0.424
Chlorine	30.00	30.00	30.00	30.00	30.00	30.00
Chromium	0.55	0.55	0.05	0.05	0.05	0.435
Copper	0.05	0.05	0.05	0.05	0.05	0.05
Iron	9.00	9.00	0.55	0.55	0.55	7.064
Lead	0.05	0.05	0.05	0.00	0.05	0.046
Molybdenum	0.55	0.55	0.00	0.00	0.00	0.424
Nickel	2.00	2.00	0.05	0.05	0.05	1.553
Potassium	4.00	0.55	13.00	14.00	10.00	3.486
Zinc	0.05	0.05	0.05	0.05	0.05	0.05
Sulfates	32.00	32.00	0.55	0.55	0.55	24.793
Nitrates	0.55	0.55	0.55	0.05	0.05	0.508
Total Carbon	7.00	8.00	3.00	5.00	5.00	7.021
(Volatile Carbon)	6.00	7.00	2.00	5.00	5.00	6.104
Other	13.00	15.450	51.450	49.00	51.500	23.496
Totals	100.00	100.00	100.00	100.00	100.00	100.00

Basis: Taback et al. (1979)

Source Profile Number - 10

Steel Abrasive Blasting

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	100.00	74.00	6.00	6.00	14.00	86.00
Species						
Cadmium	0.05	0.05	0.00	0.05	0.05	0.047
Calcium	0.55	0.55	0.00	0.55	0.05	0.512
Chromium	0.55	0.55	0.55	0.55	0.05	0.55
Copper	0.05	0.05	0.05	0.05	0.00	0.05
Iron	15.00	15.00	15.00	18.00	5.00	15.209
Lead	0.05	0.05	0.05	0.05	0.00	0.05
Manganese	0.55	0.55	0.55	0.55	0.05	0.55
Molybdenum	0.55	0.55	0.55	0.55	0.00	0.55
Nickel	0.55	0.55	0.55	0.55	0.05	0.55
Rubidium	0.00	0.00	0.00	0.05	0.00	0.003
Selenium	0.00	0.00	0.00	0.05	0.00	0.003
Strontium	0.05	0.05	0.05	0.05	0.05	0.05
Titanium	3.00	3.00	3.00	2.00	0.55	2.930
Zirconium	0.55	0.55	0.55	0.55	0.55	0.55
Sulfates	0.05	0.05	0.05	0.05	0.05	0.05
Nitrates	0.55	0.55	0.55	0.55	0.55	0.55
Total Carbon	0.05	0.05	0.05	0.05	0.55	0.05
(Carbonate Carbon)	0.00	0.00	0.00	0.00	0.55	0.00
Other	77.850	77.850	78.450	75.750	92.450	77.745
Totals	100.00	100.00	100.00	100.00	100.00	100.00

Basis: Taback et al. (1979)

Source Profile Number - 11

Aluminum Foundry

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	100.00	86.00	5.00	4.00	5.00	95.00
Species						
Calcium	3.00	3.00	3.00	3.00	3.00	3.00
Chlorine	11.00	11.00	11.00	11.00	11.00	11.00
Chromium	0.05	0.05	0.05	0.05	0.05	0.05
Cobalt	0.05	0.05	0.05	0.05	0.05	0.05
Copper	0.05	0.05	0.05	0.05	0.05	0.05
Iron	6.00	6.00	6.00	6.00	6.00	6.00
Lead	0.05	0.05	0.05	0.05	0.05	0.05
Manganese	0.55	0.55	0.55	0.55	0.55	0.55
Molybdenum	0.05	0.05	0.05	0.05	0.05	0.05
Nickel	0.55	0.55	0.55	0.55	0.55	0.55
Potassium	0.55	0.55	0.55	0.55	0.55	0.55
Tin	0.05	0.05	0.05	0.05	0.05	0.05
Titanium	0.05	0.05	0.05	0.05	0.05	0.05
Zinc	0.05	0.05	0.05	0.05	0.05	0.05
Sulfates	16.00	16.00	16.00	16.00	16.00	16.00
Nitrates	0.55	0.55	0.55	0.55	0.55	0.55
Total Carbon	13.00	13.00	13.00	13.00	13.00	13.00
(Volatile Carbon)	13.00	13.00	13.00	13.00	13.00	13.00
Other	48.400	48.400	48.400	48.400	48.400	48.400
Totals	100.00	100.00	100.00	100.00	100.00	100.00

Basis: Taback et al. (1979)

Source Profile Number - 12

Steel-Sinter Plant

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	100.00	95.00	1.00	1.00	2.00	97.00
Species						
Arsenic	0.55	0.55	0.55	0.55	0.55	0.55
Bromine	0.55	0.55	0.55	0.55	0.55	0.55
Cadmium	0.55	0.55	0.55	0.55	0.05	0.55
Calcium	0.55	0.55	0.55	1.00	9.00	0.555
Cesium	0.55	0.55	0.55	0.55	0.55	0.55
Chlorine	28.00	17.00	25.00	14.00	5.00	17.052
Chromium	3.00	3.00	0.55	0.55	0.55	2.949
Copper	2.00	2.00	2.00	2.00	0.55	2.00
Iodine	0.05	0.05	0.05	0.05	0.00	0.05
Iron	14.00	13.00	20.00	20.00	20.00	13.144
Lead	10.00	11.00	12.00	13.00	0.55	11.031
Manganese	0.55	0.55	0.55	0.55	0.55	0.55
Molybdenum	0.05	0.05	0.00	0.00	0.05	0.049
Potassium	19.00	20.00	16.00	9.00	3.00	19.845
Rubidium	0.55	0.55	0.55	0.55	0.05	0.55
Selenium	0.05	0.05	0.05	0.05	0.05	0.05
Silver	0.05	0.05	0.05	0.05	0.05	0.05
Strontium	0.05	0.05	0.00	0.00	0.05	0.049
Zinc	0.55	0.55	0.55	0.55	0.05	0.55
Zirconium	0.05	0.05	0.00	0.00	0.05	0.049
Sulfates	19.00	20.00	8.00	8.00	8.00	19.753
Total Carbon	10.00	11.00	0.55	7.00	15.00	10.851
Other			11.35	21.45	35.75	
Totals	100.00	100.00	100.00	100.00	100.00	100.00

Basis: Taback et al. (1979)

Source Profile Number - 13

Steel Open Hearth Furnace

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	100.00	88.00	7.00	4.00	2.00	99.00
Species						
Antimony	0.05	0.05	0.05	0.05	0.05	0.05
Arsenic	0.05	0.05	0.05	0.05	0.05	0.05
Bromine	0.05	0.05	0.00	0.00	0.05	0.044
Cadmium	0.05	0.05	0.05	0.05	0.05	0.05
Calcium	0.55	0.55	0.55	0.55	2.00	0.55
Chromium	2.00	2.00	0.55	0.55	0.55	1.839
Copper	0.55	0.55	0.55	0.55	0.55	0.55
Iron	11.00	10.00	15.00	16.00	18.00	10.596
Lead	0.55	0.55	0.55	0.55	0.55	0.55
Manganese	0.55	0.55	0.55	0.55	0.55	0.55
Molybdenum	0.05	0.05	0.05	0.05	0.05	0.05
Nickel	0.55	0.55	0.55	0.55	0.55	0.55
Potassium	5.00	5.00	4.00	3.00	3.00	4.848
Rubidium	0.05	0.05	0.05	0.05	0.05	0.05
Silver	0.05	0.05	0.05	0.05	0.05	0.05
Tin	0.05	0.05	0.05	0.05	0.05	0.05
Vanadium	0.55	0.55	0.55	0.55	0.55	0.55
Sulfates	40.00	40.00	38.00	35.00	33.00	39.657
Nitrates	0.55	0.55	0.55	0.55	0.55	0.55
Total Carbon	20.00	20.00	20.00	20.00	20.00	20.00
(Volatile Carbon)	20.00	20.00	20.00	20.00	20.00	20.00
Other	17.750	18.750	18.250	21.250	19.750	18.816
Totals	100.00	100.00	100.00	100.00	100.00	100.00

Basis: Taback et al. (1979)

Source Profile Number - 14

Calcination of Gypsum

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	100.00	22.00	34.00	32.00	12.00	88.00
Species						
Arsenic	0.05	0.00	0.00	0.05	0.05	0.018
Barium	0.05	0.00	0.00	0.05	0.00	0.018
Bromine	0.05	0.05	0.00	0.00	0.00	0.013
Cadmium	0.05	0.05	0.05	0.00	0.00	0.032
Calcium	12.00	13.00	15.00	9.00	10.00	12.318
Chlorine	0.55	0.55	0.00	0.00	0.00	0.138
Chromium	0.55	0.55	0.05	0.05	0.05	0.175
Copper	0.05	0.05	0.05	0.05	0.05	0.05
Iron	0.55	0.55	0.55	0.55	0.55	0.55
Lead	0.05	0.05	0.05	0.00	0.00	0.032
Manganese	0.05	0.05	0.05	0.05	0.05	0.05
Molybdenum	0.05	0.05	0.05	0.05	0.05	0.05
Nickel	0.55	0.55	0.05	0.05	0.05	0.175
Potassium	0.55	0.55	0.55	0.05	0.00	0.368
Selenium	0.05	0.05	0.00	0.05	0.00	0.031
Strontium	0.05	0.05	0.05	0.05	0.05	0.05
Yttrium	0.05	0.05	0.00	0.00	0.00	0.013
Zinc	0.05	0.05	0.05	0.05	0.05	0.05
Sulfates	55.00	41.00	61.00	57.00	62.00	54.545
Nitrates	0.05	0.05	0.05	0.05	0.05	0.05
Total Carbon	2.00	1.00	5.00	0.55	2.00	2.382
(Volatile Carbon)	2.00	0.00	4.00	0.00	0.00	1.545
(Carbonate Carbon)	0.55	0.00	0.55	0.55	0.55	0.413
Other	27.600	41.700	17.400	32.300	25.00	28.893
Totals	100.00	100.00	100.00	100.00	100.00	100.00

Basis: Taback et al. (1979)

Source Profile Number - 15

Brick Grinding and Screening

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	100.00	48.00	4.00	4.00	44.00	56.00
Species						
Arsenic	0.05	0.05	0.05	0.05	0.05	0.05
Barium	0.05	0.05	0.05	0.05	0.05	0.05
Calcium	0.55	0.55	0.55	0.55	0.55	0.55
Cobalt	0.05	0.05	0.05	0.05	0.05	0.05
Copper	0.05	0.05	0.05	0.05	0.05	0.05
Gallium	0.05	0.05	0.05	0.05	0.05	0.05
Iron	2.00	2.00	2.00	2.00	2.00	2.00
Manganese	0.05	0.05	0.05	0.05	0.05	0.05
Molybdenum	0.05	0.05	0.05	0.05	0.05	0.05
Nickel	0.05	0.05	0.05	0.05	0.05	0.05
Niobium	0.05	0.05	0.05	0.05	0.05	0.05
Potassium	1.00	1.00	1.00	1.00	1.00	1.00
Rubidium	0.05	0.05	0.05	0.05	0.05	0.05
Silicon	27.00	27.00	27.00	27.00	27.00	27.00
Titanium	0.55	0.55	0.55	0.55	0.55	0.55
Zinc	0.05	0.05	0.05	0.05	0.05	0.05
Zirconium	0.05	0.05	0.05	0.05	0.05	0.05
Sulfates	0.55	0.55	0.55	0.55	0.55	0.55
Nitrates	0.05	0.05	0.05	0.05	0.05	0.05
(Carbonate Carbon)	0.55	0.55	0.55	0.55	0.55	0.55
Other	67.700	67.700	67.700	67.700	67.700	67.700
Totals	100.00	100.00	100.00	100.00	100.00	100.00

Basis: Taback et al. (1979)

Source Profile Number - 16

Cement Production

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	100.00	34.00	34.00	24.00	8.00	92.00
Species						
Barium	0.05	0.05	0.00	0.05	0.05	0.032
Cadmium	0.00	0.00	0.05	0.05	0.00	0.032
Calcium	20.00	20.00	22.00	20.00	27.00	20.739
Chromium	0.05	0.05	0.05	0.05	0.05	0.05
Copper	0.05	0.05	0.05	0.05	0.05	0.05
Iron	0.55	0.55	0.55	0.55	0.55	0.55
Lead	0.05	0.05	0.05	0.05	0.05	0.05
Manganese	0.05	0.05	0.05	0.05	0.05	0.05
Molybdenum	0.05	0.05	0.05	0.05	0.05	0.05
Nickel	0.05	0.05	0.05	0.05	0.05	0.05
Potassium	2.00	2.00	2.00	2.00	1.00	2.00
Rubidium	0.05	0.00	0.05	0.05	0.05	0.032
Selenium	0.05	0.05	0.05	0.05	0.05	0.05
Silicon	10.00	10.00	10.00	10.00	10.00	10.00
Silver	0.05	0.05	0.05	0.05	0.05	0.05
Titanium	0.05	0.05	0.05	0.05	0.05	0.05
Zinc	0.05	0.05	0.05	0.05	0.05	0.05
Sulfates	25.00	60.00	2.00	3.00	4.00	23.696
Nitrates	0.55	0.55	0.55	0.55	0.55	0.55
Total Carbon	12.00	8.00	19.00	19.00	16.00	14.935
(Volatile Carbon)	4.00	4.00	4.00	5.00	4.00	4.261
(Carbonate Carbon)	6.00	4.00	7.00	8.00	7.00	6.152
Other	29.300		43.300	44.250	40.300	26.936
Totals	100.00	100.00	100.00	100.00	100.00	100.00

Basis: Taback et al. (1979)

Source Profile Number - 17

Glass Melting Furnace

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	100.00	95.00	2.00	1.00	2.00	98.00
Species						
Arsenic	2.00	2.00	2.00	2.00	2.00	2.00
Chromium	0.55	0.55	0.55	0.55	0.55	0.55
Iron	0.55	0.55	0.55	0.55	0.55	0.55
Lead	0.55	0.55	0.55	0.55	0.55	0.55
Nickel	0.05	0.05	0.00	0.00	0.00	0.048
Potassium	3.00	3.00	3.00	3.00	3.00	3.00
Selenium	4.00	4.00	0.05	0.00	0.00	3.879
Zinc	0.00	0.00	0.05	0.00	0.00	0.001
Sulfates	58.00	55.00	65.00	65.00	65.00	55.306
Nitrates	0.55	0.55	0.55	0.55	0.55	0.55
Total Carbon	12.00	12.00	0.00	0.00	0.00	11.633
Other	18.750	21.750	27.700	27.800	27.800	21.933
Totals	100.00	100.00	100.00	100.00	100.00	100.00

Basis: Taback et al. (1979)

Source Profile Number - 18

Fiber Glass Forming Line

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	100.00	99.00	0.20	0.20	0.60	99.40
Species						
Bromine	0.05	0.05	0.05	0.05	0.05	0.05
Calcium	0.05	0.05	0.05	0.05	0.05	0.05
Chlorine	15.00	15.00	3.00	3.00	3.00	14.952
Chromium	0.05	0.05	0.05	0.05	0.05	0.05
Cobalt	0.05	0.05	0.05	0.05	0.05	0.05
Copper	0.05	0.05	0.05	0.05	0.05	0.05
Iron	0.55	0.55	0.55	0.55	0.55	0.55
Lead	0.05	0.05	0.05	0.05	0.05	0.05
Nickel	0.05	0.05	0.05	0.05	0.05	0.05
Potassium	0.55	0.55	0.55	0.55	0.55	0.55
Selenium	0.05	0.05	0.05	0.05	0.05	0.05
Zinc	0.05	0.05	0.05	0.05	0.05	0.05
Sulfates	0.55	0.55	0.55	0.55	0.55	0.55
Nitrates	0.55	0.55	0.55	0.55	0.55	0.55
Total Carbon	30.00	30.00	15.00	15.00	15.00	29.940
(Volatile Carbon)	28.00	28.00	28.00	28.00	28.00	28.00
Other	52.350	52.350	79.350	79.350	79.350	52.459
Totals	100.00	100.00	100.00	100.00	100.00	100.00

Basis: Taback et al. (1979)

Source Profile Number - 19

Asphalt Roofing Manufacture

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	100.00	91.00	4.00	3.00	2.00	98.00
Species						
Barium	0.05	0.05	0.05	0.05	0.05	0.05
Bromine	0.05	0.05	0.05	0.05	0.05	0.05
Cadmium	0.00	0.05	0.05	0.05	0.05	0.05
Calcium	3.00	3.00	3.00	3.00	3.00	3.00
Cesium	12.00	12.00	12.00	12.00	12.00	12.00
Chlorine	0.05	0.05	0.05	0.05	0.05	0.05
Cobalt	2.00	2.00	2.00	2.00	2.00	2.00
Copper	0.05	0.05	0.05	0.05	0.05	0.05
Iron	2.00	2.00	2.00	2.00	2.00	2.00
Lead	0.05	0.05	0.05	0.05	0.05	0.05
Manganese	0.55	0.55	0.55	0.55	0.55	0.55
Molybdenum	0.05	0.05	0.05	0.05	0.05	0.05
Nickel	0.55	0.55	0.55	0.55	0.55	0.55
Potassium	0.55	0.55	0.55	0.55	0.55	0.55
Selenium	0.55	0.55	0.55	0.55	0.55	0.55
Silver	0.05	0.05	0.05	0.05	0.05	0.05
Zinc	0.55	0.55	0.55	0.55	0.55	0.55
Zirconium	0.00	0.00	0.00	0.00	10.00	0.00
Sulfates	22.00	23.00	20.00	15.00	0.00	22.633
Total Carbon	24.00	24.00	24.00	24.00	24.00	24.00
(Volatile Carbon)	23.00	23.00	23.00	23.00	23.00	23.00
Other	31.900	30.850	33.850	38.850	43.850	31.217
Totals	100.00	100.00	100.00	100.00	100.00	100.00

Basis: Taback et al. (1979)

Source Profile Number - 20

Asphaltic Concrete Batch Plant

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	100.00	30.00	4.00	6.00	60.00	40.00
Species						
Arsenic	0.55	0.00	0.00	0.00	0.55	0.00
Barium	0.55	0.00	0.00	0.00	0.55	0.00
Cadmium	5.00	0.00	0.00	0.00	0.00	0.00
Calcium	0.00	10.00	6.00	4.00	2.00	8.700
Chromium	0.55	0.55	0.55	0.55	0.55	0.55
Iron	3.00	0.55	0.55	0.55	4.00	0.55
Potassium	1.00	0.00	0.00	0.00	2.00	0.00
Silver	0.05	0.00	0.00	0.00	0.05	0.00
Titanium	0.55	0.55	0.55	0.55	0.55	0.55
Sulfates	2.00	0.55	0.55	0.55	2.00	0.55
Nitrates	0.55	0.00	0.00	0.00	0.55	0.00
Total Carbon	5.00	14.00	0.55	0.55	0.55	10.637
Other	81.200	73.800	91.250	93.250	86.650	78.463
Totals	100.00	100.00	100.00	100.00	100.00	100.00

Basis: Taback et al. (1979)

Source Profile Number - 21

Paint Spray Booth (Water Solvent)

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	100.00	58.00	5.00	5.00	32.00	68.00
Species						
Bromine	0.05	0.05	0.05	0.05	0.05	0.05
Cadmium	0.05	0.05	0.05	0.05	0.05	0.05
Calcium	0.55	0.55	0.55	0.55	0.55	0.55
Chromium	0.05	0.05	0.05	0.05	0.05	0.05
Copper	0.05	0.05	0.05	0.05	0.05	0.05
Iron	0.55	0.55	0.55	0.55	0.55	0.55
Nickel	0.05	0.05	0.05	0.05	0.05	0.05
Titanium	3.00	3.00	3.00	3.00	3.00	3.00
Zinc	0.05	0.05	0.05	0.05	0.05	0.05
Sulfates	2.00	2.00	2.00	2.00	2.00	2.00
Nitrates	0.05	0.05	0.05	0.05	0.05	0.05
Total Carbon	50.00	50.00	50.00	50.00	50.00	50.00
(Volatile Carbon)	40.00	40.00	40.00	40.00	40.00	40.00
Other	43.550	43.550	43.550	43.550	43.550	43.550
Totals	100.00	100.00	100.00	100.00	100.00	100.00

Basis: Taback et al. (1979)

Source Profile Number - 22

Paint Spray Booth (Oil Solvent)

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	100.00	90.00	3.00	3.00	4.00	96.00
Species						
Calcium	0.55	0.55	0.55	0.55	0.55	0.55
Iron	0.55	0.55	0.55	0.55	0.55	0.55
Titanium	3.00	3.00	3.00	3.00	3.00	3.00
Sulfates	2.00	2.00	2.00	2.00	2.00	2.00
Total Carbon	55.00	55.00	55.00	55.00	55.00	55.00
(Volatile Carbon)	55.00	55.00	55.00	55.00	55.00	55.00
Other	38.900	38.900	38.900	38.900	38.900	38.900
Totals	100.00	100.00	100.00	100.00	100.00	100.00

Basis: Taback et al. (1979)

Source Profile Number - 23

Boric Acid Manufacture

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	100.00	88.00	1.00	1.00	10.00	90.00
Species						
Cadmium	0.05	0.05	0.05	0.05	0.05	0.05
Calcium	0.05	0.05	0.05	0.05	0.05	0.05
Chlorine	0.55	0.55	0.55	0.05	0.05	0.544
Chromium	0.05	0.00	0.00	0.05	0.05	0.001
Copper	0.05	0.05	0.05	0.05	0.05	0.05
Iron	0.55	0.55	0.55	0.55	1.00	0.55
Lead	0.05	0.00	0.00	0.05	0.05	0.001
Manganese	0.05	0.00	0.00	0.05	0.05	0.001
Nickel	0.05	0.05	0.05	0.05	0.05	0.05
Silver	0.05	0.05	0.00	0.00	0.05	0.049
Zinc	0.05	0.05	0.05	0.05	0.05	0.05
Sulfates	2.00	2.00	2.00	2.00	2.00	2.00
Nitrates	0.55	0.55	0.55	0.55	0.55	0.55
Other	95.900	96.050	96.100	96.450	95.950	96.055
Totals	100.00	100.00	100.00	100.00	100.00	100.00

Basis: Taback et al. (1979)

Source Profile Number - 24

Chemical Fertilizer (Urea)

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	100.00	94.00	1.00	1.00	4.00	96.00
Species						
Bromine	0.05	0.05	0.05	0.05	0.05	0.05
Cadmium	0.05	0.05	0.05	0.05	0.05	0.05
Calcium	0.55	0.55	0.55	0.55	0.55	0.55
Chlorine	11.00	11.00	9.00	7.00	5.00	10.938
Cobalt	0.05	0.05	0.05	0.00	0.00	0.049
Copper	0.05	0.05	0.05	0.05	0.05	0.05
Iron	0.05	0.05	0.55	0.55	0.55	0.060
Manganese	0.05	0.05	0.05	0.05	0.05	0.05
Molybdenum	0.05	0.05	0.05	0.05	0.05	0.05
Nickel	0.05	0.05	0.05	0.05	0.05	0.05
Potassium	0.55	0.55	0.55	0.55	0.55	0.55
Selenium	0.05	0.05	0.00	0.00	0.00	0.049
Strontium	0.00	0.00	0.00	0.00	0.05	0.00
Zinc	0.05	0.05	0.05	0.05	0.05	0.05
Zirconium	0.00	0.00	0.00	0.00	0.05	0.00
Sulfates	5.00	4.00	5.00	6.00	8.00	4.031
Nitrates	0.55	0.55	0.55	0.55	0.55	0.55
Total Carbon	33.00	33.00	33.00	33.00	33.00	33.00
(Volatile Carbon)	31.00	31.00	31.00	31.00	31.00	31.00
Other	48.850	49.850	50.400	51.450	51.350	49.872
Totals	100.00	100.00	100.00	100.00	100.00	100.00

Basis: Taback et al. (1979)

Source Profile Number - 25

Wood Operation (Resawing)

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	100.00	20.00	9.00	11.00	60.00	40.00
Species						
Barium	0.05	0.05	0.05	0.05	0.05	0.05
Bismuth	0.05	0.05	0.05	0.05	0.05	0.05
Bromine	0.55	0.55	0.55	0.55	0.55	0.55
Chromium	0.05	0.05	0.05	0.05	0.05	0.05
Copper	0.05	0.05	0.05	0.05	0.05	0.05
Iron	0.55	0.55	0.55	0.55	0.55	0.55
Lead	0.05	0.05	0.05	0.05	0.05	0.05
Manganese	0.05	0.05	0.05	0.05	0.05	0.05
Molybdenum	0.05	0.05	0.05	0.05	0.05	0.05
Nickel	0.05	0.05	0.05	0.05	0.05	0.05
Tin	0.05	0.05	0.05	0.05	0.05	0.05
Titanium	0.05	0.05	0.05	0.05	0.05	0.05
Zinc	0.05	0.05	0.05	0.05	0.05	0.05
Sulfates	0.55	0.55	0.55	0.55	0.55	0.55
Nitrates	0.55	0.55	0.55	0.55	0.55	0.55
Total Carbon	42.00	42.00	42.00	42.00	42.00	42.00
(Volatile Carbon)	39.00	39.00	39.00	39.00	39.00	39.00
Other	55.250	55.250	55.250	55.250	55.250	55.250
Totals	100.00	100.00	100.00	100.00	100.00	100.00

Basis: Taback et al. (1979)

Source Profile Number - 26

Wood Operation (Sanding)

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	100.00	86.00	3.00	3.00	8.00	92.00
Species						
Calcium	0.05	0.05	0.05	0.05	0.05	0.05
Iron	0.05	0.05	0.05	0.05	0.05	0.05
Strontium	0.05	0.05	0.05	0.05	0.05	0.05
Total Carbon	41.00	41.00	41.00	41.00	41.00	41.00
(Volatile Carbon)	35.00	35.00	35.00	35.00	35.00	35.00
(Carbonate Carbon)	0.00	0.00	0.00	0.00	0.55	0.00
Other	58.850	58.850	58.850	58.850	58.850	58.850
Totals	100.00	100.00	100.00	100.00	100.00	100.00

Basis: Taback et al. (1979)

Source Profile Number - 27

Petroleum Heaters (Natural Gas Fuel)

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	100.00	91.00	2.00	2.00	5.00	95.00
Species						
Bromine	0.05	0.05	0.05	0.05	0.05	0.05
Cadmium	0.05	0.05	0.05	0.05	0.05	0.05
Calcium	5.00	5.00	5.00	5.00	5.00	5.00
Chromium	0.55	0.55	0.55	0.55	0.55	0.55
Cobalt	2.00	2.00	2.00	2.00	2.00	2.00
Copper	0.05	0.05	0.05	0.05	0.05	0.05
Iron	0.55	0.55	0.55	0.55	0.55	0.55
Lead	0.05	0.05	0.05	0.05	0.05	0.05
Manganese	0.05	0.05	0.05	0.05	0.05	0.05
Molybdenum	0.05	0.05	0.05	0.05	0.05	0.05
Nickel	0.55	0.55	0.55	0.55	0.55	0.55
Selenium	0.55	0.55	0.55	0.55	0.55	0.55
Strontium	0.05	0.05	0.05	0.05	0.05	0.05
Zinc	0.55	0.55	0.55	0.55	0.55	0.55
Zirconium	0.05	0.05	0.05	0.05	0.05	0.05
Sulfates	47.00	47.00	47.00	47.00	47.00	47.00
Nitrates	0.55	0.55	0.55	0.55	0.55	0.55
Total Carbon	7.00	7.00	7.00	7.00	7.00	7.00
(Volatile Carbon)	7.00	7.00	7.00	7.00	7.00	7.00
Other	35.300	35.300	35.300	35.300	35.300	35.300
Totals	100.00	100.00	100.00	100.00	100.00	100.00

Basis: Taback et al. (1979)

Source Profile Number - 28

Petroleum - FCC Units/CO Boiler

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	100.00	51.00	6.00	4.00	39.00	61.00
Species						
Arsenic	0.05	0.05	0.05	0.05	0.05	0.05
Calcium	0.55	0.55	0.55	0.55	0.55	0.55
Cesium	1.00	2.00	1.00	1.00	1.00	1.836
Gallium	0.05	0.05	0.05	0.05	0.00	0.05
Iron	0.55	1.00	1.00	0.500	0.55	0.967
Lanthanum	0.55	0.55	0.55	5.550	0.55	0.878
Lead	0.05	0.05	0.05	0.05	0.05	0.05
Molybdenum	0.05	0.05	0.05	0.05	0.05	0.05
Neodymium	0.55	0.55	0.55	0.55	0.55	0.55
Nickel	0.05	0.05	0.05	0.05	0.05	0.05
Praeseodymium	0.55	0.55	0.55	0.55	0.55	0.55
Silicon	10.00	0.05	20.00	20.00	20.00	3.320
Strontium	0.05	0.05	0.05	0.05	0.05	0.05
Titanium	0.55	0.55	0.55	0.55	0.55	0.55
Sulfates	30.00	50.00	6.00	7.00	7.00	42.852
Total Carbon	2.00	4.00	0.00	0.00	0.00	3.344
(Volatile Carbon)	1.500	3.00	0.00	0.00	0.00	2.508
Other	53.400	39.900	68.950	63.450	68.450	44.302
Totals	100.00	100.00	100.00	100.00	100.00	100.00

Basis: Taback et al. (1979)

Source Profile Number - 29

Feed and Grain Operations

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	100.00	0.00	2.00	27.00	71.00	29.00
Species						
Calcium	0.55	0.55	0.55	0.55	0.55	0.55
Copper	0.05	0.05	0.05	0.05	0.05	0.05
Iron	0.05	0.05	0.05	0.05	0.05	0.05
Potassium	0.55	0.55	0.55	0.55	0.55	0.55
Silicon	15.00	15.00	15.00	15.00	15.00	15.00
Sulfates	0.55	0.55	0.55	0.55	0.55	0.55
Total Carbon	30.00	30.00	30.00	30.00	30.00	30.00
Other	53.250	53.250	53.250	53.250	53.250	53.250
Totals	100.00	100.00	100.00	100.00	100.00	100.00

Basis: Taback et al. (1979)

Source Profile Number - 30

Limestone Kilns

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	100.00	7.00	6.00	17.00	70.00	30.00
Species						
Calcium	30.00	30.00	30.00	30.00	30.00	30.00
Iron	2.00	2.00	2.00	2.00	2.00	2.00
Selenium	10.00	10.00	10.00	10.00	10.00	10.00
(Carbonate Carbon)	40.00	40.00	40.00	40.00	40.00	40.00
Other	58.00	58.00	58.00	58.00	58.00	58.00
Totals	100.00	100.00	100.00	100.00	100.00	100.00

Basis: Taback et al. (1979)

Source Profile Number - 31

Basic Oxygen Furnace (Steel)

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	100.00	95.00	5.00	0.00	0.00	100.00
Species						
Antimony	0.05	0.05	0.05	0.00	0.00	0.05
Arsenic	0.05	0.05	0.05	0.00	0.00	0.05
Bromine	0.05	0.05	0.05	0.00	0.00	0.05
Cadmium	0.05	0.05	0.05	0.00	0.00	0.05
Calcium	0.55	0.55	0.55	0.00	0.00	0.55
Chromium	2.00	2.00	2.00	0.00	0.00	2.00
Copper	0.55	0.55	0.55	0.00	0.00	0.55
Iron	11.00	11.00	11.00	0.00	0.00	11.00
Lead	0.55	0.55	0.55	0.00	0.00	0.55
Manganese	0.55	0.55	0.55	0.00	0.00	0.55
Molybdenum	0.05	0.05	0.05	0.00	0.00	0.05
Nickel	0.55	0.55	0.55	0.00	0.00	0.55
Potassium	5.00	5.00	5.00	0.00	0.00	5.00
Rubidium	0.05	0.05	0.05	0.00	0.00	0.05
Silver	0.05	0.05	0.05	0.00	0.00	0.05
Tin	0.05	0.05	0.05	0.00	0.00	0.05
Vanadium	0.55	0.55	0.55	0.00	0.00	0.55
Sulfates	40.00	40.00	40.00	0.00	0.00	40.00
Nitrates	0.55	0.55	0.55	0.00	0.00	0.55
Total Carbon	20.00	20.00	20.00	0.00	0.00	20.00
(Volatile Carbon)	20.00	20.00	20.00	0.00	0.00	20.00
Other	17.750	17.750	17.750	100.00	100.00	17.750
Totals	100.00	100.00	100.00	100.00	100.00	100.00

Basis: Taback et al. (1979)

Source Profile Number - 32

Electric Arc Furnace (Steel)

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	100.00	45.00	18.00	20.00	17.00	83.00
Species						
Antimony	0.05	0.05	0.05	0.05	0.05	0.05
Arsenic	0.05	0.05	0.05	0.05	0.05	0.05
Bromine	0.05	0.05	0.05	0.05	0.05	0.05
Cadmium	0.05	0.05	0.05	0.05	0.05	0.05
Calcium	0.55	0.55	0.55	0.55	0.55	0.55
Chromium	2.00	2.00	2.00	2.00	2.00	2.00
Copper	0.55	0.55	0.55	0.55	0.55	0.55
Iron	11.00	11.00	11.00	11.00	11.00	11.00
Lead	0.55	0.55	0.55	0.55	0.55	0.55
Manganese	0.55	0.55	0.55	0.55	0.55	0.55
Molybdenum	0.05	0.05	0.05	0.05	0.05	0.05
Nickel	0.55	0.55	0.55	0.55	0.55	0.55
Potassium	5.00	5.00	5.00	5.00	5.00	5.00
Rubidium	0.05	0.05	0.05	0.05	0.05	0.05
Silver	0.05	0.05	0.05	0.05	0.05	0.05
Tin	0.05	0.05	0.05	0.05	0.05	0.05
Vanadium	0.55	0.55	0.55	0.55	0.55	0.55
Sulfates	40.00	40.00	40.00	40.00	40.00	40.00
Nitrates	0.55	0.55	0.55	0.55	0.55	0.55
Total Carbon	20.00	20.00	20.00	20.00	20.00	20.00
(Volatile Carbon)	20.00	20.00	20.00	20.00	20.00	20.00
Other	17.750	17.750	17.750	17.750	17.750	17.750
Totals	100.00	100.00	100.00	100.00	100.00	100.00

Basis: Taback et al. (1979)

Source Profile Number - 33

Rock Crushers

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	100.00	1.00	2.00	7.00	90.00	10.00
Species						
Copper	0.05	0.05	0.05	0.05	0.05	0.05
Iron	0.55	0.55	0.55	0.55	0.55	0.55
Nickel	0.05	0.05	0.05	0.05	0.05	0.05
Silicon	40.00	40.00	40.00	40.00	40.00	40.00
Sulfates	0.55	0.55	0.55	0.55	0.55	0.55
Other	58.800	58.800	58.800	58.800	58.800	58.800
Totals	100.00	100.00	100.00	100.00	100.00	100.00

Basis: Taback et al. (1979)

Source Profile Number - 34

Rock Screening

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	100.00	2.00	18.00	30.00	50.00	50.00
Species						
Copper	0.05	0.05	0.05	0.05	0.05	0.05
Iron	0.55	0.55	0.55	0.55	0.55	0.55
Nickel	0.05	0.05	0.05	0.05	0.05	0.05
Silicon	40.00	40.00	40.00	40.00	40.00	40.00
Sulfates	0.55	0.55	0.55	0.55	0.55	0.55
Other	58.800	58.800	58.800	58.800	58.800	58.800
Totals	100.00	100.00	100.00	100.00	100.00	100.00

Basis: Taback et al. (1979)

Source Profile Number - 35

Structural Fires

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	100.00	80.00	13.00	5.00	2.00	98.00
Species						
Calcium	1.00	1.00	0.55	14.00	7.00	1.60
Chlorine	2.00	2.00	0.0	0.0	0.0	1.63
Iron	2.00	2.00	5.00	5.00	5.00	2.55
Potassium	5.00	5.00	5.00	5.00	5.00	5.00
Silicon	10.00	10.00	10.00	10.00	10.00	10.00
Sulfates	0.0	0.0	0.0	0.55	0.55	0.03
Total Carbon	30.00	30.00	30.00	30.00	30.00	30.00
(Volatile Carbon)	10.00	10.00	10.00	10.00	15.00	10.00
(Carbonate Carbon)	50.00	50.00	50.00	74.00	57.00	51.22
Other	50.00	50.00	49.45	35.45	42.45	49.18
Totals	100.00	100.00	100.00	100.00	100.00	100.00

Basis: Taback et al. (1979)

Source Profile Number - 36

Residential Natural Gas Combustion

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	100.00	100.00	0.00	0.00	0.00	100.00
Species						
Sulfates	20.00	20.00	0.00	0.00	0.00	20.00
Total Carbon	50.00	50.00	0.00	0.00	0.00	50.00
Other	30.00	30.00	100.00	100.00	100.00	30.00
Totals	100.00	100.00	100.00	100.00	100.00	100.00

Basis: Taback et al. (1979)

Source Profile Number - 37

Fireplaces

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	100.00	36.00	12.00	14.00	38.00	62.00
Species						
Calcium	5.00	1.00	0.55	14.00	7.00	3.848
Chlorine	0.55	2.00	0.00	0.00	0.00	1.161
Iron	4.00	2.00	5.00	5.00	5.00	3.258
Potassium	5.00	5.00	5.00	5.00	5.00	5.00
Silicon	10.00	10.00	10.00	10.00	10.00	10.00
Sulfates	0.55	0.00	0.00	0.55	0.55	0.124
Total Carbon	30.00	30.00	30.00	30.00	30.00	30.00
(Volatile Carbon)	10.00	10.00	10.00	10.00	15.00	10.00
(Carbonate Carbon)	5.00	0.55	0.55	7.00	3.00	2.006
Other	44.900	50.00	49.450	35.450	42.450	46.608
Totals	100.00	100.00	100.00	100.00	100.00	100.00

Basis: Taback et al. (1979)

Source Profile Number - 38

Tire Attrition Dust

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	100.00	20.00	15.00	5.00	60.00	40.00
Species						
Zinc	1.00	1.00	1.00	1.00	1.00	1.00
Total Carbon	87.00	87.00	87.00	87.00	87.00	87.00
Other	12.00	12.00	12.00	12.00	12.00	12.00
Totals	100.00	100.00	100.00	100.00	100.00	100.00

Basis: Taback et al. (1979) modified to 1% zinc content on the basis of tests reported by Pierson and Brachacezek (1974)

Source Profile Number - 39

Cigarette Smoke (Side Stream)

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	100.00	100.00	0.00	0.00	0.00	100.00
Species						
Cadmium	0.05	0.05	0.00	0.00	0.00	0.05
Total Carbon	85.00	85.00	0.00	0.00	0.00	85.00
Other	14.950	14.950	100.00	100.00	100.00	14.950
Totals	100.00	100.00	100.00	100.00	100.00	100.00

Basis: Taback et al. (1979)

Source Profile Number - 40

Sea Salt

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	100.00	2.00	20.00	54.00	24.00	76.00
Species						
Bromine	0.55	0.55	0.55	0.55	0.55	0.55
Calcium	1.00	1.00	1.00	1.00	1.00	1.00
Chlorine	55.00	55.00	55.00	55.00	55.00	55.00
Iodine	0.55	0.55	0.55	0.55	0.55	0.55
Magnesium	4.00	4.00	4.00	4.00	4.00	4.00
Potassium	1.00	1.00	1.00	1.00	1.00	1.00
Sodium	31.00	31.00	31.00	31.00	31.00	31.00
Sulfur	3.00	3.00	3.00	3.00	3.00	3.00
Other	6.900	6.900	6.900	6.900	6.900	6.900
Totals	100.00	100.00	100.00	100.00	100.00	100.00

Basis: Taback et al. (1979)

Source Profile Number - 41

Brake Lining Attrition

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	100.00	100.00	0.00	0.00	0.00	100.00
Species						
Calcium	8.00	8.00	0.00	0.00	0.00	8.00
Magnesium	14.00	14.00	0.00	0.00	0.00	14.00
Silicon	21.500	21.500	0.00	0.00	0.00	21.500
Total Carbon	16.00	16.00	0.00	0.00	0.00	16.00
Other	40.500	40.500	100.00	100.00	100.00	40.500
Totals	100.00	100.00	100.00	100.00	100.00	100.00

Basis: Taback et al. (1979)

Source Profile Number - 42

Livestock Dust

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	100.00	46.00	16.00	13.00	25.00	75.00
Species						
Aluminum	8.00	8.00	8.00	8.00	8.00	8.00
Calcium	2.00	2.00	2.00	2.00	2.00	2.00
Cobalt	0.05	0.05	0.05	0.05	0.05	0.05
Copper	0.05	0.05	0.05	0.05	0.05	0.05
Iron	3.00	3.00	3.00	3.00	3.00	3.00
Lead	0.05	0.05	0.05	0.05	0.05	0.05
Manganese	0.55	0.55	0.55	0.55	0.55	0.55
Nickel	0.05	0.05	0.05	0.05	0.05	0.05
Potassium	2.00	2.00	2.00	2.00	2.00	2.00
Silicon	20.00	20.00	20.00	20.00	20.00	20.00
Titanium	0.55	0.55	0.55	0.55	0.55	0.55
Vanadium	0.05	0.05	0.05	0.05	0.05	0.05
Zinc	0.05	0.05	0.05	0.05	0.05	0.05
Total Carbon	2.00	2.00	2.00	2.00	2.00	2.00
Other	61.600	61.600	61.600	61.600	61.600	61.600
Totals	100.00	100.00	100.00	100.00	100.00	100.00

Basis: Taback et al. (1979)

Source Profile Number - 43

Unpaved Road Dust

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	100.00	18.00	12.00	16.00	54.00	46.00
Species						
Aluminum	8.00	8.00	8.00	8.00	8.00	8.00
Barium	0.05	0.05	0.05	0.05	0.05	0.05
Calcium	2.00	2.00	2.00	2.00	2.00	2.00
Cobalt	0.05	0.05	0.05	0.05	0.05	0.05
Copper	0.05	0.05	0.05	0.05	0.05	0.05
Iron	3.00	3.00	3.00	3.00	3.00	3.00
Lead	0.05	0.05	0.05	0.05	0.05	0.05
Manganese	0.55	0.55	0.55	0.55	0.55	0.55
Nickel	0.05	0.05	0.05	0.05	0.05	0.05
Potassium	2.00	2.00	2.00	2.00	2.00	2.00
Silicon	20.00	20.00	20.00	20.00	20.00	20.00
Titanium	0.55	0.55	0.55	0.55	0.55	0.55
Vanadium	0.05	0.05	0.05	0.05	0.05	0.05
Zinc	0.05	0.05	0.05	0.05	0.05	0.05
Other	63.550	63.550	63.550	63.550	63.550	63.550
Totals	100.00	100.00	100.00	100.00	100.00	100.00

Basis: Taback et al. (1979)

Source Profile Number - 44

Road Building and Construction Dust

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	100.00	24.00	16.00	16.00	36.00	56.00
Species						
Aluminum	8.00	8.00	8.00	8.00	8.00	8.00
Calcium	2.00	2.00	2.00	2.00	2.00	2.00
Cobalt	0.05	0.05	0.05	0.05	0.05	0.05
Copper	0.05	0.05	0.05	0.05	0.05	0.05
Iron	3.00	3.00	3.00	3.00	3.00	3.00
Lead	0.05	0.05	0.05	0.05	0.05	0.05
Manganese	0.55	0.55	0.55	0.55	0.55	0.55
Nickel	0.05	0.05	0.05	0.05	0.05	0.05
Potassium	2.00	2.00	2.00	2.00	2.00	2.00
Silicon	20.00	20.00	20.00	20.00	20.00	20.00
Titanium	0.55	0.55	0.55	0.55	0.55	0.55
Vanadium	0.05	0.05	0.05	0.05	0.05	0.05
Zinc	0.05	0.05	0.05	0.05	0.05	0.05
Other	63.600	63.600	63.600	63.600	63.600	63.600
Totals	100.00	100.00	100.00	100.00	100.00	100.00

Basis: Taback et al. (1979)

Source Profile Number - 45

Agricultural Burning

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	100.00	90.00	8.00	2.00	0.50	100.00
Species						
Calcium	1.00	1.00	0.55	14.00	7.00	1.224
Chlorine	2.00	2.00	0.00	0.00	0.00	1.800
Iron	2.00	2.00	5.00	5.00	5.00	2.300
Potassium	5.00	5.00	5.00	5.00	5.00	5.00
Silicon	10.00	10.00	10.00	10.00	10.00	10.00
Sulfates	0.00	0.00	0.00	0.55	0.55	0.011
Total Carbon	30.00	30.00	30.00	30.00	30.00	30.00
(Volatile Carbon)	10.00	10.00	10.00	10.00	15.00	10.00
(Carbonate Carbon)	5.00	0.55	0.55	7.00	3.00	0.679
Other	50.00	50.00	49.450	35.450	42.450	49.665
Totals	100.00	100.00	100.00	100.00	100.00	100.00

Basis: Taback et al. (1979)

Source Profile Number - 46

Forest Fires

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	100.00	80.00	12.00	5.00	3.00	97.00
Species						
Calcium	1.00	1.00	0.55	14.00	7.00	1.614
Chlorine	2.00	2.00	0.00	0.00	0.00	1.649
Iron	2.00	2.00	5.00	5.00	5.00	2.526
Potassium	5.00	5.00	5.00	5.00	5.00	5.00
Silicon	10.00	10.00	10.00	10.00	10.00	10.00
Sulfates	0.00	0.00	0.00	0.55	0.55	0.028
Total Carbon	30.00	30.00	30.00	30.00	30.00	30.00
(Volatile Carbon)	10.00	10.00	10.00	10.00	15.00	10.00
(Carbonate Carbon)	5.00	0.55	0.55	7.00	3.00	0.882
Other	50.00	50.00	49.450	35.450	42.450	49.182
Totals	100.00	100.00	100.00	100.00	100.00	100.00

Basis: Taback et al. (1979)

Source Profile Number - 47

Landfill Dust

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	28.00	28.00	12.00	15.00	45.00	55.00
Species						
Aluminum	8.00	8.00	8.00	8.00	8.00	8.00
Calcium	2.00	2.00	2.00	2.00	2.00	2.00
Cobalt	0.05	0.05	0.05	0.05	0.05	0.05
Iron	3.00	3.00	3.00	3.00	3.00	3.00
Lead	0.05	0.05	0.05	0.05	0.05	0.05
Manganese	0.55	0.55	0.55	0.55	0.55	0.55
Nickel	0.05	0.05	0.05	0.05	0.05	0.05
Potassium	2.00	2.00	2.00	2.00	2.00	2.00
Silicon	20.00	20.00	20.00	20.00	20.00	20.00
Vanadium	0.05	0.00	0.05	0.05	0.05	0.025
Zinc	0.05	0.00	0.05	0.05	0.05	0.025
Other	64.200	64.300	64.200	64.200	64.200	64.251
Totals	100.00	100.00	100.00	100.00	100.00	100.00

Basis: Taback et al. (1979)

Source Profile Number - 48

Agricultural Tillage Dust

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	100.00	22.00	17.00	21.00	40.00	60.00
Species						
Aluminum	8.00	8.00	8.00	8.00	8.00	8.00
Barium	0.05	0.05	0.05	0.05	0.05	0.05
Cadmium	2.00	2.00	2.00	2.00	2.00	2.00
Cobalt	0.05	0.05	0.05	0.05	0.05	0.05
Copper	0.05	0.05	0.05	0.05	0.05	0.05
Iron	3.00	3.00	3.00	3.00	3.00	3.00
Lead	0.05	0.05	0.05	0.05	0.05	0.05
Manganese	0.55	0.55	0.55	0.55	0.55	0.55
Nickel	0.05	0.05	0.05	0.05	0.05	0.05
Potassium	2.00	2.00	2.00	2.00	2.00	2.00
Silicon	20.00	20.00	20.00	20.00	20.00	20.00
Vanadium	0.05	0.05	0.05	0.05	0.05	0.05
Zinc	0.05	0.05	0.05	0.05	0.05	0.05
Other	64.100	64.100	64.100	64.100	64.100	64.100
Totals	100.00	100.00	100.00	100.00	100.00	100.00

Basis: Taback et al. (1979)

Source Profile Number - 49

Industrial Boiler (Natural Gas Fuel)

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	100.00	100.00	0.00	0.00	0.00	100.00
Species						
Sulfates	20.00	20.00	0.00	0.00	0.00	20.00
Total Carbon	50.00	50.00	0.00	0.00	0.00	50.00
Other	30.00	30.00	100.00	100.00	100.00	30.00
Totals	100.00	100.00	100.00	100.00	100.00	100.00

Basis: Taback et al. (1979)

Source Profile Number - 50

Internal Combustion Engine (Digester Gas)

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	0.00	0.00	0.00	0.00	0.00	99.00

Species	
Calcium	0.05
Molybdenum	0.05
Nickel	0.055
Sulfates	45.500
Nitrates	2.080
Total Carbon	21.00
(Volatile Carbon)	16.200
Other	31.265
Totals	100.00

Basis: Taback et al. (1979), Table 4-36, page 4-101, average of impinger catches from tests 7S-IC and 7J-IC.

Source Profile Number - 51

Residential Fuel Combustion (Natural Gas)

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	0.00	0.00	0.00	0.00	0.00	100.00

Species	
Bromine	0.05
Cadmium	0.05
Calcium	5.00
Chromium	0.55
Cobalt	2.00
Copper	0.05
Iron	0.55
Lead	0.05
Manganese	0.05
Selenium	0.55
Strontium	0.05
Zinc	0.55
Zirconium	0.05
Sulfates	47.00
Nitrates	0.055
Total Carbon	12.00
(Volatile Carbon)	8.00
Other	31.395
Totals	100.00

Basis: Taback et al. (1979), Appendix A profile 27, modified by substitution of carbon percentage data from Muhlbaier and Williams (1981) who described tests on home furnaces.

Source Profile Number - 52

Diesel Engine

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	0.00	0.00	0.00	0.00	0.00	96.00

Species	
Aluminum	0.340
Bromine	0.031
Calcium	0.840
Chlorine	1.690
Copper	0.730
Iron	1.320
Lead	0.095
Manganese	0.027
Silicon	0.170
Sodium	0.370
Vanadium	0.010
Zinc	0.230
Sulfates	4.200
Nitrates	0.720
Total Carbon	70.00
(Volatile Carbon)	18.900
Other	19.227
Totals	100.00

Basis: Watson (1979), page 101, diesel truck fine particulate profile modified by insertion of carbon estimates from Cass et al.(1981).

Source Profile Number - 53

Light Duty Automobile (Catalyst Equipped)

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	0.00	0.00	0.00	0.00	0.00	100.00

Species	
Aluminum	0.120
Calcium	0.170
Copper	0.024
Iron	0.110
Manganese	0.015
Nickel	0.015
Potassium	0.044
Silicon	0.510
Zinc	0.080
Sulfates	50.00
Total Carbon	39.00
(Volatile Carbon)	21.100
Other	9.927
Totals	100.00

Basis: This is a composite profile estimated as follows: sulfate fraction from Laresgoti and Springer (1977); carbon fraction from Mulhbaier and Williams (1981); other trace species from Watson (1979) unleaded auto fine particle profile.

Source Profile Number - 54

Light Duty Automobile (Non Catalyst Equipped)

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	0.00	0.00	0.00	0.00	0.00	60.00

Species	
Aluminum	0.043
Bromine	8.200
Chlorine	5.400
Copper	0.004
Iron	0.250
Lead	21.100
Silicon	0.075
Zinc	0.021
Sulfates	0.210
Total Carbon	54.500
(Volatile Carbon)	50.100
Other	10.177
Totals	100.00

Basis: The procedure used to estimate the composite profile for the <u>fine particle</u> emissions from leaded fuel combustion is as follows:

1. 2g Pb/gal in gasoline in mid-1970's in Los Angeles; at an average mileage of 13.6 miles/gal the equivalent Pb emission rate is 0.147 g/mile.

2. From Huntzicker et al. (1975), 70.5% of Pb is emitted as aerosol, and only 43% of that material is in particulate form less than 9 micron in diameter: thus 44.7 mg/mile is emitted as fine lead aerosol.

3. Fine particle lead is emitted as lead salts, $2PbBrCl.NH_4Cl$ Habibi (1973), giving 75.4 mg/mile of fine lead salts.

Basis for Profile 54 - Light Duty Automobile (Non Catalyst Equipped)

4. The carbon emitted from older cars (30,000-100,000 accumulated miles) is about 115 mg/mile form Ter Haar in Habibi (1973). Carbon aerosols are assumed to be concentrated in the fine particle fraction. Of that carbon about 9 mg/mile is non-volatile "elemental carbon" (Cass et al.; 1981). The remaining carbon is assumed to be present as a typical organic compound (organics = 1.2 organic carbon). Total organics mass is then 127 mg/mile. The total fine aerosol mass is approximately 75.4+127+9 = 211.4 mg/mile.

5. Major fine aerosol components are: lead 44.7 mg/mile (21%), Br 17.2 mg/mile (8.2%), Cl 11.5 mg/mile (5.4%), and Carbon 115 mg/mile (54.5%).

6. Other minor aerosol components shown in the profile were taken from Watson (1979), page 96, leaded automobile exhaust profile fine particle fraction, except for sulfates that were estimated at 0.45 mg/mile for 0.05% S in the gasoline. This is based on a scale up of the data from Pierson (1976) who reported 0.27 mg/mile sulfates from pre-catalyst cars using fuel with 0.03% S.

Source Profile Number - 55

Jet Aircraft

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	0.00	0.00	0.00	0.00	0.00	100.00

Species	
Total Carbon	96.00
(Volatile Carbon)	25.900
Other	4.00
Totals	100.00

Basis: Heywood et al. (1971), jet exhaust aerosol is 96% carbon; for a discussion of non-volatile carbon content see paper by Cass et al. (1981)

Source Profile Number - 56

Hydrocarbon Material

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	0.00	0.00	0.00	0.00	0.00	100.00

Species	
Total Carbon	83.300
(Volatile Carbon)	83.300
Other	16.700
Totals	100.00

Basis: Assumed to be a typical organic compound with the organic mass = 1.2 x carbon present.

Source Profile Number - 57

Soil Dust

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	0.00	0.00	0.00	0.00	0.00	100.00

Species	
Aluminum	8.200
Barium	0.060
Calcium	1.500
Cobalt	0.002
Copper	0.008
Iron	3.200
Lead	0.020
Magnesium	1.400
Manganese	0.110
Nickel	0.004
Potassium	1.500
Silicon	20.00
Sodium	2.500
Titanium	0.400
Vanadium	0.006
Zinc	0.005
Other	61.085
Totals	100.00

Basis: Friedlander (1973), Los Angeles area soil dust.

Source Profile Number - 58

Street Dust

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	0.00	0.00	0.00	0.00	0.00	100.00

Species	
Aluminum	8.400
Bromine	0.022
Calcium	2.390
Chlorine	1.210
Chromium	0.040
Copper	0.032
Iron	6.920
Lead	0.470
Magnesium	1.170
Manganese	0.137
Nickel	0.012
Potassium	1.050
Silicon	20.600
Sodium	1.070
Titanium	0.670
Vanadium	0.023
Zinc	0.110
Sulfates	0.620
Nitrates	0.420
Total Carbon	18.00
(Volatile Carbon)	16.600
Other	36.634
Totals	100.00

Basis: Watson (1979), Portland, Oregon, street dust fine particulate fraction.

Source Profile Number - 59

Livestock Dust

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	0.00	0.00	0.00	0.00	0.00	100.00

Species	
Aluminum	8.200
Barium	0.060
Calcium	1.500
Cobalt	0.002
Copper	0.008
Iron	3.200
Lead	0.020
Magnesium	1.400
Manganese	0.110
Nickel	0.004
Potassium	1.500
Silicon	20.00
Sodium	2.500
Titanium	0.400
Vanadium	0.006
Zinc	0.005
Total Carbon	2.00
(Volatile Carbon)	2.00
Other	59.085
Totals	100.00

Basis: Soil dust composition from Friedlander (1973), augmented with 2% carbon as suggested by Taback et al. (1979) Appendix A, source profile 42.

Source Profile Number - 60

Slash Burning

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	0.00	0.00	0.00	0.00	0.00	100.00

Species	
Aluminum	1.440
Bromine	0.053
Calcium	1.070
Chlorine	5.550
Copper	0.090
Iron	0.190
Manganese	0.120
Potassium	0.600
Silicon	0.890
Sodium	0.650
Sulfates	1.600
Nitrates	5.100
Total Carbon	62.900
(Volatile Carbon)	59.400
Other	19.747
Totals	100.00

Basis: Watson (1979), page 107, slash burning fine particle composition.

Source Profile Number - 61

Simulated Field Burning

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	0.00	0.00	0.00	0.00	0.00	100.00

Species	
Aluminum	0.450
Bromine	0.045
Calcium	0.092
Chlorine	0.990
Chromium	0.012
Copper	0.054
Iron	0.054
Manganese	0.047
Potassium	6.500
Silicon	0.490
Sodium	0.330
Titanium	0.070
Sulfates	5.00
Nitrates	2.00
Total Carbon	51.600
(Volatile Carbon)	47.200
Other	32.266
Totals	100.00

Basis: Watson (1979), page 109, simulated field burning, fine particle composition.

Source Profile Number - 62

Sea Salt

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	0.00	0.00	0.00	0.00	0.00	100.00

Species	
Bromine	0.190
Calcium	1.160
Chlorine	55.00
Magnesium	3.700
Potassium	1.100
Sodium	30.600
Sulfates	5.200
Other	3.050
Totals	100.00

Basis: Friedlander (1973)

Source Profile Number - 63

Wood Fireplace

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	0.00	0.00	0.00	0.00	0.00	100.00

Species	
Aluminum	0.024
Bromine	0.007
Calcium	0.055
Chlorine	0.610
Copper	0.019
Iron	0.002
Lead	0.011
Manganese	0.002
Potassium	0.530
Silicon	0.024
Sodium	0.370
Zinc	0.120
Sulfates	0.110
Nitrates	0.130
Total Carbon	58.800
(Volatile Carbon)	45.900
Other	39.186
Totals	100.00

Basis: Watson (1979), page 107, fireplace burning, fine particle composition.

Source Profile Number - 64

Electric Utility Boiler (Residual Fuel Oil)

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	0.00	0.00	0.00	0.00	0.00	97.00

Species	
Arsenic	0.014
Barium	0.160
Bromine	0.340
Cadmium	0.022
Calcium	1.120
Chromium	0.130
Cobalt	0.047
Copper	0.042
Gallium	0.002
Iron	1.130
Lead	0.064
Manganese	0.052
Molybdenum	0.023
Nickel	2.120
Potassium	0.090
Rubidium	0.002
Selenium	0.098
Silver	0.008
Sulfur	20.400
Titanium	0.008
Vanadium	0.340
Zinc	0.100
Sulfates	31.900
Nitrates	4.500
Total Carbon	14.900
(Volatile Carbon)	10.00
(Carbonate Carbon)	0.022
Other	42.788
Totals	100.00

Basis: Average of elemental percentages given by Taback et al. (1979), tests 11, 12, 13, 21, 22, 24, 32, 33, as reported in "Total" columns of Tables 4-26 to 4-33.

Source Profile Number - 65

Metallurgical Processing

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	0.00	0.00	0.00	0.00	0.00	100.00

Species	
Antimony	0.015
Arsenic	0.120
Bromine	0.119
Cadmium	0.120
Calcium	0.276
Cesium	0.105
Chlorine	3.240
Chromium	1.164
Copper	0.55
Iodine	0.010
Iron	5.867
Lead	2.266
Manganese	0.275
Molybdenum	0.025
Nickel	0.170
Potassium	5.305
Rubidium	0.120
Selenium	0.010
Silver	0.025
Strontium	0.009
Tin	0.015
Vanadium	0.170
Zinc	0.105
Zirconium	0.009
Sulfates	16.119
Nitrates	0.170
Total Carbon	49.912
(Volatile Carbon)	47.850
Other	13.707
Totals	100.00

Basis: A composite of 21% profile 31, 19% profile 12, 10% profile 12 and 50% profile 56. (Based emissions at Kaiser Steel, (Cass et al.;1981))

Source Profile Number - 66

Wood Processing

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	0.00	0.00	0.00	0.00	0.00	100.00

Species	
Barium	0.025
Bismuth	0.025
Bromine	0.275
Calcium	0.025
Chromium	0.025
Copper	0.025
Iron	0.300
Lead	0.025
Manganese	0.025
Molybdenum	0.025
Nickel	0.025
Strontium	0.025
Tin	0.025
Titanium	0.025
Zinc	0.025
Sulfates	0.275
Nitrates	0.275
Total Carbon	41.500
(Volatile Carbon)	37.00
Other	57.050
Totals	100.00

Basis: Formed as a composite of 50% profile 25 and 50% profile 26.

Source Profile Number - 67

Miscellaneous Industrial Processes

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	0.00	0.00	0.00	0.00	0.00	100.00

Species	
Antimony	0.001
Arsenic	0.017
Barium	0.005
Bismuth	0.002
Bromine	0.037
Cadmium	0.017
Calcium	0.338
Cesium	0.162
Chlorine	1.305
Chromium	0.103
Cobalt	0.004
Copper	0.065
Gallium	0.004
Iodine	0.001
Iron	0.789
Lanthanum	0.073
Lead	0.199
Manganese	0.075
Molybdenum	0.058
Neodymium	0.046
Nickel	0.075
Potassium	0.673
Praeseodymium	0.046
Rubidium	0.011
Selenium	0.009
Silicon	5.693
Silver	0.002
Strontium	0.011
Tin	0.003
Titanium	0.304
Vanadium	0.014

Source Profile Number - 67 (Continued)

Miscellaneous Industrial Processes

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	0.00	0.00	0.00	0.00	0.00	100.00

Species	
Zinc	0.05
Zirconium	0.001
Sulfates	5.754
Nitrates	0.083
Total Carbon	47.996
(Volatile Carbon)	43.077
(Carbonate Carbon)	0.073
Other	35.972
Totals	100.00

Basis: This profile has been created as an average of the following profiles: 5, 22, 24, 28, 29, 33, 56, 65 and 66.

Source Profile Number - 68

Brake Lining Attrition

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	0.00	0.00	0.00	0.00	0.00	100.00

Species	
Calcium	5.500
Magnesium	8.250
Silicon	15.400
Total Carbon	28.300
(Volatile Carbon)	23.300
Other	42.550
Totals	100.00

Basis: Lynch (1968), automobile brake linings are 55% asbestos, 28% resins and polymers, 9% oxides and pigments, metals 3%, carbon and graphite 5%. Resins and polymers were taken to be 1.2 x organic carbon present. Graphite was equated with the non-volatile carbon. The composition of asbestos was assumed to be Tremolite $[Ca_2Mg_5(Si_4O_{11})_2(OH)_2]_n$, from Dillard and Goldberg (1971).

Source Profile Number - 69

Non-Ferrous Metals

Source Category	Aluminum	Brass Foundry	Lead	Zinc	Weighted Average (0-10 Micron)
Weight Percent (%)	95.00 64%	95.00 21%	95.00 11%	95.00 4%	95.00 100%
Species					
Calcium	3.00				1.92
Chlorine	11.00			35.22	8.45
Chromium	0.05				0.05
Cobalt	0.05				0.05
Copper	0.05				0.05
Iron	6.00				3.84
Lead	0.05	14.0	87.0		12.54
Manganese	0.55				0.55
Molybdenum	0.05				0.05
Nickel	0.55				0.55
Potassium	0.55				0.55
Tin	0.05				0.05
Titanium	0.05				0.05
Zinc	0.05	47.0		15.92	10.54
Sulfates	16.00				10.24
Nitrates	0.55				0.55
Total Carbon	13.00			19.23	9.09
(Volatile Carbon)	13.00			19.23	9.09
Other	48.40	39.0	13.0	29.63	40.88
Totals	100.00	100.00	100.00	100.00	100.00

Basis: 64% Profile 11 (Aluminum Foundry); 21% Brass Foundry (Based on Danielson, 1967, p. 271); 11% Lead Fume; 4% Zinc Matting (Based on galvanising operation data from Danielson, 1967, p. 405, average of the two tests shown).

Weights % composition taken in proportion to emissions from such sources in Los Angeles as given by Chass et al. (1971), p. 23.

Source Profile Number - 70

Gray Iron Cupola

Size Range (Micron)	0-99	0-1	1-3	3-10	10-99	0-10
Weight Percent (%)	0.00	0.00	0.00	0.00	0.00	100.00

Species	
Aluminum	0.96
Antimony	0.24
Boron	0.052
Cadmium	0.097
Calcium	0.205
Chromium	0.021
Copper	0.37
Gallium	0.018
Germanium	0.016
Iron	6.75
Lead	17.0
Magnesium	0.30
Manganese	0.905
Molybdenum	0.007
Nickel	0.022
Potassium	1.35
Silicon	11.80
Silver	0.009
Tin	0.395
Titanium	0.027
Zinc	6.5
Other	52.96
Totals	100.00

Basis: Danielson (1967) p. 261, average of two tests (Size distribution after control is 95% < 10 micron)

References for Appendix B

Cass, G.R., Boone, P.M., Macias, E.S. (1981) "Emissions and Air Quality Relationships for Atmospheric Carbon Particles in Los Angeles," in Particulate Carbon: Atmospheric Life Cycle, G.T. Wolff and R.L. Klimisch eds., Plenum Press, New York.(In press)

Chass, R.L. et al. (1971) Profile of Air Pollution Control, Los Angeles, California, County of Los Angeles, Air Pollution Control District.

Danielson, J.A. (ed) (1967) Air Pollution Engineering Manual, U.S. Department of Health, Education and Welfare, Public Health Service, Document 999-AP-40, Cincinnati, Ohio.

Dillard, C.R. and Goldberg, D.E. (1971) Chemistry: Reactions, Structure, and Properties, The Macmillian Company, New York, 654 pp.

Friedlander, S.K. (1973) "Chemical Element Balances and Identification of Air Pollution Sources," Environmental Science and Technology, 7, 235-240.

Grisinger, J.G. (ed) (1981) "Draft 1979 Emissions Inventory for South Coast Air Basin," El Monte, California, South Coast Air Quality Management District, 1982 AQMP Revision Working Paper No. 1.

Habibi, K. (1973) "Characterization of Particulate Matter in Vehicle Exhaust," Environmental Science and Technology, 7, 223-234.

Heywood, J.B., Fay, J.A. and Linden, L.H. (1971) "Jet Aircraft Air Pollutant Production and Dispersion," AIAA Journal, 9, 841-850.

Huntzicker, J.J., Friedlander, S.K. and Davidson, C.I. (1975), "Material Balance for Automobile-Emitted Lead in Los Angeles Basin," Environmental Science and Technology, 9, 448-457.

Laresgoiti, A. and Springer, G.S. (1977) "Sulfate and Particulate Emissions from an Oxidation Catalyst Equipped Engine," Environmental Science and Technology, 11, 285-292.

Lynch, J.R. (1968) "Brake Lining Decomposition Products," J. Air Pollution Control Association, 18, 824-826.

Muhlbaier, J.L. and Williams, R.L. (1981) "Fireplaces, Furnaces and Vehicles as Emissions Sources of Particulate Carbon," in Particulate Carbon: Atmospheric Life Cycle, G.T. Wolff and R.L. Klimisch eds., Plenum Press, New York.(In press)

Pierson, W.R. (1976), Ford Motor Company, Personal Communication

Pierson, W.R. and W.W. Brachaczek (1974) Rubber Chemistry and Technology, 47, 1275-1299

Taback, H.J., Brienza, A.R., Macko, J. and Brunetz, N. (1979) "Fine Particle Emissions from Stationary and Miscellaneous Sources in the South Coast Air Basin," Report Number KVB 5806-783, KVB Inc., Tustin, California. (Profiles are contained in Appendix A)

Watson, J.G. Jr. (1979) Chemical Element Balance Receptor Model Methodology for assessing the sources of Fine and Total Suspended Particulate Matter in Portland, Oregon, Ph.D. Thesis, Oregon Graduate Center, Beaverton, Oregon.

APPENDIX C

PARTICULATE EMISSION INVENTORY FOR THE SOUTH COAST AIR BASIN

An inventory of fine particle emissions to the atmosphere of the South Coast Air Basin for the year 1976 is presented in this appendix. The 1974 air basin boundaries are used, including portions of Los Angeles, Riverside, San Bernardino, and Santa Barbara Counties, plus all of Ventura and Orange Counties. The basic emission inventory procedure is described in Cass et al. (1981). For a more detailed discussion of the steps in developing the inventory the reader is referred to that source. A summary of the information presented in this Appendix is presented in Table C.1.

Mobile source emission estimates have been calculated from fuel burning data assembled by Cass et al. (1980) plus the transportation mode growth survey by Cass (1980). Emissions from large stationary sources have been calculated from electric utility and South Coast Air Quality Management District (1980) fuel burning records. For smaller sources, the data presented in Cass et al. (1980) have been used. Industrial process and fugitive source emissions have been primarily derived from Taback et al. (1979) and Grisinger et al. (1981). Any modifications to data derived from the above literature sources are indicated in footnotes to the tables.

TABLE C.1

Summary of Information Presented in this Appendix

TABLE C.2

Estimated Fuel Combustion By Mobile Sources

Source Category	1973 Annual Average (10^9 BTU/Day)[a]	Growth Factor	1976 Annual Average (10^9 BTU/Day)[a]
Highway Vehicles			
Catalyst Autos & Lt. Trucks	0.0	(c)	368.78
Non-Catalyst Autos & Lt. Trucks	1566.58	(c)	1255.16
Medium & Heavy Gasoline Vehicles	213.64	1.068	228.17
Diesel Vehicles	117.53	1.068	125.52
Civil Aviation			
Jet Aircraft	47.40	0.94	44.56
Aviation Gasoline	1.37	0.94	1.29
Commercial Shipping			
Residual Oil-Fired Ships Boilers	24.66	1.01	29.41
Diesel Ships	17.26	1.01	17.43
Railroad			
Diesel Oil	29.32	0.68	19.94
Military			
Gasoline	6.03	1.00	6.03
Diesel Oil	17.81	1.00	17.81
Jet Fuel	16.71	1.00	16.71
Residual Oil (Bunker Fuel)	0.27	1.00	0.27
Miscellaneous			
Off-Highway Vehicles	39.73	1.00	39.73

Notes: (a) From Cass et al. (1980); Table A.3.6.

(b) From Cass (1980)

(c) See Table C.6 in this paper

TABLE C.3

Estimated Fuel Combustion By Stationary Sources

Source Category	1973 Annual Average (10^9 BTU/Day)[a]	1976 Annual Average (10^9 BTU/Day)[a]
Fuel Combustion		
Electric Utilities		
Natural Gas	440.55 (a)	227.45 (e)
Residual Oil (0.50%)	1058.36 (a)	993.42 (e)
Landfill & Digester Gas	0.82 (a)	0.82 (h)
Refinery Fuel		
Natural Gas	132.88 (b)	93.03 (g)
Refinery Gas	410.41 (b)	395.95 (g)
Residual Oil	32.33 (b)	32.97 (g)
Non-Refinery Industrial Fuel		
Natural Gas	421.64 (c)	421.64 (f)
LPG	2.74 (c)	2.74 (f)
Residual Oil	53.42 (c)	53.42 (f)
Distillate Oil	42.74 (c)	42.74 (f)
Digester Gas (IC Engines)	6.30 (c)	6.30 (f)
Coke Oven Gas	37.53 (d)	37.53 (f)
Residential/Commercial		
Natural Gas	1181.92 (c)	1181.92 (h)
LPG	18.08 (c)	18.08 (h)
Residual Oil	22.19 (c)	22.19 (h)
Distillate Oil	22.19 (c)	22.19 (h)

Notes: (a) From Cass et al. (1980), Table A3.5

(b) From Cass et al. (1980), Table A3.4

(c) From Cass et al. (1980), Table A3.6

(d) Danielson et al. (1976), p. 51, 2.17×10^6 equivalent bbl/year. A fuel oil equivalent barrel is 6.3×10^6 BTU

Footnotes for Table C.3 (Continued)

(e) 3.46×10^{14} BTU oil per year plus 7.9×10^{13} BTU natural gas per year burned at Southern California Edison plus Los Angeles Department of Water and Power steam plants in 1976. (Southern California Edison, 1976; Los Angeles Department of Water and Power, 1976). Totals for gas and oil scaled up by 4.7% to account for fuel burned at power plants of the cities of Glendale, Burbank and Pasadena.

(f) California Gas Report (1977) "Requirements" for industrial natural gas show that 1976 industrial fuel use was approximately the same as 1973.

(g) South Coast Air Quality Management District (1980)

(h) Survey by Cass (1980) shows little growth in demand since 1974.

TABLE C.4

Fuel Economy Calculations for 1976 Auto Fleet

Age (Years)	Model Year	Fraction of Total vehicles in use (b)	Annual Avg. Mileage Driven(b)	Fraction of Annual Travel	Fuel Economy (mpg)	Weighted Average Fuel Economy (mpg)
1	1976	0.083	15,900	0.116	16.5(a)	15.5(d)
2	1975	0.103	15,000	0.135	14.7(a)	
3	1974	0.102	14,000	0.125		
4	1973	0.106	13,100	0.122		
5	1972	0.099	12,200	0.106		
6	1971	0.087	11,300	0.086		
7	1970	0.092	10,300	0.083		
8	1969	0.088	9,400	0.072		
9	1968	0.068	8,500	0.051		
10	1967	0.055	7,600	0.037		13.6(b,c)
11	1966	0.039	6,700	0.023		
12	1965	0.021	6,700	0.012		
>13	1964(-)	0.057	6,700	0.033		

Notes:

(a) U.S. Environmental Protection Agency, Fleet Average Fuel Economy Data, reduced to 94% of measured value (see Bureau of National Affairs, 1982).

(b) U.S. Environmental Protection Agency (1976).

(c) Pre-catalyst auto fleet average fuel economy.

(d) Weighted average fuel economy for catalyst equipped automobiles.

TABLE C.5

Percentage of Vehicle Miles Traveled and Fuel Economy for Each Vehicle Type in 1976

Vehicle Type	Fraction of Daily Total Vehicle Miles Traveled (a)(b)	Weighted Average Fuel Economy (miles/gallon)
Automobiles		
Catalyst-equipped	19.2%	15.5 (c)
Non-catalyst type	77.6%	13.6 (d)
Light Trucks		
Catalyst-equipped	3.3%	11.4 (e)
Non-catalyst type	10.1%	10.0 (d)
Medium and Heavy Duty		
Gasoline Trucks	6.5%	6.83(f)
Diesel Trucks and Buses	3.5%	4.6 (d)

Notes:

(a) Fraction of vehicle miles travelled by automobiles, light trucks, medium and heavy gasoline trucks and buses and diesel trucks and buses computed from 1975 data reported for the South Coast Air Basin by TRW (Goodman et al., 1977; Arledge and Tan, 1977).

(b) Light duty vehicle miles traveled are divided into 25% by catalyst equipped vehicles and 75% by non-catalyst vehicles, as computed from Table C.4.

(c) Computed in Table C.4

(d) See U.S. Environmental Protection Agency (1976).

(e) Assuming improvement in newer light truck fuel economy proportional to that observed for new automobiles.

(f) Heavy trucks computed at 6 mpg (U.S. Environmental Protection Agency, 1976), medium trucks evaluated at 8 mpg.

TABLE C.6

Computation of 1976 Fuel Use by Gasoline-Powered Highway Vehicles

	Col 1 Percentage of Total Highway Vehicle Miles Traveled (a)	Col 2 Fraction of Miles Traveled Within Group Shown	Col 3 Total 1973 Gasoline Use by Entire Group (10^9 BTU/day) (b)	Col 4 Growth in Vehicle Miles Traveled: 1973 to 1976 (c)	Col 5 Change in Fuel Economy Relative to 1973 (d)	Col 6 Estimated 1976 Fuel Consumption (10^9 BTU/day) (e)
Vehicle Type						
Group 1						
Catalyst equipped autos	19.2%	0.25	1264	1.068	0.88	296.99
Non-catalyst autos	77.6%	0.75	1264	1.068	1.00	1012.46
Group 2						
Catalyst light trucks	3.3%	0.25	303	1.068	0.88	71.19
Non-catalyst light trucks	10.0%	0.75	303	1.068	1.00	242.70

Notes:

(a) From Table C.5

(b) From Cass et al. (1980)

(c) Computed from survey of growth in vehicle miles traveled; Cass (1980)

(d) Catalyst equipped auto fleet fuel economy computed at 15.5 mpg in Table C.5; non-catalyst older cars estimated at 13.6 mpg; relative improvement of catalyst fleet fuel economy is 13.6/15.5 = 0.88

(e) Col (2) x Col (3) x Col (4) x Col (5)

TABLE C.7

Emission Estimates From Mobile Sources

MOBILE SOURCES	Profile	Estimated Fuel Usage (10^9 BTU/day) (a)	Emission Factor	Emissions (kg/day)	Mass Fraction < 10 Micron (%)	Fine Particle Emissions (kg/day)
Highway Vehicles						
Catalyst Autos & Lt. Trucks	53	368.78	2.137 kg/10^9BTU (b)	788.	100.0	788.1
Non-Catalyst Autos & Lt. Trucks	54	1255.16	37.814 kg/10^9BTU (c)	47463.	60.0	28477.6
Medium & Heavy Gasoline Vehicles	54	228.17	43.596 kg/10^9BTU (d)	9947.	60.0	5968.4
Diesel Vehicles	52	125.52	64.200 kg/10^9BTU (e)	8058.	96.0	7736.0
Civil Aviation						
Jet Aircraft	55	44.56	U.S. EPA (1976) (f)	733.	100.0	733.0
Aviation Gasoline	54	1.29	9.08 g/LTO cycle (g)	28.	60.0	16.8
Commercial Shipping						
Residual Oil-Fired Ships Boilers	1	29.41	85.386 kg/10^9BTU (h)	2511.	87.0	2184.7
Diesel Ships	52	17.43	49.102 kg/10^9BTU (i)	856.	96.0	821.6
Railroad						
Diesel Oil	52	19.94	81.837 kg/10^9BTU (j)	1632.	96.0	1566.6
Military						
Gasoline	54	6.03	43.596 kg/10^9BTU (k)	263.	60.0	157.7
Diesel Oil	52	17.81	78.564 kg/10^9BTU (l)	1399.	96.0	1343.3
Jet Fuel	55	16.71	U.S. EPA (1976) (m)	659.	100.0	659.0
Residual Oil (Bunker Fuel)	1	0.27	83.386 kg/10^9BTU (n)	23.	87.0	19.6
Miscellaneous						
Off-Highway Vehicles	52	39.73	78.564 kg/10^9BTU (l)	3121.	96.0	2996.5
					SUB TOTAL	53468.9

Footnotes for Table C.7

(a) From Table C.2 of this appendix

(b) Laresgoiti and Springer (1977) at 0.3% sulfur in unleaded gasoline obtained 0.016 g/mile for oxidation catalyst car. Muhlbaier and Williams (1981) report 0.014 g/mile from test of 49-state oxidation catalyst equipped cars. At 0.015 g/mile and 17.8 miles/gallon for catalyst auto fleet, we obtain an emission factor of 2.137 kg/10^9 BTU.

(c) 0.35 g/mile from Habibi (1973) Table VIII (leaded fuel cars) adjusted upward to 0.0705 g/mile lead emitted; pre-1975 auto fuel economy of 13.6 miles/gallon is assumed; emission factor is 10.5 lb/1000 gallon or 37.184 kg/10^9 BTU.

(d) U.S. Environmental Protection Agency (1976) Table 3.1.4-13, 12 lb/1000 gallon or 45.596 kg/10^9 BTU.

(e) Los Angeles diesel usage emission factor of 0.83 g/km plus fuel consumption rate of 0.3536 l/km from Baines et al. (1979) gives 64.20 kg/10^9 BTU.

(f) Average daily emissions from jet engines at commercial airports were obtained from Federal Aviation Administration (1973) air traffic data plus U.S. Environmental Protection Agency (1976) part 3.2.1

(g) U.S. Environmental Protection Agency (1976) part 3.2.1 calculation procedure plus general aviation traffic data from Federal Aviation Administration (1973)

(h) Industrial boiler emissions factor of 21.619 kg/10^9 BTU at 0.4% S in fuel was scaled up to 85.386 kg/10^9 BTU at 1.58% S in bunker fuel based on evidence in Taback et al. (1979) that shows that particulate emissions rate from residual oil-fired boilers is roughly proportional to fuel oil sulfur content. The underlying reason for this is that higher sulfur fuels are higher in ash and asphaltenes. The fuel use shown for ships includes shipping lane activity from Pt. Conception to the south boundary of Orange County.

(i) U.S. Environmental Protection Agency (1976) Table 3.2.3-2 gives 15 lb/1000 gallons or 49.102 kg/10^9 BTU.

Footnotes for Table C.7 (Continued)

(j) U.S. Environmental Protection Agency (1976) Table 3.2.1-2 gives 25 lb/1000 gallons or 81.837 kg/10^9 BTU.

(k) From medium and heavy duty highway highway vehicle emission factor (d)

(l) U.S. Environmental Protection Agency (1976) Table 3.2.7-1 assumed at 24 lb/1000 gallons or 78.564 kg/10^9 BTU from mid-range of off highway diesels listed.

(m) Average daily emissions from jet engines at military airports were obtained from Federal Aviation Administration (1974) air traffic data plus U.S. Environmental Protection Agency (1976) part 3.2.1.

TABLE C.8

Emission Estimates For Stationary Combustion Sources

STATIONARY SOURCES	Profile	Estimated Fuel Usage (10^9 BTU/day) (a)	Emission Factor	Emissions (kg/day)	Mass Fraction < 10 Micron (%)	Fine Particle Emissions (kg/day)
Fuel Combustion						
Electric Utilities						
Natural Gas	27	227.45	1.081 kg/10^9BTU (b)	246.	95.0	233.6
Residual Oil (0.50%)	64	993.42	21.619 kg/10^9BTU (c)	21477.	97.0	20832.4
Landfill & Digester Gas	27	0.82	1.081 kg/10^9BTU (d)	1.	95.0	0.8
Refinery Fuel						
Natural Gas	27	93.03	9.080 kg/10^9BTU (e)	845.	95.0	802.5
Refinery Gas	27	395.95	9.080 kg/10^9BTU (e)	3595.	95.0	3415.5
Residual Oil	1	32.97	21.619 kg/10^9BTU (c)	713.	87.0	620.1
Non-Refinery Industrial Fuel						
Natural Gas	27	421.64	7.567 kg/10^9BTU (f)	3191.	95.0	3031.0
LPG	27	2.74	7.567 kg/10^9BTU (f)	21.	95.0	19.7
Residual Oil	1	53.42	21.619 kg/10^9BTU (f)	1155.	87.0	1004.8
Distillate Oil	2	42.74	23.520 kg/10^9BTU (g)	1005.	98.0	985.1
Digester Gas (IC Engines)	50	6.30	20.430 kg/10^9BTU (h)	129.	99.0	127.4
Coke Oven Gas	27	37.53	7.567 kg/10^9BTU (i)	284.	95.0	269.8
Residential/Commercial						
Natural Gas	51	1181.92	8.071 kg/10^9BTU (j)	9539.	95.0	9062.3
LPG	51	18.08	8.071 kg/10^9BTU (k)	146.	100.0	145.9
Residual Oil	1	22.19	21.619 kg/10^9BTU (l)	480.	100.0	479.7
Distillate Oil	2	22.19	21.619 kg/10^9BTU (m)	480.	98.0	470.1
					SUB TOTAL	41500.8

Footnotes for Table C.8

(a) From Table C.3 of this appendix

(b) Danielson et al. (1976), p. 77; 0.015 lb/equivalent barrel (1.081 kg/10^9BTU) from Los Angeles tests.

(c) Danielson et al. (1976), p. 77; 0.30 lb/bbl (21.619 kg/10^9BTU) for combustion of industrial residual fuel oil.

(d) Electric utility boiler natural gas combustion emission factor used.

(e) Danielson et al. (1976), p. 77; 0.126 lb/bbl (9.080 kg/10^9BTU)

(f) Danielson et al. (1976), p. 77; 0.105 lb/bbl (7.567 kg/10^9BTU); LPG combustion is assumed to emit at the same rate as as industrial natural gas combustion on an equivalent heat input basis. This is the same assumption as made by the U.S. Environmental Protection Agency (1976), Table 1.5-1, except that our natural gas emission factor is lower.

(g) Taback et al. (1979); Table 2-1, KVB data, 7.2 lb/1000 gallons (23.52 kg/10^9BTU).

(h) Average of two tests by Taback et al. (1979), (pp. 4-95, 4-101) performed on digester gas-fired IC engines; 0.045 lb/10^6BTU (20.43 kg/10^9BTU).

(i) Assumed similar to industrial natural gas combustion on an equivalent heat input basis.

(j) Danielson et al. (1976), p. 77; 0.112 lb/bbl (8.071 kg/10^9BTU)

(k) Assumed same as residential/commercial natural gas on an equivalent heat input basis. This is the same assumption as made by the U.S. Environmental Protection Agency (1976), Table 1.5-1, except that our natural gas emission factor is lower.

(l) Danielson et al. (1976), p. 77; 0.300 lb/bbl (21.619 kg/10^9BTU)

(m) U.S. Environmental Protection Agency (1976), Table 1.1-2, assuming hand-fired stove use, 20 lb/ton coal (378.333 kg/10^9BTU).

TABLE C.9

Industrial and Fugitive Emissions Based On 1979 AQMP Inventory (July 1981 Version)

STATIONARY SOURCES	Profile	Emissions (kg/day)	Mass Fraction < 10 Micron (%)	Fine Particle Emissions (kg/day)
Industrial Process Point Sources				
Petroleum Industry				
Refining	28	1943.	61.0	1185.2
Paving and Roofing Materials	19	527.	98.0	516.5
Other (calcining-mineral)	28	454.	61.0	276.9
Organic Solvent Use				
Surface Coating	22	772.	96.0	741.1
Printing	56	9.	99.0	8.9
Storage Loss	56	9.	99.0	8.9
Other	56	12.	99.0	11.9
Chemical Plants	24	1952.	96.0	1873.9
Metallurgical Industry				
Metals-General	65	1716.	100.0	1716.0
Primary Metals	65	4041.	100.0	4041.0
Secondary metals				
Non-Ferrous Metals	69	953.	95.0	905.3
Other	70	799.	95.0	759.0
Metal fabrication				
Non-Ferrous Metals	69	1153.	95.0	1095.3
Other	67	409.	100.0	409.0
Mineral Industry				
Glass Furnaces	17	708.	98.0	693.8
Rock, Stone, Other	33	10433.	10.0	1043.3
Waste Burning at Point Sources	5	209.	100.0	209.0
Wood and Paper Burning	5	263.	100.0	263.0

TABLE C.9 (Continued)

Industrial and Fugitive Emissions Based On 1979 AQMP Inventory (July 1981 Version)

STATIONARY SOURCES	Profile	Emissions (kg/day)	Mass Fraction < 10 Micron (%)	Fine Particle Emissions (kg/day)
Food and Agriculture				
Food and Kindred	56	6637.	100.0	6637.0
Grain Mill and Bakery	29	944.	29.0	273.8
Vegetable Oil	56	236.	100.0	236.0
Other	29	427.	29.0	123.8
Miscellaneous Industrial				
Iron and Steel Foundry	70	272.	100.0	272.0
Non-Ferrous Metals	69	182.	95.0	172.9
Other	67	663.	100.0	663.0
Unspecified	67	3514.	100.0	3514.0
			SUB TOTAL	27650.7

Notes:

(a) From Grisinger et al. (1981)

TABLE C.10

Emission Estimates From Other Fugitive Sources

FUGITIVE SOURCES	Profile	Emissions (kg/day)	Mass Fraction < 10 Micron (%)	Fine Particle Emissions (kg/day)
Road and Building Construction	57	176625. (a)	100.0	176625.0
Agricultural Tilling	57	23633. (a)	100.0	23633.0
Refuse Disposal Sites	57	746. (a)	100.0	746.0
Livestock Feedlots	59	3234. (a)	100.0	3234.0
Unpaved Road Travel	57	57216. (a)	100.0	57216.0
Paved Road Travel	58	165400. (b)	100.0	165400.0
Forest Fires (Seasonal)	60	5790. (a)	100.0	5790.0
Structural Fires	35	498. (a)	80.0	398.4
Fireplaces	63	1244. (a)	100.0	1244.0
Cigarettes	39	1990. (a)	100.0	1990.0
Agricultural Burning	61	1244. (a)	100.0	1244.0
Tire Attrition	38	6023. (a)	40.0	2409.2
Brake Lining Attrition	41	7712. (c)	100.0	7712.0
Sea Salt	62	49753. (a)	100.0	49753.0
			SUB TOTAL	497394.6

Footnotes for Table C.10

(a) Taback et al. (1979) Table 2-4.

(b) California Air Resources Board (1981) paved road travel emissions estimate for the South Coast Air Basin portion of Los Angeles, Orange, Riverside and San Bernardino Counties, plus estimates for Ventura County in order to closely match former air basin boundaries used here. Size cut is 15 micron or smaller.

(c) Daily tire-miles traveled estimated from Taback et al. (1979), Table 2-15; suspended aerosol emission rates of 0.0063 g/tire mile based on average of results by Pierson and Brachaczek (1974). Some of these particles may be larger than 10 micron.

TABLE C.11

Elemental Emission Estimates From Mobile Sources

MOBILE SOURCES	Profile	Emissions (kg/day)	Elements							
			Al	Sb	As	Ba	Bi	Br	Cd	Ca
Highway Vehicles										
Catalyst Autos & Lt. Trucks	53	788.08	0.9	0.0	0.0	0.0	0.0	0.0	0.0	1.3
Non-Catalyst Autos & Lt. Trucks	54	28477.57	12.2	0.0	0.0	0.0	0.0	2335.2	0.0	0.0
Medium & Heavy Gasoline Vehicles	54	5968.38	2.6	0.0	0.0	0.0	0.0	489.4	0.0	0.0
Diesel Vehicles	52	7736.05	26.3	0.0	0.0	0.0	0.0	2.4	0.0	65.0
Civil Aviation										
Jet Aircraft	55	733.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Aviation Gasoline	54	16.80	0.0	0.0	0.0	0.0	0.0	1.4	0.0	0.0
Commercial Shipping										
Residual Oil-Fired Ships Boilers	1	2184.75	0.0	0.0	0.8	1.1	0.0	0.0	0.0	12.0
Diesel Ships	52	821.61	2.8	0.0	0.0	0.0	0.0	0.3	0.0	6.9
Railroad										
Diesel Oil	52	1566.56	5.3	0.0	0.0	0.0	0.0	0.5	0.0	13.2
Military										
Gasoline	54	157.73	0.1	0.0	0.0	0.0	0.0	12.9	0.0	0.0
Diesel Oil	52	1343.26	4.6	0.0	0.0	0.0	0.0	0.4	0.0	11.3
Jet Fuel	55	659.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Residual Oil (Bunker Fuel)	1	19.59	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Miscellaneous										
Off-Highway Vehicles	52	2996.49	10.2	0.0	0.0	0.0	0.0	0.9	0.0	25.2
SUB TOTALS		53468.9	65.0	0.0	0.8	1.1	0.0	2843.4	0.0	135.0

TABLE C.11 (Continued)

Emission Estimates From Mobile Sources

MOBILE SOURCES	Profile	Emissions (kg/day)	Elements							
			Cs	Cl	Cr	Co	Cu	Fe	La	Pb
Highway Vehicles										
Catalyst Autos & Lt. Trucks	53	788.08	0.0	0.0	0.0	0.0	0.2	0.9	0.0	0.0
Non-Catalyst Autos & Lt. Trucks	54	28477.57	0.0	1537.8	0.0	0.0	1.1	71.2	0.0	6008.8
Medium & Heavy Gasoline Vehicles	54	5968.38	0.0	322.3	0.0	0.0	0.2	14.9	0.0	1259.3
Diesel Vehicles	52	7736.05	0.0	130.7	0.0	0.0	56.5	102.1	0.0	7.3
Civil Aviation										
Jet Aircraft	55	733.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Aviation Gasoline	54	16.80	0.0	0.9	0.0	0.0	0.0	0.0	0.0	3.5
Commercial Shipping										
Residual Oil-Fired Ships Boilers	1	2184.75	0.0	0.0	12.0	1.1	1.1	69.2	0.0	0.0
Diesel Ships	52	821.61	0.0	13.9	0.0	0.0	6.0	10.8	0.0	0.8
Railroad										
Diesel Oil	52	1566.56	0.0	26.5	0.0	0.0	11.4	20.7	0.0	1.5
Military										
Gasoline	54	157.73	0.0	8.5	0.0	0.0	0.0	0.4	0.0	33.3
Diesel Oil	52	1343.26	0.0	22.7	0.0	0.0	9.8	17.7	0.0	1.3
Jet Fuel	55	659.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Residual Oil (Bunker Fuel)	1	19.59	0.0	0.0	0.1	0.0	0.0	0.6	0.0	0.0
Miscellaneous										
Off-Highway Vehicles	52	2996.49	0.0	50.6	0.0	0.0	21.9	39.6	0.0	2.8
SUB TOTALS		53468.9	0.0	2113.9	12.1	1.1	108.3	348.2	0.0	7318.7

TABLE C.11 (Continued)

Elemental Emission Estimates From Mobile Sources

MOBILE SOURCES	Profile	Emissions (kg/day)	Elements Mg	Mn	Mo	Nd	Ni	K	Pr	Rb
Highway Vehicles										
Catalyst Autos & Lt. Trucks	53	788.08	0.0	0.1	0.0	0.0	0.1	0.3	0.0	0.0
Non-Catalyst Autos & Lt. Trucks	54	28477.57	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Medium & Heavy Gasoline Vehicles	54	5968.38	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diesel Vehicles	52	7736.05	0.0	2.1	0.0	0.0	0.0	0.0	0.0	0.0
Civil Aviation										
Jet Aircraft	55	733.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Aviation Gasoline	54	16.80	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Commercial Shipping										
Residual Oil-Fired Ships Boilers	1	2184.75	0.0	1.1	1.1	0.0	12.0	9.1	0.0	0.0
Diesel Ships	52	821.61	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0
Railroad										
Diesel Oil	52	1566.56	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0
Military										
Gasoline	54	157.73	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diesel Oil	52	1343.26	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0
Jet Fuel	55	659.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Residual Oil (Bunker Fuel)	1	19.59	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0
Miscellaneous										
Off-Highway Vehicles	52	2996.49	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0
	SUB TOTALS	53468.9	0.0	5.1	1.1	0.0	12.2	9.5	0.0	0.0

TABLE C.11 (Continued)

Elemental Emission Estimates From Mobile Sources

MOBILE SOURCES	Profile	Emissions (kg/day)	Elements Se	Si	Ag	Na	Sr	Sn	Ti
Highway Vehicles									
Catalyst Autos & Lt. Trucks	53	788.08	0.0	4.0	0.0	0.0	0.0	0.0	0.0
Non-Catalyst Autos & Lt. Trucks	54	28477.57	0.0	21.4	0.0	0.0	0.0	0.0	0.0
Medium & Heavy Gasoline Vehicles	54	5968.38	0.0	4.5	0.0	0.0	0.0	0.0	0.0
Diesel Vehicles	52	7736.05	0.0	13.2	0.0	28.6	0.0	0.0	0.0
Civil Aviation									
Jet Aircraft	55	733.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Aviation Gasoline	54	16.80	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Commercial Shipping									
Residual Oil-Fired Ships Boilers	1	2184.75	1.1	0.0	0.0	0.0	1.1	0.0	1.1
Diesel Ships	52	821.61	0.0	1.4	0.0	3.0	0.0	0.0	0.0
Railroad									
Diesel Oil	52	1566.56	0.0	2.7	0.0	5.8	0.0	0.0	0.0
Military									
Gasoline	54	157.73	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Diesel Oil	52	1343.26	0.0	2.3	0.0	5.0	0.0	0.0	0.0
Jet Fuel	55	659.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Residual Oil (Bunker Fuel)	1	19.59	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Miscellaneous									
Off-Highway Vehicles	52	2996.49	0.0	5.1	0.0	11.1	0.0	0.0	0.0
SUB TOTALS		53468.9	1.1	54.6	0.0	53.5	1.1	0.0	1.1

TABLE C.11 (Continued)

Elemental Emission Estimates From Mobile Sources

MOBILE SOURCES	Profile	Emissions (kg/day)	Elements V	Zn	Zr	$SO_4^=$	NO_3^-	TC
Highway Vehicles								
Catalyst Autos & Lt. Trucks	53	788.08	0.0	0.6	0.0	394.0	0.0	307.4
Non-Catalyst Autos & Lt. Trucks	54	28477.57	0.0	6.0	0.0	59.8	0.0	15520.3
Medium & Heavy Gasoline Vehicles	54	5968.38	0.0	1.3	0.0	12.5	0.0	3252.8
Diesel Vehicles	52	7736.05	0.8	17.8	0.0	324.9	55.7	5415.2
Civil Aviation								
Jet Aircraft	55	733.00	0.0	0.0	0.0	0.0	0.0	703.7
Aviation Gasoline	54	16.80	0.0	0.0	0.0	0.0	0.0	9.2
Commercial Shipping								
Residual Oil-Fired Ships Boilers	1	2184.75	12.0	0.0	0.0	1099.2	1.1	446.0
Diesel Ships	52	821.61	0.1	1.9	0.0	34.5	5.9	575.1
Railroad								
Diesel Oil	52	1566.56	0.2	3.6	0.0	65.8	11.3	1096.6
Military								
Gasoline	54	157.73	0.0	0.0	0.0	0.3	0.0	86.0
Diesel Oil	52	1343.26	0.1	3.1	0.0	56.4	9.7	940.3
Jet Fuel	55	659.00	0.0	0.0	0.0	0.0	0.0	632.6
Residual Oil (Bunker Fuel)	1	19.59	0.1	0.0	0.0	9.9	0.0	4.0
Miscellaneous								
Off-Highway Vehicles	52	2996.49	0.3	6.9	0.0	125.9	21.6	2097.5
SUB TOTALS		53468.9	13.6	41.2	0.0	2183.2	105.2	31086.6

TABLE C.12

Emission Estimates From Stationary Combustion Sources

STATIONARY SOURCES	Profile	Emissions (kg/day)	Elements Al	Sb	As	Ba	Bi	Br	Cd	Ca
Fuel Combustion										
Electric Utilities										
Natural Gas	27	233.58	0.0	0.0	0.0	0.0	0.0	0.1	0.1	11.7
Residual Oil (0.50%)	64	20832.44	0.0	0.0	2.9	33.3	0.0	70.8	4.6	233.3
Landfill & Digester Gas	27	0.84	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Refinery Fuel										
Natural Gas	27	802.48	0.0	0.0	0.0	0.0	0.0	0.4	0.4	40.1
Refinery Gas	27	3415.46	0.0	0.0	0.0	0.0	0.0	1.7	1.7	170.8
Residual Oil	1	620.12	0.0	0.0	0.2	0.3	0.0	0.0	0.0	3.4
Non-Refinery Industrial Fuel										
Natural Gas	27	3031.02	0.0	0.0	0.0	0.0	0.0	1.5	1.5	151.6
LPG	27	19.70	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0
Residual Oil	1	1004.75	0.0	0.0	0.4	0.5	0.0	0.0	0.0	5.5
Distillate Oil	2	985.14	0.0	0.0	5.3	0.0	0.0	0.0	0.5	0.0
Digester Gas (IC Engines)	50	127.42	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Coke Oven Gas	27	269.79	0.0	0.0	0.0	0.0	0.0	0.1	0.1	13.5
Residential/Commercial										
Natural Gas	51	9062.31	0.0	0.0	0.0	0.0	0.0	4.5	4.5	453.1
LPG	51	145.92	0.0	0.0	0.0	0.0	0.0	0.1	0.1	7.3
Residual Oil	1	479.73	0.0	0.0	0.2	0.2	0.0	0.0	0.0	2.6
Distillate Oil	2	470.13	0.0	0.0	2.5	0.0	0.0	0.0	0.2	0.0
	SUB TOTALS	41500.8	0.0	0.0	11.6	34.4	0.0	79.3	13.8	1094.0

TABLE C.12 (Continued)

Emission Estimates From Stationary Combustion Sources

STATIONARY SOURCES	Profile	Emissions (kg/day)	Elements Cs	Cl	Cr	Co	Cu	Fe	La	Pb
Fuel Combustion										
Electric Utilities										
Natural Gas	27	233.58	0.0	0.0	1.3	4.7	0.1	1.3	0.0	0.1
Residual Oil (0.50%)	64	20832.44	0.0	0.0	27.1	9.8	8.7	235.4	0.0	13.3
Landfill & Digester Gas	27	0.84	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Refinery Fuel										
Natural Gas	27	802.48	0.0	0.0	4.4	16.0	0.4	4.4	0.0	0.4
Refinery Gas	27	3415.46	0.0	0.0	18.8	68.3	1.7	18.8	0.0	1.7
Residual Oil	1	620.12	0.0	0.0	3.4	0.3	0.3	19.6	0.0	0.0
Non-Refinery Industrial Fuel										
Natural Gas	27*	3031.02	0.0	0.0	16.7	*	1.5	16.7	0.0	1.5
LPG	27*	19.70	0.0	0.0	0.1	*	0.0	0.1	0.0	0.0
Residual Oil	1	1004.75	0.0	0.0	5.5	0.5	0.5	31.8	0.0	0.0
Distillate Oil	2	985.14	0.0	0.0	5.3	0.0	0.0	0.0	0.0	5.4
Digester Gas (IC Engines)	50	127.42	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Coke Oven Gas	27*	269.79	0.0	0.0	1.5	*	0.1	1.5	0.0	0.1
Residential/Commercial										
Natural Gas	51*	9062.31	0.0	0.0	49.8	*	4.5	49.8	0.0	4.5
LPG	51*	145.92	0.0	0.0	0.8	*	0.1	0.8	0.0	0.1
Residual Oil	1	479.73	0.0	0.0	2.6	0.2	0.2	15.2	0.0	0.0
Distillate Oil	2	470.13	0.0	0.0	2.5	0.0	0.0	0.0	0.0	2.6
SUB TOTALS		41500.8	0.0	0.0	139.9	99.8	18.3	395.5	0.0	29.8

* High cobalt content in these gaseous fuel profiles is believed to be due to contamination of source tested by prior oil burning. When these profiles are applied to sources that seldom burn oil, cobalt emissions are neglected.

TABLE C.12 (Continued)

Emission Estimates For Stationary Combustion Sources

STATIONARY SOURCES	Profile	Emissions (kg/day)	Elements Mg	Mn	Mo	Nd	Ni	K	Pr	Rb
Fuel Combustion										
Electric Utilities										
Natural Gas	27	233.58	0.0	0.1	0.1	0.0	1.3	0.0	0.0	0.0
Residual Oil (0.50%)	64	20832.44	0.0	10.8	4.8	0.0	441.6	18.7	0.0	0.4
Landfill & Digester Gas	27	0.84	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Refinery Fuel										
Natural Gas	27	802.48	0.0	0.4	0.4	0.0	4.4	0.0	0.0	0.0
Refinery Gas	27	3415.46	0.0	1.7	1.7	0.0	18.8	0.0	0.0	0.0
Residual Oil	1	620.12	0.0	0.3	0.3	0.0	3.4	2.6	0.0	0.0
Non-Refinery Industrial Fuel										
Natural Gas	27	3031.02	0.0	1.5	1.5	0.0	16.7	0.0	0.0	0.0
LPG	27	19.70	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Residual Oil	1	1004.75	0.0	0.5	0.5	0.0	5.5	4.2	0.0	0.0
Distillate Oil	2	985.14	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0
Digester Gas (IC Engines)	50	127.42	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0
Coke Oven Gas	27	269.79	0.0	0.1	0.1	0.0	1.5	0.0	0.0	0.0
Residential/Commercial										
Natural Gas	51	9062.31	0.0	4.5	0.0	0.0	0.0	0.0	0.0	0.0
LPG	51	145.92	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Residual Oil	1	479.73	0.0	0.2	0.2	0.0	2.6	2.0	0.0	0.0
Distillate Oil	2	470.13	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0
SUB TOTALS		41500.8	0.0	20.4	9.8	0.0	496.8	27.5	0.0	0.4

TABLE C.12 (Continued)

Emission Estimates From Stationary Combustion Sources

STATIONARY SOURCES	Profile	Emissions (kg/day)	Elements Se	Si	Ag	Na	Sr	Sn	Ti
Fuel Combustion									
Electric Utilities									
Natural Gas	27	233.58	1.3	0.0	0.0	0.0	0.1	0.0	0.0
Residual Oil (0.50%)	64	20832.44	20.4	0.0	1.7	0.0	0.0	0.0	1.7
Landfill & Digester Gas	27	0.84	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Refinery Fuel									
Natural Gas	27	802.48	4.4	0.0	0.0	0.0	0.4	0.0	0.0
Refinery Gas	27	3415.46	18.8	0.0	0.0	0.0	1.7	0.0	0.0
Residual Oil	1	620.12	0.3	0.0	0.0	0.0	0.3	0.0	0.3
Non-Refinery Industrial Fuel									
Natural Gas	27	3031.02	16.7	0.0	0.0	0.0	1.5	0.0	0.0
LPG	27	19.70	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Residual Oil	1	1004.75	0.5	0.0	0.0	0.0	0.5	0.0	0.5
Distillate Oil	2	985.14	0.5	0.0	0.0	0.0	0.0	0.5	0.5
Digester Gas (IC Engines)	50	127.42	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Coke Oven Gas	27	269.79	1.5	0.0	0.0	0.0	0.1	0.0	0.0
Residential/Commercial									
Natural Gas	51	9062.31	49.8	0.0	0.0	0.0	4.5	0.0	0.0
LPG	51	145.92	0.8	0.0	0.0	0.0	0.1	0.0	0.0
Residual Oil	1	479.73	0.2	0.0	0.0	0.0	0.2	0.0	0.2
Distillate Oil	2	470.13	0.2	0.0	0.0	0.0	0.0	0.2	0.2
SUB TOTALS		41500.8	115.6	0.0	1.7	0.0	9.5	0.7	3.4

TABLE C.12 (Continued)

Emission Estimates For Stationary Combustion Sources

STATIONARY SOURCES	Profile	Emissions (kg/day)	Elements V	Zn	Zr	$SO_4^=$	NO_3^-	TC
Fuel Combustion								
Electric Utilities								
Natural Gas	27	233.58	0.0	1.3	0.1	109.8	1.3	16.4
Residual Oil (0.50%)	64	20832.44	70.8	20.8	0.0	6645.5	937.5	3104.0
Landfill & Digester Gas	27	0.84	0.0	0.0	0.0	0.4	0.0	0.1
Refinery Fuel								
Natural Gas	27	802.48	0.0	4.4	0.4	377.2	4.4	56.2
Refinery Gas	27	3415.46	0.0	18.8	1.7	1605.3	18.8	239.1
Residual Oil	1	620.12	3.4	0.0	0.0	312.0	0.3	126.6
Non-Refinery Industrial Fuel								
Natural Gas	27	3031.02	0.0	16.7	1.5	1424.6	16.7	212.2
LPG	27	19.70	0.0	0.1	0.0	9.3	0.1	1.4
Residual Oil	1	1004.75	5.5	0.0	0.0	505.5	0.5	205.1
Distillate Oil	2	985.14	0.0	5.4	0.0	246.3	38.8	147.8
Digester Gas (IC Engines)	50	127.42	0.0	0.0	0.0	58.0	2.7	26.8
Coke Oven Gas	27	269.79	0.0	1.5	0.1	126.8	1.5	18.9
Residential/Commercial								
Natural Gas	51	9062.31	0.0	49.8	4.5	4259.3	5.0	1087.5
LPG	51	145.92	0.0	0.8	0.1	68.6	0.1	17.5
Residual Oil	1	479.73	2.6	0.0	0.0	241.4	0.2	97.9
Distillate Oil	2	470.13	0.0	2.6	0.0	117.5	18.5	70.5
SUB TOTALS		41500.8	82.4	122.2	8.5	16107.3	1046.4	5427.8

TABLE C.13

Elemental Emissions From Industrial and Fugitive Sources Based On 1979 AQMP Inventory (July 1981 Version)

STATIONARY SOURCES	Profile	Emissions (kg/day)	Elements Al	Sb	As	Ba	Bi	Br	Cd	Ca
Industrial Process Point Sources										
Petroleum Industry										
Refining	28	1185.23	0.0	0.0	0.6	0.0	0.0	0.0	0.0	6.5
Paving and Roofing Materials	19	516.46	0.0	0.0	0.0	0.3	0.0	0.3	0.3	15.5
Other (calcining-mineral)	28	276.94	0.0	0.0	0.1	0.0	0.0	0.0	0.0	1.5
Organic Solvent Use										
Surface Coating	22	741.12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.1
Printing	56	8.91	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Storage Loss	56	8.91	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other	56	11.88	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chemical Plants	24	1873.92	0.0	0.0	0.0	0.0	0.0	0.9	0.9	10.3
Metallurgical Industry										
Metals-General	65	1716.00	0.0	0.3	2.1	0.0	0.0	2.0	2.1	4.7
Primary Metals	65	4041.00	0.0	0.6	4.8	0.0	0.0	4.8	4.8	11.1
Secondary metals										
Non-Ferrous Metals	69	905.35	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.4
Other	70	759.05	7.3	1.8	0.0	0.0	0.0	0.0	0.7	1.6
Metal fabrication										
Non-Ferrous Metals	69	1095.35	0.0	0.0	0.0	0.0	0.0	0.0	0.0	21.0
Other	67	409.00	0.0	0.0	0.1	0.0	0.0	0.2	0.1	1.4
Mineral Industry										
Glass Furnaces	17	693.84	0.0	0.0	13.9	0.0	0.0	0.0	0.0	0.0
Rock, Stone, Other	33	1043.30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Waste Burning at Point Sources	5	209.00	0.0	0.0	0.1	0.1	0.0	0.0	0.1	3.3

TABLE C.13 (Continued)

Elemental Emissions From Industrial and Fugitive Sources Based On 1979 AQMP Inventory (July 1981 Version)

STATIONARY SOURCES	Profile	Emissions (kg/day)	Elements Al	Sb	As	Ba	Bi	Br	Cd	Ca
Wood and Paper Burning	5	263.00	0.0	0.0	0.1	0.1	0.0	0.0	0.1	4.1
Food and Agriculture										
Food and Kindred	56	6637.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Grain Mill and Bakery	29	273.76	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5
Vegetable Oil	56	236.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other	29	123.83	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7
Miscellaneous Industrial										
Iron and Steel Foundry	70	272.00	2.6	0.7	0.0	0.0	0.0	0.0	0.3	0.6
Non-Ferrous Metals	69	172.90	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.3
Other	67	663.00	0.0	0.0	0.1	0.0	0.0	0.2	0.1	2.2
Unspecified	67	3514.00	0.0	0.0	0.6	0.2	0.1	1.3	0.6	11.9
SUB TOTALS		27650.7	9.9	3.4	22.5	0.7	0.1	9.8	10.1	122.7

TABLE C.13 (Continued)

Elemental Emissions From Industrial and Fugitive Sources Based On 1979 AQMP Inventory (July 1981 Version)

STATIONARY SOURCES	Profile	Emissions (kg/day)	Elements Cs	Cl	Cr	Co	Cu	Fe	La	Pb
Industrial Process Point Sources										
Petroleum Industry										
Refining	28	1185.23	21.8	0.0	0.0	0.0	0.0	11.5	10.4	0.6
Paving and Roofing Materials	19	516.46	62.0	0.3	0.0	10.3	0.3	10.3	0.0	0.3
Other (calcining-mineral)	28	276.94	5.1	0.0	0.0	0.0	0.0	2.7	2.4	0.1
Organic Solvent Use										
Surface Coating	22	741.12	0.0	0.0	0.0	0.0	0.0	4.1	0.0	0.0
Printing	56	8.91	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Storage Loss	56	8.91	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other	56	11.88	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chemical Plants	24	1873.92	0.0	205.0	0.0	0.9	0.9	1.1	0.0	0.0
Metallurgical Industry										
Metals-General	65	1716.00	1.8	55.6	20.0	0.0	9.4	100.7	0.0	38.9
Primary Metals	65	4041.00	4.2	130.9	47.0	0.0	22.2	237.1	0.0	91.6
Secondary metals										
Non-Ferrous Metals	69	905.35	0.0	76.5	0.5	0.5	0.5	34.8	0.0	113.2
Other	70	759.05	0.0	0.0	0.2	0.0	2.8	51.2	0.0	129.0
Metal fabrication										
Non-Ferrous Metals	69	1095.35	0.0	92.6	0.5	0.5	0.5	42.1	0.0	136.9
Other	67	409.00	0.7	5.3	0.4	0.0	0.3	3.2	0.3	0.8
Mineral Industry										
Glass Furnaces	17	693.84	0.0	0.0	3.8	0.0	0.0	3.8	0.0	3.8
Rock, Stone, Other	33	1043.30	0.0	0.0	0.0	0.0	0.5	5.7	0.0	0.0
Waste Burning at Point Sources	5	209.00	0.0	3.1	0.1	0.0	0.1	2.4	0.0	0.1

TABLE C.13 (Continued)

Elemental Emissions From Industrial and Fugitive Sources Based On 1979 AQMP Inventory (July 1981 Version)

STATIONARY SOURCES	Profile	Emissions (kg/day)	Elements							
			Cs	Cl	Cr	Co	Cu	Fe	La	Pb
Wood and Paper Burning	5	263.00	0.0	3.9	0.1	0.0	0.1	3.0	0.0	0.1
Food and Agriculture										
Food and Kindred	56	6637.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Grain Mill and Bakery	29	273.76	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0
Vegetable Oil	56	236.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other	29	123.83	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0
Miscellaneous Industrial										
Iron and Steel Foundry	70	272.00	0.0	0.0	0.1	0.0	1.0	18.4	0.0	46.2
Non-Ferrous Metals	69	172.90	0.0	14.6	0.1	0.1	0.1	6.6	0.0	21.6
Other	67	663.00	1.1	8.7	0.7	0.0	0.4	5.2	0.5	1.3
Unspecified	67	3514.00	5.7	45.8	3.6	0.1	2.3	27.7	2.6	7.0
	SUB TOTALS	27650.7	102.3	642.2	77.1	12.5	41.7	571.8	16.2	591.6

TABLE C.13 (Continued)

Elemental Emissions From Industrial and Fugitive Sources Based On 1979 AQMP Inventory (July 1981 Version)

STATIONARY SOURCES	Profile	Emissions (kg/day)	Elements							
			Mg	Mn	Mo	Nd	Ni	K	Pr	Rb
Industrial Process Point Sources										
Petroleum Industry										
Refining	28	1185.23	0.0	0.0	0.6	6.5	0.6	0.0	6.5	0.0
Paving and Roofing Materials	19	516.46	0.0	2.8	0.3	0.0	2.8	2.8	0.0	0.0
Other (calcining-mineral)	28	276.94	0.0	0.0	0.1	1.5	0.1	0.0	1.5	0.0
Organic Solvent Use										
Surface Coating	22	741.12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Printing	56	8.91	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Storage Loss	56	8.91	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other	56	11.88	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chemical Plants	24	1873.92	0.0	0.9	0.9	0.0	0.9	10.3	0.0	0.0
Metallurgical Industry										
Metals-General	65	1716.00	0.0	4.7	0.4	0.0	2.9	91.0	0.0	2.1
Primary Metals	65	4041.00	0.0	11.1	1.0	0.0	6.9	214.4	0.0	4.8
Secondary metals										
Non-Ferrous Metals	69	905.35	0.0	5.0	0.5	0.0	5.0	5.0	0.0	0.0
Other	70	759.05	2.3	6.9	0.1	0.0	0.2	10.2	0.0	0.0
Metal fabrication										
Non-Ferrous Metals	69	1095.35	0.0	6.0	0.5	0.0	6.0	6.0	0.0	0.0
Other	67	409.00	0.0	0.3	0.2	0.2	0.3	2.8	0.2	0.0
Mineral Industry										
Glass Furnaces	17	693.84	0.0	0.0	0.0	0.0	0.3	20.8	0.0	0.0
Rock, Stone, Other	33	1043.30	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0
Waste Burning at Point Sources	5	209.00	0.0	1.1	1.1	0.0	1.1	3.5	0.0	0.0

TABLE C.13 (Continued)

Elemental Emissions From Industrial and Fugitive Sources Based On 1979 AQMP Inventory (July 1981 Version)

STATIONARY SOURCES	Profile	Emissions (kg/day)	Elements Mg	Mn	Mo	Nd	Ni	K	Pr	Rb
Wood and Paper Burning	5	263.00	0.0	1.4	1.4	0.0	1.4	4.4	0.0	0.0
Food and Agriculture										
Food and Kindred	56	6637.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Grain Mill and Bakery	29	273.76	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0
Vegetable Oil	56	236.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other	29	123.83	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0
Miscellaneous Industrial										
Iron and Steel Foundry	70	272.00	0.8	2.5	0.0	0.0	0.1	3.7	0.0	0.0
Non-Ferrous Metals	69	172.90	0.0	1.0	0.1	0.0	1.0	1.0	0.0	0.0
Other	67	663.00	0.0	0.5	0.4	0.3	0.5	4.5	0.3	0.1
Unspecified	67	3514.00	0.0	2.6	2.0	1.6	2.6	23.6	1.6	0.4
SUB TOTALS		27650.7	3.1	46.9	9.8	10.1	33.4	406.2	10.1	7.5

TABLE C.13 (Continued)

Elemental Emissions From Industrial and Fugitive Sources Based On 1979 AQMP Inventory (July 1981 Version)

STATIONARY SOURCES	Profile	Emissions (kg/day)	Elements Se	Si	Ag	Na	Sr	Sn	Ti
Industrial Process Point Sources									
Petroleum Industry									
Refining	28	1185.23	0.0	39.4	0.0	0.0	0.6	0.0	6.5
Paving and Roofing Materials	19	516.46	2.8	0.0	0.3	0.0	0.0	0.0	0.0
Other (calcining-mineral)	28	276.94	0.0	9.2	0.0	0.0	0.1	0.0	1.5
Organic Solvent Use									
Surface Coating	22	741.12	0.0	0.0	0.0	0.0	0.0	0.0	22.2
Printing	56	8.91	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Storage Loss	56	8.91	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other	56	11.88	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chemical Plants	24	1873.92	0.9	0.0	0.0	0.0	0.0	0.0	0.0
Metallurgical Industry									
Metals-General	65	1716.00	0.2	0.0	0.4	0.0	0.2	0.3	0.0
Primary Metals	65	4041.00	0.4	0.0	1.0	0.0	0.4	0.6	0.0
Secondary metals									
Non-Ferrous Metals	69	905.35	0.0	0.0	0.0	0.0	0.0	0.5	0.5
Other	70	759.05	0.0	89.6	0.1	0.0	0.0	3.0	0.2
Metal fabrication									
Non-Ferrous Metals	69	1095.35	0.0	0.0	0.0	0.0	0.0	0.5	0.5
Other	67	409.00	0.0	23.3	0.0	0.0	0.0	0.0	1.2
Mineral Industry									
Glass Furnaces	17	693.84	26.9	0.0	0.0	0.0	0.0	0.0	0.0
Rock, Stone, Other	33	1043.30	0.0	417.3	0.0	0.0	0.0	0.0	0.0
Waste Burning at Point Sources	5	209.00	0.1	20.9	0.0	0.0	0.1	0.0	0.2

TABLE C.13 (Continued)

Elemental Emissions From Industrial and Fugitive Sources Based On 1979 AQMP Inventory (July 1981 Version)

STATIONARY SOURCES	Profile	Emissions (kg/day)	Elements Se	Si	Ag	Na	Sr	Sn	Ti
Wood and Paper Burning	5	263.00	0.1	26.3	0.0	0.0	0.1	0.0	0.2
Food and Agriculture									
Food and Kindred	56	6637.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Grain Mill and Bakery	29	273.76	0.0	41.1	0.0	0.0	0.0	0.0	0.0
Vegetable Oil	56	236.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other	29	123.83	0.0	18.6	0.0	0.0	0.0	0.0	0.0
Miscellaneous Industrial									
Iron and Steel Foundry	70	272.00	0.0	32.1	0.0	0.0	0.0	1.1	0.1
Non-Ferrous Metals	69	172.90	0.0	0.0	0.0	0.0	0.0	0.1	0.1
Other	67	663.00	0.1	37.7	0.0	0.0	0.1	0.0	2.0
Unspecified	67	3514.00	0.3	200.1	0.1	0.0	0.4	0.1	10.7
SUB TOTALS		27650.7	31.8	955.5	1.9	0.0	2.0	6.2	45.9

TABLE C.13 (Continued)

Elemental Emissions From Industrial and Fugitive Sources Based On 1979 AQMP Inventory (July 1981 Version)

STATIONARY SOURCES	Profile	Emissions (kg/day)	Elements V	Zn	Zr	$SO_4^=$	NO_3^-	TC
Industrial Process Point Sources								
Petroleum Industry								
Refining	28	1185.23	0.0	0.0	0.0	507.9	0.0	39.6
Paving and Roofing Materials	19	516.46	0.0	2.8	0.0	116.9	0.0	124.0
Other (calcining-mineral)	28	276.94	0.0	0.0	0.0	118.7	0.0	9.3
Organic Solvent Use								
Surface Coating	22	741.12	0.0	0.0	0.0	14.8	0.0	407.6
Printing	56	8.91	0.0	0.0	0.0	0.0	0.0	7.4
Storage Loss	56	8.91	0.0	0.0	0.0	0.0	0.0	7.4
Other	56	11.88	0.0	0.0	0.0	0.0	0.0	9.9
Chemical Plants	24	1873.92	0.0	0.9	0.0	75.5	10.3	618.4
Metallurgical Industry								
Metals-General	65	1716.00	2.9	1.8	0.2	276.6	2.9	856.5
Primary Metals	65	4041.00	6.9	4.2	0.4	651.4	6.9	2016.9
Secondary metals								
Non-Ferrous Metals	69	905.35	0.0	95.1	0.0	92.3	0.5	82.3
Other	70	759.05	0.0	49.3	0.0	0.0	0.0	0.0
Metal fabrication								
Non-Ferrous Metals	69	1095.35	0.0	115.0	0.0	111.7	0.6	99.6
Other	67	409.00	0.1	0.2	0.0	23.5	0.3	196.3
Mineral Industry								
Glass Furnaces	17	693.84	0.0	0.0	0.0	383.7	3.8	80.7
Rock, Stone, Other	33	1043.30	0.0	0.0	0.0	5.7	0.0	0.0
Waste Burning at Point Sources	5	209.00	0.0	0.9	0.0	5.6	0.0	62.7

TABLE C.13 (Continued)

Elemental Emissions From Industrial and Fugitive Sources Based On 1979 AQMP Inventory (July 1981 Version)

STATIONARY SOURCES	Profile	Emissions (kg/day)	Elements V	Zn	Zr	$SO_4^=$	NO_3^-	TC
Wood and Paper Burning	5	263.00	0.0	1.1	0.0	7.0	0.0	78.9
Food and Agriculture								
Food and Kindred	56	6637.00	0.0	0.0	0.0	0.0	0.0	5528.6
Grain Mill and Bakery	29	273.76	0.0	0.0	0.0	1.5	0.0	82.1
Vegetable Oil	56	236.00	0.0	0.0	0.0	0.0	0.0	196.6
Other	29	123.83	0.0	0.0	0.0	0.7	0.0	37.1
Miscellaneous Industrial								
Iron and Steel Foundry	70	272.00	0.0	17.7	0.0	0.0	0.0	0.0
Non-Ferrous Metals	69	172.90	0.0	18.2	0.0	17.6	0.1	15.7
Other	67	663.00	0.1	0.3	0.0	38.1	0.6	318.2
Unspecified	67	3514.00	0.5	1.8	0.0	202.2	2.9	1686.6
SUB TOTALS		27650.7	10.5	309.3	0.6	2651.6	28.9	12562.5

TABLE C.14

Elemental Emission Estimates From Other Fugitive Sources

FUGITIVE SOURCES	Profile	Emissions (kg/day)	Elements							
			Al	Sb	As	Ba	Bi	Br	Cd	Ca
Road and Building Construction	57	176625.00	14483.3	0.0	0.0	106.0	0.0	0.0	0.0	2649.4
Agricultural Tilling	57	23633.00	1937.9	0.0	0.0	14.2	0.0	0.0	0.0	354.5
Refuse Disposal Sites	57	746.00	61.2	0.0	0.0	0.4	0.0	0.0	0.0	11.2
Livestock Feedlots	59	3234.00	265.2	0.0	0.0	1.9	0.0	0.0	0.0	48.5
Unpaved Road Travel	57	57216.00	4691.7	0.0	0.0	34.3	0.0	0.0	0.0	858.2
Paved Road Travel	58	165400.00	13893.6	0.0	0.0	0.0	0.0	36.4	0.0	3953.1
Forest Fires (Seasonal)	60	5790.00	83.4	0.0	0.0	0.0	0.0	3.1	0.0	62.0
Structural Fires	35	398.40	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.4
Fireplaces	63	1244.00	0.3	0.0	0.0	0.0	0.0	0.1	0.0	0.7
Cigarettes	39	1990.00	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0
Agricultural Burning	61	1244.00	5.6	0.0	0.0	0.0	0.0	0.6	0.0	1.1
Tire Attrition	38	2409.20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Brake Lining Attrition	41	7712.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	617.0
Sea Salt	62	49753.00	0.0	0.0	0.0	0.0	0.0	94.5	0.0	577.1
SUB TOTALS		497394.6	35422.1	0.0	0.0	156.9	0.0	134.6	1.0	9139.1

TABLE C.14 (Continued)

Elemental Emission Estimates From Other Fugitive Sources

FUGITIVE SOURCES	Profile	Emissions (kg/day)	Elements							
			Cs	Cl	Cr	Co	Cu	Fe	La	Pb
Road and Building Construction	57	176625.00	0.0	0.0	0.0	3.5	14.1	5652.0	0.0	35.3
Agricultural Tilling	57	23633.00	0.0	0.0	0.0	0.5	1.9	756.3	0.0	4.7
Refuse Disposal Sites	57	746.00	0.0	0.0	0.0	0.0	0.1	23.9	0.0	0.1
Livestock Feedlots	59	3234.00	0.0	0.0	0.0	0.1	0.3	103.5	0.0	0.6
Unpaved Road Travel	57	57216.00	0.0	0.0	0.0	1.1	4.6	1830.9	0.0	11.4
Paved Road Travel	58	165400.00	0.0	2001.3	66.2	0.0	52.9	11445.7	0.0	777.4
Forest Fires (Seasonal)	60	5790.00	0.0	321.3	0.0	0.0	5.2	11.0	0.0	0.0
Structural Fires	35	398.40	0.0	6.5	0.0	0.0	0.0	10.2	0.0	0.0
Fireplaces	63	1244.00	0.0	7.6	0.0	0.0	0.2	0.0	0.0	0.1
Cigarettes	39	1990.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Agricultural Burning	61	1244.00	0.0	12.3	0.1	0.0	0.7	0.7	0.0	0.0
Tire Attrition	38	2409.20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Brake Lining Attrition	41	7712.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sea Salt	62	49753.00	0.0	27364.2	0.0	0.0	0.0	0.0	0.0	0.0
SUB TOTALS		497394.6	0.0	29713.2	66.3	5.2	80.0	19834.1	0.0	829.8

TABLE C.14 (Continued)

Emission Estimates From Fugitive Sources

FUGITIVE SOURCES	Profile	Emissions (kg/day)	Elements Mg	Mn	Mo	Nd	Ni	K	Pr	Rb
Road and Building Construction	57	176625.00	2472.8	194.3	0.0	0.0	7.1	2649.4	0.0	0.0
Agricultural Tilling	57	23633.00	330.9	26.0	0.0	0.0	0.9	354.5	0.0	0.0
Refuse Disposal Sites	57	746.00	10.4	0.8	0.0	0.0	0.0	11.2	0.0	0.0
Livestock Feedlots	59	3234.00	45.3	3.6	0.0	0.0	0.1	48.5	0.0	0.0
Unpaved Road Travel	57	57216.00	801.0	62.9	0.0	0.0	2.3	858.2	0.0	0.0
Paved Road Travel	58	165400.00	1935.2	226.6	0.0	0.0	19.8	1736.7	0.0	0.0
Forest Fires (Seasonal)	60	5790.00	0.0	6.9	0.0	0.0	0.0	34.7	0.0	0.0
Structural Fires	35	398.40	0.0	0.0	0.0	0.0	0.0	19.9	0.0	0.0
Fireplaces	63	1244.00	0.0	0.0	0.0	0.0	0.0	6.6	0.0	0.0
Cigarettes	39	1990.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Agricultural Burning	61	1244.00	0.0	0.6	0.0	0.0	0.0	80.9	0.0	0.0
Tire Attrition	38	2409.20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Brake Lining Attrition	41	7712.00	1079.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sea Salt	62	49753.00	1840.9	0.0	0.0	0.0	0.0	547.3	0.0	0.0
SUB TOTALS		497394.6	8516.1	521.8	0.0	0.0	30.3	6347.9	0.0	0.0

TABLE C.14 (Continued)

Elemental Emission Estimates From Other Fugitive Sources

FUGITIVE SOURCES	Profile	Emissions (kg/day)	Elements						
			Se	Si	Ag	Na	Sr	Sn	Ti
Road and Building Construction	57	176625.00	0.0	35325.0	0.0	4415.6	0.0	0.0	706.5
Agricultural Tilling	57	23633.00	0.0	4726.6	0.0	590.8	0.0	0.0	94.5
Refuse Disposal Sites	57	746.00	0.0	149.2	0.0	18.6	0.0	0.0	3.0
Livestock Feedlots	59	3234.00	0.0	646.8	0.0	80.8	0.0	0.0	12.9
Unpaved Road Travel	57	57216.00	0.0	11443.2	0.0	1430.4	0.0	0.0	228.9
Paved Road Travel	58	165400.00	0.0	34072.4	0.0	1769.8	0.0	0.0	1108.2
Forest Fires (Seasonal)	60	5790.00	0.0	51.5	0.0	37.6	0.0	0.0	0.0
Structural Fires	35	398.40	0.0	39.8	0.0	0.0	0.0	0.0	0.0
Fireplaces	63	1244.00	0.0	0.3	0.0	4.6	0.0	0.0	0.0
Cigarettes	39	1990.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Agricultural Burning	61	1244.00	0.0	6.1	0.0	4.1	0.0	0.0	0.9
Tire Attrition	38	2409.20	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Brake Lining Attrition	41	7712.00	0.0	1658.1	0.0	0.0	0.0	0.0	0.0
Sea Salt	62	49753.00	0.0	0.0	0.0	15224.4	0.0	0.0	0.0
	SUB TOTALS	497394.6	0.0	88119.0	0.0	23576.9	0.0	0.0	2154.9

TABLE C.14 (Continued)

Elemental Emission Estimates From Other Fugitive Sources

FUGITIVE SOURCES	Profile	Emissions (kg/day)	Elements V	Zn	Zr	$SO_4^=$	NO_3^-	TC
Road and Building Construction	57	176625.00	10.6	8.8	0.0	0.0	0.0	0.0
Agricultural Tilling	57	23633.00	1.4	1.2	0.0	0.0	0.0	0.0
Refuse Disposal Sites	57	746.00	0.0	0.0	0.0	0.0	0.0	0.0
Livestock Feedlots	59	3234.00	0.2	0.2	0.0	0.0	0.0	64.7
Unpaved Road Travel	57	57216.00	3.4	2.9	0.0	0.0	0.0	0.0
Paved Road Travel	58	165400.00	38.0	181.9	0.0	1025.5	694.7	29772.0
Forest Fires (Seasonal)	60	5790.00	0.0	0.0	0.0	92.6	295.3	3641.9
Structural Fires	35	398.40	0.0	0.0	0.0	0.1	0.0	119.5
Fireplaces	63	1244.00	0.0	1.5	0.0	1.4	1.6	731.5
Cigarettes	39	1990.00	0.0	0.0	0.0	0.0	0.0	1691.5
Agricultural Burning	61	1244.00	0.0	0.0	0.0	62.2	24.9	641.9
Tire Attrition	38	2409.20	0.0	24.1	0.0	0.0	0.0	2096.0
Brake Lining Attrition	41	7712.00	0.0	0.0	0.0	0.0	0.0	1233.9
Sea Salt	62	49753.00	0.0	0.0	0.0	2587.2	0.0	0.0
SUB TOTALS		497394.6	53.7	220.6	0.0	3769.0	1016.5	39992.9

TABLE C.15

Summary of Particulate Emissions by Element
(Aerodynamic Diameter d_p < 10 Micron)

Species	Symbol	Fine Particulate Emissions (kg/day)
Aluminum	Al	35497.0
Antimony	Sb	3.4
Arsenic	As	34.9
Barium	Ba	193.0
Bismuth	Bi	0.1
Bromine	Br	3067.1
Cadmium	Cd	24.9
Calcium	Ca	10490.0
Cesium	Cs	102.3
Chlorine	Cl	32469.4
Chromium	Cr	295.5
Cobalt	Co	118.6
Copper	Cu	248.2
Iron	Fe	21149.5
Lanthanum	La	16.2
Lead	Pb	8769.9
Magnesium	Mg	8519.2
Manganese	Mn	594.2
Molybdenum	Mo	20.7
Neodymium	Nd	10.1

TABLE C.15 (Continued)

Summary of Particulate Emissions by Element
(Aerodynamic Diameter d_p < 10 Micron)

Species	Symbol	Fine Particulate Emissions (kg/day)
Nickel	Ni	572.7
Potassium	K	6791.2
Praeseodymium	Pr	10.1
Rubidium	Rb	7.9
Selenium	Se	148.5
Silicon	Si	89129.1
Silver	Ag	3.6
Sodium	Na	23630.4
Strontium	Sr	12.7
Tin	Sn	6.9
Titanium	Ti	2205.4
Vanadium	V	160.2
Zinc	Zn	693.3
Zirconium	Zr	9.1
Sulfates	$SO_4^{=}$	24711.1
Nitrates	NO_3^-	2197.0
Total Carbon	TC	89069.8
Elements Listed		360983. (58%)
Other Emissions		259032. (42%)
TOTAL EMISSIONS		620015. (100%)

TABLE C.16

Summary of Particulate Emissions Ranked by Emission Rate
(Aerodynamic Diameter d_p < 10 Micron)

Species	Symbol	Fine Particulate Emissions (kg/day)	Ratio of Element Emissions to Lead
Silicon	Si	89129.1	10.163
Total Carbon	TC	89069.8	10.156
Aluminum	Al	35497.0	4.048
Chlorine	Cl	32469.4	3.702
Sulfates	$SO_4^=$	24711.1	2.818
Sodium	Na	23630.4	2.695
Iron	Fe	21149.5	2.412
Calcium	Ca	10490.0	1.196
Lead	Pb	8769.9	1.0
Magnesium	Mg	8519.2	0.971
Potassium	K	6791.2	0.774
Bromine	Br	3067.1	0.350
Titanium	Ti	2205.4	0.251
Nitrates	NO_3^-	2197.0	0.251
Zinc	Zn	693.3	0.079
Manganese	Mn	594.2	0.068
Nickel	Ni	572.7	0.065

TABLE C.16 (Continued)

Summary of Particulate Emissions Ranked by Emission Rate
(Aerodynamic Diameter d_p < 10 Micron)

Species	Symbol	Fine Particulate Emissions (kg/day)	Ratio of Element Emissions to Lead
Chromium	Cr	295.5	0.034
Copper	Cu	248.2	0.028
Barium	Ba	193.0	0.022
Vanadium	V	160.2	0.018
Selenium	Se	148.5	0.017
Cobalt	Co	118.6	0.013
Cesium	Cs	102.3	0.012
Arsenic	As	34.9	0.004
Cadmium	Cd	24.9	0.003
Molybdenum	Mo	20.7	0.002
Lanthanum	La	16.2	0.001
Strontium	Sr	12.7	0.001
Neodymium	Nd	10.1	0.001
Praeseodymium	Pr	10.1	0.001
Zirconium	Zr	9.1	0.001
Rubidium	Rb	7.9	0.001
Tin	Sn	6.9	0.0008
Silver	Ag	3.6	0.0004
Antimony	Sb	3.4	0.0004
Bismuth	Bi	0.1	0.0000
Elements Listed		360983. (58%)*	
Other Emissions		259032. (42%)	
TOTAL EMISSIONS		620015. (100%)	

Table C.17

Summary of Particulate Emissions By Major Source Category
(Aerodynamic Diameter d_p < 10 micron)

Major Source Caregory	Total Particulate Emissions (kg/day)	Total Particulate Emissions of Elements Used in This Study (kg/day)	% of Total Emissions
Mobile Sources	53468.9	46516.7	(87%)
Stationary Sources	41500.8	25647.5	(62%)
Industrial Fugitive Emissions	27650.7	19368.4	(70%)
Other Fugitive Sources	497394.6	269701.9	(54%)
Total Emissions	620015.0	361234.5	(58%)

References for Appendix C

Arledge, K.W. and Tan, R.L. (1977) A Heavy Duty Vehicle Emission Inventory System, TRW Environmental Engineering Division, Redondo Beach, California.

Baines, T.M., Somers, J.H. and Harvey, C.A. (1979) J. Air Pollution Control Association, 29, 616-621.

Bureau of National Affairs, Environmental Reporter, 7(43), 1638-1639; 7(52), 1982; 9(3) 78.

California Air Resources Board (1981) "1979 Area Source Emission Inventory - On Road Travel- Paved Roads - Dust," California Air Resource Board, Draft Report Dated August 13, 1981.

California Gas Report (1977) A report prepared pursuant to California Public Utilities Commission Decision Number 62260; authorship and publisher are unknown, but copies are available from the Southern California Gas Company.

Cass, G.R. (1980) "Sulfur Oxides Emissions in the Early 1980's Under Conditions of Low Natural Gas Supply," Working Paper, Environmental Quality Laboratory, California Institute of Technology, Pasadena, California.

Cass, G.R., Boone, P.M., Macias, E.S. (1981) "Emissions and Air Quality Relationships for Atmospheric Carbon Particles in Los Angeles," in Particulate Carbon: Atmospheric Life Cycle, G.T. Wolff and R.L. Klimisch eds., Plenum Press, New York.(In press)

Cass, G.R., McMurry, P.S. and Houseworth, J.E. (1980) Methods for Sulfate Air Quality Management, Environmental Quality Laboratory, Report Number 16, California Institute of Technology, Pasadena, California, 801 pp.

Danielson, J.A. and Graves, R.W. (1976) "Fuel Use and Emissions from Stationary Combustion Processes," Southern California Air Pollution Control District, El Monte, California.

Federal Aviation Administration (1973) FAA Air Traffic Activity, Fiscal Year 1973, (74), U.S. Department of Transportation.

Federal Aviation Administration (1974) Military Air Traffic Activity Report, Calendar Year 1974, U.S. Department of Transportation.

Goodman, H.S. et al. (1977) A Mobile Source Emission Inventory System for Light Duty Vehicles in the South Coast Air Basin, TRW Environmental Engineering Division, Redondo Beach, California.

Grisinger, J.G. (ed) (1981) "Draft 1979 Emissions Inventory for South Coast Air Basin," El Monte, California, South Coast Air Quality Management District, 1982 AQMP Revision Working Paper No. 1.

Habibi, K. (1973) "Characterization of Particulate Matter in Vehicle Exhaust," Environmental Science and Technology, 7, 223-234.

Laresgoiti, A. and Springer, G.S. (1977) "Sulfate and Particulate Emissions from an Oxidation Catalyst Equipped Engine," Environmental Science and Technology, 11, 285-292.

Los Angeles Department of Water and Power (1976) "Personal Communication"

Muhlbaier, J.L. and Williams, R.L. (1981) "Fireplaces, Furnaces and Vehicles as Emissions Sources of Particulate Carbon," in Particulate Carbon: Atmospheric Life Cycle, G.T. Wolff and R.L. Klimisch eds., Plenum Press, New York.(In press)

Pierson, W.R. and W.W. Brachaczek (1974) Rubber Chemistry and Technology, 47, 1275-1299

South Coast Air Quality Management District (1980) "Personal Communication" (Copies of fuel use reports for 1976 filed by refiners in Los Angeles County, California)

Southern California Edison (1976) "Personal Communication"

Taback, H.J., Brienza, A.R., Macko, J. and Brunetz, N. (1979) "Fine Particle Emissions from Stationary and Miscellaneous Sources in the South Coast Air Basin," Report Number KVB 5806-783, KVB Inc., Tustin, California. (Profiles are contained in Appendix A of the report).

U.S. Environmental Protection Agency (1976) "Compilation of Air Pollutant Emission Factors," Second Edition, Including supplements 1-8, U.S. Environmental Protection Agency, document AP-42, Research Triangle Park, North Carolina.

APPENDIX D

SOURCE CONTRIBUTION TO PARTICULATE AIR QUALITY AT MONITORING SITES WITHIN THE SOUTH COAST AIR BASIN

D.1 Introduction

Receptor model calculations that relate emission sources to particulate air quality at ten sites in the South Coast Air Basin are presented in this Appendix. Results at each air monitoring station are represented by a set of eight tables, as indexed in Table D.1.1 and summarized in Table D.1.2. A description of calculation procedures used and a discussion of these results are contained in the main text of this report.

D.2 A Brief Description of the Tables in This Appendix

The first table of each set provides statistical information on the chemical composition of the particulate matter measured at each monitoring station. The second and third tables in each group summarize the results obtained when the multiple regression model of equation (13) in the main text is applied to the air quality data at each monitoring site. Each regression coefficient estimated in those tables is compared to a prior expectation that relates the concentration of the chemical species being studied to the abundance in its most likely source. For example, if manganese comes mainly from crustal material and constitutes between 0.11% and 0.14% of the mass of soil or road dust, then the coefficient associated with $\beta_{CRUSTAL}$ in the regression

TABLE D.1.1

Monitoring Sites and Data Displayed in this Appendix

Monitoring Site	Monitoring Agency		Tables
	NASN	SCAQMD	
Azusa		*	D.3.1 - D.3.8
Downtown Los Angeles		*	D.4.1 - D.4.8
Lennox		*	D.5.1 - D.5.8
Lynwood		*	D.6.1 - D.6.8
Pasadena		*	D.7.1 - D.7.8
Reseda		*	D.8.1 - D.8.8
West Los Angeles		*	D.9.1 - D.9.8
Anaheim	*		D.10.1 - D.10.8
Downtown Los Angeles	*		D.11.1 - D.11.8
San Bernardino	*		D.12.1 - D.12.8

Note: The NASN data are quarterly composites

TABLE D.1.2

Summary of the Calculated Results Displayed for Each Monitoring Site

Table	Calculated Results for ..... Monitoring Site
D.*.1	Particulate Air Quality Data At .....
D.*.2	Chemically Resolved Regression Model Relating Tracer Element Concentrations to Pollutants at .....
D.*.3	Chemically Resolved Regression Model Relating Tracer Element Concentrations to Pollutants at .....
D.*.4	Chemical Elements Used As if They Were Unique Tracers for Major Source Types at ..... Monitoring Station
D.*.5	Aerosol Source Assignment for the Year 1976 at ..... Station
D.*.6	Composition of Aerosol Observed At ..... From Chemical Element Balance
D.*.7	Composition of Aerosol Observed At ..... From Chemical Element Balance
D.*.8	Composition of Aerosol Observed At ..... From Tracer Study

equation should fall within about two standard errors of the range defined by 1/0.0011 = 909.1 and 1/0.0014 = 729.9 when manganese is used in the regression model. Regression coefficients are accompanied by the standard error of each coefficient estimate in order to aid hypothesis testing. Source attributions computed by inserting ambient pollutant concentrations into the fitted regression models will be referred to as obtained by the "multiple regression method." A fourth table is provided in which source contributions to the total suspended particulate burden are estimated as if Mn, Ni or V, Pb, $SO_4^=$ and NO_3^- were unique tracers for the presence of crustal material, fuel oil fly ash, highway vehicle aerosol, ammonium sulfate and ammonium nitrate respectively. These results will be said to be obtained from the "tracer" element study.

Source contributions estimated by chemical element balance, tracer element, and multiple regression methods are compared in the fifth table presented for each monitoring site. That table gives annual mean values for the year 1976 and is used as the basis for Figures 14 through 23 in the main text. The sixth, seventh and eighth tables detail the sources contributing to each single daily aerosol sample (or quarterly composite) during that year. All source contributions are in micrograms per cubic meter; the "traced" column represents the summation of all source contributions identified, while the "residual" column gives the mass of material not attributed to a particular source. The sixth and seventh tables both are obtained using chemical element balance methods, with crustal material represented by the soil dust profile (sixth table) and by the road dust profile (seventh table).

The final table of each set gives 1976 daily (or quarterly) source contributions as estimated by the "tracer" element method, with manganese acting as the soil dust tracer.

D.3 Analysis of Monitoring Data at Azusa Site (SCAQMD)

TABLE D.3.1

SCAQMD Particulate Air Quality Data at Azusa
[386 Samples Considered]

July 1971 - Dec. 1977

	TSP	$SO_4^=$	NO_3^-	Pb	Fe	Mn	Ni
MEAN	136.39	11.78	11.53	2.20	3.12	0.075	0.027
STANDARD DEVIATION	66.32	10.05	9.18	1.29	2.12	0.047	0.021

CORRELATION MATRIX

	TSP	$SO_4^=$	NO_3^-	Pb	Fe	Mn	Ni
TSP	1.00	0.61	0.39	0.74	0.78	0.79	0.57
$SO_4^=$		1.00	0.16	0.54	0.26	0.30	0.47
NO_3^-			1.00	0.44	0.18	0.23	0.24
Pb				1.00	0.42	0.55	0.53
Fe					1.00	0.88	0.43
Mn						1.00	0.42
Ni							1.00

All pollutant concentrations are in $\mu g\ m^{-3}$.

TABLE D.3.2

Chemically Resolved Regression Model Relating Tracer Element Concentrations to Pollutant Sources at Azusa

MODEL STRUCTURE:

$$TSP_j = SULFATES_j + NITRATES_j + CRUSTAL_j + OIL\ ASH_j + HIGHWAY_j + OTHER_j$$

MODEL ESTIMATED:

$$TSP_j = \beta_{SO_4} \cdot SO_4{}^{=}_j + \beta_{NO_3} \cdot NO_3{}^{-}_j + \beta_{CRUSTAL} \cdot Mn_j + \beta_{OIL} \cdot Ni_j + \beta_{HIGHWAY} \cdot Pb_j + \beta_{OTHER} + \varepsilon_j$$

REGRESSION MODEL RESULTS	TSP AVERAGE (TSP VARIANCE)	COEFFICIENTS (STANDARD ERROR)						CORRELATION COEFFICIENT (number of samples)
		β_{SO_4}	β_{NO_3}	$\beta_{CRUSTAL}$	β_{OIL}	$\beta_{HIGHWAY}$	β_{OTHER}	
[1971-1977]	136.39	1.94	0.84	760.29	247.86	10.08	18.18	0.91
	(4398.5)	(0.17)	(0.17)	(35.73)	(82.30)	(1.59)	(3.08)	(386)
Prior Expectation		1.02 to 1.38	1.29	729.9 to 909.1	47.17	7.81		

TABLE D.3.3

Chemically Resolved Regression Model Relating Tracer Element Concentrations to Pollutant Sources at Azusa

MODEL STRUCTURE:

$$TSP_j = SULFATES_j + NITRATES_j + CRUSTAL_j + OIL\ ASH_j + HIGHWAY_j + OTHER_j$$

MODEL ESTIMATED:

$$TSP_j = \beta_{SO_4} \cdot SO_4{}_j^{=} + \beta_{NO_3} \cdot NO_3{}_j^{-} + \beta_{CRUSTAL} \cdot Fe_j + \beta_{OIL} \cdot Ni_j + \beta_{HIGHWAY} \cdot Pb_j + \beta_{OTHER} + \varepsilon_j$$

REGRESSION MODEL RESULTS	TSP AVERAGE (TSP VARIANCE)	COEFFICIENTS (STANDARD ERROR)						CORRELATION COEFFICIENT (number of samples)
		β_{SO_4}	β_{NO_3}	$\beta_{CRUSTAL}$	β_{OIL}	$\beta_{HIGHWAY}$	β_{OTHER}	
[1971-1977]	136.39	1.86	0.81	17.48	52.33	15.15	15.91	0.94
	(4398.5)	(0.14)	(0.14)	(0.63)	(71.39)	(1.28)	(2.62)	(386)
Prior Expectation		1.02 to 1.38	1.29	14.47 to 31.25	47.17	7.81		

TABLE D.3.4

Chemical Elements Used As If They Were
Unique Tracers for Major Source Types

Azusa AQMD Station

EXPRESSION EVALUATED:

TSP = SULFATES + NITRATES + CRUSTAL + OIL ASH + HIGHWAY + OTHER

$TSP = 1.38\ SO_4^{=} + 1.29\ NO_3^{-} + 909.1\ Mn + 47.2\ Ni + 7.81\ Pb + OTHER$

COMPONENT	AVERAGE MASS LOADING ($\mu g\ m^{-3}$) 1971-1977	1976
Sulfate compounds	16.26	14.44
Nitrate compounds	14.88	20.92
Crustal components	67.99	50.22
Fuel Oil Fly Ash	1.27	1.20
Highway Aerosol	17.18	13.08
Subtotal	117.59	99.87
Remaining to be determined	18.80	19.29
TOTAL PARTICULATE	136.39	119.16

Regression of TSP on Σ(SULFATES + NITRATES + CRUSTAL + OIL ASH + HIGHWAY)

YEAR	REGRESSION EQUATION	CORRELATION (NUMBER OF SAMPLES)
1971-1977	TSP = 0.99 [Σ TRACED] + 19.85	0.90 (386)
1976	TSP = 0.98 [Σ TRACED] + 21.57	0.83 (61)

TABLE D.3.5

Aerosol Source Assignment for the Year 1976

Azusa

AQMD Station

COMPONENT	1976 AVERAGE MASS LOADING ($\mu g\ m^{-3}$)			
	CHEMICAL ELEMENT BALANCE (ROAD DUST CASE)	CHEMICAL ELEMENT BALANCE (SOIL DUST CASE)	TRACER ELEMENT METHOD(a)	MULTIPLE REGRESSION METHOD(b)
SULFATE COMPOUNDS	13.55	13.79	14.44	19.46
NITRATE COMPOUNDS	20.54	20.72	20.92	13.14
CRUSTAL COMPONENTS	35.37	55.51	50.23	43.47
FUEL OIL FLY ASH	1.00	1.09	1.20	1.31
HIGHWAY AEROSOL	11.78	13.03	13.08	25.30
Subtotal	82.24	104.14	99.87	102.68
Remaining to be Determined	36.92	15.02	19.29	16.48
TOTAL PARTICULATE	119.16	119.16	119.16	119.16

(a) $TSP = 1.38\ SO_4^{=} + 1.29\ NO_3^{-} + 909.1\ Mn + 47.2\ Ni + 7.81\ Pb + OTHER$

(b) $TSP = 1.86\ SO_4^{=} + 0.81\ NO_3^{-} + 17.48\ Fe + 52.33\ Ni + 15.15\ Pb + OTHER$

TABLE D.3.6

COMPOSITION OF AEROSOL OBSERVED AT AZUSA FROM CHEMICAL ELEMENT BALANCE

DATE	TSP	SULFATES	NITRATES	HIGHWAY	SOILDUST	OIL ASH	TRACED	RESIDUAL
760101.	51.00	3.65	2.28	3.08	32.03	0.41	41.44	9.56
760107.	94.00	5.36	18.02	5.98	70.13	0.81	100.30	-6.30
760113.	130.00	5.98	30.46	10.43	82.43	0.79	130.08	-0.08
760119.	139.00	6.14	32.12	14.89	52.46	0.84	106.46	32.54
760125.	157.00	18.51	38.27	15.10	61.04	0.83	133.74	23.26
760131.	127.00	6.05	30.71	13.06	61.52	0.83	112.16	14.84
760206.	28.50	4.87	3.76	3.43	9.71	1.39	23.16	5.34
760212.	76.50	4.54	24.94	11.05	38.81	0.87	80.21	-3.71
760218.	171.50	18.92	51.23	22.56	60.54	2.71	155.97	15.53
760224.	78.00	5.86	12.76	7.98	51.17	0.85	78.61	-0.61
760301.	37.50	7.33	3.94	6.42	33.18	0.41	51.29	-13.79
760307.	63.50	6.94	19.68	8.21	20.55	0.90	56.29	7.21
760313.	76.50	7.40	17.15	9.84	31.92	0.41	66.72	9.78
760319.	109.00	10.08	16.76	8.32	42.83	0.39	78.38	30.62
760325.	158.50	18.48	21.04	9.88	80.25	1.73	131.39	27.11
760331.	155.00	8.62	32.24	14.43	19.23	0.91	75.43	79.57
760406.	62.00	7.38	11.22	7.68	39.11	0.87	66.27	-4.27
760412.	47.00	8.47	5.74	5.25	35.28	0.40	55.15	-8.15
760418.	94.50	9.17	20.45	8.86	40.59	0.87	79.93	14.57
760424.	155.50	25.16	26.56	24.06	8.11	1.40	85.29	70.21
760430.	176.50	10.38	22.41	21.66	50.34	2.26	107.05	69.45
760506.	85.00	13.50	13.97	6.93	32.63	-0.06	66.97	18.03
760512.	192.50	21.29	18.63	19.83	95.73	1.23	156.71	35.79
760518.	203.50	20.33	31.83	18.96	94.43	1.23	166.79	36.71
760524.	113.50	16.56	22.30	7.01	32.56	-0.06	78.37	35.13
760530.	95.00	17.96	22.95	6.75	43.29	-0.08	90.86	4.14
760605.	131.50	17.27	31.09	13.51	42.78	0.86	105.51	25.99
760611.	99.50	9.68	22.12	11.27	51.83	0.84	95.75	3.75
760617.	132.00	10.08	22.07	13.48	83.98	1.73	131.34	0.66
760623.	175.50	5.98	21.30	12.53	136.40	1.63	177.84	-2.34
760629.	151.00	8.06	24.79	14.11	82.92	1.26	131.14	19.86
760705.	180.00	40.47	19.52	17.58	52.75	1.31	131.63	48.37
760711.	102.00	22.07	18.79	9.20	30.82	0.88	81.76	20.24
760717.	114.50	25.20	15.19	12.10	20.99	0.90	74.38	40.12
760723.	193.00	34.22	26.42	21.25	62.98	1.76	146.63	46.37
760729.	136.50	21.75	17.89	12.06	52.77	0.84	105.31	31.19
760804.	128.00	9.01	16.61	11.68	82.96	0.79	121.05	6.95
760810.	181.00	22.69	26.55	15.21	82.35	1.73	148.53	32.47
760816.	71.50	9.20	10.46	7.58	50.88	0.85	78.96	-7.46
760822.	71.00	6.92	10.45	9.08	20.72	0.90	48.08	22.92
760828.	144.50	30.96	17.67	20.23	41.60	2.27	112.73	31.77
760903.	110.00	18.71	18.27	17.83	40.54	0.86	96.22	13.78
760909.	163.00	15.96	20.65	17.83	72.87	1.75	129.05	33.95
760915.	94.00	17.80	17.63	7.39	29.45	0.89	73.15	20.85
760921.	184.00	34.49	20.29	17.31	48.63	1.32	122.05	61.95
760927.	97.50	12.53	15.71	14.36	40.27	0.87	83.73	13.77
761003.	75.00	7.83	16.63	8.99	19.75	0.43	53.63	21.37
761009.	97.00	4.34	12.95	8.20	60.59	-0.12	85.96	11.04
761015.	226.00	39.98	18.73	19.19	90.91	1.71	170.51	55.49
761021.	165.50	28.86	36.80	19.13	79.99	1.73	166.52	-1.02

TABLE D.3.6
(continued)

COMPOSITION OF AEROSOL OBSERVED AT AZUSA FROM CHEMICAL ELEMENT BALANCE

DATE	TSP	SULFATES	NITRATES	HIGHWAY	SOILDUST	OIL ASH	TRACED	RESIDUAL
761027.	116.00	3.96	12.21	32.60	99.75	1.22	149.75	-33.75
761102.	71.50	4.16	11.25	5.94	48.69	0.38	70.43	1.07
761108.	91.00	7.15	14.20	10.06	64.49	0.35	96.24	-5.24
761114.	62.50	11.51	15.35	12.18	8.50	0.45	47.99	14.51
761120.	168.00	21.91	54.04	32.55	54.96	2.72	166.18	1.82
761126.	93.00	17.50	28.48	8.00	27.82	1.83	83.63	9.37
761202.	68.00	3.07	7.61	5.38	55.98	1.31	73.34	-5.34
761208.	143.50	8.12	25.52	23.41	122.54	1.65	181.24	-37.74
761214.	128.50	4.66	18.61	15.82	128.51	1.64	169.24	-40.74
761220.	154.00	13.45	38.04	20.46	123.45	2.59	197.99	-43.99
761226.	71.50	2.91	8.51	5.86	51.53	1.32	70.13	1.37

TABLE D.3.7

COMPOSITION OF AEROSOL OBSERVED AT AZUSA FROM CHEMICAL ELEMENT BALANCE

DATE	TSP	SULFATES	NITRATES	HIGHWAY	ROADDUST	OIL ASH	TRACED	RESIDUAL
760101.	51.00	3.50	2.17	2.32	21.96	0.35	30.29	20.71
760107.	94.00	5.07	17.80	4.52	42.66	0.70	70.75	23.25
760113.	130.00	5.62	30.19	8.62	52.36	0.65	97.44	32.56
760119.	139.00	5.91	31.93	13.62	35.36	0.74	87.56	51.44
760125.	157.00	18.25	38.07	13.73	38.50	0.72	109.27	47.73
760131.	127.00	5.78	30.51	11.68	39.18	0.72	87.86	39.14
760206.	28.50	4.83	3.73	3.20	6.28	1.38	19.42	9.08
760212.	76.50	4.38	24.82	10.22	23.14	0.81	63.38	13.12
760218.	171.50	18.65	51.03	21.12	38.99	2.61	132.39	39.11
760224.	78.00	5.64	12.60	6.85	32.39	0.76	58.24	19.76
760301.	37.50	7.21	3.85	5.83	17.34	0.37	34.61	2.89
760307.	63.50	6.85	19.61	7.69	13.77	0.86	48.78	14.72
760313.	76.50	7.26	17.03	9.02	22.41	0.34	56.07	20.43
760319.	109.00	9.88	16.61	7.26	29.97	0.30	64.02	44.98
760325.	158.50	18.15	20.79	8.18	49.33	1.61	98.05	60.45
760331.	155.00	8.52	32.16	13.82	16.29	0.85	71.63	83.37
760406.	62.00	7.22	11.10	6.86	23.40	0.81	49.40	12.60
760412.	47.00	8.33	5.64	4.60	19.12	0.36	38.06	8.94
760418.	94.50	8.99	20.32	7.96	25.57	0.80	63.64	30.86
760424.	155.50	25.12	26.53	23.72	6.81	1.37	83.55	71.95
760430.	176.50	10.17	22.24	20.42	32.45	2.18	87.46	89.04
760506.	85.00	13.34	13.84	6.06	24.62	-0.14	57.72	27.28
760512.	192.50	20.85	18.29	17.49	66.02	1.04	123.69	68.81
760518.	203.50	19.91	31.51	16.75	62.80	1.06	132.03	71.47
760524.	113.50	16.40	22.18	6.16	23.88	-0.14	68.48	45.02
760530.	95.00	17.76	22.79	5.67	30.74	-0.17	76.78	18.22
760605.	131.50	17.07	30.93	12.37	31.31	0.76	92.44	39.06
760611.	99.50	9.46	21.94	10.08	33.77	0.75	76.01	23.49
760617.	132.00	9.71	21.78	11.53	56.08	1.57	100.66	31.34
760623.	175.50	5.38	20.84	9.44	89.53	1.38	126.56	48.94
760629.	151.00	7.70	24.51	12.24	53.71	1.11	99.26	51.74
760705.	180.00	40.22	19.33	16.23	36.79	1.20	113.78	66.22
760711.	102.00	21.93	18.68	8.47	20.11	0.83	70.02	31.98
760717.	114.50	25.10	15.11	11.46	16.12	0.85	68.64	45.86
760723.	193.00	33.93	26.19	19.65	43.43	1.64	124.84	68.16
760729.	136.50	21.52	17.70	10.79	35.84	0.74	86.59	49.91
760804.	128.00	8.65	16.33	9.83	53.37	0.64	88.83	39.17
760810.	181.00	22.33	26.28	13.35	52.99	1.59	116.54	64.46
760816.	71.50	8.98	10.29	6.48	31.90	0.76	58.42	13.08
760822.	71.00	6.83	10.38	8.54	14.25	0.86	40.85	30.15
760828.	144.50	30.77	17.52	19.07	29.68	2.19	99.22	45.28
760903.	110.00	18.54	18.13	16.84	26.00	0.80	80.30	29.70
760909.	163.00	15.64	20.40	16.10	48.38	1.61	102.14	60.86
760915.	94.00	17.67	17.54	6.75	17.84	0.84	60.65	33.35
760921.	184.00	34.30	20.14	16.23	29.29	1.25	101.21	82.79
760927.	97.50	12.36	15.57	13.43	25.35	0.80	67.51	29.99
761003.	75.00	7.75	16.57	8.52	12.18	0.40	45.42	29.58
761009.	97.00	4.08	12.75	6.92	37.09	-0.21	60.63	36.37
761015.	226.00	39.59	18.43	17.19	56.74	1.57	133.52	92.48
761021.	165.50	28.52	36.55	17.38	49.39	1.61	133.45	32.05

TABLE D.3.7
(continued)

COMPOSITION OF AEROSOL OBSERVED AT AZUSA FROM CHEMICAL ELEMENT BALANCE

DATE	TSP	SULFATES	NITRATES	HIGHWAY	ROADDUST	OIL ASH	TRACED	RESIDUAL
761027.	116.00	3.59	11.93	30.79	52.40	1.12	99.83	16.17
761102.	71.50	3.96	11.11	4.96	28.64	0.31	48.98	22.52
761108.	91.00	6.90	14.01	8.82	36.04	0.27	66.04	24.96
761114.	62.50	11.47	15.32	11.90	4.78	0.45	43.93	18.57
761120.	168.00	21.69	53.88	31.29	31.75	2.66	141.27	26.73
761126.	93.00	17.39	28.39	7.43	16.11	1.80	71.13	21.87
761202.	68.00	2.84	7.45	4.29	31.74	1.24	47.56	20.44
761208.	143.50	7.63	25.16	20.98	70.20	1.49	125.46	18.04
761214.	128.50	4.13	18.21	13.17	77.12	1.45	114.08	14.42
761220.	154.00	12.92	37.62	17.70	79.20	2.38	149.82	4.18
761226.	71.50	2.69	8.34	4.71	33.13	1.23	50.10	21.40

TABLE D.3.8

COMPOSITION OF AEROSOL OBSERVED AT AZUSA ESTIMATED FROM TRACER STUDY

DATE	TSP	SULFATES	NITRATES	HIGHWAY	SOILDUST	OIL ASH	TRACED	RESIDUAL
760101.	51.00	3.86	2.32	3.12	27.27	0.47	37.05	13.95
760107.	94.00	5.80	18.19	6.09	63.64	0.94	94.66	-0.66
760113.	130.00	6.49	30.70	10.54	72.73	0.94	121.40	8.60
760119.	139.00	6.76	32.38	14.92	45.45	0.94	100.46	38.54
760125.	157.00	19.04	38.57	15.15	54.55	0.94	128.26	28.74
760131.	127.00	6.62	30.96	13.12	54.55	0.94	106.19	20.81
760206.	28.50	5.52	3.87	3.44	9.09	1.42	23.33	5.17
760212.	76.50	5.11	25.15	11.09	36.36	0.94	78.66	-2.16
760218.	171.50	20.42	51.73	22.57	54.55	2.83	152.10	19.40
760224.	78.00	6.35	12.90	8.04	45.45	0.94	73.69	4.31
760301.	37.50	7.59	4.00	6.48	36.36	0.47	54.91	-17.41
760307.	63.50	7.45	19.87	8.20	18.18	0.94	54.64	8.86
760313.	76.50	7.73	17.29	9.84	27.27	0.47	62.60	13.90
760319.	109.00	10.35	16.90	8.36	36.36	0.47	72.44	36.56
760325.	158.50	19.32	21.28	10.00	72.73	1.89	125.22	33.28
760331.	155.00	9.25	32.51	14.37	18.18	0.94	75.25	79.75
760406.	62.00	7.87	11.35	7.73	36.36	0.94	64.26	-2.26
760412.	47.00	8.69	5.80	5.31	36.36	0.47	56.65	-9.65
760418.	94.50	9.66	20.64	8.90	36.36	0.94	76.51	17.99
760424.	155.50	26.08	26.83	23.82	9.09	1.42	87.24	68.26
760430.	176.50	11.73	22.70	21.63	45.45	2.36	103.88	72.62
760506.	85.00	13.52	14.06	6.95	27.27	0.0	61.81	23.19
760512.	192.50	22.08	18.83	19.92	81.82	1.42	144.06	48.44
760518.	203.50	21.11	32.12	19.06	81.82	1.42	155.53	47.97
760524.	113.50	16.56	22.45	7.03	27.27	0.0	73.31	40.19
760530.	95.00	17.94	23.09	6.79	36.36	0.0	84.19	10.81
760605.	131.50	17.80	31.35	13.51	36.36	0.94	99.97	31.53
760611.	99.50	10.21	22.32	11.32	45.45	0.94	90.25	9.25
760617.	132.00	11.04	22.32	13.59	72.73	1.89	121.56	10.44
760623.	175.50	6.90	21.54	12.73	118.18	1.89	161.24	14.26
760629.	151.00	8.83	25.03	14.21	72.73	1.42	122.22	28.78
760705.	180.00	41.12	19.74	17.57	45.45	1.42	125.30	54.70
760711.	102.00	22.49	18.96	9.22	27.27	0.94	78.89	23.11
760717.	114.50	25.67	15.35	12.03	18.18	0.94	72.17	42.33
760723.	193.00	35.19	26.70	21.24	54.55	1.89	139.57	53.43
760729.	136.50	22.22	18.06	12.11	45.45	0.94	98.78	37.72
760804.	128.00	9.52	16.77	11.79	72.73	0.94	111.76	16.24
760810.	181.00	23.60	26.83	15.31	72.73	1.89	140.35	40.65
760816.	71.50	9.66	10.58	7.65	45.45	0.94	74.29	-2.79
760822.	71.00	7.45	10.58	9.06	18.18	0.94	46.21	24.79
760828.	144.50	32.15	17.93	20.15	36.36	2.36	108.96	35.54
760903.	110.00	19.32	18.45	17.81	36.36	0.94	92.88	17.12
760909.	163.00	16.97	20.90	17.88	63.64	1.89	121.28	41.72
760915.	94.00	18.22	17.80	7.42	27.27	0.94	71.65	22.35
760921.	184.00	35.19	20.51	17.34	45.45	1.42	119.91	64.09
760927.	97.50	13.11	15.87	14.37	36.36	0.94	80.65	16.85
761003.	75.00	8.14	16.77	8.98	18.18	0.47	52.55	22.45
761009.	97.00	4.42	13.03	8.28	54.55	0.0	80.27	16.73
761015.	226.00	40.85	18.96	19.29	81.82	1.89	162.81	63.19
761021.	165.50	29.81	37.15	19.21	72.73	1.89	160.79	4.71

TABLE D.3.8
(continued)

COMPOSITION OF AEROSOL OBSERVED AT AZUSA ESTIMATED FROM TRACER STUDY

DATE	TSP	SULFATES	NITRATES	HIGHWAY	SOILDUST	OIL ASH	TRACED	RESIDUAL
761027.	116.00	5.11	12.38	32.80	109.09	1.42	160.80	-44.80
761102.	71.50	4.42	11.35	6.01	45.45	0.47	67.71	3.79
761108.	91.00	7.45	14.32	10.15	63.64	0.47	96.03	-5.03
761114.	62.50	11.87	15.48	12.18	9.09	0.47	49.09	13.41
761120.	168.00	23.60	54.57	32.57	54.55	2.83	168.11	-0.11
761126.	93.00	18.35	28.77	8.04	27.27	1.89	84.32	8.68
761202.	68.00	3.73	7.74	5.47	54.55	1.42	72.89	-4.89
761208.	143.50	9.25	25.80	23.59	118.18	1.89	178.70	-35.20
761214.	128.50	5.66	18.83	16.01	118.18	1.89	160.57	-32.07
761220.	154.00	14.90	38.44	20.62	109.09	2.83	185.89	-31.89
761226.	71.50	3.59	8.64	5.94	45.45	1.42	65.04	6.46

D.4 Monitoring Data at Downtown Los Angeles Site (SCAQMD)

TABLE D.4.1

SCAQMD Particulate Air Quality Data at Downtown Los Angeles
[742 Samples Considered]

Aug. 1965 - Dec. 1977

	TSP	$SO_4^=$	NO_3^-	Pb	Fe	Mn	Ni
MEAN	140.8	12.80	10.88	3.90	2.18	0.046	0.033
STANDARD DEVIATION	59.6	10.71	8.48	2.70	1.31	0.028	0.031

CORRELATION MATRIX

	TSP	$SO_4^=$	NO_3^-	Pb	Fe	Mn	Ni
TSP	1.00	0.39	0.45	0.60	0.65	0.68	0.34
$SO_4^=$		1.00	0.09	0.01	0.03	0.08	0.10
NO_3^-			1.00	0.35	0.28	0.30	0.16
Pb				1.00	0.46	0.44	0.40
Fe					1.00	0.89*	0.24
Mn						1.00	0.27
Ni							1.00

All pollutant concentrations are in $\mu g\ m^{-3}$.

*737 Sample Pairs

TABLE D.4.2

Chemically Resolved Regression Model Relating Tracer Element Concentrations to Pollutant Sources at Downtown Los Angeles

MODEL STRUCTURE:

$$TSP_j = SULFATES_j + NITRATES_j + CRUSTAL_j + OIL\ ASH_j + HIGHWAY_j + OTHER_j$$

MODEL ESTIMATED:

$$TSP_j = \beta_{SO_4} \cdot SO_4^{=}{}_j + \beta_{NO_3} \cdot NO_3^{-}{}_j + \beta_{CRUSTAL} \cdot Mn_j + \beta_{OIL} \cdot Ni_j + \beta_{HIGHWAY} \cdot Pb_j + \beta_{OTHER} + \varepsilon_j$$

REGRESSION MODEL RESULTS	TSP AVERAGE (TSP VARIANCE)	COEFFICIENTS (STANDARD ERROR)						CORRELATION COEFFICIENT (number of samples)
		β_{SO_4}	β_{NO_3}	$\beta_{CRUSTAL}$	β_{OIL}	$\beta_{HIGHWAY}$	β_{OTHER}	
[1965-1977]	140.83	1.85	1.24	958.5	69.6	7.12	29.16	0.84
	(3546.2)	(0.11)	(0.15)	(47.9)	(41.5)	(0.52)	(2.86)	(742)
Prior Expectation		1.02 to 1.38	1.29	729.9 to 909.1	47.17	7.81		

TABLE D.4.3

Chemically Resolved Regression Model Relating Tracer Element Concentrations to Pollutant Sources at Downtown Los Angeles AQMD Station

MODEL STRUCTURE:

$$TSP_j = SULFATES_j + NITRATES_j + CRUSTAL_j + OIL\ ASH_j + HIGHWAY_j + OTHER_j$$

MODEL ESTIMATED:

$$TSP_j = \beta_{SO_4} \cdot SO_{4_j}^{=} + \beta_{NO_3} \cdot NO_{3_j}^{-} + \beta_{CRUSTAL} \cdot Fe_j + \beta_{OIL} \cdot Ni_j + \beta_{HIGHWAY} \cdot Pb_j + \beta_{OTHER} + \varepsilon_j$$

REGRESSION MODEL RESULTS	TSP AVERAGE (TSP VARIANCE)	COEFFICIENTS (STANDARD ERROR)						CORRELATION COEFFICIENT (number of samples)
		β_{SO_4}	β_{NO_3}	$\beta_{CRUSTAL}$	β_{OIL}	$\beta_{HIGHWAY}$	β_{OTHER}	
[1965-1977]	140.83	1.97	1.31	19.62	104.2	6.79	28.66	0.84
	(3546.2)	(0.11)	(0.15)	(1.04)	(42.2)	(0.54)	(2.95)	(742)
Prior Expectation		1.02 to 1.38	1.29	729.9 to 909.1	47.17	7.81		

TABLE D.4.4

Chemical Elements Used As If They Were
Unique Tracers for Major Source Types

Downtown Los Angeles AQMD Station

EXPRESSION EVALUATED:

TSP = SULFATES + NITRATES + CRUSTAL + OIL ASH + HIGHWAY + OTHER

$TSP = 1.38\ SO_4^{=} + 1.29\ NO_3^{-} + 909.1\ Mn + 47.2\ Ni + 7.81\ Pb + OTHER$

COMPONENT	AVERAGE MASS LOADING ($\mu g\ m^{-3}$) 1965-1977	1976
Sulfate compounds	17.67	16.72
Nitrate compounds	14.04	19.59
Crustal components	42.15	30.00
Fuel Oil Fly Ash	1.55	1.47
Highway Aerosol	30.50	21.21
Subtotal	105.91	88.99
Remaining to be determined	34.92	22.30
TOTAL PARTICULATE	140.83	111.29

Regression of TSP on Σ(SULFATES + NITRATES + CRUSTAL + OIL ASH + HIGHWAY)

YEAR	REGRESSION EQUATION	CORRELATION (NUMBER OF SAMPLES)
1965-1977	TSP = 1.03[Σ TRACED] + 31.37	0.84 (742)
1976	TSP = 1.04[Σ TRACED] + 18.80	0.91 (60)

TABLE D.4.5

Aerosol Source Assignment for the Year 1976

Downtown Los Angeles

AQMD Station

COMPONENT	1976 AVERAGE MASS LOADING ($\mu g\ m^{-3}$)			
	CHEMICAL ELEMENT BALANCE (ROAD DUST CASE)	CHEMICAL ELEMENT BALANCE (SOIL DUST CASE)	TRACER ELEMENT METHOD(a)	MULTIPLE REGRESSION METHOD(b)
SULFATE COMPOUNDS	15.64	15.79	16.72	23.87
NITRATE COMPOUNDS	19.25	19.37	19.59	19.90
CRUSTAL COMPONENTS	22.99	33.58	30.00	33.83
FUEL OIL FLY ASH	1.34	1.40	1.47	3.25
HIGHWAY AEROSOL	20.37	21.35	21.21	18.44
Subtotal	79.59	91.49	88.99	99.29
Remaining to be Determined	31.70	19.80	22.30	12.00
TOTAL PARTICULATE	111.29	111.29	111.29	111.29

(a) $TSP = 1.38\ SO_4^{=} + 1.29\ NO_3^{-} + 909.1\ Mn + 47.2\ Ni + 7.81\ Pb + OTHER$

(b) $TSP = 1.97\ SO_4^{=} + 1.31\ NO_3^{-} + 19.62\ Fe + 104.2\ Ni + 6.79\ Pb + OTHER$

TABLE D.4.6

COMPOSITION OF AEROSOL OBSERVED AT LOS ANGELES FROM CHEMICAL ELEMENT BALANCE

DATE	TSP	SULFATES	NITRATES	HIGHWAY	SOILDUST	OIL ASH	TRACED	RESIDUAL
760101.	52.00	6.70	2.79	10.12	21.26	0.43	41.29	10.71
760107.	126.50	11.86	9.99	35.40	61.84	1.77	120.86	5.64
760113.	205.00	11.01	41.54	51.63	82.26	3.61	190.04	14.96
760119.	205.50	30.31	30.67	48.04	82.24	3.14	194.41	11.09
760125.	144.00	21.27	32.60	18.06	31.05	1.35	104.33	39.67
760131.	177.00	11.79	34.43	57.08	58.80	2.24	164.34	12.66
760206.	39.50	7.69	3.04	8.65	18.50	0.44	38.33	1.17
760212.	99.00	7.43	29.39	22.76	30.94	1.35	91.88	7.12
760218.	193.00	18.97	44.06	44.69	59.27	2.24	169.23	23.77
760224.	71.50	8.22	10.96	14.24	30.23	0.88	64.53	6.97
760301.	32.50	7.47	2.66	6.00	20.07	0.43	36.63	-4.13
760307.	65.00	6.70	15.26	13.18	9.41	1.86	46.40	18.60
760313.	86.00	5.53	15.57	23.89	31.22	0.88	77.09	8.91
760319.	126.50	10.21	12.47	16.32	53.07	1.31	93.38	33.12
760325.	159.50	20.42	37.39	15.64	41.82	2.74	118.02	41.48
760331.	119.50	8.14	29.14	15.48	42.19	1.33	96.28	23.22
760406.	41.50	7.11	6.89	9.96	10.24	0.45	34.65	6.85
760412.	47.50	8.85	5.71	9.85	19.57	0.90	44.88	2.62
760418.	104.50	9.82	17.75	17.58	30.81	0.88	76.84	27.66
760424.	111.50	22.76	1.83	12.34	20.70	1.37	59.01	52.49
760430.	161.50	13.12	27.81	34.72	50.35	1.79	127.79	33.71
760506.	65.50	12.71	10.58	11.45	20.30	0.90	55.94	9.56
760512.	147.00	24.60	25.83	22.30	42.16	0.86	115.74	31.26
760518.	131.00	20.19	29.96	16.72	31.74	0.41	99.02	31.98
760524.	96.00	17.64	18.97	8.14	21.60	-0.04	66.30	29.70
760530.	79.00	16.43	16.92	5.65	10.58	-0.02	49.56	29.44
760605.	100.50	15.32	19.81	12.98	20.95	0.90	69.96	30.54
760611.	79.50	10.69	14.29	15.21	20.70	0.90	61.80	17.70
760617.	97.50	17.99	20.71	11.73	31.84	0.88	83.16	14.34
760623.	149.00	12.91	20.12	31.13	52.38	1.78	118.33	30.67
760629.	124.00	18.52	27.67	16.80	30.97	2.29	96.26	27.74
760705.	165.50	47.11	20.32	13.62	20.88	0.90	102.83	62.67
760711.	91.50	27.11	17.12	6.21	10.21	0.92	61.57	29.93
760717.	79.50	22.59	13.81	6.25	9.26	0.45	52.37	27.13
760723.	137.50	35.57	18.21	14.28	19.29	1.85	89.21	48.29
760804.	100.50	15.23	10.45	10.78	31.17	0.88	68.52	31.98
760810.	127.50	23.27	22.86	14.97	20.57	1.37	83.03	44.47
760816.	61.50	10.84	8.40	7.65	20.34	0.90	48.14	13.36
760822.	46.00	9.21	6.85	9.08	9.04	3.26	37.44	8.56
760828.	135.00	39.62	18.18	24.11	19.64	2.31	103.85	31.15
760903.	188.00	24.74	24.74	29.84	51.94	1.78	133.05	54.95
760909.	176.50	29.41	29.34	21.56	40.83	2.28	123.41	53.09
760915.	82.50	16.43	14.40	9.39	20.28	1.37	61.88	20.62
760921.	144.00	32.33	26.85	16.93	20.05	0.90	97.06	46.94
760927.	64.00	10.49	10.60	14.66	10.11	0.45	46.31	17.69
761003.	64.00	10.10	14.80	16.69	9.79	0.92	52.30	11.70
761009.	96.00	4.91	14.80	27.98	40.75	0.86	89.29	6.71
761015.	158.50	38.86	15.78	17.35	39.87	1.81	113.67	44.83
761021.	76.00	14.32	11.25	10.78	19.03	0.43	55.81	20.19
761027.	122.00	8.48	31.94	33.80	49.34	1.32	124.89	-2.89

TABLE D.4.6
(continued)

COMPOSITION OF AEROSOL OBSERVED AT LOS ANGELES FROM CHEMICAL ELEMENT BALANCE

DATE	TSP	SULFATES	NITRATES	HIGHWAY	SOILDUST	OIL ASH	TRACED	RESIDUAL
761102.	90.50	5.15	12.00	33.59	41.44	0.39	92.55	-2.05
761108.	122.50	9.90	22.59	32.60	60.91	1.30	127.29	-4.79
761114.	63.50	11.34	10.56	24.26	9.28	0.92	56.36	7.14
761120.	125.00	20.75	34.96	37.94	33.36	2.29	129.30	-4.30
761126.	111.00	18.39	33.37	15.93	20.53	1.37	89.58	21.42
761202.	111.00	1.60	11.12	38.23	60.95	2.24	114.13	-3.13
761208.	121.00	7.30	19.55	41.23	51.11	2.73	121.91	-0.91
761214.	119.00	9.15	22.50	39.07	61.97	2.71	135.39	-16.39
761220.	166.00	15.67	39.08	42.88	60.99	4.12	162.74	3.26
761226.	94.50	5.14	9.15	31.37	63.00	0.82	109.48	-14.98

TABLE D.4.7

COMPOSITION OF AEROSOL OBSERVED AT LOS ANGELES FROM CHEMICAL ELEMENT BALANCE

DATE	TSP	SULFATES	NITRATES	HIGHWAY	ROADDUST	OIL ASH	TRACED	RESIDUAL
760101.	52.00	6.59	2.70	9.51	15.76	0.38	34.95	17.05
760107.	126.50	11.59	9.78	33.68	41.91	1.65	98.60	27.90
760113.	205.00	10.64	41.24	49.24	56.82	3.45	161.38	43.62
760119.	205.50	29.95	30.38	45.74	56.04	2.98	165.09	40.41
760125.	144.00	21.13	32.48	17.18	21.72	1.29	93.80	50.20
760131.	177.00	11.54	34.24	55.12	37.76	2.14	140.80	36.20
760206.	39.50	7.62	2.99	8.26	10.61	0.41	29.88	9.62
760212.	99.00	7.29	29.27	21.79	21.96	1.29	81.60	17.40
760218.	193.00	18.72	43.86	42.97	37.86	2.14	145.56	47.44
760224.	71.50	8.09	10.86	13.49	19.36	0.83	52.63	18.87
760301.	32.50	7.38	2.60	5.55	12.51	0.40	28.44	4.06
760307.	65.00	6.66	15.23	12.74	6.72	1.84	43.19	21.81
760313.	86.00	5.39	15.45	22.88	22.48	0.81	67.01	18.99
760319.	126.50	9.96	12.28	14.95	37.66	1.20	76.05	50.45
760325.	159.50	20.22	37.23	14.50	30.67	2.65	105.28	54.22
760331.	119.50	7.94	28.98	14.37	29.90	1.24	82.45	37.05
760406.	41.50	7.06	6.85	9.59	7.39	0.43	31.32	10.18
760412.	47.50	8.77	5.64	9.38	12.14	0.88	36.80	10.70
760418.	104.50	9.69	17.65	16.73	20.69	0.82	65.58	38.92
760424.	111.50	22.67	1.75	11.72	15.20	1.33	52.66	58.84
760430.	161.50	12.90	27.64	33.28	33.05	1.70	108.57	52.93
760506.	65.50	12.62	10.51	10.90	13.48	0.87	48.38	17.12
760512.	147.00	24.41	25.67	21.10	30.12	0.77	102.06	44.94
760518.	131.00	20.04	29.84	15.82	22.72	0.34	88.77	42.23
760524.	96.00	17.53	18.88	7.53	16.41	-0.09	60.27	35.73
760530.	79.00	16.37	16.87	5.33	8.62	-0.05	47.14	31.86
760605.	100.50	15.22	19.73	12.33	15.87	0.85	63.99	36.51
760611.	79.50	10.60	14.22	14.55	14.91	0.86	55.12	24.38
760617.	97.50	17.84	20.59	10.88	23.07	0.81	73.19	24.31
760623.	149.00	12.66	19.93	29.58	37.97	1.67	101.80	47.20
760629.	124.00	18.37	27.56	15.90	22.52	2.22	86.57	37.43
760705.	165.50	47.01	20.24	12.97	15.46	0.85	96.53	68.97
760711.	91.50	27.06	17.08	5.90	7.39	0.90	58.34	33.16
760717.	79.50	22.56	13.79	6.03	5.43	0.44	48.24	31.26
760723.	137.50	35.49	18.15	13.73	12.33	1.82	81.52	55.98
760804.	100.50	15.09	10.34	10.01	20.95	0.82	57.22	43.28
760810.	127.50	23.17	22.78	14.31	15.06	1.33	76.65	50.85
760816.	61.50	10.75	8.33	7.16	13.29	0.87	40.40	21.10
760822.	46.00	9.18	6.82	8.75	6.70	3.22	34.67	11.33
760828.	135.00	39.53	18.10	23.28	14.18	2.27	97.36	37.64
760903.	188.00	24.50	24.55	28.36	36.26	1.68	115.36	72.64
760909.	176.50	29.22	29.19	20.46	27.67	2.20	108.74	67.76
760915.	82.50	16.34	14.33	8.87	13.60	1.34	54.47	28.03
760921.	144.00	32.24	26.79	16.29	13.35	0.87	89.54	54.46
760927.	64.00	10.44	10.56	14.17	7.81	0.43	43.40	20.60
761003.	64.00	10.06	14.76	16.14	7.39	0.90	49.25	14.75
761009.	96.00	4.73	14.66	26.80	27.02	0.79	73.99	22.01
761015.	158.50	38.69	15.64	16.39	25.29	1.74	97.76	60.74
761021.	76.00	14.24	11.19	10.33	11.29	0.41	47.46	28.54
761027.	122.00	8.28	31.78	32.46	31.04	1.24	104.80	17.20

TABLE D.4.7
(continued)

COMPOSITION OF AEROSOL OBSERVED AT LOS ANGELES FROM CHEMICAL ELEMENT BALANCE

DATE	TSP	SULFATES	NITRATES	HIGHWAY	ROADDUST	OIL ASH	TRACED	RESIDUAL
761102.	90.50	4.96	11.85	32.24	29.71	0.31	78.07	12.43
761108.	122.50	9.64	22.38	31.01	39.51	1.19	103.73	18.77
761114.	63.50	11.31	10.53	23.41	6.59	0.90	52.74	10.76
761120.	125.00	20.62	34.86	37.06	18.34	2.26	113.15	11.85
761126.	111.00	18.29	33.29	15.25	15.07	1.33	83.23	27.77
761202.	111.00	1.33	10.91	36.53	40.51	2.13	91.40	19.60
761208.	121.00	7.06	19.36	39.56	36.06	2.62	104.67	16.33
761214.	119.00	8.87	22.27	37.25	43.40	2.58	114.37	4.63
761220.	166.00	15.40	38.86	41.02	42.42	4.00	141.71	24.29
761226.	94.50	4.85	8.93	29.65	43.64	0.69	87.77	6.73

TABLE D.4.8

COMPOSITION OF AEROSOL OBSERVED AT LOS ANGELES ESTIMATED FROM TRACER STUDY

DATE	TSP	SULFATES	NITRATES	HIGHWAY	SOILDUST	OIL ASH	TRACED	RESIDUAL
760101.	52.00	7.04	2.84	10.07	18.18	0.47	38.60	13.40
760107.	126.50	13.25	10.19	35.22	54.55	1.89	115.09	11.41
760113.	205.00	13.52	42.05	51.31	72.73	3.77	183.39	21.61
760119.	205.50	32.43	31.09	47.80	72.73	3.30	187.35	18.15
760125.	144.00	22.08	32.89	17.96	27.27	1.42	101.63	42.37
760131.	177.00	13.80	34.83	56.62	54.55	2.36	162.16	14.84
760206.	39.50	8.00	3.10	8.67	18.18	0.47	38.42	1.08
760212.	99.00	8.42	29.67	22.57	27.27	1.42	89.35	9.65
760218.	193.00	20.70	44.50	44.44	54.55	2.36	166.55	26.45
760224.	71.50	8.83	11.09	14.21	27.27	0.94	62.36	9.14
760301.	32.50	7.73	2.71	6.01	18.18	0.47	35.10	-2.60
760307.	65.00	7.73	15.48	12.96	9.09	1.89	47.15	17.85
760313.	86.00	6.35	15.74	23.66	27.27	0.94	73.97	12.03
760319.	126.50	11.04	12.64	16.32	45.45	1.42	86.87	39.63
760325.	159.50	21.80	37.80	15.62	36.36	2.83	114.42	45.08
760331.	119.50	8.97	29.41	15.46	36.36	1.42	91.62	27.88
760406.	41.50	7.45	6.97	9.84	9.09	0.47	33.82	7.68
760412.	47.50	9.38	5.80	9.84	18.18	0.94	44.15	3.35
760418.	104.50	10.49	17.93	17.49	27.27	0.94	74.13	30.37
760424.	111.50	23.46	1.93	12.26	18.18	1.42	57.25	54.25
760430.	161.50	14.49	28.12	34.52	45.45	1.89	124.47	37.03
760506.	65.50	13.25	10.71	11.40	18.18	0.94	54.48	11.02
760512.	147.00	25.25	26.06	22.18	36.36	0.94	110.80	36.20
760518.	131.00	20.56	30.19	16.64	27.27	0.47	95.13	35.87
760524.	96.00	17.66	19.09	8.12	18.18	0.0	63.06	32.94
760530.	79.00	16.42	17.03	5.62	9.09	0.0	48.16	30.84
760605.	100.50	15.87	19.99	12.89	18.18	0.94	67.88	32.62
760611.	79.50	11.32	14.45	15.07	18.18	0.94	59.96	19.54
760617.	97.50	18.49	20.90	11.71	27.27	0.94	79.32	18.18
760623.	149.00	14.21	20.38	30.93	45.45	1.89	112.87	36.13
760629.	124.00	19.73	27.99	16.71	27.27	2.36	94.07	29.93
760705.	165.50	47.47	20.51	13.51	18.18	0.94	100.62	64.88
760711.	91.50	27.46	17.29	6.17	9.09	0.94	60.95	30.55
760717.	79.50	22.77	13.93	6.25	9.09	0.47	52.51	26.99
760723.	137.50	36.43	18.45	14.21	18.18	1.89	89.16	48.34
760804.	100.50	15.73	10.58	10.78	27.27	0.94	65.30	35.20
760810.	127.50	24.01	23.09	14.84	18.18	1.42	81.54	45.96
760816.	61.50	11.32	8.51	7.65	18.18	0.94	46.61	14.89
760822.	46.00	10.76	7.09	8.98	9.09	3.30	39.23	6.77
760828.	135.00	40.85	18.45	23.74	18.18	2.36	103.58	31.42
760903.	188.00	25.94	25.03	29.68	45.45	1.89	127.99	60.01
760909.	176.50	30.64	29.67	21.48	36.36	2.36	120.51	55.99
760915.	82.50	17.11	14.58	9.37	18.18	1.42	60.66	21.84
760921.	144.00	32.84	27.09	16.79	18.18	0.94	95.85	48.15
760927.	64.00	10.90	10.71	14.37	9.09	0.47	45.54	18.46
761003.	64.00	10.76	14.96	16.32	9.09	0.94	52.09	11.91
761009.	96.00	5.80	14.96	27.80	36.36	0.94	85.87	10.13
761015.	158.50	39.74	16.00	17.34	36.36	1.89	111.33	47.17
761021.	76.00	14.63	11.35	10.78	18.18	0.47	55.41	20.59
761027.	122.00	9.66	32.25	33.66	45.45	1.42	122.44	-0.44

TABLE D.4.8
(continued)

COMPOSITION OF AEROSOL OBSERVED AT LOS ANGELES ESTIMATED FROM TRACER STUDY

DATE	TSP	SULFATES	NITRATES	HIGHWAY	SOILDUST	OIL ASH	TRACED	RESIDUAL
761102.	90.50	5.93	12.13	33.27	36.36	0.47	88.17	2.33
761108.	122.50	11.04	22.83	32.49	54.55	1.42	122.32	0.18
761114.	63.50	12.14	10.71	23.59	9.09	0.94	56.47	7.03
761120.	125.00	22.36	35.35	38.03	36.36	2.36	134.46	-9.46
761126.	111.00	19.18	33.67	15.78	18.18	1.42	88.22	22.78
761202.	111.00	3.31	11.35	38.03	54.55	2.36	109.60	1.40
761208.	121.00	9.25	19.87	40.85	45.45	2.83	118.24	2.76
761214.	119.00	11.04	22.83	38.82	54.55	2.83	130.06	-11.06
761220.	166.00	18.22	39.60	42.56	54.55	4.25	159.17	6.83
761226.	94.50	6.07	9.29	31.24	54.55	0.94	102.09	-7.59

D.5 Monitoring Data at Lennox Site (SCAQMD)

TABLE D.5.1

SCAQMD Particulate Air Quality Data at Lennox
[730 Samples Considered]

Aug. 1965 - Dec. 1977

	TSP	$SO_4^=$	NO_3^-	Pb	Fe	Mn	Ni
MEAN	137.30	12.39	7.28	5.76	2.06	0.042	0.044
STANDARD DEVIATION	52.60	9.79	6.66	4.65	1.28	0.027	0.038

CORRELATION MATRIX

	TSP	$SO_4^=$	NO_3^-	Pb	Fe	Mn	Ni
TSP	1.00	0.11	0.40	0.53	0.65	0.69	0.27
$SO_4^=$		1.00	0.10	-0.24	-0.04	-0.07	0.18
NO_3^-			1.00	0.32	0.18	0.24	0.19
Pb				1.00	0.40	0.40	0.26
Fe					1.00	0.85	0.12
Mn						1.00	0.15
Ni							1.00

All pollutant concentrations are in $\mu g\ m^{-3}$.

TABLE D.5.2

Chemically Resolved Regression Model Relating Tracer Element Concentrations to Pollutant Sources at Lennox

MODEL STRUCTURE:

$$TSP_j = SULFATES_j + NITRATES_j + CRUSTAL_j + OIL\ ASH_j + HIGHWAY_j + OTHER_j$$

MODEL ESTIMATED:

$$TSP_j = \beta_{SO_4} \cdot SO_4^{=}{}_j + \beta_{NO_3} \cdot NO_3^{-}{}_j + \beta_{CRUSTAL} \cdot Mn_j + \beta_{OIL} \cdot Ni_j + \beta_{HIGHWAY} \cdot Pb_j + \beta_{OTHER} + \varepsilon_j$$

REGRESSION MODEL RESULTS	TSP AVERAGE (TSP VARIANCE)	COEFFICIENTS (STANDARD ERROR)						CORRELATION COEFFICIENT (number of samples)
		β_{SO_4}	β_{NO_3}	$\beta_{CRUSTAL}$	β_{OIL}	$\beta_{HIGHWAY}$	β_{OTHER}	
[1965-1977]	137.33	1.03	1.21	1031.3	67.68	3.34	50.81	0.79
	(2770.8)	(0.13)	(0.20)	(48.5)	(33.79)	(0.31)	(3.04)	(730)
Prior Expectation		1.02 to 1.38	1.29	729.9 to 909.1	47.17	5.64		

TABLE D.5.3

Chemically Resolved Regression Model Relating Tracer Element Concentrations to Pollutant Sources at Lennox

MODEL STRUCTURE:

$$TSP_j = SULFATES_j + NITRATES_j + CRUSTAL_j + OIL\ ASH_j + HIGHWAY_j + OTHER_j$$

MODEL ESTIMATED:

$$TSP_j = \beta_{SO_4} \cdot SO_{4_j}^{=} + \beta_{NO_3} \cdot NO_{3_j}^{-} + \beta_{CRUSTAL} \cdot Fe_j + \beta_{OIL} \cdot Ni_j + \beta_{HIGHWAY} \cdot Pb_j + \beta_{OTHER} + \varepsilon_j$$

REGRESSION MODEL RESULTS	TSP AVERAGE (TSP VARIANCE)	COEFFICIENTS (STANDARD ERROR)						CORRELATION COEFFICIENT (number of samples)
		β_{SO_4}	β_{NO_3}	$\beta_{CRUSTAL}$	β_{OIL}	$\beta_{HIGHWAY}$	β_{OTHER}	
[1965-1977]	137.33	0.93	1.46	20.76	87.32	3.38	49.16	0.78
	(2770.8)	(0.14)	(0.20)	(1.04)	(34.59)	(0.32)	(3.17)	(730)
Prior Expectation		1.02 to 1.38	1.29	14.45 to 31.25	47.17	5.64		

TABLE D.5.4

Chemical Elements Used As If They Were
Unique Tracers for Major Source Types

Lennox AQMD Station

EXPRESSION EVALUATED:

TSP = SULFATES + NITRATES + CRUSTAL + OIL ASH + HIGHWAY + OTHER

$TSP = 1.38\ SO_4^{=} + 1.29\ NO_3^{-} + 909.1\ Mn + 47.2\ Ni + 5.64\ Pb + OTHER$

COMPONENT	AVERAGE MASS LOADING ($\mu g\ m^{-3}$) 1965-1977	1976
Sulfate compounds	17.09	19.05
Nitrate compounds	9.39	14.56
Crustal components	37.73	22.06
Fuel Oil Fly Ash	2.06	2.05
Highway Aerosol	32.49	22.99
Subtotal	98.76	80.71
Remaining to be determined	38.57	21.70
TOTAL PARTICULATE	137.33	102.41

Regression of TSP on Σ(SULFATES + NITRATES + CRUSTAL + OIL ASH + HIGHWAY)

YEAR	REGRESSION EQUATION	CORRELATION (NUMBER OF SAMPLES)
1965-1977	$TSP = 0.87[\Sigma\ TRACED] + 51.54$	0.78 (730)
1976	$TSP = 0.99[\Sigma\ TRACED] + 22.75$	0.92 (61)

TABLE D.5.5

Aerosol Source Assignment for the Year 1976

Lennox

AQMD Station

COMPONENT	1976 AVERAGE MASS LOADING ($\mu g\ m^{-3}$)			
	CHEMICAL ELEMENT BALANCE (ROAD DUST CASE)	CHEMICAL ELEMENT BALANCE (SOIL DUST CASE)	TRACER ELEMENT METHOD(a)	MULTIPLE REGRESSION METHOD(b)
SULFATE COMPOUNDS	17.76	17.87	19.05	12.83
NITRATE COMPOUNDS	14.25	14.33	14.56	16.48
CRUSTAL COMPONENTS	16.54	23.98	22.06	28.96
FUEL OIL FLY ASH	1.95	2.00	2.05	3.75
HIGHWAY AEROSOL	22.59	23.28	22.99	13.79
Subtotal	73.09	81.46	80.71	75.81
Remaining to be Determined	29.32	20.95	21.70	26.60
TOTAL PARTICULATE	102.41	102.41	102.41	102.41

(a) $TSP = 1.38\ SO_4^{=} + 1.29\ NO_3^{-} + 909.1\ Mn + 47.2\ Ni + 5.64\ Pb + OTHER$

(b) $TSP = 0.93 SO_4^{=} + 1.46\ NO_3^{-} + 20.76 Fe + 87.32 Ni + 3.38 Pb + OTHER$

TABLE D.5.6

COMPOSITION OF AEROSOL OBSERVED AT LENNOX FROM CHEMICAL ELEMENT BALANCE

DATE	TSP	SULFATES	NITRATES	HIGHWAY	SOILDUST	OIL ASH	TRACED	RESIDUAL
760101.	81.50	5.66	3.27	19.26	41.18	0.86	70.23	11.27
760107.	133.00	6.34	16.91	44.02	51.28	1.78	120.33	12.67
760113.	229.50	15.63	49.97	57.22	69.36	4.10	196.29	33.21
760119.	161.00	23.47	21.86	34.21	60.98	2.71	143.23	17.77
760125.	148.50	25.77	30.74	24.66	30.14	2.30	113.60	34.90
760131.	220.00	19.22	43.25	49.48	38.20	5.10	155.25	64.75
760206.	48.50	9.00	1.73	17.69	9.39	0.92	38.73	9.77
760212.	99.00	7.84	18.66	28.46	18.67	2.78	76.42	22.58
760218.	141.00	20.04	29.50	38.13	28.33	3.71	119.70	21.30
760224.	67.50	9.52	4.04	11.80	10.02	0.92	36.30	31.20
760301.	37.00	7.23	1.89	3.38	1.11	0.47	14.08	22.92
760307.	81.50	10.05	13.24	17.67	19.06	1.38	61.39	20.11
760313.	99.00	9.44	16.02	32.96	29.18	1.83	89.42	9.58
760319.	124.50	13.78	8.11	19.50	41.56	1.33	84.28	40.22
760325.	148.50	19.35	23.06	19.38	49.53	2.26	113.57	34.93
760331.	106.00	14.19	14.67	19.70	29.38	3.24	81.17	24.83
760406.	44.00	9.24	3.56	8.27	10.31	0.45	31.82	12.18
760412.	39.00	8.35	2.50	6.69	0.42	0.94	18.91	20.09
760418.	105.00	15.66	14.36	18.22	20.35	1.84	70.44	34.56
760424.	100.00	35.88	15.14	5.62	9.77	1.86	68.27	31.73
760430.	118.00	16.36	20.64	25.95	20.01	1.84	84.80	33.20
760506.	69.00	14.65	6.40	12.14	10.26	-0.02	43.43	25.57
760512.	121.00	34.59	13.75	16.13	19.54	3.72	87.73	33.27
760518.	111.00	21.38	18.27	17.05	20.57	0.90	78.16	32.84
760524.	83.00	14.88	9.45	11.70	21.07	0.43	57.54	25.46
760530.	83.50	14.42	9.84	5.62	10.41	0.45	40.75	42.75
760605.	84.00	14.48	10.30	10.23	9.81	1.39	46.21	37.79
760611.	70.00	11.10	7.31	17.08	19.70	1.84	57.04	12.96
760617.	76.00	20.38	9.83	10.55	19.95	2.78	63.49	12.51
760623.	119.00	15.47	14.83	13.94	30.93	2.76	77.94	41.06
760629.	73.50	16.91	9.93	6.99	9.13	3.26	46.22	27.28
760705.	104.00	50.31	6.37	6.65	9.38	2.79	75.51	28.49
760711.	73.50	30.32	10.78	5.91	9.80	1.86	58.67	14.83
760717.	55.50	20.41	10.04	4.52	9.42	1.39	45.79	9.71
760723.	110.50	41.17	11.60	9.19	9.09	3.25	74.31	36.19
760729.	58.50	22.56	5.91	5.04	9.48	1.86	44.85	13.65
760804.	78.50	11.91	5.45	10.47	10.07	0.92	38.82	39.68
760810.	86.00	27.83	14.03	9.88	9.02	3.26	64.02	21.98
760816.	35.00	10.73	2.07	6.00	8.90	1.86	29.56	5.44
760822.	48.00	21.47	9.55	8.08	8.99	3.26	51.35	-3.35
760828.	87.50	45.44	5.47	7.05	9.40	2.79	70.17	17.33
760903.	128.50	24.84	15.24	14.05	30.78	2.29	87.21	41.29
760909.	150.00	20.46	26.51	26.08	30.69	2.29	106.04	43.96
760915.	73.50	15.05	12.27	17.32	9.02	0.45	54.11	19.39
760921.	91.00	24.55	13.22	10.14	9.23	1.86	59.01	31.99
760927.	54.50	12.05	6.09	10.20	9.58	0.92	38.84	15.66
761003.	61.50	11.82	10.70	22.74	9.54	0.92	55.73	5.77
761009.	103.00	7.42	15.01	41.57	38.99	1.34	104.33	-1.33
761015.	123.00	36.22	10.52	18.09	20.19	1.84	86.87	36.13
761021.	72.50	21.67	11.19	12.36	19.54	1.38	66.14	6.36

TABLE D.5.6
(continued)

COMPOSITION OF AEROSOL OBSERVED AT LENNOX FROM CHEMICAL ELEMENT BALANCE

DATE	TSP	SULFATES	NITRATES	HIGHWAY	SOILDUST	OIL ASH	TRACED	RESIDUAL
761027.	137.50	6.10	7.96	46.49	61.42	1.29	123.26	14.24
761102.	113.50	9.22	15.02	61.19	38.42	0.86	124.71	-11.21
761108.	186.50	14.26	23.37	66.64	39.65	2.74	146.67	39.83
761114.	73.50	11.65	7.51	28.81	9.47	0.45	57.90	15.60
761120.	116.50	32.51	34.83	31.57	27.16	4.65	130.72	-14.22
761126.	132.50	19.58	28.49	29.12	30.62	1.35	109.16	23.34
761202.	130.00	6.43	9.51	62.99	59.00	0.83	138.76	-8.76
761208.	116.00	8.70	16.87	55.44	39.08	2.28	122.36	-6.36
761214.	143.00	9.29	21.81	69.34	48.18	3.20	151.81	-8.81
761220.	176.50	30.15	37.07	59.74	38.81	3.22	168.98	7.52
761226.	105.00	5.79	6.90	39.59	39.93	4.16	96.37	8.63

TABLE D.5.7

COMPOSITION OF AEROSOL OBSERVED AT LENNOX FROM CHEMICAL ELEMENT BALANCE

DATE	TSP	SULFATES	NITRATES	HIGHWAY	ROADDUST	OIL ASH	TRACED	RESIDUAL
760101.	81.50	5.48	3.13	18.48	27.15	0.79	55.02	26.48
760107.	133.00	6.10	16.73	42.69	35.53	1.68	102.73	30.27
760113.	229.50	15.32	49.73	55.56	45.29	3.99	169.89	59.61
760119.	161.00	23.19	21.65	32.97	40.37	2.60	120.79	40.21
760125.	148.50	25.63	30.64	23.91	20.62	2.24	103.03	45.47
760131.	220.00	19.05	43.12	48.15	25.76	5.04	141.12	78.88
760206.	48.50	8.96	1.69	17.21	6.25	0.91	35.02	13.48
760212.	99.00	7.76	18.60	27.71	12.41	2.76	69.24	29.76
760218.	141.00	19.91	29.40	37.13	18.70	3.67	108.80	32.20
760224.	67.50	9.47	4.00	11.48	8.01	0.89	33.86	33.64
760301.	37.00	7.23	1.89	3.32	1.40	0.46	14.29	22.71
760307.	81.50	9.96	13.18	17.20	11.86	1.35	53.56	27.94
760313.	99.00	9.31	15.92	32.09	18.94	1.78	78.04	20.96
760319.	124.50	13.59	7.96	18.68	28.34	1.25	69.82	54.68
760325.	148.50	19.13	22.90	18.53	30.91	2.19	93.65	54.85
760331.	106.00	14.05	14.57	19.07	19.30	3.20	70.18	35.82
760406.	44.00	9.19	3.52	8.01	7.32	0.43	28.46	15.54
760412.	39.00	8.36	2.50	6.61	0.86	0.92	19.24	19.76
760418.	105.00	15.56	14.28	17.66	15.50	1.79	64.80	40.20
760424.	100.00	35.83	15.10	5.39	7.96	1.82	66.11	33.89
760430.	118.00	16.26	20.56	25.23	15.06	1.79	78.91	39.09
760506.	69.00	14.60	6.36	11.82	8.48	-0.05	41.21	27.79
760512.	121.00	34.50	13.67	15.62	15.40	3.65	82.83	38.17
760518.	111.00	21.28	18.19	16.52	14.50	0.86	71.35	39.65
760524.	83.00	14.78	9.37	11.25	14.98	0.39	50.77	32.23
760530.	83.50	14.37	9.80	5.38	8.44	0.42	38.41	45.09
760605.	84.00	14.43	10.25	9.95	7.98	1.36	43.97	40.03
760611.	70.00	11.01	7.25	16.59	13.14	1.81	49.80	20.20
760617.	76.00	20.29	9.76	10.13	13.95	2.74	56.88	19.12
760623.	119.00	15.32	14.71	13.31	22.42	2.70	68.46	50.54
760629.	73.50	16.87	9.90	6.77	7.39	3.19	44.12	29.38
760705.	104.00	50.27	6.33	6.42	7.50	2.74	73.27	30.73
760711.	73.50	30.27	10.75	5.69	7.05	1.84	55.59	17.91
760717.	55.50	20.37	10.01	4.35	5.86	1.39	41.98	13.52
760723.	110.50	41.14	11.56	8.93	7.18	3.20	72.01	38.49
760729.	58.50	22.51	5.88	4.85	6.20	1.86	41.30	17.20
760804.	78.50	11.85	5.41	10.17	8.04	0.89	36.37	42.13
760810.	86.00	27.79	14.00	9.62	7.29	3.20	61.90	24.10
760816.	35.00	10.69	2.04	5.83	5.36	1.87	25.78	9.22
760822.	48.00	21.42	9.52	7.85	6.30	3.25	48.34	-0.34
760828.	87.50	45.40	5.44	6.82	7.31	2.75	67.72	19.78
760903.	128.50	24.70	15.13	13.44	21.32	2.23	76.83	51.67
760909.	150.00	20.31	26.39	25.27	22.56	2.22	96.76	53.24
760915.	73.50	15.00	12.23	17.06	7.61	0.43	52.32	21.18
760921.	91.00	24.51	13.18	9.89	7.84	1.82	57.23	33.77
760927.	54.50	12.00	6.05	9.94	8.12	0.89	37.00	17.50
761003.	61.50	11.79	10.66	22.06	7.00	0.90	52.41	9.09
761009.	103.00	7.25	14.89	40.48	24.77	1.27	88.65	14.35
761015.	123.00	36.13	10.44	17.55	14.52	1.80	80.44	42.56
761021.	72.50	21.58	11.13	11.97	12.36	1.35	58.38	14.12

TABLE D.5.7
(continued)

COMPOSITION OF AEROSOL OBSERVED AT LENNOX FROM CHEMICAL ELEMENT BALANCE

DATE	TSP	SULFATES	NITRATES	HIGHWAY	ROADDUST	OIL ASH	TRACED	RESIDUAL
761027.	137.50	5.82	7.75	45.04	41.20	1.18	100.99	36.51
761102.	113.50	9.07	14.90	59.58	24.58	0.80	108.92	4.58
761108.	186.50	14.08	23.22	64.76	29.08	2.65	133.80	52.70
761114.	73.50	11.61	7.48	27.86	6.90	0.43	54.28	19.22
761120.	116.50	32.39	34.74	30.80	16.90	4.64	119.48	-2.98
761126.	132.50	19.43	28.37	28.26	21.45	1.29	98.81	33.69
761202.	130.00	6.18	9.32	61.33	37.48	0.73	115.03	14.97
761208.	116.00	8.53	16.74	53.94	26.16	2.21	107.56	8.44
761214.	143.00	9.09	21.64	67.50	31.63	3.12	132.98	10.02
761220.	176.50	29.98	36.93	58.10	26.50	3.15	154.66	21.84
761226.	105.00	5.60	6.76	38.44	28.48	4.07	83.35	21.65

TABLE D.5.8

COMPOSITION OF AEROSOL OBSERVED AT LENNOX ESTIMATED FROM TRACER STUDY

DATE	TSP	SULFATES	NITRATES	HIGHWAY	SOILDUST	OIL ASH	TRACED	RESIDUAL
760101.	81.50	6.35	3.35	19.18	36.36	0.94	66.19	15.31
760107.	133.00	7.87	17.16	43.54	45.45	1.89	115.91	17.09
760113.	229.50	18.35	50.57	56.74	63.64	4.25	193.54	35.96
760119.	161.00	25.12	22.19	34.01	54.55	2.83	138.69	22.31
760125.	148.50	27.05	31.09	24.42	27.27	2.36	112.19	36.31
760131.	220.00	22.22	43.86	48.79	36.36	5.19	156.42	63.58
760206.	48.50	9.66	1.81	17.37	9.09	0.94	38.87	9.63
760212.	99.00	9.52	18.96	28.03	18.18	2.83	77.53	21.47
760218.	141.00	22.22	29.93	37.62	27.27	3.77	120.81	20.19
760224.	67.50	10.07	4.13	11.62	9.09	0.94	35.85	31.65
760301.	37.00	7.45	1.93	3.33	0.0	0.47	13.19	23.81
760307.	81.50	10.90	13.42	17.54	18.18	1.42	61.46	20.04
760313.	99.00	10.76	16.25	32.60	27.27	1.89	88.78	10.22
760319.	124.50	14.63	8.26	19.40	36.36	1.42	80.06	44.44
760325.	148.50	20.56	23.35	19.35	45.45	2.36	111.07	37.43
760331.	106.00	15.87	14.96	19.57	27.27	3.30	80.98	25.02
760406.	44.00	9.52	3.61	8.18	9.09	0.47	30.87	13.13
760412.	39.00	8.83	2.58	6.54	0.0	0.94	18.90	20.10
760418.	105.00	16.70	14.58	17.99	18.18	1.89	69.34	35.66
760424.	100.00	36.57	15.35	5.58	9.09	1.89	68.48	31.52
760430.	118.00	17.53	20.90	25.49	18.18	1.89	83.99	34.01
760506.	69.00	14.77	6.45	11.96	9.09	0.0	42.26	26.74
760512.	121.00	36.29	14.06	15.96	18.18	3.77	88.27	32.73
760518.	111.00	21.94	18.45	16.86	18.18	0.94	76.38	34.62
760524.	83.00	15.18	9.55	11.62	18.18	0.47	55.00	28.00
760530.	83.50	14.63	9.93	5.58	9.09	0.47	39.71	43.79
760605.	84.00	15.18	10.45	10.10	9.09	1.42	46.23	37.77
760611.	70.00	12.14	7.48	16.92	18.18	1.89	56.61	13.39
760617.	76.00	21.67	10.06	10.49	18.18	2.83	63.23	12.77
760623.	119.00	16.84	15.09	13.87	27.27	2.83	75.91	43.09
760629.	73.50	18.35	10.19	6.94	9.09	3.30	47.88	25.62
760705.	104.00	51.34	6.58	6.60	9.09	2.83	76.43	27.57
760711.	73.50	31.05	10.96	5.87	9.09	1.89	58.86	14.64
760717.	55.50	20.98	10.19	4.51	9.09	1.42	46.19	9.31
760723.	110.50	42.50	11.87	9.08	9.09	3.30	75.85	34.65
760729.	58.50	23.32	6.06	5.02	9.09	1.89	45.38	13.12
760804.	78.50	12.42	5.55	10.32	9.09	0.94	38.32	40.18
760810.	86.00	29.26	14.32	9.76	9.09	3.30	65.73	20.27
760816.	35.00	11.59	2.19	5.98	9.09	1.89	30.74	4.26
760822.	48.00	22.91	9.80	8.01	9.09	3.30	53.11	-5.11
760828.	87.50	46.51	5.68	6.99	9.09	2.83	71.10	16.40
760903.	128.50	25.94	15.48	13.99	27.27	2.36	85.04	43.46
760909.	150.00	21.80	26.83	25.77	27.27	2.36	104.04	45.96
760915.	73.50	15.46	12.38	17.15	9.09	0.47	54.55	18.95
760921.	91.00	25.39	13.42	10.04	9.09	1.89	59.82	31.18
760927.	54.50	12.56	6.19	10.10	9.09	0.94	38.88	15.62
761003.	61.50	12.56	10.84	22.11	9.09	0.94	55.54	5.96
761009.	103.00	8.69	15.22	41.17	36.36	1.42	102.87	0.13
761015.	123.00	37.12	10.71	17.88	18.18	1.89	85.78	37.22
761021.	72.50	22.36	11.35	12.30	18.18	1.42	65.60	6.90

TABLE D.5.8
(continued)

COMPOSITION OF AEROSOL OBSERVED AT LENNOX ESTIMATED FROM TRACER STUDY

DATE	TSP	SULFATES	NITRATES	HIGHWAY	SOILDUST	OIL ASH	TRACED	RESIDUAL
761027.	137.50	7.45	8.13	46.08	54.55	1.42	117.62	19.88
761102.	113.50	10.63	15.22	60.35	36.36	0.94	123.50	-10.00
761108.	186.50	16.56	23.74	65.20	36.36	2.83	144.69	41.81
761114.	73.50	12.28	7.61	27.86	9.09	0.47	57.32	16.18
761120.	116.50	34.91	35.35	31.30	27.27	4.72	133.55	-17.05
761126.	132.50	20.56	28.77	28.76	27.27	1.42	106.78	25.72
761202.	130.00	7.87	9.67	62.38	54.55	0.94	135.41	-5.41
761208.	116.00	10.63	17.16	54.60	36.36	2.36	121.10	-5.10
761214.	143.00	11.87	22.19	68.36	45.45	3.30	151.17	-8.17
761220.	176.50	32.43	37.54	58.71	36.36	3.30	168.35	8.15
761226.	105.00	8.28	7.22	39.09	36.36	4.25	95.20	9.80

D.6 Monitoring Data at Lynwood Site (SCAQMD)

TABLE D.6.1

SCAQMD Particulate Air Quality Data at Lynwood
[211 Samples Considered]

Jan. 1974 - Dec. 1977

	TSP	$SO_4^=$	NO_3^-	Pb	Fe	Mn	Ni
MEAN	104.90	10.85	8.46	2.63	1.73	0.036	0.035
STANDARD DEVIATION	42.75	8.67	8.26	2.06	1.06	0.023	0.024

CORRELATION MATRIX

	TSP	$SO_4^=$	NO_3^-	Pb	Fe	Mn	Ni
TSP	1.00	0.65	0.68	0.69	0.62	0.71	0.62
$SO_4^=$		1.00	0.71	0.39	0.29	0.34	0.52
NO_3^-			1.00	0.53	0.40	0.43	0.49
Pb				1.00	0.39	0.62	0.43
Fe					1.00	0.88	0.31
Mn						1.00	0.39
Ni							1.00

All pollutant concentrations are in $\mu g\ m^{-3}$.

TABLE D.6.2

Chemically Resolved Regression Model Relating Tracer Element Concentrations to Pollutant Sources at Lynwood

MODEL STRUCTURE:

$$TSP_j = SULFATES_j + NITRATES_j + CRUSTAL_j + OIL\ ASH_j + HIGHWAY_j + OTHER_j$$

MODEL ESTIMATED:

$$TSP_j = \beta_{SO_4} \cdot SO_4{}^{=}_j + \beta_{NO_3} \cdot NO_3{}^{-}_j + \beta_{CRUSTAL} \cdot Mn_j + \beta_{OIL} \cdot Ni_j + \beta_{HIGHWAY} \cdot Pb_j + \beta_{OTHER} + \varepsilon_j$$

REGRESSION MODEL RESULTS	TSP AVERAGE (TSP VARIANCE)	COEFFICIENTS (STANDARD ERROR)						CORRELATION COEFFICIENT (number of samples)
		β_{SO_4}	β_{NO_3}	$\beta_{CRUSTAL}$	β_{OIL}	$\beta_{HIGHWAY}$	β_{OTHER}	
[1974-1977]	104.90	1.18	0.75	657.3	344.4	4.58	37.51	0.88
	(1827.4)	(0.24)	(0.26)	(79.3)	(70.9)	(0.94)	(2.99)	(211)
Prior Expectation		1.02 to 1.38	1.29	729.9 to 909.1	47.17	7.81		

TABLE D.6.3

Chemically Resolved Regression Model Relating Tracer Element Concentrations to Pollutant Sources at Lynwood

MODEL STRUCTURE:

$$TSP_j = SULFATES_j + NITRATES_j + CRUSTAL_j + OIL\ ASH_j + HIGHWAY_j + OTHER_j$$

MODEL ESTIMATED:

$$TSP_j = \beta_{SO_4} \cdot SO_{4_j}^{=} + \beta_{NO_3} \cdot NO_{3_j}^{-} + \beta_{CRUSTAL} \cdot Fe_j + \beta_{OIL} \cdot Ni_j + \beta_{HIGHWAY} \cdot Pb_j + \beta_{OTHER} + \varepsilon_j$$

REGRESSION MODEL RESULTS	TSP AVERAGE (TSP VARIANCE)	COEFFICIENTS (STANDARD ERROR)						CORRELATION COEFFICIENT (number of samples)
		β_{SO_4}	β_{NO_3}	$\beta_{CRUSTAL}$	β_{OIL}	$\beta_{HIGHWAY}$	β_{OTHER}	
[1974-1977]	104.90	1.23	0.51	12.70	361.7	6.84	34.48	0.88
	(1827.4)	(0.24)	(0.26)	(1.45)	(69.76)	(0.83)	(3.09)	(211)
Prior Expectation		1.02 to 1.38	1.29	14.45 to 31.25	47.17	7.81		

TABLE D.6.4

Chemical Elements Used As If They Were
Unique Tracers for Major Source Types

Lynwood AQMD Station

EXPRESSION EVALUATED:

TSP = SULFATES + NITRATES + CRUSTAL + OIL ASH + HIGHWAY + OTHER

$TSP = 1.38\ SO_4^{=} + 1.29\ NO_3^{-} + 909.1\ Mn + 47.2\ Ni + 7.81\ Pb + OTHER$

COMPONENT	AVERAGE MASS LOADING ($\mu g\ m^{-3}$) 1974-1977	1976
Sulfate compounds	14.97	18.55
Nitrate compounds	10.92	16.95
Crustal components	33.18	36.21
Fuel Oil Fly Ash	1.67	1.77
Highway Aerosol	20.58	23.08
Subtotal	81.30	96.56
Remaining to be determined	23.60	19.69
TOTAL PARTICULATE	104.90	116.25

Regression of TSP on Σ(SULFATES + NITRATES + CRUSTAL + OIL ASH + HIGHWAY)

YEAR	REGRESSION EQUATION	CORRELATION (NUMBER OF SAMPLES)
1974-1977	TSP = 0.77 [Σ TRACED] + 41.96	0.87 (211)
1976	TSP = 0.68 [Σ TRACED] + 50.62	0.88 (59)

TABLE D.6.5

Aerosol Source Assignment for the Year 1976

Lynwood

AQMD Station

COMPONENT	1976 AVERAGE MASS LOADING ($\mu g\ m^{-3}$)			
	CHEMICAL ELEMENT BALANCE (ROAD DUST CASE)	CHEMICAL ELEMENT BALANCE (SOIL DUST CASE)	TRACER ELEMENT METHOD(a)	MULTIPLE REGRESSION METHOD(b)
SULFATE COMPOUNDS	17.30	17.47	18.55	16.53
NITRATE COMPOUNDS	16.58	16.73	16.95	6.70
CRUSTAL COMPONENTS	27.05	40.22	36.21	25.50
FUEL OIL FLY ASH	1.61	1.69	1.77	13.38
HIGHWAY AEROSOL	22.07	23.19	23.08	20.18
Subtotal	84.61	99.30	96.56	82.29
Remaining to be Determined	31.64	16.95	19.69	33.96
TOTAL PARTICULATE	116.25	116.25	116.25	116.25

(a) $TSP = 1.38\ SO_4^{=} + 1.29\ NO_3^{-} + 909.1\ Mn + 47.2\ Ni + 7.81\ Pb + OTHER$

(b) $TSP = 1.23\ SO_4^{=} + 0.51\ NO_3^{-} + 12.70\ Fe + 361.7\ Ni + 6.84\ Pb + OTHER$

TABLE D.6.6

COMPOSITION OF AEROSOL OBSERVED AT LYNWOOD FROM CHEMICAL ELEMENT BALANCE

DATE	TSP	SULFATES	NITRATES	HIGHWAY	SOILDUST	OIL ASH	TRACED	RESIDUAL
760101.	69.00	2.14	2.83	12.60	31.28	1.82	50.68	18.32
760107.	140.00	42.92	17.59	35.29	83.05	1.25	180.11	-40.11
760113.	192.00	41.50	40.06	47.82	79.87	2.67	211.92	-19.92
760119.	150.50	24.65	23.95	24.58	71.26	2.22	146.66	3.84
760125.	119.50	29.32	27.85	18.74	38.41	1.34	115.67	3.83
760131.	171.50	33.84	32.78	44.24	58.26	2.24	171.36	0.14
760206.	35.00	1.95	2.25	7.39	9.95	0.92	22.46	12.54
760212.	104.50	24.78	24.09	34.00	29.63	1.83	114.32	-9.82
760218.	165.50	39.86	38.52	44.79	39.01	2.75	164.91	0.59
760224.	64.50	6.22	6.34	16.80	28.20	0.89	58.45	6.05
760301.	45.00	2.22	2.50	8.05	20.36	0.90	34.04	10.96
760319.	117.50	9.61	9.65	18.33	42.07	1.33	80.99	36.51
760325.	142.50	24.33	23.67	14.97	51.66	2.73	117.36	25.14
760331.	125.50	26.04	24.90	23.88	58.79	1.30	134.92	-9.42
760406.	61.00	5.14	5.09	11.31	21.18	0.43	43.15	17.85
760412.	60.00	22.32	21.09	9.96	21.03	0.90	75.30	-15.30
760418.	94.50	17.82	17.11	20.18	20.63	0.90	76.64	17.86
760424.	108.50	17.18	16.35	10.12	21.06	0.90	65.61	42.89
760430.	150.00	30.63	29.03	27.39	61.91	0.82	149.79	0.21
760506.	73.50	8.42	7.94	10.92	21.47	-0.04	48.70	24.80
760512.	124.00	16.07	15.55	14.34	31.63	1.35	78.94	45.06
760518.	123.00	25.32	23.91	13.32	31.83	0.88	95.27	27.73
760524.	96.50	12.92	12.05	7.98	21.21	-0.04	54.11	42.39
760530.	85.50	12.75	11.92	9.41	21.47	-0.04	55.51	29.99
760605.	101.00	14.24	13.66	11.73	31.47	0.88	71.98	29.02
760611.	75.00	9.84	9.68	16.25	20.71	0.90	57.37	17.63
760617.	94.00	14.58	14.25	8.42	31.68	1.82	70.74	23.26
760623.	136.50	16.57	16.39	17.97	52.86	2.25	106.05	30.45
760629.	118.00	15.76	15.73	12.79	41.72	2.75	88.75	29.25
760705.	131.00	6.62	6.93	10.43	20.63	1.84	46.46	84.54
760711.	92.50	14.34	13.99	6.24	20.65	1.84	57.06	35.44
760717.	88.50	10.28	9.94	7.65	20.34	0.90	49.12	39.38
760723.	148.00	17.97	18.11	13.25	39.35	3.69	92.36	55.64
760729.	88.00	10.07	9.91	7.82	20.81	1.37	49.99	38.01
760804.	96.00	7.60	7.83	10.46	31.33	1.82	59.05	36.95
760810.	122.50	17.67	17.62	10.45	30.01	3.24	78.99	43.51
760816.	58.00	4.36	4.66	8.69	20.67	1.37	39.75	18.25
760822.	53.50	5.03	5.07	6.63	20.67	0.90	38.30	15.20
760828.	139.50	9.07	9.80	17.53	40.95	3.22	80.56	58.94
760903.	166.50	20.77	20.46	19.04	41.46	2.75	104.48	62.02
760909.	176.50	33.73	32.96	32.29	60.72	3.65	163.35	13.15
760915.	66.50	12.31	11.86	10.21	10.09	0.92	45.39	21.11
760921.	134.50	15.50	15.37	14.25	20.25	2.31	67.68	66.82
760927.	89.50	9.10	9.14	15.13	20.64	1.37	55.38	34.12
761003.	70.00	12.51	12.01	18.47	20.50	0.43	63.91	6.09
761009.	123.00	13.04	13.20	31.35	51.75	1.78	111.13	11.87
761015.	109.00	11.05	10.93	15.30	40.25	1.34	78.88	30.12
761021.	92.00	17.26	16.70	16.80	20.30	1.37	72.43	19.57
761027.	170.00	8.94	9.72	51.21	89.09	1.71	160.68	9.32
761102.	127.50	15.82	15.56	38.90	59.85	0.83	130.96	-3.46

TABLE D.6.6
(continued)

COMPOSITION OF AEROSOL OBSERVED AT LYNWOOD FROM CHEMICAL ELEMENT BALANCE

DATE	TSP	SULFATES	NITRATES	HIGHWAY	SOILDUST	OIL ASH	TRACED	RESIDUAL
761108.	182.00	32.23	31.36	49.44	81.47	2.20	196.71	-14.71
761114.	89.50	10.59	10.46	31.13	20.05	0.43	72.66	16.84
761120.	135.00	34.52	34.06	33.34	28.31	4.64	134.87	0.13
761126.	133.50	32.08	30.42	19.49	40.60	1.34	123.93	9.57
761202.	153.00	8.66	9.69	55.08	88.73	2.18	164.34	-11.34
761208.	165.00	20.14	20.68	68.00	92.12	2.65	203.59	-38.59
761214.	205.00	23.22	23.85	78.57	110.93	3.08	239.65	-34.65
761220.	182.50	39.25	38.92	73.01	56.39	4.13	211.70	-29.20
761226.	127.00	8.28	8.86	44.49	60.59	1.30	123.51	3.49

TABLE D.6.7

COMPOSITION OF AEROSOL OBSERVED AT LYNWOOD FROM CHEMICAL ELEMENT BALANCE

DATE	TSP	SULFATES	NITRATES	HIGHWAY	ROADDUST	OIL ASH	TRACED	RESIDUAL
760101.	69.00	1.99	2.72	11.76	22.36	1.76	40.59	28.41
760107.	140.00	42.56	17.30	33.18	55.45	1.10	149.58	-9.58
760113.	192.00	41.16	39.79	45.70	51.08	2.54	180.27	11.73
760119.	150.50	24.34	23.71	22.89	46.00	2.10	119.04	31.46
760125.	119.50	29.16	27.73	17.85	23.07	1.29	99.11	20.39
760131.	171.50	33.60	32.59	42.61	36.25	2.15	147.21	24.29
760206.	35.00	1.90	2.21	7.09	6.75	0.90	18.86	16.14
760212.	104.50	24.65	23.99	32.84	20.05	1.77	103.30	1.20
760218.	165.50	39.69	38.38	43.28	25.88	2.68	149.92	15.58
760224.	64.50	6.11	6.26	16.13	16.61	0.85	45.96	18.54
760301.	45.00	2.13	2.43	7.55	13.36	0.87	26.34	18.66
760319.	117.50	9.41	9.49	17.19	29.86	1.24	67.20	50.30
760325.	142.50	24.10	23.49	13.70	34.92	2.63	98.85	43.65
760331.	125.50	25.80	24.72	22.55	35.76	1.21	110.04	15.46
760406.	61.00	5.04	5.01	10.69	15.51	0.38	36.65	24.35
760412.	60.00	22.22	21.01	9.36	15.42	0.85	68.87	-8.87
760418.	94.50	17.72	17.03	19.41	15.74	0.85	70.75	23.75
760424.	108.50	17.08	16.26	9.50	16.33	0.85	60.02	48.48
760430.	150.00	30.36	28.82	25.83	40.80	0.71	126.51	23.49
760506.	73.50	8.31	7.86	10.29	16.16	-0.09	42.53	30.97
760512.	124.00	15.91	15.42	13.42	24.51	1.27	70.54	53.46
760518.	123.00	25.16	23.78	12.39	25.00	0.80	87.13	35.87
760524.	96.50	12.81	11.96	7.35	17.38	-0.10	49.40	47.10
760530.	85.50	12.64	11.83	8.78	16.91	-0.10	50.06	35.44
760605.	101.00	14.10	13.54	10.92	21.77	0.82	61.15	39.85
760611.	75.00	9.74	9.60	15.57	15.11	0.86	50.87	24.13
760617.	94.00	14.43	14.12	7.57	23.51	1.75	61.39	32.61
760623.	136.50	16.32	16.19	16.56	38.63	2.14	89.82	46.68
760629.	118.00	15.56	15.57	11.72	29.71	2.66	75.22	42.78
760705.	131.00	6.52	6.85	9.82	15.91	1.79	40.89	90.11
760711.	92.50	14.24	13.91	5.70	14.70	1.80	50.36	42.14
760717.	88.50	10.20	9.87	7.16	13.29	0.87	41.39	47.11
760723.	148.00	17.79	17.98	12.33	25.07	3.64	76.81	71.19
760729.	88.00	9.98	9.84	7.26	14.88	1.33	43.29	44.71
760804.	96.00	7.45	7.72	9.65	22.22	1.76	48.80	47.20
760810.	122.50	17.53	17.52	9.72	20.02	3.19	67.98	54.52
760816.	58.00	4.27	4.58	8.14	14.51	1.33	32.83	25.17
760822.	53.50	4.93	5.00	6.12	13.91	0.86	30.83	22.67
760828.	139.50	8.88	9.65	16.45	28.39	3.14	66.51	72.99
760903.	166.50	20.58	20.31	17.90	29.64	2.66	91.09	75.41
760909.	176.50	33.46	32.75	30.67	40.52	3.54	140.94	35.56
760915.	66.50	12.26	11.82	9.83	7.68	0.90	42.48	24.02
760921.	134.50	15.41	15.29	13.60	15.48	2.26	62.03	72.47
760927.	89.50	9.00	9.06	14.46	15.82	1.32	49.65	39.85
761003.	70.00	12.42	11.94	17.77	14.16	0.39	56.67	13.33
761009.	123.00	12.81	13.01	29.86	35.89	1.68	93.25	29.75
761015.	109.00	10.88	10.80	14.35	25.59	1.27	62.90	46.10
761021.	92.00	17.17	16.63	16.13	14.33	1.33	65.58	26.42
761027.	170.00	8.57	9.44	48.95	55.56	1.57	124.08	45.92
761102.	127.50	15.57	15.36	37.29	37.85	0.73	106.80	20.70

TABLE D.6.7
(continued)

COMPOSITION OF AEROSOL OBSERVED AT LYNWOOD FROM CHEMICAL ELEMENT BALANCE

761108.	182.00	31.00	31.08	47.20	39.84	2.05	166.05	15.95
761114.	89.50	10.51	10.39	30.08	14.20	0.39	65.56	23.94
761120.	138.00	SULFATE 39	NITRATE 96	HIGHWAY 24	ROADDUST 08	OIL A 61	TRACER 28	RESIDUAL 2
761126.	133.50	31.91	30.28	18.46	26.45	1.26	108.37	25.13
761202.	153.00	8.29	9.40	52.77	55.39	2.04	127.89	25.11
761208.	165.00	19.78	20.40	65.71	53.49	2.53	161.90	3.10
761214.	205.00	22.74	23.47	75.36	72.66	2.89	197.12	7.88
761220.	182.50	39.02	38.74	70.77	35.58	4.05	188.15	-5.65
761226.	127.00	8.02	8.65	42.71	39.67	1.19	100.24	26.76

TABLE D.6.8

COMPOSITION OF AEROSOL OBSERVED AT LYNWOOD ESTIMATED FROM TRACER STUDY

DATE	TSP	SULFATES	NITRATES	HIGHWAY	SOILDUST	OIL ASH	TRACED	RESIDUAL
760101.	69.00	3.17	2.97	12.57	27.27	1.89	47.87	21.13
760107.	140.00	43.88	17.80	35.22	72.73	1.42	171.05	-31.05
760113.	192.00	43.33	40.51	47.64	72.73	2.83	207.04	-15.04
760119.	150.50	25.94	24.25	24.60	63.64	2.36	140.79	9.71
760125.	119.50	30.08	28.12	18.74	36.36	1.42	114.73	4.77
760131.	171.50	35.47	33.15	44.05	54.55	2.36	169.57	1.93
760206.	35.00	2.48	2.32	7.34	9.09	0.94	22.18	12.82
760212.	104.50	26.08	24.38	33.58	27.27	1.89	113.21	-8.71
760218.	165.50	41.68	38.96	44.28	36.36	2.83	164.11	1.39
760224.	64.50	6.90	6.45	16.79	27.27	0.94	58.36	6.14
760301.	45.00	2.76	2.58	8.04	18.18	0.94	32.51	12.49
760319.	117.50	10.49	9.80	18.28	36.36	1.42	76.35	41.15
760325.	142.50	25.67	23.99	15.00	45.45	2.83	112.94	29.56
760331.	125.50	26.91	25.15	23.90	54.55	1.42	131.92	-6.42
760406.	61.00	5.52	5.16	11.25	18.18	0.47	40.58	20.42
760412.	60.00	22.77	21.28	9.92	18.18	0.94	73.10	-13.10
760418.	94.50	18.49	17.29	19.92	18.18	0.94	74.82	19.68
760424.	108.50	17.66	16.51	10.07	18.18	0.94	63.38	45.12
760430.	150.00	31.33	29.28	27.33	54.55	0.94	143.43	6.57
760506.	73.50	8.56	8.00	10.86	18.18	0.0	45.59	27.91
760512.	124.00	16.84	15.74	14.29	27.27	1.42	75.55	48.45
760518.	123.00	25.81	24.12	13.28	27.27	0.94	91.42	31.58
760524.	96.50	12.97	12.13	7.97	18.18	0.0	51.25	45.25
760530.	85.50	12.83	12.00	9.37	18.18	0.0	52.38	33.12
760605.	101.00	14.77	13.80	11.71	27.27	0.94	68.50	32.50
760611.	75.00	10.49	9.80	16.09	18.18	0.94	55.51	19.49
760617.	94.00	15.46	14.45	8.43	27.27	1.89	67.50	26.50
760623.	136.50	17.80	16.64	17.96	45.45	2.36	100.22	36.28
760629.	118.00	17.11	16.00	12.81	36.36	2.83	85.11	32.89
760705.	131.00	7.59	7.09	10.39	18.18	1.89	45.14	85.86
760711.	92.50	15.18	14.19	6.25	18.18	1.89	55.69	36.81
760717.	88.50	10.76	10.06	7.65	18.18	0.94	47.61	40.89
760723.	148.00	19.73	18.45	13.28	36.36	3.77	91.60	56.40
760729.	88.00	10.76	10.06	7.81	18.18	1.42	48.23	39.77
760804.	96.00	8.56	8.00	10.47	27.27	1.89	56.18	39.82
760810.	122.50	19.18	17.93	10.47	27.27	3.30	78.15	44.35
760816.	58.00	5.11	4.77	8.67	18.18	1.42	38.15	19.85
760822.	53.50	5.52	5.16	6.64	18.18	0.94	36.44	17.06
760828.	139.50	10.76	10.06	17.49	36.36	3.30	77.99	61.51
760903.	166.50	22.22	20.77	18.98	36.36	2.83	101.16	65.34
760909.	176.50	35.74	33.41	32.18	54.55	3.77	159.65	16.85
760915.	66.50	12.83	12.00	10.07	9.09	0.94	44.94	21.56
760921.	134.50	16.70	15.61	14.14	18.18	2.36	66.98	67.52
760927.	89.50	9.94	9.29	15.00	18.18	1.42	53.82	35.68
761003.	70.00	12.97	12.13	18.28	18.18	0.47	62.03	7.97
761009.	123.00	14.35	13.42	31.16	45.45	1.89	106.27	16.73
761015.	109.00	11.87	11.09	15.31	36.36	1.42	76.05	32.95
761021.	92.00	18.08	16.90	16.64	18.18	1.42	71.21	20.79
761027.	170.00	10.63	9.93	51.08	81.82	1.89	155.34	14.66
761102.	127.50	16.84	15.74	38.74	54.55	0.94	126.80	0.70

TABLE D.6.8
(continued)

COMPOSITION OF AEROSOL OBSERVED AT LYNWOOD ESTIMATED FROM TRACER STUDY

DATE	TSP	SULFATES	NITRATES	HIGHWAY	SOILDUST	OIL ASH	TRACED	RESIDUAL
761108.	182.00	33.95	31.73	49.20	72.73	2.36	189.97	-7.97
761114.	89.50	11.32	10.58	30.54	18.18	0.47	71.08	18.42
761120.	135.00	36.98	34.57	32.96	27.27	4.72	136.50	-1.50
761126.	133.50	32.84	30.70	19.45	36.36	1.42	120.77	12.73
761202.	153.00	10.63	9.93	54.90	81.82	2.36	159.64	-6.64
761208.	165.00	22.49	21.03	67.95	90.91	2.83	205.21	-40.21
761214.	205.00	25.94	24.25	78.10	100.00	3.30	231.60	-26.60
761220.	182.50	42.23	39.47	72.32	54.55	4.25	212.81	-30.31
761226.	127.00	9.66	9.03	44.20	54.55	1.42	118.86	8.14

D.7 Monitoring Data at Pasadena Site (SCAQMD)

TABLE D.7.1

SCAQMD Particulate Air Quality Data at Pasadena
[387 Samples Considered]

Jul. 1971 - Dec. 1977

	TSP	$SO_4^=$	NO_3^-	Pb	Fe	Mn	Ni
MEAN	105.29	10.66	8.35	2.83	1.75	0.040	0.021
STANDARD DEVIATION	46.38	9.48	6.59	1.40	1.58	0.043	0.016

CORRELATION MATRIX

	TSP	$SO_4^=$	NO_3^-	Pb	Fe	Mn	Ni
TSP	1.00	0.44	0.31	0.50	0.70	0.56	0.55
$SO_4^=$		1.00	-0.002	0.07	0.04	0.18	0.45
NO_3^-			1.00	0.34	0.06	0.08	0.10
Pb				1.00	0.29	0.27	0.40
Fe					1.00	0.65	0.28
Mn						1.00	0.30
Ni							1.00

All pollutant concentrations are in $\mu g\ m^{-3}$.

TABLE D.7.2

Chemically Resolved Regression Model Relating Tracer Element Concentrations to Pollutant Sources at Pasadena AQMD Station

MODEL STRUCTURE:

$$TSP_j = SULFATES_j + NITRATES_j + CRUSTAL_j + OIL\ ASH_j + HIGHWAY_j + OTHER_j$$

MODEL ESTIMATED:

$$TSP_j = \beta_{SO_4} \cdot SO_{4_j}^{=} + \beta_{NO_3} \cdot NO_{3_j}^{-} + \beta_{CRUSTAL} \cdot Mn_j + \beta_{OIL} \cdot Ni_j + \beta_{HIGHWAY} \cdot Pb_j + \beta_{OTHER} + \varepsilon_j$$

REGRESSION MODEL RESULTS	TSP AVERAGE (TSP VARIANCE)	COEFFICIENTS (STANDARD ERROR)						CORRELATION COEFFICIENT (number of samples)
		β_{SO_4}	β_{NO_3}	$\beta_{CRUSTAL}$	β_{OIL}	$\beta_{HIGHWAY}$	β_{OTHER}	
[1971-1977]	105.29	1.30	1.23	399.3	587.4	8.19	29.68	0.78
	(2150.6)	(0.18)	(0.24)	(36.58)	(118.5)	(1.24)	(3.78)	(387)
Prior Expectation		1.02 to 1.38	1.29	729.9 to 909.1	47.17	7.81		

TABLE D.7.3

Chemically Resolved Regression Model Relating Tracer Element Concentrations to Pollutant Sources at Pasadena AQMD Station

MODEL STRUCTURE:

$$TSP_j = SULFATES_j + NITRATES_j + CRUSTAL_j + OIL\ ASH_j + HIGHWAY_j + OTHER_j$$

MODEL ESTIMATED:

$$TSP_j = \beta_{SO_4} \cdot SO_4{}^{=}_j + \beta_{NO_3} \cdot NO_3{}^{-}_j + \beta_{CRUSTAL} \cdot Fe_j + \beta_{OIL} \cdot Ni_j + \beta_{HIGHWAY} \cdot Pb_j + \beta_{OTHER} + \varepsilon_j$$

REGRESSION MODEL RESULTS	TSP AVERAGE (TSP VARIANCE)	COEFFICIENTS (STANDARD ERROR)						CORRELATION COEFFICIENT (number of samples)
		β_{SO_4}	β_{NO_3}	$\beta_{CRUSTAL}$	β_{OIL}	$\beta_{HIGHWAY}$	β_{OTHER}	
[1971-1977]	105.29	1.65	1.35	16.83	412.61	6.48	20.02	0.88
	(2150.6)	(0.13)	(0.18)	(0.74)	(89.32)	(0.94)	(2.88)	(387)
Prior Expectation		1.02 to 1.38	1.29	14.45 to 31.25	47.17	7.81		

TABLE D.7.4

Chemical Elements Used As If They Were
Unique Tracers for Major Source Types

Pasadena AQMD Station

EXPRESSION EVALUATED:

TSP = SULFATES + NITRATES + CRUSTAL + OIL ASH + HIGHWAY + OTHER

$TSP = 1.38\ SO_4^{=} + 1.29\ NO_3^{-} + 909.1\ Mn + 47.2\ Ni + 7.81\ Pb + OTHER$

COMPONENT	AVERAGE MASS LOADING ($\mu g\ m^{-3}$) 1971-1977	1976
Sulfate compounds	14.72	14.73
Nitrate compounds	10.77	16.85
Crustal components	36.36	29.81
Fuel Oil Fly Ash	0.99	0.96
Highway Aerosol	22.11	22.48
Subtotal	84.95	84.83
Remaining to be determined	20.34	16.87
TOTAL PARTICULATE	105.29	101.70

Regression of TSP on Σ(SULFATES + NITRATES + CRUSTAL + OIL ASH + HIGHWAY)

YEAR	REGRESSION EQUATION	CORRELATION (NUMBER OF SAMPLES)
1971-1977	TSP = 0.68 [Σ TRACED] + 47.88	0.73 (387)
1976	TSP = 1.00 [Σ TRACED] + 16.84	0.89 (61)

TABLE D.7.5

Aerosol Source Assignment for the Year 1976

Pasadena

AQMD Station

COMPONENT	1976 AVERAGE MASS LOADING ($\mu g\ m^{-3}$)			
	CHEMICAL ELEMENT BALANCE (ROAD DUST CASE)	CHEMICAL ELEMENT BALANCE (SOIL DUST CASE)	TRACER ELEMENT METHOD(a)	MULTIPLE REGRESSION METHOD(b)
SULFATE COMPOUNDS	13.87	13.99	14.73	17.62
NITRATE COMPOUNDS	16.57	16.67	16.85	17.63
CRUSTAL COMPONENTS	19.07	30.40	29.81	23.48
FUEL OIL FLY ASH	0.85	0.90	0.96	8.25
HIGHWAY AEROSOL	21.74	22.59	22.48	18.66
Subtotal	72.10	84.55	84.83	85.64
Remaining to be Determined	29.60	17.15	16.87	16.06
TOTAL PARTICULATE	101.70	101.70	101.70	101.70

(a) $TSP = 1.38\ SO_4^{=} + 1.29\ NO_3^{-} + 909.1\ Mn + 47.2\ Ni + 7.81\ Pb + OTHER$

(b) $TSP = 1.65\ SO_4^{=} + 1.35\ NO_3^{-} + 16.83\ Fe + 412.6\ Ni + 6.48\ Pb + OTHER$

TABLE D.7.6

COMPOSITION OF AEROSOL OBSERVED AT PASADENA FROM CHEMICAL ELEMENT BALANCE

DATE	TSP	SULFATES	NITRATES	HIGHWAY	SOILDUST	OIL ASH	TRACED	RESIDUAL
760101.	93.50	5.21	3.42	23.20	48.76	0.38	80.98	12.52
760107.	115.50	5.82	19.03	24.78	61.45	0.82	111.90	3.60
760113.	162.50	6.71	28.64	30.31	86.77	0.78	153.21	9.29
760119.	201.50	9.70	16.94	37.12	95.68	1.23	160.68	40.82
760125.	130.50	14.89	28.78	21.43	38.97	0.87	104.94	25.56
760131.	120.50	5.11	21.62	28.70	55.59	0.36	111.39	9.11
760206.	24.00	6.82	2.69	6.65	0.99	-0.00	17.14	6.86
760212.	80.50	5.13	22.23	22.75	19.69	0.90	70.71	9.79
760218.	155.50	27.03	44.99	32.87	36.53	1.81	143.23	12.27
760224.	48.50	6.90	8.40	9.88	10.06	0.92	36.16	12.34
760301.	33.00	6.02	3.43	8.72	13.79	0.45	32.41	0.59
760307.	68.00	7.10	15.09	17.99	19.36	0.43	59.97	8.03
760313.	86.00	4.52	15.47	22.48	30.24	0.41	73.11	12.89
760319.	105.00	8.72	14.07	13.90	42.19	0.39	79.27	25.73
760325.	130.00	17.01	28.34	20.15	49.60	1.79	116.88	13.12
760331.	105.50	7.83	25.44	20.53	37.49	0.87	92.16	13.34
760406.	50.00	6.56	13.55	9.32	10.23	0.45	40.12	9.88
760412.	38.50	6.41	6.12	9.88	10.18	0.45	33.04	5.46
760418.	97.00	7.86	21.21	18.44	30.61	0.88	79.01	17.99
760424.	120.00	25.24	19.41	24.20	19.70	0.90	89.45	30.55
760430.	119.00	11.23	20.30	30.97	36.71	0.87	100.09	18.91
760506.	62.50	10.65	10.89	9.71	10.32	-0.02	41.55	20.95
760512.	149.00	20.89	15.80	23.89	39.16	1.34	101.07	47.93
760518.	106.00	16.30	22.49	20.12	28.58	0.89	88.38	17.62
760524.	102.00	17.08	23.46	8.38	21.41	-0.04	70.27	31.73
760530.	95.00	17.74	18.71	10.19	20.90	-0.04	67.50	27.50
760605.	112.00	15.69	25.83	15.26	20.18	0.90	77.86	34.14
760611.	79.50	10.12	16.34	15.86	9.77	0.92	53.01	26.49
760617.	87.00	15.21	18.73	11.85	23.31	1.83	75.93	11.07
760623.	107.50	7.62	13.80	20.99	48.34	0.38	91.14	16.36
760629.	81.00	14.60	18.11	17.99	25.57	1.37	77.63	3.37
760705.	151.00	46.24	14.93	15.63	19.50	0.90	97.21	53.79
760711.	84.00	23.71	15.71	9.48	10.03	0.92	59.85	24.15
760717.	80.00	19.41	11.48	9.35	9.32	0.92	50.48	29.52
760723.	140.00	36.22	14.61	23.60	18.19	1.85	94.47	45.53
760729.	86.50	20.77	17.50	10.57	9.56	0.92	59.33	27.17
760804.	96.00	9.35	15.45	13.23	26.10	0.89	65.02	30.98
760810.	113.00	21.86	18.50	16.27	25.53	1.37	83.52	29.48
760816.	43.00	8.83	9.22	10.83	9.38	-0.02	38.23	4.77
760822.	52.00	6.10	8.94	11.72	10.02	0.45	37.22	14.78
760828.	141.00	36.19	12.94	32.49	21.67	1.84	105.13	35.87
760903.	178.00	26.68	13.07	29.92	51.92	1.79	123.38	54.62
760909.	116.50	13.88	17.57	23.45	40.58	1.81	97.28	19.22
760915.	90.00	22.00	12.24	12.39	19.84	0.90	67.38	22.62
760921.	129.50	36.06	14.13	21.47	20.35	1.37	93.38	36.12
760927.	71.00	11.38	13.93	19.38	20.84	0.43	65.95	5.05
761003.	58.00	8.23	15.34	16.52	9.97	0.45	50.50	7.50
761009.	102.00	4.56	13.56	31.59	40.00	-0.08	89.63	12.37
761015.	167.00	40.35	7.82	26.32	34.04	1.82	110.35	56.65
761021.	118.50	25.98	22.44	22.05	18.72	1.85	91.04	27.46

TABLE D.7.6
(continued)

COMPOSITION OF AEROSOL OBSERVED AT PASADENA FROM CHEMICAL ELEMENT BALANCE

DATE	TSP	SULFATES	NITRATES	HIGHWAY	SOILDUST	OIL ASH	TRACED	RESIDUAL
761027.	94.00	3.80	11.17	31.55	41.86	1.33	89.71	4.29
761102.	88.50	4.10	11.99	44.63	39.29	0.39	100.40	-11.90
761108.	100.50	6.09	14.55	42.28	41.63	0.39	104.94	-4.44
761114.	66.50	10.55	11.23	25.70	9.51	0.45	57.45	9.05
761120.	145.50	16.64	30.74	52.85	32.69	1.82	134.74	10.76
761126.	99.50	17.49	24.80	15.77	20.78	0.90	79.74	19.76
761202.	93.50	3.15	10.68	40.49	51.43	0.84	106.59	-13.09
761208.	112.00	5.05	21.41	53.13	47.24	1.32	128.14	-16.14
761214.	109.50	5.52	12.70	43.82	57.84	1.30	121.17	-11.67
761220.	134.00	13.38	25.67	49.95	48.40	0.85	138.24	-4.24
761226.	77.50	2.24	9.25	33.20	41.36	1.33	87.38	-9.88

TABLE D.7.7

COMPOSITION OF AEROSOL OBSERVED AT PASADENA FROM CHEMICAL ELEMENT BALANCE

DATE	TSP	SULFATES	NITRATES	HIGHWAY	ROADDUST	OIL ASH	TRACED	RESIDUAL
760101.	93.50	5.02	3.26	22.07	29.40	0.30	60.05	33.45
760107.	115.50	5.55	18.82	23.28	39.76	0.72	88.13	27.37
760113.	162.50	6.36	28.38	28.45	51.22	0.65	115.06	47.44
760119.	201.50	9.36	16.70	35.53	47.52	1.14	110.26	91.24
760125.	130.50	14.73	28.65	20.48	23.77	0.81	88.45	42.05
760131.	120.50	4.90	21.45	27.49	31.79	0.29	85.92	34.58
760206.	24.00	6.81	2.68	6.53	1.29	-0.01	17.30	6.70
760212.	80.50	5.05	22.17	21.99	13.05	0.87	63.12	17.38
760218.	155.50	26.88	44.88	31.86	21.40	1.77	126.79	28.71
760224.	48.50	6.85	8.36	9.51	8.05	0.89	33.66	14.84
760301.	33.00	5.98	3.40	8.57	6.05	0.44	24.43	8.57
760307.	68.00	7.02	15.02	17.39	12.03	0.40	51.87	16.13
760313.	86.00	4.39	15.37	21.59	19.62	0.36	61.33	24.67
760319.	105.00	8.53	13.92	12.85	28.76	0.31	64.37	40.63
760325.	130.00	16.80	28.18	18.99	30.95	1.71	96.63	33.37
760331.	105.50	7.68	25.33	19.68	21.87	0.82	75.37	30.13
760406.	50.00	6.52	13.52	8.96	7.26	0.43	36.68	13.32
760412.	38.50	6.37	6.08	9.51	7.18	0.43	29.57	8.93
760418.	97.00	7.73	21.11	17.60	20.34	0.83	67.60	29.40
760424.	120.00	25.16	19.34	23.40	13.16	0.87	81.92	38.08
760430.	119.00	11.09	20.19	30.00	21.31	0.82	83.42	35.58
760506.	62.50	10.60	10.85	9.35	8.53	-0.05	39.27	23.23
760512.	149.00	20.72	15.67	22.88	24.33	1.28	84.88	64.12
760518.	106.00	16.18	22.40	19.38	17.20	0.85	76.01	29.99
760524.	102.00	16.98	23.38	7.81	15.21	-0.09	63.29	38.71
760530.	95.00	17.64	18.64	9.64	14.02	-0.08	59.86	35.14
760605.	112.00	15.60	25.76	14.65	13.50	0.87	70.38	41.62
760611.	79.50	10.07	16.30	15.38	7.93	0.89	50.57	28.93
760617.	87.00	15.09	18.64	11.22	16.84	1.80	63.59	23.41
760623.	107.50	7.42	13.65	19.91	28.77	0.31	70.06	37.44
760629.	81.00	14.50	18.04	17.43	13.99	1.34	65.30	15.70
760705.	151.00	46.16	14.87	15.06	12.32	0.87	89.28	61.72
760711.	84.00	23.67	15.67	9.12	7.17	0.90	56.53	27.47
760717.	80.00	19.37	11.45	9.05	5.77	0.91	46.55	33.45
760723.	140.00	36.15	14.56	22.91	11.13	1.83	86.58	53.42
760729.	86.50	20.73	17.47	10.22	6.22	0.91	55.55	30.95
760804.	96.00	9.25	15.37	12.70	14.29	0.86	52.48	43.52
760810.	113.00	21.76	18.42	15.73	13.91	1.34	71.17	41.83
760816.	43.00	8.79	9.19	10.52	5.60	-0.03	34.07	8.93
760822.	52.00	6.06	8.90	11.31	6.92	0.43	33.62	18.38
760828.	141.00	36.11	12.88	32.07	11.05	1.84	93.94	47.06
760903.	178.00	26.49	12.94	29.03	26.06	1.74	96.26	81.74
760909.	116.50	13.70	17.43	22.35	26.94	1.73	82.16	34.34
760915.	90.00	21.89	12.16	11.76	16.77	0.84	63.43	26.57
760921.	129.50	35.96	14.05	20.68	15.68	1.32	87.69	41.81
760927.	71.00	11.27	13.85	18.62	16.39	0.38	60.50	10.50
761003.	58.00	8.19	15.31	15.96	7.30	0.43	47.18	10.82
761009.	102.00	4.39	13.43	30.41	25.41	-0.15	73.49	28.51
761015.	167.00	40.22	7.72	25.57	18.65	1.79	93.94	73.06
761021.	118.50	25.90	22.37	21.37	11.83	1.82	83.29	35.21

TABLE D.7.7
(continued)

COMPOSITION OF AEROSOL OBSERVED AT PASADENA FROM CHEMICAL ELEMENT BALANCE

DATE	TSP	SULFATES	NITRATES	HIGHWAY	ROADDUST	OIL ASH	TRACED	RESIDUAL
761027.	94.00	3.59	11.01	30.16	32.03	1.23	78.02	15.98
761102.	88.50	3.94	11.86	43.17	25.17	0.33	84.46	4.04
761108.	100.50	5.90	14.40	40.70	30.46	0.30	91.75	8.75
761114.	66.50	10.52	11.20	24.78	6.94	0.43	53.86	12.64
761120.	145.50	16.52	30.65	51.79	17.96	1.79	118.70	26.80
761126.	99.50	17.39	24.72	15.08	16.34	0.85	74.37	25.13
761202.	93.50	2.92	10.50	38.86	35.13	0.74	88.15	5.35
761208.	112.00	4.86	21.26	51.51	28.88	1.25	107.76	4.24
761214.	109.50	5.28	12.52	42.24	35.30	1.21	96.55	12.95
761220.	134.00	13.18	25.52	48.33	30.21	0.77	118.01	15.99
761226.	77.50	2.05	9.10	31.84	29.42	1.24	73.66	3.84

TABLE D.7.8

COMPOSITION OF AEROSOL OBSERVED AT PASADENA ESTIMATED FROM TRACER STUDY

DATE	TSP	SULFATES	NITRATES	HIGHWAY	SOILDUST	OIL ASH	TRACED	RESIDUAL
760101.	93.50	5.80	3.48	23.20	45.45	0.47	78.40	15.10
760107.	115.50	6.62	19.22	24.76	54.55	0.94	106.09	9.41
760113.	162.50	7.59	28.90	30.38	81.82	0.94	149.63	12.87
760119.	201.50	10.90	17.16	37.41	118.18	1.42	185.07	16.43
760125.	130.50	15.59	29.02	21.40	36.36	0.94	103.33	27.17
760131.	120.50	5.80	21.80	28.74	54.55	0.47	111.36	9.14
760206.	24.00	6.90	2.71	6.48	0.0	0.0	16.09	7.91
760212.	80.50	5.93	22.45	22.49	18.18	0.94	70.00	10.50
760218.	155.50	28.29	45.41	32.80	36.36	1.89	144.75	10.75
760224.	48.50	7.45	8.51	9.76	9.09	0.94	35.76	12.74
760301.	33.00	6.35	3.48	8.83	45.45	0.47	64.58	-31.58
760307.	68.00	7.59	15.22	17.88	18.18	0.47	59.35	8.65
760313.	86.00	5.11	15.61	22.34	27.27	0.47	70.80	15.20
760319.	105.00	9.11	14.19	13.90	36.36	0.47	74.04	30.96
760325.	130.00	18.08	28.64	20.15	45.45	1.89	114.21	15.79
760331.	105.50	8.56	25.67	20.54	36.36	0.94	92.07	13.43
760406.	50.00	6.90	13.67	9.22	9.09	0.47	39.35	10.65
760412.	38.50	6.76	6.19	9.76	9.09	0.47	32.28	6.22
760418.	97.00	8.56	21.41	18.35	27.27	0.94	76.54	20.46
760424.	120.00	25.94	19.61	23.90	18.18	0.94	88.58	31.42
760430.	119.00	12.14	20.51	30.93	36.36	0.94	100.89	18.11
760506.	62.50	10.76	10.96	9.61	9.09	0.0	40.43	22.07
760512.	149.00	21.80	16.00	23.82	36.36	1.42	99.40	49.60
760518.	106.00	16.97	22.70	20.07	27.27	0.94	87.97	18.03
760524.	102.00	17.11	23.61	8.36	18.18	0.0	67.26	34.74
760530.	95.00	17.80	18.83	10.15	18.18	0.0	64.97	30.03
760605.	112.00	16.28	26.06	15.15	18.18	0.94	76.62	35.38
760611.	79.50	10.76	16.51	15.54	9.09	0.94	52.85	26.65
760617.	87.00	16.15	18.96	11.87	27.27	1.89	76.14	10.86
760623.	107.50	8.14	13.93	21.01	45.45	0.47	89.01	18.49
760629.	81.00	15.46	18.32	18.04	27.27	1.42	80.50	0.50
760705.	151.00	46.64	15.09	15.54	18.18	0.94	96.40	54.60
760711.	84.00	24.15	15.87	9.37	9.09	0.94	59.42	24.58
760717.	80.00	19.87	11.61	9.29	9.09	0.94	50.81	29.19
760723.	140.00	37.26	14.83	23.43	18.18	1.89	95.59	44.41
760729.	86.50	21.25	17.67	10.47	9.09	0.94	59.42	27.08
760804.	96.00	9.94	15.61	13.28	27.27	0.94	67.04	28.96
760810.	113.00	22.63	18.70	16.32	27.27	1.42	86.35	26.65
760816.	43.00	8.97	9.29	10.78	9.09	0.0	38.13	4.87
760822.	52.00	6.49	9.03	11.56	9.09	0.47	36.64	15.36
760828.	141.00	37.40	13.16	32.88	27.27	1.89	112.60	28.40
760903.	178.00	27.88	13.29	30.15	63.64	1.89	136.83	41.17
760909.	116.50	15.04	17.80	23.35	36.36	1.89	94.45	22.05
760915.	90.00	22.49	12.38	12.34	18.18	0.94	66.34	23.66
760921.	129.50	36.85	14.32	21.17	18.18	1.42	91.93	37.57
760927.	71.00	11.87	14.06	19.13	18.18	0.47	63.72	7.28
761003.	58.00	8.69	15.48	16.17	9.09	0.47	49.90	8.10
761009.	102.00	5.11	13.67	31.40	36.36	0.0	86.54	15.46
761015.	167.00	41.40	8.00	26.40	36.36	1.89	114.05	52.95
761021.	118.50	27.05	22.70	21.87	18.18	1.89	91.69	26.81

TABLE D.7.8
(continued)

COMPOSITION OF AEROSOL OBSERVED AT PASADENA ESTIMATED FROM TRACER STUDY

DATE	TSP	SULFATES	NITRATES	HIGHWAY	SOILDUST	OIL ASH	TRACED	RESIDUAL
761027.	94.00	4.97	11.35	31.24	36.36	1.42	85.34	8.66
761102.	88.50	5.11	12.13	44.20	36.36	0.47	98.27	-9.77
761108.	100.50	7.04	14.71	41.71	36.36	0.47	100.29	0.21
761114.	66.50	11.18	11.35	24.91	9.09	0.47	57.01	9.49
761120.	145.50	18.35	31.09	53.03	36.36	1.89	140.72	4.78
761126.	99.50	18.08	25.03	15.62	18.18	0.94	77.85	21.65
761202.	93.50	4.28	10.84	40.14	45.45	0.94	101.66	-8.16
761208.	112.00	6.62	21.67	52.80	45.45	1.42	127.96	-15.96
761214.	109.50	6.90	12.90	43.66	54.55	1.42	119.42	-9.92
761220.	134.00	14.63	25.93	49.59	45.45	0.94	136.55	-2.55
761226.	77.50	3.45	9.42	32.88	36.36	1.42	83.53	-6.03

D.8 Monitoring Data at Reseda Site (SCAQMD)

TABLE D.8.1

SCAQMD Particulate Air Quality Data at Reseda
[570 Samples Considered]

	TSP	$SO_4^=$	NO_3^-	Pb	Fe	Mn	Ni
MEAN	119.22	11.38	6.45	3.43	2.30	0.047	0.019
STANDARD DEVIATION	64.68	12.42	6.06	2.58	1.60	0.038	0.022

CORRELATION MATRIX

	TSP	$SO_4^=$	NO_3^-	Pb	Fe	Mn	Ni
TSP	1.00	0.57	0.40	0.67	0.75	0.62	0.53
$SO_4^=$		1.00	0.06	0.27	0.32	0.28	0.52
NO_3^-			1.00	0.33	0.22	0.21	0.16
Pb				1.00	0.48	0.43	0.44
Fe					1.00	0.81*	0.35
Mn						1.00	0.30
Ni							1.00

All pollutant concentrations are in $\mu g\ m^{-3}$.

*565 Data Pairs

TABLE D.8.2

Chemically Resolved Regression Model Relating Tracer Element Concentrations to Pollutant Sources at Reseda

MODEL STRUCTURE:

$$TSP_j = SULFATES_j + NITRATES_j + CRUSTAL_j + OIL\ ASH_j + HIGHWAY_j + OTHER_j$$

MODEL ESTIMATED:

$$TSP_j = \beta_{SO_4} \cdot SO_4^{=}{}_j + \beta_{NO_3} \cdot NO_3^{-}{}_j + \beta_{CRUSTAL} \cdot Mn_j + \beta_{OIL} \cdot Ni_j + \beta_{HIGHWAY} \cdot Pb_j + \beta_{OTHER} + \varepsilon_j$$

REGRESSION MODEL RESULTS	TSP AVERAGE (TSP VARIANCE)	COEFFICIENTS (STANDARD ERROR)						CORRELATION COEFFICIENT (number of samples)
		β_{SO_4}	β_{NO_3}	$\beta_{CRUSTAL}$	β_{OIL}	$\beta_{HIGHWAY}$	β_{OTHER}	
[1967-1977]	119.22	1.76	1.98	523.05	205.06	8.83	27.41	0.85
	(4183.1)	(0.13)	(0.25)	(41.64)	(80.82)	(0.67)	(2.77)	(570)
Prior Expectation		1.02 to 1.38	1.29	729.9 to 909.1	47.17	7.81		

TABLE D.8.3

Chemically Resolved Regression Model Relating Tracer Element Concentrations to Pollutant Sources at Reseda

MODEL STRUCTURE:

$$TSP_j = SULFATES_j + NITRATES_j + CRUSTAL_j + OIL\ ASH_j + HIGHWAY_j + OTHER_j$$

MODEL ESTIMATED:

$$TSP_j = \beta_{SO_4} \cdot SO_4^{=}{}_j + \beta_{NO_3} \cdot NO_3^{-}{}_j + \beta_{CRUSTAL} \cdot Fe_j + \beta_{OIL} \cdot Ni_j + \beta_{HIGHWAY} \cdot Pb_j + \beta_{OTHER} + \varepsilon_j$$

REGRESSION MODEL RESULTS	TSP AVERAGE (TSP VARIANCE)	COEFFICIENTS (STANDARD ERROR)						CORRELATION COEFFICIENT (number of samples)
		β_{SO_4}	β_{NO_3}	$\beta_{CRUSTAL}$	β_{OIL}	$\beta_{HIGHWAY}$	β_{OTHER}	
[1967-1977]	119.22	1.59	1.91	18.32	157.47	7.20	19.02	0.90
	(4183.1)	(0.12)	(0.21)	(0.88)	(68.97)	(0.58)	(2.43)	(570)
Prior Expectation		1.02 to 1.38	1.29	14.45 to 31.25	47.17	7.81		

TABLE D.8.4

Chemical Elements Used As If They Were
Unique Tracers for Major Source Types

Reseda AQMD Station

EXPRESSION EVALUATED:

TSP = SULFATES + NITRATES + CRUSTAL + OIL ASH + HIGHWAY + OTHER

$TSP = 1.38\ SO_4^{=} + 1.29\ NO_3^{-} + 909.1\ Mn + 47.2\ Ni + 7.81\ Pb + OTHER$

COMPONENT	AVERAGE MASS LOADING ($\mu g\ m^{-3}$) 1967-1977	1976
Sulfate compounds	15.71	12.84
Nitrate compounds	8.32	12.20
Crustal components	43.01	23.58
Fuel Oil Fly Ash	0.89	0.90
Highway Aerosol	26.81	17.96
Subtotal	94.74	67.46
Remaining to be determined	24.48	30.17
TOTAL PARTICULATE	119.22	97.63

Regression of TSP on Σ(SULFATES + NITRATES + CRUSTAL + OIL ASH + HIGHWAY)

YEAR	REGRESSION EQUATION	CORRELATION (NUMBER OF SAMPLES)
1967-1977	TSP = 0.92 [Σ TRACED] + 31.92	0.83 (570)
1976	TSP = 1.06 [Σ TRACED] + 26.31	0.80 (59)

TABLE D.8.5

Aerosol Source Assignment for the Year 1976

Reseda

AQMD Station

COMPONENT	1976 AVERAGE MASS LOADING ($\mu g\ m^{-3}$)			
	CHEMICAL ELEMENT BALANCE (ROAD DUST CASE)	CHEMICAL ELEMENT BALANCE (SOIL DUST CASE)	TRACER ELEMENT METHOD(a)	MULTIPLE REGRESSION METHOD(b)
SULFATE COMPOUNDS	12.07	12.19	12.84	14.79
NITRATE COMPOUNDS	11.96	12.06	12.20	18.05
CRUSTAL COMPONENTS	19.14	26.88	23.57	29.68
FUEL OIL FLY ASH	0.78	0.84	0.89	2.99
HIGHWAY AEROSOL	17.28	18.12	17.96	16.56
Subtotal	61.23	70.09	67.46	82.07
Remaining to be Determined	36.40	27.54	30.17	15.56
TOTAL PARTICULATE	97.63	97.63	97.63	97.63

(a) $TSP = 1.38\ SO_4^{=} + 1.29\ NO_3^{-} + 909.1\ Mn + 47.2\ Ni + 7.81\ Pb + OTHER$

(b) $TSP = 1.59\ SO_4^{=} + 1.91\ NO_3^{-} + 18.32\ Fe + 157.47\ Ni + 7.20\ Pb + OTHER$

TABLE D.8.6

COMPOSITION OF AEROSOL OBSERVED AT RESEDA FROM CHEMICAL ELEMENT BALANCE

DATE	TSP	SULFATES	NITRATES	HIGHWAY	SOILDUST	OIL ASH	TRACED	RESIDUAL
760101.	83.50	3.86	2.94	17.52	40.97	-0.08	65.21	18.29
760107.	84.00	5.19	4.73	20.15	31.91	-0.06	61.92	22.08
760113.	155.50	7.09	7.36	31.56	74.06	0.80	120.87	34.63
760125.	155.50	19.60	25.53	33.01	40.86	1.33	120.34	35.16
760131.	116.50	6.74	8.78	44.27	41.37	0.39	101.56	14.94
760206.	28.50	5.20	3.30	7.56	1.24	0.47	17.77	10.73
760212.	80.50	6.03	6.11	23.08	20.71	0.43	56.36	24.14
760218.	144.50	13.70	29.99	39.38	29.34	1.83	114.23	30.27
760224.	73.50	5.88	5.89	5.62	21.66	-0.04	39.01	34.49
760301.	25.50	5.56	2.53	3.43	1.73	0.47	13.72	11.78
760307.	68.00	6.02	10.34	22.89	9.63	0.45	49.34	18.66
760313.	66.00	5.22	5.37	18.17	21.00	-0.04	49.71	16.29
760319.	199.50	11.12	8.43	10.41	8.94	0.45	39.36	160.14
760331.	136.50	7.32	14.94	10.99	42.21	0.86	76.32	60.18
760406.	44.50	5.59	6.99	5.73	10.29	0.92	29.53	14.97
760412.	88.50	5.83	5.58	7.98	21.15	0.90	41.45	47.05
760418.	90.50	5.63	11.47	18.21	20.09	0.90	56.31	34.19
760424.	132.00	22.99	18.88	15.21	31.17	1.35	89.61	42.39
760430.	115.00	8.05	13.05	19.26	30.77	2.29	73.43	41.57
760506.	78.50	11.80	10.89	7.80	10.43	-0.02	40.91	37.59
760512.	161.50	15.00	12.93	23.42	42.87	-0.08	94.14	67.36
760518.	111.00	15.81	16.89	13.06	21.10	0.43	67.28	43.72
760524.	125.00	18.36	18.46	7.45	42.73	-0.08	86.93	38.07
760530.	91.00	13.90	15.38	7.51	21.62	-0.04	58.37	32.63
760605.	119.00	13.69	19.65	15.20	30.95	1.35	80.85	38.15
760611.	68.00	6.44	11.60	12.57	20.70	0.90	52.22	15.78
760617.	91.00	14.36	11.99	12.42	20.91	0.90	60.57	30.43
760623.	93.00	3.13	8.63	8.42	31.92	1.35	53.45	39.55
760629.	99.00	3.56	15.04	14.42	31.60	1.35	65.98	33.02
760705.	107.50	31.11	13.01	15.29	20.84	0.90	81.15	26.35
760711.	82.00	27.70	12.24	11.58	10.02	0.92	62.47	19.53
760717.	83.00	23.01	12.89	10.10	20.00	0.90	66.90	16.10
760723.	106.00	26.52	9.90	19.37	20.43	1.37	77.59	28.41
760729.	75.50	22.76	12.12	8.77	21.14	0.90	65.69	9.81
760804.	94.00	8.53	11.60	12.84	31.60	0.88	65.45	28.55
760810.	95.00	15.74	15.34	16.33	21.01	0.43	68.86	26.14
760816.	42.50	8.86	6.64	5.49	10.49	0.45	31.93	10.57
760822.	33.00	3.88	2.28	4.22	9.96	0.45	20.79	12.21
760828.	80.00	18.15	13.26	17.18	20.21	0.90	69.72	10.28
760903.	170.00	19.10	16.99	12.85	53.26	0.84	103.04	66.96
760909.	146.00	17.64	23.81	34.00	40.92	2.27	118.64	27.36
760915.	71.00	13.26	10.86	7.73	10.40	0.45	42.70	28.30
760921.	93.00	28.04	13.27	8.61	20.60	0.90	71.43	21.57
760927.	58.00	9.63	11.50	9.00	10.32	0.45	40.91	17.09
761003.	41.00	6.62	10.47	13.44	10.16	0.45	41.15	-0.15
761009.	151.00	15.90	11.96	38.76	72.60	3.16	142.38	8.62
761015.	159.00	40.69	9.75	23.35	39.65	1.81	115.24	43.76
761021.	91.00	25.13	17.63	15.35	20.45	0.90	79.47	11.53
761027.	43.00	2.80	1.35	7.03	21.00	0.90	33.08	9.92
761102.	85.00	4.96	6.20	31.27	20.13	0.90	63.47	21.53

TABLE D.8.6
(continued)

COMPOSITION OF AEROSOL OBSERVED AT RESEDA FROM CHEMICAL ELEMENT BALANCE

DATE	TSP	SULFATES	NITRATES	HIGHWAY	SOILDUST	OIL ASH	TRACED	RESIDUAL
761108.	123.50	9.69	15.55	39.37	41.32	0.86	106.79	16.71
761114.	59.00	8.03	10.47	12.41	9.72	0.45	41.08	17.92
761120.	86.50	10.31	19.95	31.24	19.34	0.43	81.27	5.23
761126.	156.50	21.93	40.12	30.87	40.92	1.80	135.65	20.85
761202.	56.00	2.46	3.39	17.29	20.75	0.90	44.80	11.20
761208.	117.00	10.06	21.42	45.10	40.29	1.33	118.20	-1.20
761214.	101.50	5.26	6.32	38.36	40.70	0.86	91.50	10.00
761220.	123.50	7.03	14.13	23.03	52.72	1.31	98.22	25.28
761226.	105.00	1.91	3.12	32.28	40.67	0.86	78.84	26.16

TABLE D.8.7

COMPOSITION OF AEROSOL OBSERVED AT RESEDA FROM CHEMICAL ELEMENT BALANCE

DATE	TSP	SULFATES	NITRATES	HIGHWAY	ROADDUST	OIL ASH	TRACED	RESIDUAL
760101.	83.50	3.69	2.80	16.52	26.25	-0.15	49.11	34.39
760107.	84.00	5.04	4.61	19.18	23.27	-0.13	51.97	32.03
760113.	155.50	6.75	7.09	29.59	51.82	0.65	95.90	59.60
760125.	155.50	19.42	25.39	31.70	28.00	1.25	105.76	49.74
760131.	116.50	6.56	8.63	42.66	29.72	0.30	87.87	28.63
760206.	28.50	5.20	3.29	7.35	1.41	0.46	17.70	10.80
760212.	80.50	5.93	6.03	22.25	15.87	0.38	50.45	30.05
760218.	144.50	13.58	29.88	38.07	19.85	1.77	103.15	41.35
760224.	73.50	5.77	5.81	5.01	16.95	-0.10	33.44	40.06
760301.	25.50	5.55	2.53	3.33	1.55	0.46	13.41	12.09
760307.	68.00	5.99	10.30	22.09	6.99	0.43	45.80	22.20
760313.	66.00	5.12	5.29	17.44	15.12	-0.09	42.90	23.10
760319.	199.50	11.08	8.39	10.14	7.43	0.43	37.46	162.04
760331.	136.50	7.13	14.79	9.95	28.95	0.78	61.60	74.90
760406.	44.50	5.54	6.95	5.42	7.80	0.90	26.61	17.89
760412.	88.50	5.73	5.50	7.38	16.43	0.85	35.87	52.63
760418.	90.50	5.55	11.40	17.54	13.54	0.87	48.89	41.61
760424.	132.00	22.85	18.77	14.36	21.77	1.29	79.03	52.97
760430.	115.00	7.91	12.94	18.34	22.09	2.23	63.51	51.49
760506.	78.50	11.75	10.85	7.45	8.58	-0.05	38.58	39.92
760512.	161.50	14.79	12.76	22.14	32.52	-0.19	82.02	79.48
760518.	111.00	15.70	16.80	12.40	16.63	0.38	61.90	49.10
760524.	125.00	18.17	18.31	6.43	29.14	-0.17	71.88	53.12
760530.	91.00	13.79	15.30	6.91	16.31	-0.09	52.22	38.78
760605.	119.00	13.55	19.54	14.37	21.17	1.29	69.93	49.07
760611.	68.00	6.34	11.53	11.97	14.56	0.86	45.26	22.74
760617.	91.00	14.25	11.90	11.77	16.52	0.85	55.29	35.71
760623.	93.00	2.97	8.51	7.55	24.37	1.27	44.66	48.34
760629.	99.00	3.41	14.92	13.53	23.40	1.28	56.53	42.47
760705.	107.50	31.01	12.93	14.61	15.72	0.85	75.12	32.38
760711.	82.00	27.65	12.20	11.17	7.85	0.89	59.77	22.23
760717.	83.00	22.93	12.82	9.59	12.83	0.87	59.04	23.96
760723.	106.00	26.42	9.82	18.63	15.34	1.32	71.53	34.47
760729.	75.50	22.66	12.04	8.17	15.95	0.85	59.67	15.83
760804.	94.00	8.38	11.49	12.00	22.29	0.82	54.97	39.03
760810.	95.00	15.64	15.26	15.63	16.20	0.38	63.10	31.90
760816.	42.50	8.81	6.60	5.19	7.69	0.43	28.72	13.78
760822.	33.00	3.84	2.24	3.98	6.30	0.44	16.81	16.19
760828.	80.00	18.07	13.19	16.52	13.73	0.86	62.37	17.63
760903.	170.00	18.85	16.80	11.52	37.28	0.73	85.19	84.81
760909.	146.00	17.45	23.66	32.64	29.18	2.19	105.11	40.89
760915.	71.00	13.21	10.82	7.38	8.15	0.42	39.98	31.02
760921.	93.00	27.95	13.20	8.08	13.91	0.86	64.00	29.00
760927.	58.00	9.58	11.46	8.65	7.57	0.43	37.68	20.32
761003.	41.00	6.58	10.43	12.98	7.74	0.43	38.15	2.85
761009.	151.00	15.57	11.70	36.74	50.77	3.01	117.78	33.22
761015.	159.00	40.52	9.61	22.31	25.25	1.74	99.44	59.56
761021.	91.00	25.04	17.55	14.72	14.15	0.86	72.32	18.68
761027.	43.00	2.70	1.27	6.49	14.83	0.86	26.14	16.86
761102.	85.00	4.87	6.12	30.24	15.60	0.85	57.68	27.32

TABLE D.8.7
(continued)

COMPOSITION OF AEROSOL OBSERVED AT RESEDA FROM CHEMICAL ELEMENT BALANCE

DATE	TSP	SULFATES	NITRATES	HIGHWAY	ROADDUST	OIL ASH	TRACED	RESIDUAL
761108.	123.50	9.50	15.40	37.88	29.50	0.77	93.05	30.45
761114.	59.00	7.99	10.44	12.01	6.36	0.43	37.23	21.77
761120.	86.50	10.24	19.88	30.23	12.68	0.40	73.43	13.07
761126.	156.50	21.75	39.98	29.59	28.35	1.72	121.39	35.11
761202.	56.00	2.36	3.31	16.58	15.97	0.85	39.06	16.94
761208.	117.00	9.89	21.28	43.52	27.69	1.25	103.62	13.38
761214.	101.50	5.08	6.18	36.94	27.71	0.78	76.70	24.80
761220.	123.50	6.78	13.94	21.61	37.36	1.20	80.89	42.61
761226.	105.00	1.73	2.98	31.01	27.18	0.79	63.69	41.31

TABLE D.8.8

COMPOSITION OF AEROSOL OBSERVED AT RESEDA ESTIMATED FROM TRACER STUDY

DATE	TSP	SULFATES	NITRATES	HIGHWAY	SOILDUST	OIL ASH	TRACED	RESIDUAL
760101.	83.50	4.14	2.97	17.49	36.36	0.0	60.97	22.53
760107.	84.00	5.52	4.77	19.99	27.27	0.0	57.56	26.44
760113.	155.50	8.00	7.48	31.47	63.64	0.94	111.54	43.96
760125.	155.50	20.70	25.80	32.72	36.36	1.42	117.00	38.50
760131.	116.50	7.73	8.90	43.66	36.36	0.47	97.12	19.38
760206.	28.50	5.52	3.35	7.26	0.0	0.47	16.61	11.89
760212.	80.50	6.62	6.19	22.73	18.18	0.47	54.20	26.30
760218.	144.50	15.18	30.31	39.82	27.27	1.89	113.47	31.03
760224.	73.50	5.93	5.93	5.62	18.18	0.0	35.67	37.83
760301.	25.50	5.80	2.58	3.36	0.0	0.47	12.21	13.29
760307.	68.00	6.62	10.45	22.26	9.09	0.47	48.89	19.11
760313.	66.00	5.52	5.42	17.96	18.18	0.0	47.08	18.92
760319.	199.50	11.45	8.51	10.39	9.09	0.47	39.92	159.58
760331.	136.50	7.87	15.09	11.01	36.36	0.94	71.28	65.22
760406.	44.50	6.07	7.09	5.70	9.09	0.94	28.90	15.60
760412.	88.50	6.35	5.68	7.97	18.18	0.94	39.12	49.38
760418.	90.50	6.35	11.61	18.04	18.18	0.94	55.12	35.38
760424.	132.00	23.74	19.09	15.15	27.27	1.42	86.67	45.33
760430.	115.00	9.38	13.29	19.13	27.27	2.36	71.44	43.56
760506.	78.50	11.87	10.96	7.73	9.09	0.0	39.66	38.84
760512.	161.50	15.32	13.03	23.27	36.36	0.0	87.98	73.52
760518.	111.00	16.15	17.03	12.96	18.18	0.47	64.79	46.21
760524.	125.00	18.35	18.58	7.50	36.36	0.0	80.79	44.21
760530.	91.00	13.94	15.48	7.50	18.18	0.0	55.10	35.90
760605.	119.00	14.49	19.87	15.15	27.27	1.42	78.20	40.80
760611.	68.00	7.04	11.74	12.50	18.18	0.94	50.40	17.60
760617.	91.00	14.90	12.13	12.34	18.18	0.94	58.50	32.50
760623.	93.00	3.86	8.77	8.43	27.27	1.42	49.76	43.24
760629.	99.00	4.42	15.22	14.37	27.27	1.42	62.70	36.30
760705.	107.50	31.60	13.16	15.15	18.18	0.94	79.04	28.46
760711.	82.00	28.15	12.38	11.40	9.09	0.94	61.97	20.03
760717.	83.00	23.46	13.03	10.07	18.18	0.94	65.69	17.31
760723.	106.00	27.32	10.06	19.13	18.18	1.42	76.12	29.88
760729.	75.50	23.18	12.25	8.75	18.18	0.94	63.31	12.19
760804.	94.00	9.11	11.74	12.81	27.27	0.94	61.87	32.13
760810.	95.00	16.15	15.48	16.17	18.18	0.47	66.45	28.55
760816.	42.50	9.11	6.71	5.47	9.09	0.47	30.85	11.65
760822.	33.00	4.14	2.32	4.22	9.09	0.47	20.24	12.76
760828.	80.00	18.77	13.42	17.03	18.18	0.94	68.34	11.66
760903.	170.00	19.60	17.16	12.89	45.45	0.94	96.04	73.96
760909.	146.00	19.18	24.12	33.66	36.36	2.36	115.69	30.31
760915.	71.00	13.52	10.96	7.65	9.09	0.47	41.71	29.29
760921.	93.00	28.43	13.42	8.59	18.18	0.94	69.56	23.44
760927.	58.00	9.94	11.61	8.90	9.09	0.47	40.01	17.99
761003.	41.00	7.04	10.58	13.20	9.09	0.47	40.38	0.62
761009.	151.00	17.94	12.25	38.58	63.64	3.30	135.72	15.28
761015.	159.00	41.68	9.93	23.27	36.36	1.89	113.13	45.87
761021.	91.00	25.67	17.80	15.23	18.18	0.94	77.82	13.18
761027.	43.00	3.31	1.42	7.03	18.18	0.94	30.89	12.11
761102.	85.00	5.93	6.32	30.62	18.18	0.94	62.00	23.00

TABLE D.8.8
(continued)

COMPOSITION OF AEROSOL OBSERVED AT RESEDA ESTIMATED FROM TRACER STUDY

DATE	TSP	SULFATES	NITRATES	HIGHWAY	SOILDUST	OIL ASH	TRACED	RESIDUAL
761108.	123.50	10.76	15.74	38.89	36.36	0.94	102.70	20.80
761114.	59.00	8.42	10.58	12.26	9.09	0.47	40.82	18.18
761120.	86.50	11.04	20.12	30.77	18.18	0.47	80.59	5.91
761126.	156.50	23.18	40.51	30.62	36.36	1.89	132.56	23.94
761202.	56.00	3.17	3.48	17.10	18.18	0.94	42.89	13.11
761208.	117.00	11.45	21.67	44.52	36.36	1.42	115.42	1.58
761214.	101.50	6.35	6.45	37.96	36.36	0.94	88.06	13.44
761220.	123.50	8.00	14.32	22.96	45.45	1.42	92.15	31.35
761226.	105.00	2.90	3.22	32.02	36.36	0.94	75.45	29.55

D.9 Monitoring Data at West Los Angeles Site (SCAQMD)

TABLE D.9.1

SCAQMD Particulate Air Quality Data at West Los Angeles
[677 Samples Considered]

Aug. 1965 - Dec. 1977

	TSP	$SO_4^=$	NO_3^-	Pb	Fe	Mn	Ni
MEAN	86.11	8.40	5.77	2.30	1.05	0.024	0.020
STANDARD DEVIATION	34.69	7.93	4.84	1.70	0.72	0.034	0.030

CORRELATION MATRIX

	TSP	$SO_4^=$	NO_3^-	Pb	Fe	Mn	Ni
TSP	1.00	0.29	0.32	0.52	0.58	0.45	0.14
$SO_4^=$		1.00	0.12	-0.02	-0.04	0.08	0.08
NO_3^-			1.00	0.31	0.16	0.13	0.05
Pb				1.00	0.38	0.36	0.20
Fe					1.00	0.56*	0.10
Mn						1.00	0.11
Ni							1.00

All pollutant concentrations are in $\mu g\ m^{-3}$.

*672 Data Pairs

TABLE D.9.2

Chemically Resolved Regression Model Relating Tracer Element Concentrations to Pollutant Sources at West Los Angeles

MODEL STRUCTURE:

$$TSP_j = SULFATES_j + NITRATES_j + CRUSTAL_j + OIL\ ASH_j + HIGHWAY_j + OTHER_j$$

MODEL ESTIMATED:

$$TSP_j = \beta_{SO_4} \cdot SO_4{}^{=}_j + \beta_{NO_3} \cdot NO_3{}^{-}_j + \beta_{CRUSTAL} \cdot Mn_j + \beta_{OIL} \cdot Ni_j + \beta_{HIGHWAY} \cdot Pb_j + \beta_{OTHER} + \varepsilon_j$$

REGRESSION MODEL RESULTS	TSP AVERAGE (TSP VARIANCE)	COEFFICIENTS (STANDARD ERROR)						CORRELATION COEFFICIENT (number of samples)
		β_{SO_4}	β_{NO_3}	$\beta_{CRUSTAL}$	β_{OIL}	$\beta_{HIGHWAY}$	β_{OTHER}	
[1965-1977]	86.11	1.14	0.97	280.0	7.40	7.74	46.13	0.66
	(1203.2)	(0.13)	(0.22)	(31.63)	(34.43)	(0.67)	(2.14)	(677)
Prior Expectation		1.02 to 1.38	1.29	729.9 to 909.1	47.17	7.81		

TABLE D.9.3

Chemically Resolved Regression Model Relating Tracer Element Concentrations to Pollutant Sources at West Los Angeles

MODEL STRUCTURE:

$$TSP_j = SULFATES_j + NITRATES_j + CRUSTAL_j + OIL\ ASH_j + HIGHWAY_j + OTHER_j$$

MODEL ESTIMATED:

$$TSP_j = \beta_{SO_4} \cdot SO_{4_j}^{=} + \beta_{NO_3} \cdot NO_{3_j}^{-} + \beta_{CRUSTAL} \cdot Fe_j + \beta_{OIL} \cdot Ni_j + \beta_{HIGHWAY} \cdot Pb_j + \beta_{OTHER} + \varepsilon_j$$

REGRESSION MODEL RESULTS	TSP AVERAGE (TSP VARIANCE)	COEFFICIENTS (STANDARD ERROR)						CORRELATION COEFFICIENT (number of samples)
		β_{SO_4}	β_{NO_3}	$\beta_{CRUSTAL}$	β_{OIL}	$\beta_{HIGHWAY}$	β_{OTHER}	
[1965-1977]	86.11	1.33	0.81	22.09	-0.19	6.43	32.24	0.74
	(1203.2)	(0.11)	(0.20)	(1.35)	(30.79)	(0.60)	(2.12)	(677)
Prior Expectation		1.02 to 1.38	1.29	14.45 to 31.25	47.17	7.81		

TABLE D.9.4

Chemical Elements Used As If They Were
Unique Tracers for Major Source Types

West Los Angeles AQMD Station

EXPRESSION EVALUATED:

TSP = SULFATES + NITRATES + CRUSTAL + OIL ASH + HIGHWAY + OTHER

$TSP = 1.38\ SO_4^{=} + 1.29\ NO_3^{-} + 909.1\ Mn + 47.2\ Ni + 7.81\ Pb + OTHER$

COMPONENT	AVERAGE MASS LOADING ($\mu g\ m^{-3}$) 1965-1977	1976
Sulfate compounds	11.60	10.92
Nitrate compounds	7.44	10.70
Crustal components	22.22	13.71
Fuel Oil Fly Ash	0.96	0.86
Highway Aerosol	17.96	11.70
Subtotal	60.18	47.90
Remaining to be determined	25.93	22.50
TOTAL PARTICULATE	86.11	70.40

Regression of TSP on Σ(SULFATES + NITRATES + CRUSTAL + OIL ASH + HIGHWAY)

YEAR	REGRESSION EQUATION	CORRELATION (NUMBER OF SAMPLES)
1965-1977	TSP = 0.51 [Σ TRACED] + 55.35	0.62 (677)
1976	TSP = 0.99 [Σ TRACED] + 23.04	0.81 (59)

TABLE D.9.5

Aerosol Source Assignment for the Year 1976

West Los Angeles

AQMD Station

COMPONENT	1976 AVERAGE MASS LOADING ($\mu g\ m^{-3}$) CHEMICAL ELEMENT BALANCE (ROAD DUST CASE)	CHEMICAL ELEMENT BALANCE (SOIL DUST CASE)	TRACER ELEMENT METHOD(a)	MULTIPLE REGRESSION METHOD(b)
SULFATE COMPOUNDS	10.33	10.39	10.92	10.52
NITRATE COMPOUNDS	10.52	10.58	10.70	6.72
CRUSTAL COMPONENTS	9.73	14.75	13.72	16.37
FUEL OIL FLY ASH	0.81	0.83	0.86	- 0.003
HIGHWAY AEROSOL	11.33	11.78	11.70	9.65
Subtotal	42.72	48.33	47.90	43.26
Remaining to be Determined	27.68	22.07	22.50	27.14
TOTAL PARTICULATE	70.40	70.40	70.40	70.40

(a) $TSP = 1.38\ SO_4^{=} + 1.29\ NO_3^{-} + 909.1\ Mn + 47.2\ Ni + 7.81\ Pb + OTHER$

(b) $TSP = 1.33\ SO_4^{=} + 0.81\ NO_3^{-} + 22.09\ Fe\ \ -0.19\ Ni + 6.43\ Pb + OTHER$

TABLE D.9.6

COMPOSITION OF AEROSOL OBSERVED AT WEST L A FROM CHEMICAL ELEMENT BALANCE

DATE	TSP	SULFATES	NITRATES	HIGHWAY	SOILDUST	OIL ASH	TRACED	RESIDUAL
760101.	57.00	4.49	3.53	5.53	20.58	0.90	35.04	21.96
760107.	82.50	5.08	9.42	18.75	38.61	0.87	72.73	9.77
760113.	145.50	7.60	32.11	39.60	47.27	2.74	129.32	16.18
760119.	152.00	17.82	19.84	32.38	61.52	2.24	133.80	18.20
760125.	87.00	19.88	25.29	10.19	9.62	1.39	66.37	20.63
760131.	150.50	13.15	25.28	28.47	27.77	1.36	96.03	54.47
760206.	45.50	8.65	3.53	5.48	9.68	0.92	28.27	17.23
760212.	75.00	7.11	19.65	9.77	9.45	1.39	47.38	27.62
760218.	95.00	11.45	24.23	26.33	17.75	1.85	81.61	13.39
760224.	41.50	8.12	4.07	7.54	8.19	0.46	28.38	13.12
760301.	33.00	7.22	1.76	3.57	1.09	0.47	14.12	18.88
760307.	50.50	6.99	11.99	12.35	9.06	0.92	41.31	9.19
760313.	67.00	5.57	4.42	14.01	9.92	0.92	34.83	32.17
760319.	120.50	9.49	5.58	6.82	43.04	0.86	65.79	54.71
760325.	106.50	10.47	11.96	9.04	31.15	1.35	63.99	42.51
760331.	77.00	8.06	12.53	11.71	29.38	0.42	62.09	14.91
760406.	41.50	5.65	3.43	6.53	10.44	0.45	26.49	15.01
760412.	26.50	4.29	3.30	4.24	1.47	0.47	13.78	12.72
760418.	46.50	6.35	8.78	9.65	10.11	0.92	35.81	10.69
760424.	95.00	19.45	14.81	7.32	10.01	0.92	52.51	42.49
760430.	43.00	5.56	9.89	7.47	9.61	1.86	34.39	8.61
760506.	52.50	9.64	5.89	4.14	1.28	-0.00	20.95	31.55
760512.	87.50	15.71	11.78	14.07	10.20	-0.02	51.73	35.77
760518.	78.50	11.99	11.41	5.02	10.75	-0.02	39.15	39.35
760524.	83.00	13.96	10.38	4.07	10.80	-0.02	39.19	43.81
760530.	84.00	12.14	8.84	4.94	10.68	-0.02	36.58	47.42
760605.	94.50	9.79	8.17	7.56	10.33	0.45	36.31	58.19
760611.	70.50	9.63	5.86	8.68	10.24	0.45	34.87	35.63
760617.	82.50	18.24	13.02	5.41	10.13	0.92	47.72	34.78
760623.	99.00	6.20	7.88	17.98	30.95	0.88	63.90	35.10
760629.	67.50	13.43	12.99	5.94	8.98	1.40	42.74	24.76
760705.	96.50	30.83	14.17	7.72	10.10	0.92	63.74	32.76
760723.	70.00	26.13	14.04	6.58	9.48	0.92	57.16	12.84
760729.	38.50	13.78	7.28	2.48	6.78	0.46	30.77	7.73
760804.	55.50	7.75	4.97	5.65	10.44	0.45	29.26	26.24
760810.	52.50	13.52	10.07	5.01	9.82	0.92	39.35	13.15
760816.	23.00	4.46	3.05	2.95	1.84	0.47	12.76	10.24
760822.	25.00	5.36	4.20	6.69	1.06	0.47	17.78	7.22
760828.	58.50	25.36	12.70	10.75	9.47	1.86	60.14	-1.64
760903.	80.50	14.74	11.48	7.18	20.32	0.90	54.62	25.88
760909.	70.00	6.03	7.37	11.74	10.02	0.92	36.09	33.91
760915.	34.50	7.99	6.15	3.70	4.93	-0.01	22.75	11.75
760921.	67.00	21.94	14.68	7.60	7.62	0.93	52.77	14.23
760927.	35.00	5.87	5.00	5.60	8.34	-0.02	24.79	10.21
761003.	28.50	6.98	8.15	5.51	1.51	0.93	23.07	5.43
761009.	45.00	3.44	9.32	12.69	10.00	0.45	35.89	9.11
761015.	65.50	20.76	13.30	7.79	10.10	0.45	52.40	13.10
761021.	46.00	13.85	8.94	6.00	8.78	0.45	38.02	7.98
761027.	71.50	4.51	6.63	15.44	20.73	0.43	47.73	23.77
761102.	51.50	3.14	9.32	13.78	9.74	0.45	36.43	15.07

TABLE D.9.6
(continued)

COMPOSITION OF AEROSOL OBSERVED AT WEST L A FROM CHEMICAL ELEMENT BALANCE

DATE	TSP	SULFATES	NITRATES	HIGHWAY	SOILDUST	OIL ASH	TRACED	RESIDUAL
761108.	78.50	7.07	13.03	26.55	19.33	0.43	66.41	12.09
761114.	53.00	9.73	7.91	17.88	7.97	0.46	43.94	9.06
761120.	57.50	9.61	13.65	20.44	9.07	0.92	53.69	3.81
761126.	61.50	13.77	17.11	13.74	9.80	0.92	55.34	6.16
761202.	51.00	2.06	4.68	16.52	19.80	0.90	43.95	7.05
761208.	81.00	4.30	10.79	33.52	28.24	1.36	78.20	2.80
761214.	74.00	3.32	7.46	27.08	28.30	1.36	67.52	6.48
761220.	128.00	11.34	24.09	32.63	36.43	1.81	106.31	21.69
761226.	116.50	2.23	2.89	7.40	10.22	0.92	23.66	92.84

TABLE D.9.7

COMPOSITION OF AEROSOL OBSERVED AT WEST L A FROM CHEMICAL ELEMENT BALANCE

DATE	TSP	SULFATES	NITRATES	HIGHWAY	ROADDUST	OIL ASH	TRACED	RESIDUAL
760101.	57.00	4.40	3.46	5.04	13.63	0.87	27.40	29.60
760107.	82.50	4.93	9.30	17.85	23.18	0.81	56.07	26.43
760113.	145.50	7.41	31.96	38.25	28.85	2.67	109.14	36.36
760119.	152.00	17.55	19.63	30.73	41.29	2.12	111.32	40.68
760125.	87.00	19.84	25.26	9.83	6.58	1.38	62.89	24.11
760131.	150.50	13.04	25.19	27.61	16.63	1.32	83.80	66.70
760206.	45.50	8.61	3.50	5.23	6.13	0.91	24.38	21.12
760212.	75.00	7.07	19.62	9.44	6.21	1.38	43.72	31.28
760218.	95.00	11.38	24.17	25.61	10.68	1.83	73.67	21.33
760224.	41.50	8.09	4.05	7.36	4.39	0.45	24.34	17.16
760301.	33.00	7.22	1.76	3.49	1.38	0.46	14.31	18.69
760307.	50.50	6.95	11.96	12.00	5.54	0.91	37.37	13.13
760313.	67.00	5.52	4.38	13.54	7.79	0.89	32.13	34.87
760319.	120.50	9.28	5.42	5.73	31.23	0.77	52.43	68.07
760325.	106.50	10.33	11.85	8.28	21.12	1.29	52.88	53.62
760331.	77.00	7.94	12.44	11.04	17.78	0.37	49.57	27.43
760406.	41.50	5.60	3.39	6.21	7.66	0.43	23.28	18.22
760412.	26.50	4.29	3.29	4.13	1.54	0.46	13.71	12.79
760418.	46.50	6.30	8.74	9.28	7.60	0.90	32.82	13.68
760424.	95.00	19.40	14.78	7.01	6.89	0.90	48.98	46.02
760430.	43.00	5.51	9.85	7.17	6.69	1.84	31.07	11.93
760506.	52.50	9.64	5.89	4.05	1.51	-0.01	21.07	31.43
760512.	87.50	15.66	11.74	13.62	8.38	-0.05	49.35	38.15
760518.	78.50	11.94	11.36	4.71	8.08	-0.05	36.05	42.45
760524.	83.00	13.90	10.34	3.77	8.21	-0.05	36.17	46.83
760530.	84.00	12.08	8.80	4.62	8.55	-0.05	34.00	50.00
760605.	94.50	9.74	8.13	7.24	7.38	0.43	32.92	61.58
760611.	70.50	9.59	5.83	8.34	7.22	0.43	31.40	39.10
760617.	82.50	18.19	12.98	5.13	7.03	0.90	44.23	38.27
760623.	99.00	6.07	7.77	17.11	21.05	0.82	52.83	46.17
760629.	67.50	13.39	12.96	5.72	5.34	1.39	38.81	28.69
760705.	96.50	30.78	14.13	7.40	7.18	0.90	60.40	36.10
760723.	70.00	26.09	14.01	6.33	5.88	0.91	53.23	16.77
760729.	38.50	13.75	7.26	2.37	3.29	0.46	27.13	11.37
760804.	55.50	7.70	4.93	5.35	7.50	0.43	25.91	29.59
760810.	52.50	13.48	10.04	4.76	6.34	0.91	35.52	16.98
760816.	23.00	4.45	3.04	2.85	1.50	0.46	12.30	10.70
760822.	25.00	5.35	4.19	6.54	1.35	0.46	17.89	7.11
760828.	58.50	25.31	12.67	10.39	6.63	1.84	56.84	1.66
760903.	80.50	14.65	11.41	6.69	13.22	0.87	46.84	33.66
760909.	70.00	5.98	7.33	11.33	7.65	0.90	33.19	36.81
760915.	34.50	7.97	6.14	3.64	2.23	-0.01	19.97	14.53
760921.	67.00	21.91	14.66	7.45	3.98	0.93	48.92	18.08
760927.	35.00	5.84	4.97	5.43	4.42	-0.02	20.64	14.36
761003.	28.50	6.98	8.14	5.33	1.22	0.91	22.59	5.91
761009.	45.00	3.40	9.28	12.25	6.95	0.43	32.32	12.68
761015.	65.50	20.72	13.26	7.48	6.78	0.43	48.68	16.82
761021.	46.00	13.81	8.92	5.81	4.90	0.45	33.89	12.11
761027.	71.50	4.42	6.55	14.79	14.47	0.39	40.61	30.89
761102.	51.50	3.10	9.29	13.33	6.48	0.43	32.63	18.87

TABLE D.9.7
(continued)

COMPOSITION OF AEROSOL OBSERVED AT WEST L A FROM CHEMICAL ELEMENT BALANCE

DATE	TSP	SULFATES	NITRATES	HIGHWAY	ROADDUST	OIL ASH	TRACED	RESIDUAL
761108.	78.50	6.99	12.96	25.71	12.41	0.40	58.47	20.03
761114.	53.00	9.70	7.88	17.54	4.40	0.45	39.97	13.03
761120.	57.50	9.58	13.61	19.79	5.93	0.91	49.82	7.68
761126.	61.50	13.73	17.08	13.28	6.96	0.90	51.95	9.55
761202.	51.00	1.97	4.61	15.91	12.86	0.87	36.22	14.78
761208.	81.00	4.19	10.70	32.50	17.45	1.32	66.15	14.85
761214.	74.00	3.20	7.37	26.21	17.27	1.32	55.37	18.63
761220.	128.00	11.20	23.98	31.63	21.28	1.77	89.86	38.14
761226.	116.50	2.18	2.85	7.07	7.80	0.89	20.79	95.71

TABLE D.9.8

COMPOSITION OF AEROSOL OBSERVED AT WEST LOS ANGELES ESTIMATED FROM TRACER STUDY

DATE	TSP	SULFATES	NITRATES	HIGHWAY	SOILDUST	OIL ASH	TRACED	RESIDUAL
760101.	57.00	4.97	3.61	5.55	18.18	0.94	33.25	23.75
760107.	82.50	5.80	9.55	18.74	36.36	0.94	71.39	11.11
760113.	145.50	9.52	32.51	39.44	45.45	2.83	129.76	15.74
760119.	152.00	19.32	20.12	32.26	54.55	2.36	128.60	23.40
760125.	87.00	20.56	25.54	10.07	9.09	1.42	66.68	20.32
760131.	150.50	14.21	25.54	28.35	27.27	1.42	96.79	53.71
760206.	45.50	9.11	3.61	5.47	9.09	0.94	28.22	17.28
760212.	75.00	7.87	19.87	9.68	9.09	1.42	47.92	27.08
760218.	95.00	12.70	24.51	26.16	18.18	1.89	83.44	11.56
760224.	41.50	8.42	4.13	7.58	9.09	0.47	29.68	11.82
760301.	33.00	7.45	1.81	3.51	0.0	0.47	13.24	19.76
760307.	50.50	7.59	12.13	12.26	9.09	0.94	42.01	8.49
760313.	67.00	6.21	4.51	13.75	9.09	0.94	34.50	32.50
760319.	120.50	9.94	5.68	6.87	36.36	0.94	59.79	60.71
760325.	106.50	11.18	12.13	9.06	27.27	1.42	61.05	45.45
760331.	77.00	8.42	12.64	11.71	27.27	0.47	60.52	16.48
760406.	41.50	5.93	3.48	6.48	9.09	0.47	25.46	16.04
760412.	26.50	4.55	3.35	4.14	0.0	0.47	12.52	13.98
760418.	46.50	6.90	8.90	9.53	9.09	0.94	35.36	11.14
760424.	95.00	19.87	14.96	7.26	9.09	0.94	52.13	42.87
760430.	43.00	6.49	10.06	7.42	9.09	1.89	34.95	8.05
760506.	52.50	9.66	5.93	4.06	0.0	0.0	19.66	32.84
760512.	87.50	15.87	11.87	13.82	9.09	0.0	50.65	36.85
760518.	78.50	12.01	11.48	5.00	9.09	0.0	37.58	40.92
760524.	83.00	13.94	10.45	4.06	9.09	0.0	37.54	45.46
760530.	84.00	12.14	8.90	4.92	9.09	0.0	35.06	48.94
760605.	94.50	10.07	8.26	7.50	9.09	0.47	35.39	59.11
760611.	70.50	9.94	5.93	8.59	9.09	0.47	34.02	36.48
760617.	82.50	18.63	13.16	5.39	9.09	0.94	47.21	35.29
760623.	99.00	6.90	8.00	17.88	27.27	0.94	61.00	38.00
760629.	67.50	14.08	13.16	5.94	9.09	1.42	43.68	23.82
760705.	96.50	31.19	14.32	7.65	9.09	0.94	63.20	33.30
760723.	70.00	26.50	14.19	6.56	9.09	0.94	57.28	12.72
760729.	38.50	13.94	7.35	2.50	9.09	0.47	33.35	5.15
760804.	55.50	8.00	5.03	5.62	9.09	0.47	28.22	27.28
760810.	52.50	13.94	10.19	5.00	9.09	0.94	39.16	13.34
760816.	23.00	4.69	3.10	2.89	0.0	0.47	11.15	11.85
760822.	25.00	5.66	4.26	6.48	0.0	0.47	16.87	8.13
760828.	58.50	26.22	12.90	10.62	9.09	1.89	60.72	-2.22
760903.	80.50	15.18	11.61	7.19	18.18	0.94	53.10	27.40
760909.	70.00	6.62	7.48	11.56	9.09	0.94	35.70	34.30
760915.	34.50	8.00	6.19	3.75	9.09	0.0	27.04	7.46
760921.	67.00	22.36	14.83	7.65	9.09	0.94	54.88	12.12
760927.	35.00	5.93	5.03	5.62	9.09	0.0	25.68	9.32
761003.	28.50	7.45	8.26	5.31	0.0	0.94	21.96	6.54
761009.	45.00	3.86	9.42	12.50	9.09	0.47	35.34	9.66
761015.	65.50	20.98	13.42	7.73	9.09	0.47	51.69	13.81
761021.	46.00	14.08	9.03	6.01	9.09	0.47	38.68	7.32
761027.	71.50	4.97	6.71	15.31	18.18	0.47	45.64	25.86
761102.	51.50	3.59	9.42	13.59	9.09	0.47	36.16	15.34

TABLE D.9.8
(continued)

COMPOSITION OF AEROSOL OBSERVED AT WEST LOS ANGELES ESTIMATED FROM TRACER STUDY

DATE	TSP	SULFATES	NITRATES	HIGHWAY	SOILDUST	OIL ASH	TRACED	RESIDUAL
761108.	78.50	7.73	13.16	26.24	18.18	0.47	65.78	12.72
761114.	53.00	10.21	8.00	17.96	9.09	0.47	45.74	7.26
761120.	57.50	10.35	13.80	20.07	9.09	0.94	54.26	3.24
761126.	61.50	14.35	17.29	13.51	9.09	0.94	55.18	6.32
761202.	51.00	2.76	4.77	16.40	18.18	0.94	43.06	7.94
761208.	81.00	5.52	10.96	33.27	27.27	1.42	78.44	2.56
761214.	74.00	4.42	7.61	26.94	27.27	1.42	67.66	6.34
761220.	128.00	12.70	24.38	32.57	36.36	1.89	107.90	20.10
761226.	116.50	2.76	2.97	7.34	9.09	0.94	23.10	93.40

D.10 Monitoring Data at Anaheim Site (NASN)

TABLE D.10.1

NASN Particulate Air Quality Data at Anaheim
[26 Quarters Considered]

1969 - 1976

	TSP	$SO_4^=$	NO_3^-	NH_4^+	Pb	Fe	Mn	V	Ti	Cr	Cu
MEAN	105.23	10.93	8.20	0.78	2.24	1.40	0.027	0.011	0.075	0.006	0.13
STANDARD DEVIATION	20.63	4.72	3.01	0.85	0.81	0.41	0.009	0.011	0.022	0.006	0.11

CORRELATION MATRIX

	TSP	$SO_4^=$	NO_3^-	NH_4^+	Pb	Fe	Mn	V	Ti	Cr	Cu
TSP	1.00	0.38	0.45	0.56	0.55	0.57	0.50	0.29	0.15	-0.006	-0.04
SO_4		1.00	0.14	0.50	-0.25	-0.08	0.14	0.30	-0.09	0.04	0.08
NO_3			1.00	0.26	0.29	0.21	0.44	0.33	0.23	0.36	0.11
NH_4				1.00	0.26	0.28	0.36	0.58	0.03	-0.07	-0.11
Pb					1.00	0.47	0.44	0.20	0.41	0.10	-0.01
Fe						1.00	0.65	0.31	0.33	-0.21	-0.08
Mn							1.00	0.53	0.39	0.01	-0.10
V								1.00	0.17	0.04	-0.01
Ti									1.00	0.08	0.14
Cr										1.00	0.06
Cu											1.00

All pollutant concentrations are in $\mu g\ m^{-3}$.

TABLE D.10.2

Chemically Resolved Regression Model Relating Tracer Element Concentrations to Pollutant Sources at Anaheim NASN Station

MODEL STRUCTURE:

$$TSP_j = SULFATES_j + NITRATES_j + CRUSTAL_j + OIL\ ASH_j + HIGHWAY_j + OTHER_j$$

MODEL ESTIMATED:

$$TSP_j = \beta_{SO_4} \cdot SO_{4_j}^{=} + \beta_{NO_3} \cdot NO_{3_j}^{-} + \beta_{CRUSTAL} \cdot Mn_j + \beta_{OIL} \cdot V_j + \beta_{HIGHWAY} \cdot Pb_j + \beta_{OTHER} + \varepsilon_j$$

REGRESSION MODEL RESULTS	TSP AVERAGE (TSP VARIANCE)	COEFFICIENTS (STANDARD ERROR)						CORRELATION COEFFICIENT (number of quarters)
		β_{SO_4}	β_{NO_3}	$\beta_{CRUSTAL}$	β_{OIL}	$\beta_{HIGHWAY}$	β_{OTHER}	
[1969-1976]	105.23	2.27	1.25	383.8	-260.0	15.04	29.16	0.75
	(425.48)	(0.58)	(0.91)	(370.6)	(281.4)	(3.60)	(11.58)	(26)
Prior Expectation		1.02 to 1.38	1.29	729.9 to 909.1	295.0	7.81		

TABLE D.10.3

Chemically Resolved Regression Model Relating Tracer Element Concentrations to Pollutant Sources at Anáheim NASN Station

MODEL STRUCTURE:

$$TSP_j = SULFATES_j + NITRATES_j + CRUSTAL_j + OIL\ ASH_j + HIGHWAY_j + OTHER_j$$

MODEL ESTIMATED:

$$TSP_j = \beta_{SO_4} \cdot SO_4{}^{=}_j + \beta_{NO_3} \cdot NO_3{}^{-}_j \cdot \beta_{CRUSTAL} \cdot Fe_j + \beta_{OIL} \cdot V_j \cdot \beta_{HIGHWAY} \cdot Pb_j + \beta_{OTHER} + \varepsilon_j$$

REGRESSION MODEL RESULTS	TSP AVERAGE (TSP VARIANCE)	COEFFICIENTS (STANDARD ERROR)						CORRELATION COEFFICIENT (number of quarters)
		β_{SO_4}	β_{NO_3}	$\beta_{CRUSTAL}$	β_{OIL}	$\beta_{HIGHWAY}$	β_{OTHER}	
[1969-1976]	105.23	2.40	1.42	20.08	-321.8	12.19	15.61	0.83
	(425.48)	(0.49)	(0.75)	(5.85)	(224.3)	(3.09)	(10.61)	(26)
Prior Expectation		1.02 to 1.38	1.29	14.45 to 31.25	295.0	7.81		

TABLE D.10.4

Chemical Elements Used As If They Were
Unique Tracers for Major Source Types

Anaheim NASN Station

EXPRESSION EVALUATED:

TSP = SULFATES + NITRATES + CRUSTAL + OIL ASH + HIGHWAY + OTHER

TSP = 1.38 $SO_4^{=}$ + 1.29 NO_3^{-} + 909.1 Mn + 295 V + 7.81 Pb + OTHER

COMPONENT	AVERAGE MASS LOADING ($\mu g\ m^{-3}$) 1969-1976	1976
Sulfate compounds	15.08	13.51
Nitrate compounds	10.57	13.99
Crustal components	24.48	27.27
Fuel Oil Fly Ash	3.29	5.46
Highway Aerosol	17.47	19.29
Subtotal	70.89	79.52
Remaining to be determined	34.34	19.53
TOTAL PARTICULATE	105.23	99.05

Regression of TSP on Σ(SULFATES + NITRATES + CRUSTAL + OIL ASH + HIGHWAY)

YEARS	REGRESSION EQUATION	CORRELATION (NUMBER OF QUARTERS)
1969-1976	TSP = 0.84 [Σ TRACED] + 45.64	0.71 (26)
1976	TSP = 0.62 [Σ TRACED] + 49.80	0.96 (4)

TABLE D.10.5

Aerosol Source Assignment for the Year 1976

Anaheim

NASN Station

COMPONENT	1976 AVERAGE MASS LOADING ($\mu g\ m^{-3}$) CHEMICAL ELEMENT BALANCE (ROAD DUST CASE)	CHEMICAL ELEMENT BALANCE (SOIL DUST CASE)	TRACER ELEMENT METHOD(a)
SULFATE COMPOUNDS	11.25	11.07	13.51
NITRATE COMPOUNDS	13.54	13.61	13.99
CRUSTAL COMPONENTS	18.95	28.44	27.27
FUEL OIL FLY ASH	4.12	4.85	5.46
HIGHWAY AEROSOL	18.57	19.37	19.29
Subtotal	66.43	77.34	79.52
Remaining to be Determined	32.62	21.71	19.53
TOTAL PARTICULATE	99.05	99.05	99.05

(a) $TSP = 1.38\ SO_4^{=} + 1.29\ NO_3^{-} + 909.1\ Mn + 295\ V + 7.81\ Pb + OTHER$

TABLE D.10.6

COMPOSITION OF AEROSOL OBSERVED AT ANAHEIM FROM CHEMICAL ELEMENT BALANCE

DATE	TSP	SULFATES	NITRATES	HIGHWAY	SOILDUST	OIL ASH	TRACED	RESIDUAL
76 Q1.	107.10	7.23	16.69	22.05	27.10	7.06	80.13	26.97
76 Q2.	82.90	11.49	13.76	10.76	21.62	-0.43	57.20	25.70
76 Q3.	99.10	18.08	11.23	15.64	27.33	7.37	79.65	19.45
76 Q4.	107.10	7.48	12.74	29.03	37.71	5.39	92.35	14.75

TABLE D.10.7

COMPOSITION OF AEROSOL OBSERVED AT ANAHEIM FROM CHEMICAL ELEMENT BALANCE

DATE	TSP	SULFATES	NITRATES	HIGHWAY	ROADDUST	OIL ASH	TRACED	RESIDUAL
76 Q1.	107.10	7.38	16.63	21.25	17.62	6.42	69.30	37.80
76 Q2.	82.90	11.68	13.71	10.13	16.16	-1.14	50.55	32.35
76 Q3.	99.10	18.23	11.17	14.93	17.79	6.73	68.84	30.26
76 Q4.	107.10	7.70	12.66	27.95	24.23	4.46	77.00	30.10

TABLE D.10.8

COMPOSITION OF AEROSOL OBSERVED AT ANAHEIM ESTIMATED FROM TRACER STUDY

DATE	TSP	SULFATES	NITRATES	HIGHWAY	SOILDUST	OIL ASH	TRACED	RESIDUAL
76 Q1.	107.10	10.72	17.22	21.95	27.27	7.67	84.83	22.27
76 Q2.	82.90	11.44	13.83	10.70	18.18	0.0	54.15	28.75
76 Q3.	99.10	21.51	11.74	15.62	27.27	7.96	84.11	14.99
76 Q4.	107.10	10.36	13.16	28.90	36.36	6.19	94.98	12.12

D.11 Monitoring Data at Downtown Los Angeles Site (NASN)

TABLE D.11.1

NASN Particulate Air Quality Data at Downtown Los Angeles
[38 Quarters Considered]

1965 - 1976

	TSP	$SO_4^=$	NO_3^-	NH_4^+	Pb	Fe	Mn	V	Ti	Cr	Cu
MEAN	119.42	11.37	10.40	1.06	3.52	1.75	0.033	0.011	0.059	0.013	0.089
STANDARD DEVIATION	30.27	4.53	4.33	1.17	1.86	0.56	0.012	0.014	0.032	0.006	0.045

CORRELATION MATRIX

	TSP	$SO_4^=$	NO_3^-	NH_4^+	Pb	Fe	Mn	V	Ti	Cr	Cu
TSP	1.00	0.37	0.34	0.16	0.36	0.63	0.54	0.002	0.47	0.27	-0.12
SO_4		1.00	0.22	0.47	-0.19	-0.15	-0.12	-0.003	0.12	-0.13	-0.02
NO_3			1.00	0.11	-0.15	0.10	0.03	-0.33	0.50	-0.05	-0.29
NH_4				1.00	-0.02	-0.24	-0.07	0.28	-0.02	0.01	0.14
Pb					1.00	0.64	0.60	0.42	-0.03	0.68	0.38
Fe						1.00	0.80	0.04	0.44	0.61	0.10
Mn							1.00	0.12	0.33	0.54	0.30
V								1.00	-0.12	0.35	0.49
Ti									1.00	0.07	-0.16
Cr										1.00	0.44
Cu											1.00

All pollutant concentrations are in $\mu g\ m^{-3}$.

TABLE D.11.2

Chemically Resolved Regression Model Relating Tracer Element Concentrations to Pollutant Sources at Downtown Los Angeles NASN Station

MODEL STRUCTURE:

$$TSP_j = SULFATES_j + NITRATES_j + CRUSTAL_j + OIL\ ASH_j + HIGHWAY_j + OTHER_j$$

MODEL ESTIMATED:

$$TSP_j = \beta_{SO_4} \cdot SO_{4_j}^{=} + \beta_{NO_3} \cdot NO_{3_j}^{-} + \beta_{CRUSTAL} \cdot Mn_j + \beta_{OIL} \cdot V_j + \beta_{HIGHWAY} \cdot Pb_j + \beta_{OTHER} + \varepsilon_j$$

REGRESSION MODEL RESULTS	TSP AVERAGE (TSP VARIANCE)	COEFFICIENTS (STANDARD ERROR)						CORRELATION COEFFICIENT (number of quarters)
		β_{SO_4}	β_{NO_3}	$\beta_{CRUSTAL}$	β_{OIL}	$\beta_{HIGHWAY}$	β_{OTHER}	
[1965–1976]	119.42	2.74	1.76	1119.7	-146.51	3.87	20.63	0.70
	(916.51)	(0.76)	(0.83)	(346.10)	(279.9)	(2.46)	(15.12)	(38)
Prior Expectation		1.02 to 1.38	1.29	729.9 to 909.1	295.0	7.81		

TABLE D.11.3

Chemically Resolved Regression Model Relating Tracer Element Concentrations to Pollutant Sources at Downtown Los Angeles NASN Station

MODEL STRUCTURE:

$$TSP_j = SULFATES_j + NITRATES_j + CRUSTAL_j + OIL\ ASH_j + HIGHWAY_j + OTHER_j$$

MODEL ESTIMATED:

$$TSP_j = \beta_{SO_4} \cdot SO_{4_j}^{=} + \beta_{NO_3} \cdot NO_{3_j}^{-} \cdot \beta_{CRUSTAL} \cdot Fe_j + \beta_{OIL} \cdot V_j \cdot \beta_{HIGHWAY} \cdot Pb_j + \beta_{OTHER} + \varepsilon_j$$

REGRESSION MODEL RESULTS	TSP AVERAGE (TSP VARIANCE)	COEFFICIENTS (STANDARD ERROR)						CORRELATION COEFFICIENT (number of quarters)
		β_{SO_4}	β_{NO_3}	$\beta_{CRUSTAL}$	β_{OIL}	$\beta_{HIGHWAY}$	β_{OTHER}	
[1965-1976]	119.42	2.87	1.39	34.79	42.18	0.88	8.05	0.77
	(916.51)	(0.68)	(0.75)	(7.33)	(256.67)	(2.41)	(14.13)	(38)
Prior Expectation		1.02 to 1.38	1.29	14.45 to 31.25	295.0	7.81		

TABLE D.11.4

Chemical Elements Used As If They Were
Unique Tracers for Major Source Types

Downtown Los Angeles NASN Station

EXPRESSION EVALUATED:

TSP = SULFATES + NITRATES + CRUSTAL + OIL ASH + HIGHWAY + OTHER

$TSP = 1.38\ SO_4^{=} + 1.29\ NO_3^{-} + 909.1\ Mn + 295\ V + 7.81\ Pb + OTHER$

COMPONENT	AVERAGE MASS LOADING ($\mu g\ m^{-3}$) 1965-1976	1976
Sulfate compounds	15.69	14.31
Nitrate compounds	13.42	17.75
Crustal components	30.38	29.55
Fuel Oil Fly Ash	3.31	4.79
Highway Aerosol	27.50	22.59
Subtotal	90.30	88.99
Remaining to be determined	29.12	20.01
TOTAL PARTICULATE	119.42	109.00

Regression of TSP on Σ(SULFATES + NITRATES + CRUSTAL + OIL ASH + HIGHWAY)

YEARS	REGRESSION EQUATION	CORRELATION (NUMBER OF QUARTERS)
1965-1976	TSP = 0.78[Σ TRACED] + 49.29	0.62 (38)
1976	TSP = 0.56[Σ TRACED] + 58.73	0.60 (4)

TABLE D.11.5

Aerosol Source Assignment for the Year 1976

Downtown Los Angeles

NASN Station

COMPONENT	1976 AVERAGE MASS LOADING ($\mu g\ m^{-3}$) CHEMICAL ELEMENT BALANCE (ROAD DUST CASE)	CHEMICAL ELEMENT BALANCE (SOIL DUST CASE)	TRACER ELEMENT METHOD(a)
SULFATE COMPOUNDS	12.32	12.13	14.31
NITRATE COMPOUNDS	17.32	17.38	17.75
CRUSTAL COMPONENTS	20.16	31.00	29.55
FUEL OIL FLY ASH	3.35	4.14	4.79
HIGHWAY AEROSOL	21.81	22.71	22.59
Subtotal	74.96	87.36	88.99
Remaining to be Determined	34.04	21.64	20.01
TOTAL PARTICULATE	109.00	109.00	109.00

(a) $TSP = 1.38\ SO_4^{=} + 1.29\ NO_3^{-} + 909.1\ Mn + 295\ V + 7.81\ Pb + OTHER$

TABLE D.11.6

COMPOSITION OF AEROSOL OBSERVED AT DOWNTOW L A FROM CHEMICAL ELEMENT BALANCE (NASN station)

DATE	TSP	SULFATES	NITRATES	HIGHWAY	SOILDUST	OIL ASH	TRACED	RESIDUAL
76 Q1.	132.00	8.55	20.30	19.70	38.23	5.42	92.20	39.80
76 Q2.	94.00	11.68	18.32	16.05	28.97	3.54	78.55	15.45
76 Q3.	97.00	18.13	9.94	15.97	18.62	4.59	67.25	29.75
76 Q4.	113.00	10.15	20.97	39.12	38.17	2.99	111.40	1.60

TABLE D.11.7

COMPOSITION OF AEROSOL OBSERVED AT DOWNTOW L A FROM CHEMICAL ELEMENT BALANCE (NASN station)

DATE	TSP	SULFATES	NITRATES	HIGHWAY	ROADDUST	OIL ASH	TRACED	RESIDUAL
76 Q1.	132.00	8.78	20.22	18.74	24.59	4.47	76.80	55.20
76 Q2.	94.00	11.85	18.26	15.30	18.77	2.81	66.99	27.01
76 Q3.	97.00	18.26	9.90	15.37	12.83	4.07	60.44	36.56
76 Q4.	113.00	10.39	20.89	37.82	24.44	2.03	95.58	17.42

TABLE D.11.8

COMPOSITION OF AEROSOL OBSERVED AT LOS ANGELES ESTIMATED FROM TRACER STUDY (NASN station)

DATE	TSP	SULFATES	NITRATES	HIGHWAY	SOILDUST	OIL ASH	TRACED	RESIDUAL
76 Q1.	132.00	11.26	20.76	19.68	36.36	6.19	94.26	37.74
76 Q2.	94.00	13.47	18.65	16.01	27.27	4.13	79.54	14.46
76 Q3.	97.00	20.34	10.28	15.85	18.18	5.01	69.67	27.33
76 Q4.	113.00	12.16	21.21	38.82	36.36	3.83	112.48	0.52

D.12 Monitoring Data at San Bernardino Site (NASN)

TABLE D.12.1

NASN Particulate Air Quality Data at San Bernardino
[28 Quarters Considered]

1969 - 1976

	TSP	$SO_4^=$	NO_3^-	NH_4^+	Pb	Fe	Mn	V	Ti	Cr	Cu
MEAN	131.86	12.22	14.56	1.26	1.50	2.36	0.050	0.0086	0.096	0.014	0.22
STANDARD DEVIATION	45.50	5.32	4.55	1.07	0.53	1.14	0.020	0.0092	0.053	0.006	0.18

CORRELATION MATRIX

	TSP	$SO_4^=$	NO_3^-	NH_4^+	Pb	Fe	Mn	V	Ti	Cr	Cu
TSP	1.00	0.77	0.58	0.21	0.68	0.83	0.82	0.16	0.71	0.45	-0.05
SO_4		1.00	0.49	0.18	0.40	0.83	0.73	0.37	0.61	0.59	-0.06
NO_3			1.00	0.63	0.19	0.53	0.48	0.08	0.47	0.26	0.31
NH_4				1.00	0.05	0.11	0.04	0.17	0.10	-0.07	0.44
Pb					1.00	0.50	0.60	0.16	0.53	0.31	0.08
Fe						1.00	0.97	0.41	0.87	0.68	-0.03
Mn							1.00	0.37	0.86	0.65	0.014
V								1.00	0.30	0.42	0.28
Ti									1.00	0.55	0.13
Cr										1.00	-0.19
Cu											1.00

All pollutant concentrations are in $\mu g\ m^{-3}$.

TABLE D.12.2

Chemically Resolved Regression Model Relating Tracer Element Concentrations to Pollutant Sources at San Bernardino

MODEL STRUCTURE:

$$TSP_j = SULFATES_j + NITRATES_j + CRUSTAL_j + OIL\ ASH_j + HIGHWAY_j + OTHER_j$$

MODEL ESTIMATED:

$$TSP_j = \beta_{SO_4} \cdot SO_4{}^{=}_j + \beta_{NO_3} \cdot NO_3{}^{-}_j + \beta_{CRUSTAL} \cdot Mn_j + \beta_{OIL} \cdot V_j + \beta_{HIGHWAY} \cdot Pb_j + \beta_{OTHER} + \varepsilon_j$$

REGRESSION MODEL RESULTS	TSP AVERAGE (TSP VARIANCE)	COEFFICIENTS (STANDARD ERROR)						CORRELATION COEFFICIENT (number of quarters)
		β_{SO_4}	β_{NO_3}	$\beta_{CRUSTAL}$	β_{OIL}	$\beta_{HIGHWAY}$	β_{OTHER}	
[1969-1976]	131.86	3.03	2.00	735.5	-768.8	28.65	-7.69	0.91
	(2069.8)	(0.94)	(0.85)	(282.7)	(389.7)	(7.78)	(13.31)	(28)
[1969-1976]	131.86	2.68	2.28	623.1	*	30.08	-10.60	0.90
	(2069.8)	(0.99)	(0.90)	(295.5)		(8.27)		(28)
Prior Expectation		1.02 to 1.38	1.29	729.9 to 909.1	295.0	7.81		

*Vanadium removed from equation.

TABLE D.12.3

Chemically Resolved Regression Model Relating Tracer Element Concentrations to Pollutant Sources at San Bernardino

MODEL STRUCTURE:

$$TSP_j = SULFATES_j + NITRATES_j + CRUSTAL_j + OIL\ ASH_j + HIGHWAY_j + OTHER_j$$

MODEL ESTIMATED:

$$TSP_j = \beta_{SO_4} \cdot SO_{4_j}^{=} + \beta_{NO_3} \cdot NO_{3_j}^{-} \cdot \beta_{CRUSTAL} \cdot Fe_j + \beta_{OIL} \cdot V_j \cdot \beta_{HIGHWAY} \cdot Pb_j + \beta_{OTHER} + \varepsilon_j$$

REGRESSION MODEL RESULTS	TSP AVERAGE (TSP VARIANCE)	COEFFICIENTS (STANDARD ERROR)						CORRELATION COEFFICIENT (number of quarters)
		β_{SO_4}	β_{NO_3}	$\beta_{CRUSTAL}$	β_{OIL}	$\beta_{HIGHWAY}$	β_{OTHER}	
[1969-1976]	131.86	2.15	1.83	16.65	-859.7	31.62	-0.24	0.91
	(2069.8)	(1.07)	(0.84)	(5.64)	(384.6)	(6.98)	(13.44)	(28)
Prior Expectation		1.02 to 1.38	1.29	14.45 to 31.25	295.0	7.81		

TABLE D.12.4

Chemical Elements Used As If They Were
Unique Tracers for Major Source Types

San Bernardino NASN Station

EXPRESSION EVALUATED:

TSP = SULFATES + NITRATES + CRUSTAL + OIL ASH + HIGHWAY + OTHER

$TSP = 1.38\ SO_4^{=} + 1.29\ NO_3^{-} + 909.1\ Mn + 295\ V + 7.81\ Pb + OTHER$

COMPONENT	AVERAGE MASS LOADING ($\mu g\ m^{-3}$) 1969-1976	1976
Sulfate compounds	16.86	12.25
Nitrate compounds	18.79	19.99
Crustal components	45.78	40.91
Fuel Oil Fly Ash	2.55	3.47
Highway Aerosol	11.72	11.83
Subtotal	95.70	88.45
Remaining to be determined	36.16	23.70
TOTAL PARTICULATE	131.86	112.15

Regression of TSP on Σ(SULFATES + NITRATES + CRUSTAL + OIL ASH + HIGHWAY)

YEARS	REGRESSION EQUATION	CORRELATION (NUMBER OF QUARTERS)
1969-1976	TSP = 1.28 [Σ TRACED] + 9.49	0.88 (28)
1976	TSP = 1.32 [Σ TRACED] − 5.01	0.61 (4)

TABLE D.12.5

Aerosol Source Assignment for the Year 1976

San Bernardino

NASN Station

COMPONENT	1976 AVERAGE MASS LOADING ($\mu g\ m^{-3}$) CHEMICAL ELEMENT BALANCE (ROAD DUST CASE)	CHEMICAL ELEMENT BALANCE (SOIL DUST CASE)	TRACER ELEMENT METHOD(a)
SULFATE COMPOUNDS	11.18	10.93	12.25
NITRATE COMPOUNDS	19.62	19.71	19.99
CRUSTAL COMPONENTS	27.45	44.07	40.91
FUEL OIL FLY ASH	1.57	2.63	3.47
HIGHWAY AEROSOL	10.81	11.78	11.83
Subtotal	70.63	89.12	88.45
Remaining to be Determined	41.52	23.03	23.70
TOTAL PARTICULATE	112.15	112.15	112.15

(a) $TSP = 1.38\ SO_4^{=} + 1.29\ NO_3^{-} + 909.1\ Mn + 295\ V + 7.81\ Pb + OTHER$

TABLE D.12.6

COMPOSITION OF AEROSOL OBSERVED AT SAN BERNARDINO FROM CHEMICAL ELEMENT BALANCE

DATE	TSP	SULFATES	NITRATES	HIGHWAY	SOILDUST	OIL ASH	TRACED	RESIDUAL
76 Q1.	87.20	8.07	20.98	10.89	38.85	3.68	82.48	4.72
76 Q2.	119.50	11.85	21.68	9.44	61.40	2.12	106.48	13.02
76 Q3.	142.00	16.90	23.27	10.50	38.60	2.51	91.78	50.22
76 Q4.	99.90	6.89	12.89	16.30	37.41	2.22	75.71	24.19

TABLE D.12.7

COMPOSITION OF AEROSOL OBSERVED AT SAN BERNARDINO FROM CHEMICAL ELEMENT BALANCE

DATE	TSP	SULFATES	NITRATES	HIGHWAY	ROADDUST	OIL ASH	TRACED	RESIDUAL
76 Q1.	87.20	8.29	20.91	10.02	24.36	2.75	66.33	20.87
76 Q2.	119.50	12.24	21.56	8.07	39.74	0.52	82.12	37.38
76 Q3.	142.00	17.11	23.19	9.66	23.54	1.62	75.13	66.87
76 Q4.	99.90	7.08	12.82	15.47	22.14	1.40	58.92	40.98

TABLE D.12.8

COMPOSITION OF AEROSOL OBSERVED AT SAN BERNARDINO ESTIMATED FROM TRACER STUDY

DATE	TSP	SULFATES	NITRATES	HIGHWAY	SOILDUST	OIL ASH	TRACED	RESIDUAL
76 Q1.	87.20	9.85	21.34	10.93	36.36	4.42	82.91	4.29
76 Q2.	119.50	12.89	21.94	9.53	54.55	3.24	102.15	17.35
76 Q3.	142.00	18.11	23.57	10.54	36.36	3.24	91.83	50.17
76 Q4.	99.90	8.14	13.12	16.32	36.36	2.95	76.90	23.00