



# Residential Wood Combustion Study

## *Task 1* Appendices



RESIDENTIAL WOOD COMBUSTION STUDY

TASK 1

AMBIENT AIR QUALITY IMPACT ANALYSIS

APPENDICES

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TASK 1

Ambient Air Quality Impact Analysis

APPENDICES

FINAL REPORT

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EPA 910/9-82-089a Residential Wood Combustion Study  
Task 1 - Ambient Air Quality Impact  
Analysis

EPA 910/9-82-089b Task 1 - Appendices

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Volumes 1 & 2

EPA 910/9-82-089h Task 5 - Emissions Testing of Wood Stoves  
Volumes 3 & 4 (Appendices)

EPA 910/9-82-089i Task 6 - Control Strategy Analysis

EPA 910/9-82-089j Task 7 - Indoor Air Quality

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**Residential Wood Combustion  
Air Monitoring Network**

**Appendix 1**

**Sampling Site Descriptions**

The residential sampling sites were established and operating in Portland and Spokane by Friday, January 30, 1981 and by Friday, Feb. 6, 1981 in Seattle. All three were operated through March 8-10, 1981. Background sites were operational by the following dates: (1) Portland, Carus (2-6-81); (2) Seattle, Lake Samamish State Park (3-6-81); (3) Spokane, Turnbull Wildlife Refuge (2-4-81).

The following sections describe these sites in more detail.

#### Portland Area Monitoring Sites

##### Marcus Whitman School

A temporary monitoring site was established at Marcus Whitman School, 7326 S.E. Flavel Street in Southeast Portland. Instruments were installed on the roof on a 1½ story temporary classroom - a small building near the main school building.

The small building was surrounded on three sides by open playing fields. The area around the school for blocks in all directions is residential, mostly single family housing. Some of the houses closest to the site were new and some of the newer houses frequently had wood stove installations. Wood stoves were present in some of the houses nearest the monitoring site. The nearest house with an obvious wood stove roof stack was approximately 300 feet from the building on which the instruments were mounted (to the south).

The larger school building was adjacent to the temporary classroom, and two stories in height at the corner nearest to the instruments. Thus, it was a few feet taller than the instrument heights, but not close enough to seriously obstruct air circulation. On the roof of the main school building, at the end farthest from the sampling site, was a large brick chimney, which vents exhaust from the school's heating furnace. The furnace burns distillate oil. The height of the chimney top is approximately 22 feet above ground level. No evidence of vandalism or tampering with instruments was noted during the sampling period. No sampling at the school site was typically conducted between 5 p.m. and 5 p.m. the following day. If dichotomous filters were changed during the 24 hour sampling period, it was done early the following morning, around 8 a.m.

### Carus

DEQ's Portland area background site at Carus, Oregon required only slight adaptation to serve as a background site for this study. The site already operated all three instruments used in this study. DEQ did change their dichotomous sampler filter holders from their customary larger (47 mm) filter size to accomodate the smaller (37 mm) teflon filters used in this study. DEQ field staff loaded and unloaded filters at Carus on their regular 6th day sampling schedule, using preweighed and labeled filters supplied by NEA, INC. Sampling times were adjusted to correspond to the 5 p.m. to 5 p.m. sampling regimen at the residential site in Portland.

### Seattle Area Monitoring Sites

#### Newport Way

A temporary monitoring site was established at 13820-22 S.E. Newport Way, in Bellevue, Washington. Instruments were installed on the roof of a GMC Motor Home, which had been outfitted by the U.S. Environmental Protection Agency for air pollution monitoring. Power for the instruments was supplied directly from a nearby residence. The motor home served primarily to mount the instruments above ground level, and to provide storage and work space for the sampling technician.

The surrounding area was entirely residential, with mostly single family housing, some apartments, a school and a church were within a 1/2 mile of the site. The terrain was hilly. The monitoring site was located at the downslope end of a small valley which contained a few houses with wood stove roof stacks. This area had shown the most evidence of wood combustion activity (smoke plumes) during a January, 1981 drive-by inspection of several candidate sites in Bellevue.

The monitoring site was located downslope at the neck of the small valley to sample drainage winds from the valley. A stand of small trees at the western (further downslope) edge of the site may have slightly compromised sampler exposure from that direction. No evidence of vandalism or tampering with the instruments was noted during the study.

The nearest wood burning devices were Franklin type stoves in each of the duplex units at the site and what appeared to be similar units at similar apartments next door. No data was gathered as to whether these combustion units were used, or how often. The chimney exits serving these stoves were in high, peaked second story roofs.

The site was fully operational and the first sample taken, on Friday, February 6, 1981. Initially, and for most of the samples taken at the site, the 24 hour sampling period was begun about 7-8 a.m. Late in the field sampling period, dichotomous sampler filters were changed during the 24 hour sample to avoid the possibility of fine filter plugging if heavy impacts occurred. At this time the 24 hour sampling period was begun around 4:00-4:30 p.m. The filter change was made the next morning.

#### Lake Samamish

A temporary background site was established at Lake Samamish State Park and made operational just before our field sampling ended in early March. Instruments were installed on the roof of a small utility shed at the Park Ranger's residence, near several other maintenance buildings. The site was already used by DOE for ozone monitoring. The site was flat with open space in all directions with only 2 houses in the vicinity. The nearest houses had no wood stove.

The background site was established late in our field sampling period. Only three samples were taken there. Each of these, unfortunately, has some irregularity or uncertainty worth noting. The March 6-7 background sample was not picked up until several days after it was completed, due to restricted access to the site. The sample time notations appear to be erroneous on the March 6-7 and March 9-10 samples. The filters listed as being used for the March 10-11 sample appeared to be unused when logged in and weighed by NEA. Accordingly, background particulate levels attributed to this site must be interpreted with extra caution.

Spokane Area Monitoring Sites

Country Homes

A new monitoring site was established in a residential area of north Spokane, located south of Country Homes Blvd. at the intersection of Country Homes Blvd. and Wall Street. The instruments were located on the roof of a small, one-story pump station operated by the Whitworth Water District. The surrounding area is primarily single family residential. Some homes in the area, including some in the immediate vicinity of the monitoring site, had wood stove roof stacks, but the great majority did not. Most homes probably had fireplaces. Several homes nearest the monitoring site had large wood piles. No nearby objects compromised sampler exposure and no evidence of vandalism or tampering with instruments was noted.

Samples were initially started about 2 p.m. and run for 24 hours. On March 1st the dichotomous fine filter plugged with particulate. After this, filters were changed on this instrument, normally around midnight, to avoid other plugging. On at least one of these late night trips to change filters, the field technician reported strong evidence of wood burning, e.g., visible haze and noticeable odor of wood burning.

Turnbull

SCAPCA's regular background monitoring site at Turnbull Wildlife Refuge near Cheney, Washington, was adapted for our study by installing an extra high volume sampler. These instruments were mounted on the roof and on a metal balcony of a one-story frame building. This location was at least several hundred yards away from the nearest buildings.

Samples were run from 2 p.m. to 2 p.m. to correspond to urban sampling at the residential site.

Appendix 2  
Source Composition Files

Tables included in Appendix 2 describe the fractional composition (weight percent) of source emissions within the fine particle mode ( $\leq 2.5 \mu\text{m}$ ) and each values associated uncertainty. The data was developed through extensive programs of source emission testing and comprehensive chemical analysis of the samples referenced in section 2.5. The uncertainty values represent 1 standard deviation values obtained through analysis of replicate source test samples.

Appendix 2  
 Source Emission Composition  
 File (Fine Fraction)

RESUD	RESIDENTIAL WOOD BURNING										P
	HA	MG	AL	K	CA	SI	FE	H1	CU	CD	
0.0830	0.0460	0.0730	0.0730	0.0210	0.0200	-----	-----	-----	-----	-----	
S	-----	CL	-----	-----	-----	-----	-----	-----	-----	-----	
0.1820	0.2000	0.3090	0.3090	0.8600	0.7000	0.0670	0.0600	-----	-----	-----	
V	-----	MH	-----	-----	-----	-----	-----	-----	-----	-----	
0.0370	0.0370	AS	-----	-----	-----	-----	-----	-----	-----	-----	
PB	-----	OC	-----	-----	-----	-----	-----	-----	-----	-----	
-----	47.5000	13.8000	12.8000	8.4000	-----	-----	-----	-----	-----	-----	

CDUST	CONTINENTAL DUST MEDFORD										P
	HA	MG	AL	K	CA	SI	FE	H1	CU	CD	
1.5000	0.2000	1.9000	0.6000	9.5000	0.1000	26.6000	1.4000	-----	-----	-----	
S	-----	CL	-----	-----	-----	-----	-----	-----	-----	-----	
0.0900	0.0400	0.0700	0.0500	0.9200	0.3300	1.8000	0.4000	1.0000	0.1000	-----	
0.0240	0.0050	0.1600	0.0700	5.3000	0.6000	-----	-----	-----	0.0300	0.0200	
ZH	-----	AS	-----	-----	-----	-----	-----	-----	-----	-----	
0.0030	0.0010	-----	-----	-----	-----	-----	-----	-----	-----	-----	
PB	-----	OC	-----	-----	-----	-----	-----	-----	-----	-----	
0.0110	0.0080	4.4000	1.7000	0.6000	0.4000	-----	-----	-----	-----	-----	

UDUST 0003 URBAN DUST MEDFORD  
 HA MG AL SI P  
 2.0000 0.2000 2.0000 0.3000 8.1000 0.3000 23.8000 1.3000 ----  
 S CL K CA TI  
 0.4000 0.1000 0.0400 0.0100 0.9200 0.0800 2.5000 1.1000 0.6500 0.1100  
 V NH FE NI CU  
 0.0230 0.0060 0.1100 0.0100 4.9000 0.4000 ---- 0.0400 0.0300  
 ZH AS BR SR CD  
 0.0500 0.0100 ---- ---- ---- ----  
 PB DC EC  
 0.1300 0.0400 10.0000 2.0000 1.4000 0.5000

TRANSP 0004 TRANSPORTATION  
 HA MG AL SI P  
 ---- 0.8600 0.7400 0.1400 0.1300 0.5900 0.2200 ----  
 S CL K CA TI  
 3.9200 4.9500 2.3500 0.7800 ---- 1.1700 1.5500 0.3200 0.3700  
 V NH FE NI CU  
 ---- ---- 1.8500 1.7900 ---- ----  
 ZH AS BR SR CD  
 0.0900 0.0900 ---- 5.3200 1.8100 ---- ----  
 PB DC EC  
 13.8000 2.0700 43.1200 8.6200 26.1200 9.6600

RDOIL 0005 RESID OIL

	HA	MG	AL	SI	P				
	3.5000	1.7000	0.0000	3.0000	0.5300	0.2400	0.9600	0.4800	----
S			CL		K		CA		TI
V	13.3000	2.1000	0.0000	0.1000	0.2800	0.1000	1.3800	0.6400	0.1100 0.6380
MH					FE		HI		CU
ZH	3.4400	0.7500	0.0460	0.0130	2.9700	0.6100	3.3600	1.2100	0.0750 0.0250
AS			BR				SR		CD
PB	0.4000	0.1800	---		0.0130	0.0210	---		----
DC			EC						
	0.1100	0.0640	10.1000	8.7000		----			

CDUST 0006 SOIL PORTLAND

	HA	MG	AL	SI	P				
	0.6900	0.3800	1.7600	0.6200	11.7000	2.2000	23.4000	3.4000	----
S			CL		K		CA		TI
V	0.0700	0.0300	0.0000	0.0100	1.0000	0.2800	0.9300	0.3700	0.7600 0.2400
MH					FE		HI		CU
ZH	0.0250	0.0060	0.2000	0.0900	6.8000	2.3000	---		0.0200 0.0040
AS			BR				SR		CD
PB	0.0410	0.0260	---		0.0000	0.0100	---		----
DC			EC						
	0.0060	0.0020	---		4.9100	2.1000			

RDUST	0007	ROAD DUST	PORTLAND					
HA		MG		AL		SI		P
1.2500	0.3400	1.3000	0.2700	8.8400	2.7100	22.3000	1.1000	----
S		CL		K		CA		TI
0.3700	0.1400	0.0000	0.0100	1.0300	0.0600	2.4400	0.4000	0.6400 0.1200
V		MN		FE		HI		CU
0.0230	0.0050	0.1230	0.0170	6.0000	0.6000	---		0.0300 0.0120
ZH		AS		BR		SR		CD
0.1100	0.0370	---		0.0200	0.0056	---		----
PB		DC		EC				
0.3700	0.1500	13.6500	5.2100		----			

ALUMP	0011	ALUMINUM PROCESSING						
HA		MG		AL		SI		P
4.1000	1.7000	2.8000	1.8000	27.0000	8.0000	0.3400	0.3400	----
S		CL		K		CA		TI
1.4000	0.2000	1.3300	0.8400	0.2200	0.0600	0.3300	0.0300	0.0400 0.0300
V		MN		FE		HI		CU
0.0640	0.0360	0.0110	0.0080	0.4500	0.2900	0.1900	0.0850	0.0440 0.0070
ZH		AS		BR		SR		CD
0.0150	0.0110	---		0.0370	0.0540	---		----
PB		DC		EC				
0.0120	0.0100	6.2000	4.9000		----			

MARINE 0015 MARINE

HA	MG	AL	SI	P
40.0000	4.0000	4.8000	0.9000	----
S	CL	K	CA	TI
3.3000	1.3000	40.0000	10.0000	1.4000 0.2000 1.4000 0.2000
V	MH	FE	HI	CU
----	----	----	----	----
ZH	AS	BR	SR	CD
----	----	0.2000 0.0500	----	----
PB	OC	EC	----	----
----	----	----	----	----

HOGFU 0016 HOGGED FUEL BOILER MEDFORD

HA	MG	AL	SI	P
14.0000	3.0000	----	0.1300 0.0700	----
S	CL	K	CA	TI
3.0000	2.0000	13.0000	12.0000	9.0000 6.0000 3.0000 2.0000
V	MH	FE	HI	CU
----	0.2000 0.1000	0.3000 0.1000	----	0.0270 0.0060
ZH	AS	BR	SR	CD
0.3000 0.1000	----	0.0170 0.0040	----	----
PB	OC	EC	----	----
0.0300 0.0200	5.0000	4.0000	4.3000 4.0000	

PARTD	0017	PARTICLE BOARD DRYER MEDFORD							
	HA	MG	AL	SI	P				
	18.2000	1.6000	----	----	----	-----			
S		CL	K	CA	TI				
V	1.0000	0.4000	23.4000	1.9000	1.0500	0.0700	0.2000	0.0090	-----
		MH	FE	HI	CU				
	----	0.0200	0.0010	0.0200	0.0300	----	-----	-----	-----
ZH		AS	BR	SR	CD				
PB	0.0200	0.0010	----	----	-----	-----			
	OC	EC							
----	10.0000	5.0000	1.2000	0.3000					

KRAFT	0018	KRAFT RECOVERY BOILER								
	HA	MG	AL	SI	P					
	12.7000	0.7100	0.6300	0.5300	0.2500	0.0140	0.1500	0.0140	-----	
S		CL	K	CA	TI					
V	11.7000	1.0000	1.8000	0.4200	1.5000	0.1400	0.0000	0.5000	0.0060	0.0020
		MH	FE	HI	CU					
	0.0010	0.0010	0.0300	0.0040	1.2000	0.1100	0.1300	0.0140	0.0210	0.0130
ZH		AS	BR	SR	CD					
PB	0.0690	0.0210	----	0.1300	0.0600	----	-----	-----	-----	
	OC	EC								
0.0130	0.0110	1.9200	0.4400	----						

## SULFI 0019 SULFITE RECOVERY BOILER

HA		MG		AL		SI		P
2.5000	0.8000	0.7300	0.5200	----		0.4000	0.1500	----
S		CL		K		CA		TI
12.0000	2.0000	0.5800	0.1000	30.0000	10.0000	2.0000	0.2000	0.0100 0.0010
V		MH		FE		HI		CU
0.0000	0.0010	0.0540	0.0700	0.0660	0.0360	0.0000	0.0010	0.0160 0.0170
ZH		AS		BR		SR		CD
0.0170	0.0020	----		0.0000	0.0050	----		----
PB		OC		EC				
0.0000	0.0300	----		----				

## RODUST 0020 ROAD DUST SEATTLE

HA		MG		AL		SI		P
----		1.2800	0.1088	11.1200	0.7432	27.3360	1.7800	0.3336 0.0312
S		CL		K		CA		TI
0.3800	0.0088	0.0248	0.0352	0.7192	0.0664	0.8640	0.0712	0.4400 0.0384
V		MH		FE		HI		CU
0.0392	0.0096	0.1448	0.0144	4.9896	0.3400	----		0.0080 0.0060
ZH		AS		BR		SR		CD
0.0424	0.0088	----		----		0.0208	0.0088	0.0392 0.0552
PB		OC		EC				
0.1072	0.0224	----		----				

RDUST	0021	ROAD DUST	SPOKANE						
HA		MG		AL		SI		P	
---		1.8660	0.1545	11.0100	0.7785	27.9750	1.9350	0.2992	0.0315
S		CL		K		CA		TI	
0.3660	0.0960	0.1125	0.0465	1.5450	0.1275	0.7950	0.0705	0.4425	0.0405
V		MH		FE		HI		CU	
0.0248	0.0090	0.2400	0.0217	5.2800	0.3750	0.0105	0.0082	0.0180	0.0075
ZH		AS		BR		SR		CD	
0.0270	0.0077	---		---		0.0135	0.0098	0.0532	0.0645
PB		DC		EC					
0.1065	0.0248	----		----					

RDUST	0022	ROAD DUST	BOISE						
HA		MG		AL		SI		P	
---		0.9040	0.0680	8.1600	0.4630	30.2730	1.6600	0.2430	0.0210
S		CL		K		CA		TI	
0.5240	0.0800	0.0830	0.0300	1.7480	0.1220	1.2680	0.0810	0.4390	0.0320
V		MH		FE		HI		CU	
0.0330	0.0070	0.0970	0.0090	3.4060	0.1990	---		0.0070	0.0040
ZH		AS		BR		SR		CD	
0.0810	0.0090	---		---		0.0350	0.0070	0.0680	0.0400
PB		DC		EC					
0.2050	0.0220	----		----					

DISOL 0023 DISTILLATE OIL EMISSIONS  
 HA MG AL SI P  
 ---- ----  
 S CL K 0.2700 0.3200 ----  
 6.9300 2.6200 1.2000 0.9000 0.0180 0.0130 CA TI  
 V MN FE 0.5000 0.5500 ----  
 0.0050 0.0810 0.0140 0.0100 0.1200 0.1100 HI CU  
 ZH AS BR SR CD  
 0.0290 0.0190 ---- 0.0260 0.0280 ----  
 PB OC EC ----  
 0.5400 0.5100 18.0000 5.6600 17.8000 22.9000

SEC804 0024 SECONDARY SULFATE  
 HA MG AL SI P  
 ---- ----  
 S CL K 0.2700 0.3200 ----  
 33.0000 1.7000 MN FE CA TI  
 V ----- HI CU  
 ZH AS BR SR CD  
 PB OC EC ----  
 ----

GALVN	0025	GALVANIZING - EXCESS ZINC			
	NA	MG	AL	SI	P
---	---	---	---	---	---
S	CL	K	CA	TI	---
---	---	---	---	---	---
V	MN	FE	HI	CU	---
---	---	---	---	---	---
ZN	AS	BR	SR	CD	---
80.3000	4.0000	---	---	---	---
PB	OC	EC	---	---	---
---	---	---	---	---	---

**Appendix 3**

**Field Program Sample  
Summary**



Appendix 3  
Field Program Sample Summary

Date	Fine Mass ( $\mu\text{g}/\text{m}^3$ )	24 Hour Avg. Bacat ( $10^{-4}\text{ m}^{-1}$ )	Average Wind Speed (mph)	TSP ( $\mu\text{g}/\text{m}^3$ )	Min. Temp. (°F)	Day of Week	RWC Impact ( $\mu\text{g}/\text{m}^3$ )	Other Analysis*	Comments
<b>Spokane (Country Homes)</b>									
1-31-81	35	-	8.5	77	29	Sat.	32.7 ± 7.7		
2-1-81	70	-	3.5	223	25	Sun.	68.1 ± 16.0	1,2	} Probable 3rd highest impact weekend. Cold lower than average wind speeds.
2-4-81	58	-	2.6	122	19	Wed.	48.9 ± 12.6	1,2	
2-6-81	83	-	5.0	153	26	Fri.	57.9 ± 13.6	1,2	
2-8-81	43	2.1	4.0	115	24	Sun.	26.2 ± 6.4		
2-9-81	31	1.2	12.1	116	9	Mon.	30.2 ± 7.4		
2-11-81	59	2.1	6.2	-	2	Tue.	19.9 ± 12.6		
2-27-81	64	2.5	4.5	149	30	Fri.	50.8 ± 12.3		} Probable 2nd highest impact.
2-28-81	64	2.4	7.3	125	27	Sat.	55.8 ± 13.4	1	
3-2-81	69	4.2	4.6	168	26	Mon.	58.7 ± 16.2	1	
3-3-81	36	3.4	7.1	71	28	Tue.	26.4 ± 7.3		
3-6-81	33	4.4	5.9	92	21	Fri.	40.7 ± 9.9		} Weekend of highest overall NEPH values. No background samples.
3-7-81	32	2.0	6.5	69	25	Sat.	23.5 ± 6.3		
3-8-81	71	3.3	4.6	136	25	Sun.	62.7 ± 15.2		
3-10-81	75	4.1	4.2	-	24	Mon.	65.3 ± 15.3		
<b>Spokane (Turnbull) (Background)</b>									
2-4-81	9	-	2.6	23	19	Wed.	8.3 ± 2.2		
2-6-81	6	-	5.0	-	26	Fri.	4.8 ± 3.1	1	
3-2-81	3	-	4.6	-	26	Mon.	4.8 ± 1.2		
<b>Spokane (County Health) (Historical)</b>									
10-30-81	53	4.2	3.7	-	32	Thurs.	34.3 ± 21.3		} Air Stagnation Advisory (ASA)
<b>Spokane (Crown Zellerbach) (Historical)</b>									
11-17-80	41	1.5	3.3	159	27	Mon.	16.4 ± 16.6		ASA
11-23-80	35	0.9	4.6	87	22	Sun.	16.5 ± 13.4		
12-17-80	41	2.7	3.2	-	26	Wed.	14.9 ± 12.4		
3-11-81	37	3.9	4.8	450	29	Wed.	19.1 ± 17.4		

\* 1 = PAH, 2 = °C

## Appendix 3

Field Program Sample Summary  
(Continued)

Date	Fine Mass ( $\mu\text{g}/\text{m}^3$ )	24 Hour Avg. Beauf. ( $10^{-2}\text{ m s}^{-1}$ )	Average Wind Speed (mph)	TSP ( $\mu\text{g}/\text{m}^3$ )	Min. Temp. (°F)	Day of Week	RWC Impact ( $\mu\text{g}/\text{m}^3$ )	Other Analysis*	Comments
<b>Portland (Marcus Whitman School) (Residential)</b>									
1-30-81	50	2.3	3.6	73	36	Fri.	31.7 ± 8.6		
2-2-81	26	5.1	4.4	49	34	Mon.	13.7 ± 3.9		
2-5-81	35	1.0	12.7	55	37	Thurs.	17.1 ± 4.9		
2-8-81	34	5.1	6.2	51	28	Sun.	20.3 ± 5.5		
2-11-81	35	3.7	12.0	54	30	Wed.	32.4 ± 8.4		
2-23-81	36	-	-	52	-	Mon.	26.0 ± 7.4		
2-26-81	35	-	-	52	-	Thurs.	28.9 ± 7.2		
3-5-81	69	2.5	4.4	111	34	Thurs.	49.0 ± 13.6	1,2	
<b>Portland (Carus) (Background)</b>									
2-6-81	22	-	-	40	-	Fri.	14.7 ± 4.2	1	
2-21-81	7	-	-	-	-	Fri.	4.9 ± 1.5		
3-5-81	4	-	-	-	-	Thurs.	2.6 ± 0.9		
<b>Medford (Courthouse) (Commercial, Historical)</b>									
1-16-81	175	10.6	-	213	-	Fri.	62.2 ± 19.0	1	ASA
<b>Yakima (Courthouse) (Commercial, Historical)</b>									
11-17-80	52	-	-	148	-	Mon.	51.6 ± 32.3		
12-11-80	72	-	-	344	-	Thurs.	55.1 ± 32.4		
12-19-80	49	-	-	-	-	Mon.	48.0 ± 37.7		
2-21-81	42	-	-	173	-	Sat.	45.2 ± 37.0		

\* 1 = PAH, 2 =  $^{14}\text{C}$

## Appendix 3

Field Program Sample Summary  
(Continued)

Date	Fine Mass ( $\mu\text{g}/\text{m}^3$ )	24 Hour Avg. Bscat ( $10^{-6}\text{m}^{-1}$ )	Average Wind Speed (mph)	TSP ( $\mu\text{g}/\text{m}^3$ )	Min. Temp. (°F)	Day of Week	RWC Impact ( $\mu\text{g}/\text{m}^3$ )	Other Analysis*	Comments
<b>Seattle (Newport Way) (Residential)</b>									
2-6-81	46	2.4	4	-	32	Fri.	37.0 ± 10.9	1,2	Third highest NEPH.
2-7-81	50	3.2	2	97	31	Sat.	48.8 ± 13.8	1,2	Highest NEPH.
2-8-81	45	2.9	4	81	31	Sun.	38.3 ± 10.8	1,2	Second highest NEPH.
2-9-81	39	1.3	6	67	32	Mon.	24.1 ± 6.8		
2-10-81	31	1.2	3	61	27	Tues.	25.0 ± 7.1		
3-1-81	34	0.8	3	78	41	Sun.	28.8 ± 8.1		
3-2-81	29	1.6	2	96	36	Mon.	22.3 ± 6.3		
3-5-81	26	0.8	4	69	37	Thurs.	29.8 ± 8.3		
3-6-81	12	0.7	4	15	34	Fri.	8.2 ± 2.6		
3-8-81	39	1.0	4	81	37	Sun.	39.2 ± 10.9		
<b>Seattle (Lake Sammamish) (Background)</b>									
3-9-81	12	0.9	2	184	39	Mon.	9.4 ± 2.8	1	
<b>Seattle (South Park) (Residential)</b>									
1-15-81	112	2.2	2	235	31	Fri.	65.9 ± 19.6	1	ASA and CO Alert.
1-16-81	191	1.9	1	212	33	Sat.	68.2 ± 19.9	1	
<b>Seattle (Georgetown) (Industrial)</b>									
10-18-81	44	-	2	-	43	Wed.	20.4 ± 15.3		
10-4-81	38	3.1	2	-	38	Wed.	31.3 ± 21.0		
2-3-81	37	1.6	2	126	40	Tue.	35.5 ± 24.3		
<b>Tacoma (Fire Station #12) (Industrial)</b>									
10-4-81	51	3.1	2	65	38	Sun.			
1-16-81	39	1.9	1	180	33	Sat.			
2-3-81	45	1.6	2	174	40	Tue.			
2-9-81	53	1.3	6	217	37	Mon.			

\* 1 = PAH, 2 =  $^{14}\text{C}$

## Appendix 3

Field Program Sample Summary  
(Continued)

Date	Fine Mass ( $\mu\text{g}/\text{m}^3$ )	24 Hour Avg. Beauf. ( $10^{-4}\text{ m}^{-1}$ )	Average Wind Speed (mph)	TSP ( $\mu\text{g}/\text{m}^3$ )	Min. Temp. (°F)	Day of Week	RWC Impact ( $\mu\text{g}/\text{m}^3$ )	Other Analysis*	Comments
<b>Longview (City Shops) (Commercial)</b>									
12-11-80	35	-	-	107	-	Thurs.	26.5 ± 20.9		
1-3-80	40	-	-	-	-	Sat.	14.2 ± 9.2		
1-10-81	60	-	-	205	-	Sat.	21.2 ± 16.9		
1-6-81	32	-	-	-	-	Fri.	40.5 ± 24.1		
<b>Boise (Fairview &amp; Liberty St.) (Commercial)</b>									
12-9-80	132	-	8.2	190	8	Tue.	82.1 ± 22.9		
12-12-80	163	-	3.8	242	8	Fri.	123.2 ± 33.3	1	
1-8-81	134	-	4.0	144	29	Thurs.	78.9 ± 20.9	1	
1-18-81	196	-	4.5	196	36	Sun.	127.9 ± 29.9		
1-20-81	205 <sup>3</sup>	-	4.6	205	38	Tue.	105.0 ± 28.6		
2-7-81	82	-	5.6	100	20	Sat.	64.7 ± 17.5		
2-11-81	59 <sup>3</sup>	-	6.2	39	18	Wed.	52.1 ± 13.9		
2-13-81	89	-	8.4	80	27	Fri.	50.0 ± 13.4		
2-23-81	88	-	12.0	123	36	Mon.	77.9 ± 21.1		

\* 1 = PAH, 2 =  $^{14}\text{C}$ , 3 = Hi-vol Mass; Invalid or Questionable SSI, dichotomous mass values

**Appendix 4**

**CMB Source Impact  
Summaries By Site**



SPOKANE COUNTRY HOMES SITE #1  
 # OF SAMPLES IN THIS SET 15

SOURCE CONTRIBUTIONS

	UG/M3		PERCENT
RESWD	44.564+-11.502	15	81.044+-20.919
CDUST	0.000+-0.000	0	0.000+-0.000
UDUST	0.000+-0.000	0	0.000+-0.000
TRANSP	1.629+-0.275	15	2.962+-0.500
RDOIL	0.027+-0.012	6	0.048+-0.021
CDUST	0.000+-0.000	0	0.000+-0.000
RDUST	0.000+-0.000	0	0.000+-0.000
RDUST	0.000+-0.000	0	0.000+-0.000
RDUST	1.245+-0.149	15	2.264+-0.271
RDUST	0.000+-0.000	0	0.000+-0.000
MARINE	0.030+-0.013	3	0.054+-0.024
HOGFU	0.000+-0.000	0	0.000+-0.000
PARTD	0.000+-0.000	0	0.000+-0.000
ALUMP	0.205+-0.092	8	0.373+-0.167
KRAFT	0.000+-0.000	0	0.000+-0.000
SULFI	0.000+-0.000	0	0.000+-0.000
DISOL	0.000+-0.000	0	0.000+-0.000
SECSO4	1.968+-0.515	15	3.578+-0.937
GALVN	0.009+-0.005	3	0.017+-0.008

ELEMENTAL CONCENTRATIONS

	UG/M3
NA	0.085+-0.013
MG	0.044+-0.033
AL	0.213+-0.027
SI	0.359+-0.042
P	0.062+-0.009
S	0.806+-0.102
CL	0.196+-0.029
K	0.175+-0.022
CA	0.033+-0.006
TI	0.009+-0.002
V	0.003+-0.005
MN	0.004+-0.006
FE	0.067+-0.010
HI	0.005+-0.007
CU	0.041+-0.006
ZN	0.028+-0.004
AS	0.044+-0.083
BR	0.091+-0.011
CD	0.010+-0.019
BA	0.101+-0.202
PB	0.237+-0.028
OC	23.153+-3.547
EC	4.795+-0.947

AVERAGE MASS 55.0 UG/M3

SPOKANE TURNBULL SITE #2 (BACKGROUND)  
 # OF SAMPLES IN THIS SET 3

SOURCE CONTRIBUTIONS			PERCENT
	UG/M3		
RESWD	6.000+- 2.264	3	90.452+- 34.136
CDUST	0.000+- 0.000	0	0.000+- 0.000
UDUST	0.000+- 0.000	0	0.000+- 0.000
TRAHSP	0.105+- 0.023	2	1.578+- 0.347
RDOIL	0.000+- 0.000	0	0.000+- 0.000
CDUST	0.000+- 0.000	0	0.000+- 0.000
RDUST	0.000+- 0.000	0	0.000+- 0.000
RDUST	0.000+- 0.000	0	0.000+- 0.000
RDUST	0.296+- 0.034	3	4.457+- 0.508
RDUST	0.000+- 0.000	0	0.000+- 0.000
MARINE	0.000+- 0.000	0	0.000+- 0.000
HOGFU	0.000+- 0.000	0	0.000+- 0.000
PARTD	0.000+- 0.000	0	0.000+- 0.000
ALUMP	0.000+- 0.000	0	0.000+- 0.000
KRAFT	0.000+- 0.000	0	0.000+- 0.000
SULFI	0.000+- 0.000	0	0.000+- 0.000
DISOL	0.000+- 0.000	0	0.000+- 0.000
SECS04	1.647+- 0.231	3	24.829+- 3.477
CALVN	0.000+- 0.000	0	0.000+- 0.000

ELEMENTAL CONCENTRATIONS  
 UG/M3

NA	0.025+- 0.004
MG	0.032+- 0.061
AL	0.050+- 0.008
SI	0.081+- 0.010
P	0.028+- 0.004
S	0.560+- 0.069
CL	0.063+- 0.126
K	0.034+- 0.006
CA	0.009+- 0.002
TI	0.004+- 0.007
V	0.004+- 0.008
MN	0.001+- 0.001
FE	0.012+- 0.003
HI	0.005+- 0.010
CU	0.005+- 0.001
ZN	0.013+- 0.002
AS	0.021+- 0.040
BR	0.007+- 0.007
CD	0.009+- 0.018
BA	0.059+- 0.114
PB	0.019+- 0.004
OC	2.163+- 0.450
EC	0.675+- 0.200

AVERAGE MASS 6.6 UG/M3

SEATTLE NEWPORT WAY SITE #3  
 # OF SAMPLES IN THIS SET 10

	SOURCE CONTRIBUTIONS		PERCENT
	UG/M3		
RESWD	30.244+- 8.592	10	83.872+-23.826
CDUST	0.000+- 0.000	0	0.000+- 0.000
UDUST	0.000+- 0.000	0	0.000+- 0.000
TRANSP	2.105+- 0.357	10	5.838+- 0.991
RDOIL	0.068+- 0.025	10	0.189+- 0.070
CDUST	0.000+- 0.000	0	0.000+- 0.000
RDUST	0.000+- 0.000	0	0.000+- 0.000
RDUST	0.684+- 0.082	10	1.897+- 0.228
RDUST	0.000+- 0.000	0	0.000+- 0.000
RDUST	0.000+- 0.000	0	0.000+- 0.000
MARINE	0.383+- 0.087	10	1.062+- 0.241
HOGFU	0.000+- 0.000	0	0.000+- 0.000
PARTD	0.000+- 0.000	0	0.000+- 0.000
ALUMP	0.000+- 0.000	0	0.000+- 0.000
KRAFT	0.000+- 0.000	0	0.000+- 0.000
SULFI	0.000+- 0.000	0	0.000+- 0.000
DISOL	0.000+- 0.000	0	0.000+- 0.000
SECS04	2.551+- 0.560	10	7.074+- 1.553
GALYN	0.048+- 0.013	6	0.132+- 0.035

ELEMENTAL CONCENTRATIONS  
 UG/M3

NA	0.182+- 0.026
MG	0.024+- 0.029
AL	0.115+- 0.017
SI	0.182+- 0.022
P	0.064+- 0.008
S	1.004+- 0.123
CL	0.084+- 0.039
K	0.205+- 0.025
CA	0.024+- 0.005
TI	0.005+- 0.002
Y	0.004+- 0.004
MN	0.004+- 0.001
FE	0.064+- 0.009
NI	0.004+- 0.001
CU	0.007+- 0.004
ZN	0.055+- 0.007
AS	0.056+- 0.098
BR	0.087+- 0.010
CD	0.012+- 0.025
BA	0.067+- 0.119
PB	0.324+- 0.038
OC	14.322+- 2.421
EC	5.710+- 1.201

AVERAGE MASS 36.1 UG/M3

SEATTLE LAKE SAMANISH SITE #4 <BACKGROUND>  
 # OF SAMPLES IN THIS SET 1

SOURCE CONTRIBUTIONS

	UG/M3		PERCENT
RESWD	9.431+- 2.836	1	77.303+- 23.246
CDUST	0.000+- 0.000	0	0.000+- 0.000
UDUST	0.000+- 0.000	0	0.000+- 0.000
TRANSP	1.160+- 0.197	1	9.508+- 1.615
RDOIL	0.042+- 0.017	1	0.344+- 0.139
CDUST	0.000+- 0.000	0	0.000+- 0.000
RDUST	0.000+- 0.000	0	0.000+- 0.000
RDUST	0.870+- 0.089	1	7.131+- 0.730
RDUST	0.000+- 0.000	0	0.000+- 0.000
RDUST	0.000+- 0.000	0	0.000+- 0.000
MARINE	0.346+- 0.065	1	2.836+- 0.533
HOGFU	0.000+- 0.000	0	0.000+- 0.000
PARTD	0.000+- 0.000	0	0.000+- 0.000
ALUMP	0.000+- 0.000	0	0.000+- 0.000
KRAFT	0.000+- 0.000	0	0.000+- 0.000
SULFI	0.000+- 0.000	0	0.000+- 0.000
DISOL	0.000+- 0.000	0	0.000+- 0.000
SECS04	1.822+- 0.328	1	14.934+- 2.689
GALYN	0.000+- 0.000	0	0.000+- 0.000

ELEMENTAL CONCENTRATIONS

	UG/M3
NA	0.148+- 0.021
MG	0.019+- 0.007
AL	0.110+- 0.015
SI	0.235+- 0.027
P	0.041+- 0.006
S	0.684+- 0.084
CL	0.079+- 0.159
K	0.084+- 0.011
CA	0.024+- 0.004
TI	0.005+- 0.001
V	0.001+- 0.001
MN	0.003+- 0.001
FE	0.064+- 0.009
NI	0.003+- 0.001
CU	0.009+- 0.002
ZN	0.021+- 0.003
AS	0.031+- 0.007
BR	0.047+- 0.006
CD	0.002+- 0.001
BA	0.093+- 0.186
PB	0.179+- 0.021
OC	4.170+- 0.870
EC	2.980+- 0.630

AVERAGE MASS 12.2 UG/M3

PORLTAND MARCUS WHITMAN SITE #5  
 # OF SAMPLES IN THIS SET 8

SOURCE CONTRIBUTIONS			PERCENT
	UG/M3		
RESWD	27 428+- 7.497	8	68.144+-18.627
CDUST	0.000+- 0.000	0	0.000+- 0.000
UDUST	0.000+- 0.000	0	0.000+- 0.000
TRANSP	1.642+- 0.277	8	4.080+- 0.688
RDOIL	0.252+- 0.061	7	0.627+- 0.153
CDUST	0.000+- 0.000	0	0.000+- 0.000
RDUST	0.706+- 0.094	8	1.753+- 0.235
RDUST	0.000+- 0.000	0	0.000+- 0.000
RDUST	0.000+- 0.000	0	0.000+- 0.000
RDUST	0.000+- 0.000	0	0.000+- 0.000
MARINE	0.268+- 0.069	7	0.566+- 0.173
HOGFU	0.000+- 0.000	0	0.000+- 0.000
PARTD	0.000+- 0.000	0	0.000+- 0.000
ALUMP	0.115+- 0.055	4	0.287+- 0.136
KRAFT	0.000+- 0.000	0	0.000+- 0.000
SULFI	0.000+- 0.000	0	0.000+- 0.000
DISOL	0.000+- 0.000	0	0.000+- 0.000
SECSO4	2.486+- 0.506	8	6.176+- 1.258
GALVN	0.023+- 0.011	6	0.057+- 0.028

ELEMENTAL CONCENTRATIONS		
	UG/M3	
NA	0.154+- 0.022	
MG	0.052+- 0.078	
AL	0.125+- 0.017	
SI	0.169+- 0.020	
P	0.065+- 0.008	
S	0.981+- 0.118	
CL	0.274+- 0.041	
K	0.252+- 0.030	
CA	0.030+- 0.005	
TI	0.005+- 0.002	
V	0.009+- 0.002	
MN	0.006+- 0.004	
FE	0.061+- 0.008	
NI	0.016+- 0.006	
CU	0.021+- 0.003	
ZN	0.035+- 0.005	
AS	0.043+- 0.082	
BR	0.089+- 0.010	
CD	0.013+- 0.025	
SA	0.070+- 0.135	
PS	0.239+- 0.028	
OC	13.205+- 2.141	
EC	4.230+- 0.884	

AVERAGE MASS 40.2 UG/M3

PORLAND CARUS SITE #6 (BACKGROUND)  
 # OF SAMPLES IN THIS SET 3

SOURCE CONTRIBUTIONS

	UG/M3		PERCENT
RESWD	7.465+- 2.198	3	66.457+-19.564
CDUST	0.000+- 0.000	0	0.000+- 0.000
UDUST	0.000+- 0.000	0	0.000+- 0.000
TRANSP	0.311+- 0.058	3	2.766+- 0.519
RDCIL	0.037+- 0.009	1	0.332+- 0.080
CDUST	0.221+- 0.039	3	1.964+- 0.344
RDUST	0.000+- 0.000	0	0.000+- 0.000
RDUST	0.000+- 0.000	0	0.000+- 0.000
RDUST	0.000+- 0.000	0	0.000+- 0.000
RDUST	0.000+- 0.000	0	0.000+- 0.000
MARINE	0.417+- 0.077	3	3.712+- 0.682
HOGFU	0.000+- 0.000	0	0.000+- 0.000
PARTD	0.000+- 0.000	0	0.000+- 0.000
ALUMP	0.054+- 0.027	1	0.484+- 0.237
KRAFT	0.000+- 0.000	0	0.000+- 0.000
SULFI	0.000+- 0.000	0	0.000+- 0.000
DISOL	0.000+- 0.000	0	0.000+- 0.000
SECS04	1.406+- 0.219	3	12.513+- 1.950
GALVN	0.008+- 0.004	2	0.071+- 0.033

ELEMENTAL CONCENTRATIONS

	UG/M3
NA	0.182+- 0.026
MG	0.042+- 0.061
AL	0.048+- 0.008
SI	0.059+- 0.008
P	0.027+- 0.004
S	0.509+- 0.064
CL	0.070+- 0.013
K	0.078+- 0.011
CA	0.011+- 0.002
TI	0.004+- 0.007
V	0.004+- 0.005
MN	0.003+- 0.001
FE	0.016+- 0.003
NI	0.008+- 0.012
CU	0.017+- 0.003
ZN	0.010+- 0.002
AS	0.025+- 0.049
BR	0.015+- 0.002
CD	0.009+- 0.018
BA	0.089+- 0.179
PB	0.046+- 0.007
OC	3.253+- 0.663
EC	1.570+- 0.370

AVERAGE MASS 11.2 UG/M3

MEDFORD COURTHOUSE SITE #7  
 # OF SAMPLES IN THIS SET 2

SOURCE CONTRIBUTIONS			PERCENT
	UG/M3		
RESWD	57.673+-18.906	2	29.372+- 6.678
CDUST	0.000+- 0.000	0	0.000+- 0.000
UDUST	1.768+- 0.264	2	0.625+- 0.093
TRANSP	4.674+- 0.793	2	1.651+- 0.280
RDOIL	0.242+- 0.087	2	0.086+- 0.031
CDUST	0.000+- 0.000	0	0.000+- 0.000
RDUST	0.000+- 0.000	0	0.000+- 0.000
RDUST	0.000+- 0.000	0	0.000+- 0.000
RDUST	0.000+- 0.000	0	0.000+- 0.000
MARINE	0.000+- 0.000	0	0.000+- 0.000
HOGFU	37.466+- 6.815	2	13.234+- 2.407
PARTD	0.000+- 0.000	0	0.000+- 0.000
ALUMP	0.000+- 0.000	0	0.000+- 0.000
KRAFT	0.000+- 0.000	0	0.000+- 0.000
SULFI	0.000+- 0.000	0	0.000+- 0.000
DISOL	0.000+- 0.000	0	0.000+- 0.000
SECSO4	1.424+- 0.546	1	0.503+- 0.193
GALVN	0.000+- 0.000	0	0.000+- 0.000

ELEMENTAL CONCENTRATIONS  
 UG/M3

HA	6.229+- 0.987
MG	0.197+- 0.041
AL	0.137+- 0.044
SI	0.496+- 0.065
P	0.157+- 0.028
S	2.336+- 0.285
CL	3.233+- 0.376
K	2.988+- 0.340
CA	0.337+- 0.045
TI	0.037+- 0.054
V	0.015+- 0.004
MN	0.051+- 0.008
FE	0.276+- 0.035
NI	0.007+- 0.004
CU	0.043+- 0.008
ZN	0.199+- 0.024
AS	0.189+- 0.379
BR	0.238+- 0.028
CD	0.089+- 0.178
BA	0.509+- 1.018
PB	0.672+- 0.081
OC	24.865+- 5.480
EC	20.110+- 4.150

AVERAGE MASS 283.1 UG/M3

SEATTLE SOUTH PARK DALLAS SITE #8  
 # OF SAMPLES IN THIS SET 2

SOURCE CONTRIBUTIONS			
	UG/M3		PERCENT
RESWD	67.114+-19.816	2	65.863+-19.447
CDUST	0.000+- 0.000	0	0.000+- 0.000
UDUST	0.000+- 0.000	0	0.000+- 0.000
TRANSP	13.674+- 2.561	2	13.419+- 2.514
RDOIL	1.000+- 0.281	2	0.982+- 0.276
CDUST	0.000+- 0.000	0	0.000+- 0.000
RDUST	0.000+- 0.000	0	0.000+- 0.000
RDUST	0.218+- 0.182	1	0.214+- 0.179
RDUST	0.000+- 0.000	0	0.000+- 0.000
RDUST	0.000+- 0.000	0	0.000+- 0.000
MARINE	1.730+- 0.389	2	1.698+- 0.382
HOGFU	0.000+- 0.000	0	0.000+- 0.000
PARTD	0.000+- 0.000	0	0.000+- 0.000
ALUMP	0.000+- 0.000	0	0.000+- 0.000
KRAFT	0.000+- 0.000	0	0.000+- 0.000
SULFI	0.000+- 0.000	0	0.000+- 0.000
DISOL	0.000+- 0.000	0	0.000+- 0.000
SECS04	3.410+- 1.227	1	3.346+- 1.204
GALVN	0.082+- 0.025	1	0.080+- 0.025

ELEMENTAL CONCENTRATIONS  
 UG/M3

NA	0.879+- 0.146
MG	0.977+- 0.424
AL	0.162+- 0.324
SI	0.124+- 0.097
P	0.148+- 0.072
S	3.645+- 0.520
CL	0.808+- 0.151
K	0.631+- 0.092
CA	0.095+- 0.026
TI	0.024+- 0.012
V	0.023+- 0.011
MN	0.055+- 0.014
FE	0.682+- 0.095
HI	0.069+- 0.018
CU	0.064+- 0.017
ZN	0.201+- 0.031
AS	0.036+- 0.072
BR	15.789+- 1.771
CD	0.011+- 0.022
BA	0.125+- 0.122
PB	1.865+- 0.226
OC	43.875+- 6.430
EC	9.200+- 1.900

AVERAGE MASS 101.9 UG/M3

SEATTLE-TACOMA FIRE STATION #12 SITE #9  
 # OF SAMPLES IN THIS SET 4

	SOURCE CONTRIBUTIONS	UG/M3	PERCENT
RESWD	35.239+-25.855	4	74.977+-55.910
CDUST	0.000+- 0.000	0	0.000+- 0.000
UDUST	0.000+- 0.000	0	0.000+- 0.000
TRANSP	2.893+- 0.476	4	6.155+- 1.013
RDOIL	0.400+- 0.082	4	0.852+- 0.174
CDUST	0.000+- 0.000	0	0.000+- 0.000
RDUST	0.000+- 0.000	0	0.000+- 0.000
RDUST	0.885+- 0.129	4	1.883+- 0.274
RDUST	0.000+- 0.000	0	0.000+- 0.000
RDUST	0.000+- 0.000	0	0.000+- 0.000
MARINE	1.012+- 0.225	4	2.154+- 0.480
HOGFU	0.000+- 0.000	0	0.000+- 0.000
PARTD	0.000+- 0.000	0	0.000+- 0.000
ALUMP	0.902+- 0.331	4	1.919+- 0.704
KRAFT	0.000+- 0.000	0	0.000+- 0.000
SULFI	0.000+- 0.000	0	0.000+- 0.000
DISOL	0.000+- 0.000	0	0.000+- 0.000
SECS04	4.243+- 0.823	4	9.029+- 1.752
GALYN	0.049+- 0.023	4	0.104+- 0.048

ELEMENTAL CONCENTRATIONS  
 UG/M3

HA	0.504+- 0.072
MG	0.121+- 0.182
AL	0.356+- 0.043
SI	0.255+- 0.030
P	0.102+- 0.012
S	1.680+- 0.197
CL	0.549+- 0.067
K	0.398+- 0.047
CA	0.054+- 0.008
TI	0.010+- 0.002
V	0.015+- 0.002
MN	0.012+- 0.002
FE	0.303+- 0.036
NI	0.023+- 0.003
CU	0.015+- 0.002
ZN	0.057+- 0.007
AS	0.056+- 0.047
BR	0.136+- 0.016
CD	0.006+- 0.008
BA	0.102+- 0.204
PB	0.397+- 0.046
OC	-1.000+- -1.000
EC	-1.000+- -1.000

AVERAGE MASS 47.0 UG/M3

SEATTLE-GEORGETOWN SITE #10  
 # OF SAMPLES IN THIS SET 3

	SOURCE CONTRIBUTIONS	UG/M3	PERCENT
RESWD	29.109+-20.254	3	73.384+-51.061
CDUST	0.000+- 0.000	0	0.000+- 0.000
UDUST	0.000+- 0.000	0	0.000+- 0.000
TRANSP	4.071+- 0.673	3	10.264+- 1.696
RDOIL	0.355+- 0.071	3	0.895+- 0.178
CDUST	0.000+- 0.000	0	0.000+- 0.000
RDUST	0.000+- 0.000	0	0.000+- 0.000
RDUST	0.858+- 0.115	3	2.163+- 0.289
RDUST	0.000+- 0.000	0	0.000+- 0.000
RDUST	0.000+- 0.000	0	0.000+- 0.000
MARINE	0.532+- 0.126	3	1.342+- 0.318
HOGFU	0.000+- 0.000	0	0.000+- 0.000
PARTD	0.000+- 0.000	0	0.000+- 0.000
ALUMP	0.220+- 0.090	2	0.555+- 0.226
KRAFT	0.000+- 0.000	0	0.000+- 0.000
SULFI	0.000+- 0.000	0	0.000+- 0.000
DISOL	0.000+- 0.000	0	0.000+- 0.000
SECS04	3.857+- 0.888	3	9.724+- 2.238
GALVN	0.085+- 0.022	3	0.213+- 0.056

ELEMENTAL CONCENTRATIONS

	UG/M3
NA	0.263+- 0.038
MG	0.239+- 0.478
AL	0.175+- 0.023
SI	0.254+- 0.029
P	0.104+- 0.012
S	1.556+- 0.183
CL	0.473+- 0.059
K	0.269+- 0.032
CA	0.057+- 0.008
TI	0.011+- 0.002
V	0.012+- 0.002
MN	0.026+- 0.004
FE	0.202+- 0.024
NI	0.021+- 0.003
CU	0.011+- 0.002
ZN	0.084+- 0.010
AS	0.103+- 0.206
BR	0.225+- 0.026
CD	0.002+- 0.001
BA	0.097+- 0.195
PB	0.583+- 0.067
OC	-1.000+- -1.000
EC	-1.000+- -1.000

AVERAGE MASS 39.7 UG/M3

YAKIMA COUNTY COURTHOUSE SITE #11  
 # OF SAMPLES IN THIS SET 4

	SOURCE CONTRIBUTIONS	UG/M <sup>3</sup>	PERCENT
RESWD	50.021+-34.910	4	93.063+-64.949
CDUST	0.000+- 0.000	0	0.000+- 0.000
UDUST	0.000+- 0.000	0	0.000+- 0.000
TRANSP	2.418+- 0.402	4	4.499+- 0.749
RDOIL	0.035+- 0.018	3	0.066+- 0.034
CDUST	0.000+- 0.000	0	0.000+- 0.000
RDUST	0.000+- 0.000	0	0.000+- 0.000
RDUST	0.000+- 0.000	0	0.000+- 0.000
RDUST	1.652+- 0.177	4	3.074+- 0.330
RDUST	0.000+- 0.000	0	0.000+- 0.000
MARINE	0.000+- 0.000	0	0.000+- 0.000
HOGFU	0.000+- 0.000	0	0.000+- 0.000
PARTD	0.000+- 0.000	0	0.000+- 0.000
ALUMP	0.000+- 0.000	0	0.000+- 0.000
KRAFT	0.000+- 0.000	0	0.000+- 0.000
SULFI	0.000+- 0.000	0	0.000+- 0.000
DISOL	0.000+- 0.000	0	0.000+- 0.000
SECS04	2.865+- 0.679	4	5.330+- 1.264
GALYN	0.000+- 0.000	0	0.000+- 0.000

ELEMENTAL CONCENTRATIONS  
 UG/M<sup>3</sup>

NA	0.148+- 0.022
MG	0.035+- 0.015
AL	0.212+- 0.026
SI	0.478+- 0.054
P	0.088+- 0.010
S	1.142+- 0.136
CL	0.587+- 0.070
K	0.291+- 0.034
CA	0.076+- 0.010
TI	0.013+- 0.002
V	0.005+- 0.008
MN	0.005+- 0.001
FE	0.113+- 0.014
HI	0.004+- 0.005
CU	0.007+- 0.001
ZN	0.080+- 0.010
AS	0.083+- 0.165
BR	0.120+- 0.014
CD	0.003+- 0.001
BA	0.098+- 0.197
PB	0.343+- 0.040
OC	-1.000+- -1.000
EC	-1.000+- -1.000

AVERAGE MASS 53.8 UG/M<sup>3</sup>

LONGVIEW CITY SHOPS BUILDING SITE #12  
 # OF SAMPLES IN THIS SET 4

SOURCE CONTRIBUTIONS

	UG/M3		PERCENT
RESWD	25.627+-17.836	4	61.383+-42.722
CDUST	0.000+- 0.000	0	0.000+- 0.000
UDUST	0.000+- 0.000	0	0.000+- 0.000
TRANSP	1.424+- 0.246	4	3.412+- 0.589
RDOIL	0.465+- 0.094	4	1.115+- 0.225
CDUST	0.000+- 0.000	0	0.000+- 0.000
RDUST	0.756+- 0.113	4	1.811+- 0.270
RDUST	0.000+- 0.000	0	0.000+- 0.000
RDUST	0.000+- 0.000	0	0.000+- 0.000
RDUST	0.000+- 0.000	0	0.000+- 0.000
MARINE	0.000+- 0.000	0	0.000+- 0.000
HOGFU	0.000+- 0.000	0	0.000+- 0.000
PARTD	0.000+- 0.000	0	0.000+- 0.000
ALUMP	0.457+- 0.198	4	1.094+- 0.474
KRAFT	4.034+- 0.766	4	9.663+- 1.835
SULFI	0.000+- 0.000	0	0.000+- 0.000
DISOL	0.000+- 0.000	0	0.000+- 0.000
SECS04	2.464+- 0.675	4	5.902+- 1.618
GALVN	0.040+- 0.016	4	0.096+- 0.040

ELEMENTAL CONCENTRATIONS

	UG/M3
NA	0.679+- 0.097
MG	0.157+- 0.245
AL	0.211+- 0.026
SI	0.203+- 0.023
P	0.091+- 0.011
S	1.458+- 0.171
CL	0.615+- 0.073
K	0.265+- 0.032
CA	0.054+- 0.007
TI	0.006+- 0.001
V	0.019+- 0.002
MN	0.013+- 0.002
FE	0.089+- 0.011
NI	0.030+- 0.004
CU	0.064+- 0.008
ZN	0.048+- 0.006
AS	0.066+- 0.132
BR	0.072+- 0.008
CD	0.004+- 0.007
BA	0.067+- 0.130
PB	0.225+- 0.026
OC	-1.000+- -1.000
EC	-1.000+- -1.000

AVERAGE MASS 41.8 UG/M3

SPOKANE COUNTY HALL BUILDING SITE #13  
 # OF SAMPLES IN THIS SET 1

SOURCE CONTRIBUTIONS			PERCENT
	UG/M <sup>3</sup>		
RESWD	34.371+-21.346	1	64.729+-40.200
CDUST	0.000+- 0.000	0	0.000+- 0.000
UDUST	0.000+- 0.000	0	0.000+- 0.000
TRANSP	2.956+- 0.486	1	5.567+- 0.915
RDOIL	0.032+- 0.030	1	0.060+- 0.056
CDUST	0.000+- 0.000	0	0.000+- 0.000
RDUST	0.000+- 0.000	0	0.000+- 0.000
RDUST	0.000+- 0.000	0	0.000+- 0.000
RDUST	0.890+- 0.131	1	1.676+- 0.247
RDUST	0.000+- 0.000	0	0.000+- 0.000
MARIHE	0.000+- 0.000	0	0.000+- 0.000
HOGFU	0.000+- 0.000	0	0.000+- 0.000
PARTD	0.000+- 0.000	0	0.000+- 0.000
ALUMP	0.721+- 0.263	1	1.358+- 0.495
KRAFT	0.000+- 0.000	0	0.000+- 0.000
SULFI	0.000+- 0.000	0	0.000+- 0.000
DISOL	0.000+- 0.000	0	0.000+- 0.000
SECSO4	2.683+- 0.656	1	5.053+- 1.235
GALYN	0.073+- 0.022	1	0.137+- 0.041

ELEMENTAL CONCENTRATIONS  
 UG/M<sup>3</sup>

NA	0.186+- 0.027
MG	0.031+- 0.012
AL	0.304+- 0.036
SI	0.272+- 0.031
P	0.078+- 0.010
S	1.082+- 0.130
CL	0.383+- 0.048
K	0.242+- 0.029
CA	0.030+- 0.005
TI	0.002+- 0.001
V	0.002+- 0.001
MN	0.004+- 0.001
FE	0.104+- 0.013
HI	0.009+- 0.019
CU	0.012+- 0.002
ZN	0.075+- 0.009
AS	0.091+- 0.182
BR	0.164+- 0.019
CD	0.001+- 0.001
BA	0.025+- 0.009
PB	0.421+- 0.048
OC	-1.000+- -1.000
EC	-1.000+- -1.000

AVERAGE MASS 53.1 UG/M<sup>3</sup>

SPOKANE CROWN SITE #14  
 # OF SAMPLES IN THIS SET

4

SOURCE CONTRIBUTIONS			PERCENT
	UG/M3		
RESWD	16.761+-14.953	4	45.300+-40.414
CDUST	0.000+- 0.000	0	0.000+- 0.000
UDUST	0.000+- 0.000	0	0.000+- 0.000
TRANSP	1.735+- 0.291	4	4.689+- 0.787
RDOIL	0.017+- 0.009	2	0.047+- 0.024
CDUST	0.000+- 0.000	0	0.000+- 0.000
RDUST	0.000+- 0.000	0	0.000+- 0.000
RDUST	0.000+- 0.000	0	0.000+- 0.000
RDUST	1.231+- 0.137	4	3.328+- 0.371
RDUST	0.000+- 0.000	0	0.000+- 0.000
MARINE	0.000+- 0.000	0	0.000+- 0.000
HOGFU	0.721+- 0.228	3	1.948+- 0.617
PARTD	0.000+- 0.000	0	0.000+- 0.000
ALUMP	0.482+- 0.173	3	1.303+- 0.468
KRAFT	0.000+- 0.000	0	0.000+- 0.000
SULFI	0.000+- 0.000	0	0.000+- 0.000
DISOL	0.000+- 0.000	0	0.000+- 0.000
SECS04	2.750+- 0.506	4	7.433+- 1.368
GALVN	0.041+- 0.012	4	0.112+- 0.034

ELEMENTAL CONCENTRATIONS  
 UG/M3

HA	0.186+- 0.027
MG	0.090+- 0.125
AL	0.250+- 0.031
SI	0.353+- 0.041
P	0.073+- 0.009
S	1.041+- 0.124
CL	0.427+- 0.052
K	0.213+- 0.026
CA	0.067+- 0.009
TI	0.007+- 0.001
V	0.002+- 0.001
MN	0.006+- 0.001
FE	0.118+- 0.015
NI	0.004+- 0.006
CU	0.020+- 0.003
ZN	0.043+- 0.005
AS	0.070+- 0.140
BR	0.076+- 0.009
CD	0.016+- 0.031
BA	0.057+- 0.097
PB	0.252+- 0.029
OC	-1.000+- -1.000
EC	-1.000+- -1.000

AVERAGE MASS 37.0 UG/M3

SPOKANE - TURNBULL SITE #15  
 # OF SAMPLES IN THIS SET 2

	SOURCE CONTRIBUTIONS		PERCENT	
	UG/M <sup>3</sup>			
RESWD	8.214+-	5.240	2	56.652+- 36.138
CDUST	0.000+-	0.000	0	0.000+- 0.000
UDUST	0.000+-	0.000	0	0.000+- 0.000
TRANSP	0.429+-	0.030	2	2.962+- 0.552
RDOIL	0.000+-	0.000	0	0.000+- 0.000
CDUST	0.000+-	0.000	0	0.000+- 0.000
RDUST	0.000+-	0.000	0	0.000+- 0.000
RDUST	0.000+-	0.000	0	0.000+- 0.000
RDUST	0.351+-	0.050	2	2.421+- 0.348
RDUST	0.000+-	0.000	0	0.000+- 0.000
MARINE	0.000+-	0.000	0	0.000+- 0.000
HOGFU	0.000+-	0.000	0	0.000+- 0.000
PARTD	0.000+-	0.000	0	0.000+- 0.000
ALUMP	0.146+-	0.066	2	1.007+- 0.455
KRAFT	0.000+-	0.000	0	0.000+- 0.000
SULFI	0.000+-	0.000	0	0.000+- 0.000
DISOL	0.000+-	0.000	0	0.000+- 0.000
SECS04	1.905+-	0.285	2	13.141+- 1.969
GALVN	0.000+-	0.000	0	0.000+- 0.000

ELEMENTAL CONCENTRATIONS  
 UG/M<sup>3</sup>

NA	0.046+-	0.007
MG	0.016+-	0.006
AL	0.081+-	0.011
SI	0.109+-	0.013
P	0.033+-	0.004
S	0.663+-	0.081
CL	0.070+-	0.071
K	0.080+-	0.010
CA	0.011+-	0.002
TI	0.002+-	0.001
V	0.007+-	0.013
MN	0.005+-	0.009
FE	0.021+-	0.004
NI	0.008+-	0.017
CU	0.005+-	0.001
ZH	0.034+-	0.004
AS	0.030+-	0.054
BR	0.012+-	0.002
CD	0.008+-	0.014
BA	0.020+-	0.008
PB	0.074+-	0.009
OC	-1.000+-	-1.000
EC	-1.000+-	-1.000

AVERAGE MASS 14.5 UG/M<sup>3</sup>

BOISE FAIRVIEW & LIBERTY STREETS SITE #16  
 # OF SAMPLES IN THIS SET 9

SOURCE CONTRIBUTIONS

	UG/M3		PERCENT
RESWD	84.532+-22.383	9	79.881+-21.152
CDUST	0.000+- 0.000	0	0.000+- 0.000
UDUST	0.000+- 0.000	0	0.000+- 0.000
TRANSP	3.927+- 0.628	9	3.711+- 0.593
RDOIL	0.016+- 0.007	2	0.015+- 0.007
CDUST	0.000+- 0.000	0	0.000+- 0.000
RDUST	0.000+- 0.000	0	0.000+- 0.000
RDUST	0.000+- 0.000	0	0.000+- 0.000
RDUST	0.000+- 0.000	0	0.000+- 0.000
RDUST	17.975+- 1.211	9	16.986+- 1.144
MARINE	0.964+- 0.201	9	0.911+- 0.190
HOGFU	0.000+- 0.000	0	0.000+- 0.000
PARTD	0.000+- 0.000	0	0.000+- 0.000
ALUMP	0.000+- 0.000	0	0.000+- 0.000
KRAFT	0.000+- 0.000	0	0.000+- 0.000
SULFI	0.000+- 0.000	0	0.000+- 0.000
DISOL	0.000+- 0.000	0	0.000+- 0.000
SECS04	3.771+- 1.010	9	3.564+- 0.955
GALYN	0.000+- 0.000	0	0.000+- 0.000

ELEMENTAL CONCENTRATIONS

	UG/M3
NA	0.492+- 0.063
MG	0.219+- 0.086
AL	1.596+- 0.163
SI	5.576+- 0.595
P	0.161+- 0.015
S	1.680+- 0.168
CL	0.327+- 0.037
K	0.556+- 0.052
CA	0.458+- 0.050
TI	0.094+- 0.059
Y	0.014+- 0.028
MN	0.016+- 0.005
FE	0.626+- 0.068
NI	0.008+- 0.013
CU	0.017+- 0.006
ZH	0.054+- 0.006
AS	0.089+- 0.178
BR	0.220+- 0.021
CD	0.014+- 0.023
BA	0.119+- 0.238
PB	0.588+- 0.055
OC	50.968+- 7.784
EC	9.706+- 2.009

AVERAGE MASS 105.8 UG/M3

## **Appendix 5**

**CMB Source Apportionment  
Calculation  
Fine Particle Fraction**



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CMBDER RESULTS FOR CMB # 010004  
 FINE PARTICULATE FRACTION  
 SAMPLING DATE: 81 131 SITE: SITE 1 SITE CODE: 0000001  
 SAMPLING DURATION: 23 HRS. WITH START HOUR: 12  
 BACKGROUND SITE SUBTRACTED: NO  
 EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.689 DEGREES OF FREEDOM: 9  
 CODE SOURCE FLG UG/M3 %

1	RESUD	*	32.735+-7.744	92.273+-23.732
4	TRANS	*	0.861+-0.145	2.427+-0.477
9	RDUST	*	0.770+-0.083	2.170+-0.321
18	SECSO	*	1.740+-0.358	4.905+-1.124

TOTAL: 36.106+-7.754 101.775+-24.150

SPECIE CODE	FIT FLG	MEAS. UG/M3	FINE PERCENT	SUSPENDED PARTICULATE CALC. UG/M3	RATIO
1 HA	*	0.059+-0.009	0.166+-0.030	0.027+-0.015	0.461+-0.281 HA
2 MG		0.019+-0.007	0.054+-0.022	0.046+-0.025	2.379+-3.327 MG
3 AL	*	0.108+-0.015	0.303+-0.051	0.093+-0.009	0.963+-0.110 AL
4 SI	*	0.210+-0.025	0.591+-0.091	0.220+-0.015	1.051+-0.104 SI
5 P		0.049+-0.006	0.139+-0.023	0.002+-0.000	0.047+-0.008 P
6 S	*	0.670+-0.082	1.890+-0.300	0.670+-0.084	1.000+-0.176 S
7 CL	*	0.131+-0.020	0.369+-0.067	0.188+-0.167	1.433+-2.224 CL
8 K	*	0.123+-0.016	0.346+-0.056	0.293+-0.229	2.387+-4.826 K
9 CA		0.015+-0.003	0.041+-0.010	0.038+-0.024	2.611+-4.549 CA
10 TI	*	0.005+-0.001	0.013+-0.004	0.006+-0.003	1.340+-1.169 TI
11 V		0.001+-0.001	0.003+-0.002	0.000+-0.000	0.174+-0.303 V
12 MN		0.001+-0.001	0.003+-0.002	0.002+-0.000	1.848+-0.773 MN
13 FE	*	0.049+-0.007	0.138+-0.025	0.057+-0.016	1.157+-0.490 FE
14 HI		0.001+-0.001	0.004+-0.003	0.000+-0.000	0.062+-0.257 HI
15 CU		0.040+-0.005	0.113+-0.019	0.000+-0.000	0.003+-0.008 CU
16 ZH	*	0.015+-0.002	0.043+-0.008	0.013+-0.012	0.856+-1.044 ZH
17 AS		0.005+-0.005	0.015+-0.014	0.000+-0.000	0.000+-0.061 AS
18 BR	*	0.052+-0.006	0.147+-0.023	0.046+-0.016	0.877+-0.397 BR
19 SR		< 0.028	< 0.078	0.000+-0.000	0.000+-0.000 SR
20 CD		< 0.205	< 0.579	0.000+-0.001	0.000+-0.000 CD
21 PB	*	0.119+-0.015	0.335+-0.054	0.120+-0.018	1.005+-0.212 PB
22 DC	*	14.600+-2.170	41.154+-7.393	15.920+-4.518	1.090+-0.458 DC
23 EC	*	2.160+-0.470	6.089+-1.460	4.415+-2.751	2.044+-2.898 EC

MEAS. AMB MASS (UG/M3): FINE: 35.5+-3.6

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CMBDED RESULTS FOR CMB # 010006  
FINE PARTICULATE FRACTION  
SAMPLING DATE: 81 21 SITE: SITE 1 SITE CODE: 0000001  
SAMPLING DURATION: 23 HRS. WITH START HOUR: 12  
BACKGROUND SITE SUBTRACTED: NO  
EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.484 DEGREES OF FREEDOM: 10  
CODE SOURCE FLG UG/M3 %

-----  
1 RESWD \* 68.119+-16.076 97.312+-24.951  
4 TRAHS \* 1.565+- 0.260 2.236+- 0.434  
9 RDUST \* 0.972+- 0.111 1.388+- 0.211  
18 SECSD \* 1.603+- 0.559 2.290+- 0.831  
-----  
TOTAL: 72.258+-16.089 103.226+-25.205

SPECIE CODE	FIT FLG	MEAS	FINE UG/M3	SUSPENDED PARTICULATE PERCENT	CALC.	UG/M3	RATIO	
1 HA	*	0.055+-	0.010	0.078+-	0.016	0.057+-	0.031	1.034+-0.824 HA
2 MG	*	0.075+-	0.024	0.108+-	0.036	0.081+-	0.051	1.078+-0.996 MG
3 AL	*	0.157+-	0.020	0.224+-	0.036	0.123+-	0.016	0.788+-0.128 AL
4 SI	*	0.263+-	0.031	0.376+-	0.058	0.281+-	0.019	1.067+-0.106 SI
5 P		0.063+-	0.008	0.090+-	0.015	0.003+-	0.001	0.046+-0.012 P
6 S	*	0.718+-	0.088	1.026+-	0.163	0.718+-	0.159	1.000+-0.313 S
7 CL	*	0.210+-	0.028	0.300+-	0.050	0.385+-	0.347	1.833+-3.453 CL
8 K	*	0.196+-	0.024	0.281+-	0.044	0.601+-	0.477	3.059+-7.814 K
9 CA		0.025+-	0.005	0.035+-	0.007	0.072+-	0.048	2.890+-5.862 CA
10 TI	*	0.010+-	0.002	0.014+-	0.003	0.009+-	0.006	0.931+-0.798 TI
11 V		< 0.012		< 0.017		0.000+-	0.001	0.000+-0.000 V
12 MN		0.001+-	0.001	0.001+-	0.001	0.002+-	0.001	2.591+-2.201 MN
13 FE	*	0.046+-	0.007	0.066+-	0.012	0.080+-	0.028	1.737+-1.226 FE
14 HI		< 0.015		< 0.021		0.000+-	0.001	0.000+-0.000 HI
15 CU		0.022+-	0.003	0.031+-	0.006	0.000+-	0.001	0.008+-0.031 CU
16 ZH	*	0.017+-	0.003	0.025+-	0.005	0.027+-	0.025	1.545+-2.669 ZH
17 AS		< 0.132		< 0.188		0.000+-	0.001	0.000+-0.000 AS
18 BR	*	0.094+-	0.011	0.134+-	0.021	0.083+-	0.028	0.587+-0.403 BR
19 SR		< 0.030		< 0.043		0.000+-	0.001	0.000+-0.000 SR
20 CD		< 0.229		< 0.327		0.001+-	0.001	0.000+-0.000 CD
21 PB	*	0.218+-	0.026	0.312+-	0.048	0.217+-	0.032	0.993+-0.209 PB
22 DC	*	36.620+-	5.830	52.314+-	9.841	33.031+-	9.401	0.902+-0.346 DC
23 EC	*	11.670+-	2.410	16.671+-	3.827	9.128+-	5.724	0.782+-0.623 EC

MEAS AMB. MASS (UG/M3): FINE: 70.0+- 7.0

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CMBDEQ RESULTS FOR CMB # 010010  
 FINE PARTICULATE FRACTION  
 SAMPLING DATE: 81 24 SITE: SITE 1 SITE CODE: 0000001  
 SAMPLING DURATION: 24 HRS. WITH START HOUR: 12  
 BACKGROUND SITE SUBTRACTED: NO  
 EFFECTIVE VARIANCE FITTING REDUCED CHI SQUARE: 0.803 DEGREES OF FREEDOM: 9  
 CODE SOURCE FLG UG/M3 %

1	RESWD	*	48.985+-12.264	84.766+-22.863
4	TRANS	*	1.603+-0.270	2.773+-0.544
9	ROUST	*	1.311+-0.167	2.269+-0.368
14	ALUMP	*	0.549+-0.215	0.949+-0.384
18	SECSO	*	5.663+-0.862	9.800+-1.786
19	GALVH	*	0.053+-0.025	0.092+-0.045
TOTAL:			58.164+-12.300	100.651+-23.558

SPECIE CODE	FIT FLG	MEAS. UG/M3	FINE SUSPENDED PARTICULATE		
			PERCENT	CALC. UG/M3	RATIO
1	NA	*	0.125+-0.018	0.216+-0.039	0.506+-0.219 NA
2	MG	*	< 0.308	< 0.533	0.000+-0.000 MG
3	AL	*	0.274+-0.033	0.475+-0.074	1.112+-0.252 AL
4	SI	*	0.395+-0.045	0.684+-0.104	0.956+-0.090 SI
5	P	*	0.101+-0.012	0.175+-0.027	0.004+-0.001 P
6	S	*	2.033+-0.235	3.519+-0.538	1.000+-0.110 S
7	CL	*	0.135+-0.022	0.234+-0.044	2.191+-4.454 CL
8	K	*	0.196+-0.024	0.340+-0.054	2.254+-4.306 K
9	CA	*	0.037+-0.006	0.064+-0.012	1.729+-2.084 CA
10	TI	*	0.010+-0.002	0.018+-0.004	1.093+-0.868 TI
11	V	*	< 0.014	< 0.024	0.000+-0.000 V
12	MN	*	0.004+-0.001	0.007+-0.002	0.844+-0.197 MN
13	FE	*	0.073+-0.010	0.127+-0.021	1.381+-0.677 FE
14	HI	*	< 0.018	< 0.031	0.000+-0.000 HI
15	CU	*	0.040+-0.005	0.070+-0.012	0.012+-0.012 CU
16	ZH	*	0.063+-0.008	0.109+-0.017	1.000+-0.413 ZH
17	AS	*	< 0.138	< 0.239	0.000+-0.000 AS
18	BR	*	0.080+-0.009	0.139+-0.022	1.063+-0.527 BR
19	SR	*	< 0.028	< 0.049	0.000+-0.000 SR
20	CD	*	< 0.248	< 0.429	0.001+-0.001 CD
21	PB	*	0.239+-0.028	0.413+-0.064	0.933+-0.190 PB
22	OC	*	24.010+-3.670	41.548+-7.596	23.993+-6.761 OC
23	EC	*	5.340+-1.110	9.241+-2.133	6.689+-4.118 EC

MEAS AMB MASS (UG/M3): FINE: 57.8+-5.8

CMBDEQ RESULTS FOR CMB # 010012  
 FINE PARTICULATE FRACTION  
 SAMPLING DATE: 31 26 SITE: SITE 1 SITE CODE: 0000001  
 SAMPLING DURATION: 24 HRS. WITH START HOUR: 12  
 BACKGROUND SITE SUBTRACTED: NO  
 EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.502 DEGREES OF FREEDOM: 10  
 CODE SOURCE FLG UG/M3 %

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1	RESWD	*	57.938+-13.621	69.681+-17.806
4	TRANS	*	2.006+-0.334	2.413+-0.469
9	RDUST	*	1.529+-0.161	1.839+-0.267
18	SECSO	*	2.855+-0.639	3.434+-0.842

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TOTAL:	64	328+-13.641	77 366+-18.143
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SPECIE CODE	FIT FLG	MEAS. UG/M3	FINE PERCENT	SUSPENDED PARTICULATE CALC. UG/M3	RATIO
1 HA	*	0.074+-0.011	0.089+-0.016	0.048+-0.027	0.647+-0.427 HA
2 MG	*	0.033+-0.011	0.040+-0.014	0.088+-0.045	2.653+-3.833 MG
3 AL	*	0.217+-0.027	0.261+-0.042	0.183+-0.017	0.844+-0.101 AL
4 SI	*	0.417+-0.048	0.502+-0.076	0.440+-0.030	1.054+-0.104 SI
5 P	*	0.082+-0.010	0.099+-0.016	0.005+-0.001	0.056+-0.009 P
6 S	*	1.132+-0.135	1.361+-0.212	1.132+-0.160	1.000+-0.200 S
7 CL	*	0.311+-0.040	0.375+-0.061	0.344+-0.295	1.104+-1.412 CL
8 K	*	0.267+-0.032	0.321+-0.050	0.522+-0.406	1.955+-3.335 K
9 CA	*	0.041+-0.006	0.050+-0.009	0.074+-0.047	1.803+-2.328 CA
10 TI	*	0.011+-0.002	0.013+-0.003	0.013+-0.007	1.244+-1.125 TI
11 V	*	0.001+-0.001	0.002+-0.001	0.000+-0.001	0.253+-0.410 V
12 MN	*	0.002+-0.001	0.003+-0.001	0.004+-0.001	1.468+-0.475 MN
13 FE	*	0.078+-0.010	0.094+-0.016	0.118+-0.036	1.505+-0.839 FE
14 HI	<	0.020	< 0.025	0.000+-0.001	0.000+-0.000 HI
15 CU	*	0.044+-0.006	0.054+-0.009	0.000+-0.001	0.006+-0.013 CU
16 ZH	*	0.031+-0.004	0.037+-0.006	0.024+-0.022	0.761+-0.869 ZH
17 AS	*	0.019+-0.007	0.022+-0.009	0.000+-0.001	0.000+-0.031 AS
18 BR	*	0.119+-0.014	0.144+-0.022	0.107+-0.036	0.893+-0.407 BR
19 SR	<	0.033	< 0.039	0.000+-0.001	0.000+-0.000 SR
20 CD	<	0.206	< 0.248	0.001+-0.001	0.000+-0.000 CD
21 PB	*	0.287+-0.033	0.346+-0.053	0.278+-0.042	0.969+-0.201 PB
22 OC	*	23.940+-4.260	28.792+-5.879	28.386+-7.997	1.186+-0.518 OC
23 EC	*	10.870+-2.250	13.073+-3.006	7.940+-4.871	0.730+-0.555 EC

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MEAS AMB MASS (UG/M3): FINE: 83.1+-8.3

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CMBDEQ RESULTS FOR CMB # 010016

FINE PARTICULATE FRACTION

SAMPLING DATE: 81 28 SITE: SITE 1 SITE CODE: 0000001

SAMPLING DURATION: 24 HRS WITH START HOUR: 12

BACKGROUND SITE SUBTRACTED: NO

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.820 DEGREES OF FREEDOM: 10  
CODE SOURCE FLG UG/M3 %

1	RESWD	*	26.289+-	6.386	60.711+-	15.960
4	TRANS	*	0.644+-	0.113	1.487+-	0.301
5	RDOIL	*	0.017+-	0.014	0.039+-	0.033
9	RDUST	*	0.633+-	0.091	1.462+-	0.257
14	ALUMP	*	0.266+-	0.110	0.614+-	0.261
13	SECSD	*	4.003+-	0.570	9.243+-	1.611

TOTAL. 31.852+- 6.414 73.556+- 16.555

SPECIE CODE	FIT FLG	MEAS	FINE	SUSPENDED PARTICULATE						
			UG/M3	PERCENT	CALC. UG/M3	RATIO				
1 HA	*	0.046+-	0.007	0.106+-	0.019	0.033+-	0.013	0.724+-	0.347	HA
2 MG		0.024+-	0.008	0.055+-	0.019	0.044+-	0.020	1.833+-	1.773	MG
3 AL	*	0.142+-	0.018	0.329+-	0.053	0.148+-	0.022	1.040+-	0.228	AL
4 SI	*	0.211+-	0.025	0.488+-	0.075	0.182+-	0.012	0.861+-	0.077	SI
5 P		0.069+-	0.009	0.159+-	0.025	0.002+-	0.000	0.028+-	0.005	P
6 S	*	1.402+-	0.164	3.238+-	0.499	1.402+-	0.092	1.000+-	0.092	S
7 CL	*	0.077+-	0.015	0.178+-	0.038	0.153+-	0.134	1.990+-	3.873	CL
8 K	*	0.111+-	0.014	0.255+-	0.042	0.237+-	0.184	2.138+-	3.928	K
9 CA	*	0.020+-	0.004	0.046+-	0.010	0.031+-	0.019	1.582+-	1.765	CA
10 TI	*	0.003+-	0.001	0.006+-	0.002	0.005+-	0.002	1.918+-	2.007	TI
11 V	*	0.001+-	0.001	0.002+-	0.001	0.001+-	0.000	1.128+-	0.593	V
12 MN		0.001+-	0.001	0.003+-	0.002	0.002+-	0.000	1.297+-	0.410	MN
13 FE	*	0.023+-	0.004	0.052+-	0.011	0.047+-	0.012	2.081+-	1.205	FE
14 HI	*	0.002+-	0.001	0.004+-	0.002	0.001+-	0.000	0.864+-	0.316	HI
15 CU		0.028+-	0.004	0.085+-	0.011	0.000+-	0.000	0.009+-	0.010	CU
16 ZH	*	0.013+-	0.002	0.029+-	0.006	0.011+-	0.010	0.833+-	0.999	ZH
17 AS		<	0.094	<	0.218	0.000+-	0.000	0.000+-	0.000	AS
18 BR	*	0.036+-	0.004	0.083+-	0.013	0.034+-	0.012	0.957+-	0.450	BR
19 SR		<	0.029	<	0.068	0.000+-	0.000	0.000+-	0.000	SR
20 CD		<	0.214	<	0.494	0.000+-	0.000	0.000+-	0.000	CD
21 PB	*	0.098+-	0.012	0.227+-	0.037	0.090+-	0.013	0.910+-	0.183	PB
22 OC	*	12.700+-	2.100	29.328+-	5.676	12.783+-	3.628	1.007+-	0.405	OC
23 EC	*	4.490+-	0.940	10.369+-	2.408	3.533+-	2.209	0.787+-	0.626	EC

MEAS AMB MASS (UG/M3): FINE: 43.3+- 4.4

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CMBDEQ RESULTS FOR CMB # 010018  
 FINE PARTICULATE FRACTION  
 SAMPLING DATE: 81 29 SITE: SITE 1 SITE CODE: 0000001  
 SAMPLING DURATION: 23 HRS WITH START HOUR: 12  
 BACKGROUND SITE SUBTRACTED: NO  
 EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.650 DEGREES OF FREEDOM: 9  
 CODE SOURCE FLG UG/M3 %

1	RESWD	*	30.251+-7	430	98.533+-26	175
4	TRANS	*	0.994+-0	168	3.239+-0	638
5	RDOIL	*	0.127+-0	043	0.415+-0	148
9	ROUST	*	0.739+-0	104	2.408+-0	416
14	ALUMP	*	0.390+-0	146	1.272+-0	493
13	SECSO	*	1.557+-0	348	5.073+-1	243
<hr/>						
TOTAL: 34.060+-7.443 110.942+-26.714						

SPECIE CODE	FIT FLG	FINE MEAS.	SUSPENDED PARTICULATE PERCENT	CALC	UG/M3	RATIO
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1	HA	*	0.079+-0	011	0.257+-0	046	0.046+-0	016	0.578+-0	228	HA
2	MG	*	0.020+-0	009	0.065+-0	030	0.055+-0	025	2.782+-3	661	MG
3	AL	*	0.176+-0	022	0.573+-0	092	0.195+-0	032	1.109+-0	275	AL
4	SI	*	0.226+-0	026	0.736+-0	114	0.215+-0	015	0.952+-0	089	SI
5	P	*	0.044+-0	006	0.145+-0	024	0.092+-0	000	0.050+-0	009	P
6	S	*	0.633+-0	078	2.062+-0	329	0.633+-0	082	1.000+-0	184	S
7	CL	*	0.069+-0	013	0.225+-0	049	0.183+-0	0154	2.654+-6	329	CL
8	K	*	0.100+-0	013	0.327+-0	054	0.273+-0	0212	2.720+-6	118	K
9	CA	*	0.022+-0	004	0.072+-0	015	0.041+-0	024	1.851+-2	258	CA
10	TI	*	0.007+-0	002	0.023+-0	006	0.007+-0	004	0.951+-0	720	TI
11	V	*	0.005+-0	001	0.015+-0	004	0.005+-0	001	1.024+-0	309	V
12	MN	*	0.003+-0	001	0.011+-0	004	0.002+-0	000	0.536+-0	112	MN
13	FE	*	0.050+-0	007	0.164+-0	029	0.063+-0	018	1.249+-0	574	FE
14	HI	<	0.017		< 0.054		0.008+-0	002	0.000+-0	000	HI
15	CU	*	0.024+-0	093	0.078+-0	014	0.000+-0	000	0.017+-0	013	CU
16	ZH	*	0.015+-0	002	0.050+-0	009	0.013+-0	011	0.840+-0	959	ZH
17	AS	<	0.110		< 0.358		0.000+-0	000	0.000+-0	000	AS
18	BR	*	0.054+-0	006	0.175+-0	028	0.053+-0	018	0.990+-0	473	BR
19	SR	*	0.002+-0	001	0.008+-0	005	0.000+-0	000	0.040+-0	125	SR
20	CD	<	0.216		< 0.703		0.000+-0	001	0.000+-0	000	CD
21	PB	*	0.143+-0	017	0.466+-0	074	0.138+-0	021	0.967+-0	200	PB
22	OC	*	15.820+-2	390	51.529+-9	369	14.835+-4	176	0.938+-0	362	OC
23	EC	*	3.110+-0	660	10.130+-2	381	4.132+-2	543	1.329+-1	360	EC

MEAS AMB MASS (UG/M3): FINE: 30.7+-3.1

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CMBDEQ RESULTS FOR CMB \* 010020

FINE PARTICULATE FRACTION

SAMPLING DATE: 81 211 SITE: SITE 1 SITE CODE: 0000001

SAMPLING DURATION: 23 HRS WITH START HOUR: 12

BACKGROUND SITE SUBTRACTED: NO

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.529 DEGREES OF FREEDOM: 7  
CODE SOURCE FLG UG/M3 %

1	RESWD	*	19.923+-12.611	33.816+-21.672
4	TRANS	*	2.255+-0.380	3.827+-0.751
9	RDUST	*	2.196+-0.200	3.727+-0.505
18	SECSO	*	1.772+-0.465	3.008+-0.846
19	CALVN	*	0.044+-0.014	0.075+-0.024
<hr/>				
TOTAL:		26.189+-12.627	44.452+-21.891	

SPECIE CODE	FIT FLG	FINE SUSPENDED PARTICULATE			RATIO
		MEAS	UG/M3	PERCENT	
1 NA		0.120+-0.017	0.204+-0.036	0.017+-0.009	0.137+-0.077 HA
2 MG		0.037+-0.011	0.063+-0.020	0.075+-0.022	2.003+-1.340 MG
3 AL	*	0.278+-0.033	0.472+-0.074	0.249+-0.018	0.895+-0.086 AL
4 SI	*	0.601+-0.068	1.020+-0.155	0.628+-0.043	1.044+-0.103 SI
5 P		0.065+-0.008	0.111+-0.018	0.007+-0.001	0.101+-0.011 P
6 S	*	0.717+-0.089	1.218+-0.194	0.717+-0.122	1.000+-0.241 S
7 CL	*	0.181+-0.025	0.307+-0.053	0.157+-0.103	0.868+-0.754 CL
8 K	*	0.193+-0.024	0.328+-0.052	0.205+-0.139	1.064+-1.055 K
9 CA	*	0.040+-0.006	0.068+-0.013	0.057+-0.037	1.437+-1.626 CA
10 TI	*	0.014+-0.002	0.024+-0.005	0.017+-0.008	1.201+-0.930 TI
11 V		0.001+-0.001	0.002+-0.001	0.001+-0.000	0.545+-0.321 V
12 MN	*	0.006+-0.001	0.011+-0.002	0.005+-0.001	0.850+-0.109 MN
13 FE	*	0.101+-0.013	0.172+-0.028	0.158+-0.041	1.555+-0.751 FE
14 NI		< 0.018	< 0.031	0.000+-0.000	0.000+-0.000 NI
15 CU		0.032+-0.004	0.055+-0.009	0.000+-0.000	0.012+-0.008 CU
16 ZN	*	0.046+-0.006	0.077+-0.013	0.046+-0.008	1.000+-0.243 ZN
17 AS		< 0.164	< 0.278	0.000+-0.000	0.000+-0.000 AS
18 BR	*	0.105+-0.012	0.178+-0.027	0.120+-0.041	1.142+-0.590 BR
19 SR		0.002+-0.002	0.001+-0.003	0.000+-0.000	0.185+-0.127 SR
20 CD		< 0.226	< 0.384	0.001+-0.001	0.000+-0.000 CD
21 PB	*	0.350+-0.040	0.595+-0.091	0.313+-0.047	0.895+-0.179 PB
22 OC		-1.000+-1.000	-1.000+-1.000	1.0.435+-2.756	0.895+-0.000 OC
23 EC		-1.000+-1.000	-1.000+-1.000	3.139+-1.688	0.895+-0.000 EC

MEAS AMB MASS (UG/M3): FINE: 58.9+-5.9

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CMBDEQ RESULTS FOR CMB # 010030  
 FINE PARTICULATE FRACTION  
 SAMPLING DATE: 81 227 SITE: SITE 1 SITE CODE: 0000001  
 SAMPLING DURATION: 24 HRS. WITH START HOUR: 12  
 BACKGROUND SITE SUBTRACTED: NO  
 EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.457 DEGREES OF FREEDOM: 10  
 CODE SOURCE FLG UG/M3 %  
 -----  
 1 RESWD \* 50.871+-12.318 79.647+-20.874  
 4 TRANS \* 2.972+- 0.492 4.654+- 0.901  
 9 RDUST \* 1.569+- 0.168 2.456+- 0.360  
 18 SECSD \* 1.022+- 0.593 1.600+- 0.943  
 -----  
 TOTAL: 56.434+-12.343 98.356+-21.259

SPECIE CODE	FIT FLG	MEAS UG/M3	FINE PERCENT	SUSPENDED PARTICULATE CALC UG/M3	RATIO
1 NA	*	0.056+- 0.009	0.087+- 0.017	0.042+- 0.023	0.737+-0.526 HA
2 MG	*	0.033+- 0.014	0.052+- 0.023	0.092+- 0.043	2.770+-3.835 MG
3 AL	*	0.206+- 0.026	0.323+- 0.052	0.188+- 0.016	0.909+-0.107 AL
4 SI	*	0.446+- 0.051	0.699+- 0.106	0.456+- 0.031	1.022+-0.100 SI
5 P	*	0.054+- 0.007	0.084+- 0.014	0.005+- 0.001	0.087+-0.013 P
6 S	*	0.552+- 0.072	0.864+- 0.142	0.552+- 0.180	1.000+-0.460 S
7 CL	*	0.188+- 0.026	0.295+- 0.051	0.331+- 0.260	1.755+-2.789 CL
8 K	*	0.170+- 0.021	0.266+- 0.042	0.462+- 0.356	2.716+-6.063 K
9 CA	*	0.038+- 0.006	0.060+- 0.011	0.081+- 0.055	2.129+-3.404 CA
10 TI	*	0.012+- 0.002	0.020+- 0.004	0.016+- 0.011	1.316+-1.458 TI
11 V	*	0.001+- 0.001	0.001+- 0.001	0.000+- 0.001	0.486+-0.735 V
12 MN	*	0.001+- 0.001	0.002+- 0.001	0.004+- 0.001	2.510+-1.104 MN
13 FE	*	0.074+- 0.010	0.116+- 0.020	0.138+- 0.054	1.860+-1.525 FE
14 HI	*	0.001+- 0.001	0.002+- 0.002	0.000+- 0.001	0.137+-0.442 HI
15 CU	*	0.048+- 0.006	0.076+- 0.012	0.000+- 0.001	0.006+-0.011 CU
16 ZH	*	0.025+- 0.004	0.040+- 0.007	0.022+- 0.019	0.860+-0.983 ZH
17 AS	*	< 0.183	< 0.287	0.000+- 0.001	0.000+-0.000 AS
18 BR	*	0.176+- 0.020	0.276+- 0.042	0.158+- 0.054	0.897+-0.410 BR
19 SR	*	< 0.032	< 0.050	0.000+- 0.001	0.000+-0.000 SR
20 CD	*	< 0.228	< 0.357	0.001+- 0.001	0.000+-0.000 CD
21 PB	*	0.431+- 0.049	0.674+- 0.103	0.412+- 0.062	0.956+-0.198 PB
22 OC	*	30.170+- 4.660	47.236+- 8.698	25.445+- 7.025	0.843+-0.305 OC
23 EC	*	4.840+- 1.010	7.578+- 1.754	7.288+- 4.283	1.506+-1.599 EC

MEAS AMB MASS (UG/M3): FINE: 63.9+- 6.4

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CMBDEQ. RESULTS FOR CMB # 010038  
 FINE PARTICULATE FRACTION  
 SAMPLING DATE: 81 228 SITE: SITE 1 SITE CODE: 0000001  
 SAMPLING DURATION: 23 HRS WITH START HOUR: 12  
 BACKGROUND SITE SUBTRACTED: NO  
 EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.561 DEGREES OF FREEDOM: 9  
 CODE SOURCE FLG UG/M3 %  
 -----  
 1 RESWD \* 55.844+-13.480 87.534+-22.880  
 4 TRANS \* 2.028+- 0.339 3.180+- 0.619  
 9 RDOUST \* 1.347+- 0.188 2.111+- 0.363  
 14 ALUMP \* 0.339+- 0.175 0.531+- 0.279  
 18 SECSD \* 0.804+- 0.499 1.261+- 0.793  
 -----  
 TOTAL: 60.362+-13.496 94.617+-23.184

SPECIE CODE	FIT FLG	MEAS. UG/M3	FINE PERCENT	SUSPENDED PARTICULATE CALC. UG/M3	RATIO
1 HA	*	0 100+- 0.015	0 157+- 0 028	0.060+- 0 026	0.601+-0 307 HA
2 MG	*	0.027+- 0.010	0.042+- 0.017	0.093+- 0 044	3.464+-5.908 MG
3 AL	*	0.243+- 0.029	0 381+- 0 060	0 254+- 0 031	1.047+-0.186 AL
4 SI	*	0.415+- 0.047	0.651+- 0.099	0.390+- 0.026	0.939+-0.087 SI
5 P	*	0.059+- 0.008	0.093+- 0.015	0.004+- 0 001	0.068+-0 012 P
6 S	*	0.456+- 0.061	0.715+- 0 119	0.456+- 0.151	1.000+-0.468 S
7 CL	*	0.281+- 0.036	0.440+- 0 072	0.338+- 0 285	1.203+-1.586 CL
8 K	*	0.218+- 0.026	0.341+- 0.054	0.502+- 0.391	2.306+-4 516 K
9 CA	*	0.026+- 0.005	0.041+- 0.009	0.073+- 0.046	2.785+-5.191 CA
10 TI	*	0.010+- 0.002	0.015+- 0.003	0.013+- 0.008	1.311+-1.296 TI
11 V	*	< 0.013	< 0.021	0.001+- 0 001	0.000+-0 000 V
12 MN	*	0.002+- 0.001	0 003+- 0 001	0.003+- 0.001	2.044+-0.898 MN
13 FE	*	0.074+- 0.010	0 116+- 0 020	0.110+- 0.037	1.487+-0.887 FE
14 HI	*	0.001+- 0.001	0.002+- 0.002	0.001+- 0 001	0.561+-0.523 HI
15 CU	*	0.054+- 0.007	0.084+- 0.014	0.000+- 0 001	0.007+-0.011 CU
16 ZN	*	0.025+- 0.004	0.039+- 0 007	0.023+- 0 021	0.916+-1 125 ZN
17 AS	*	< 0.153	< 0.240	0.000+- 0 001	0.000+-0 000 AS
18 BR	*	0 113+- 0 013	0.177+- 0.027	0.108+- 0 037	0.954+-0.448 BR
19 SR	*	< 0.031	< 0.048	0.000+- 0.001	0.000+-0 000 SR
20 CD	*	< 0.239	< 0.375	0.001+- 0 001	0.000+-0 000 CD
21 PB	*	0.296+- 0.034	0.464+- 0 071	0.281+- 0 042	0.951+-0 196 PB
22 OC	*	29.050+- 4.480	45.536+- 8 376	27.421+- 7 708	0.944+-0.365 OC
23 EC	*	5.400+- 1 120	8 464+- 1 950	7 678+- 4 695	1 422+-1 511 EC

MEAS AMB. MASS (UG/M3): FINE: 63.8+- 6 4

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CMBDER RESULTS FOR CMB # 010044

FINE PARTICULATE FRACTION

SAMPLING DATE: 81 32 SITE: SITE 1 SITE CODE: 0000001

SAMPLING DURATION: 23 HRS. WITH START HOUR: 14

BACKGROUND SITE SUBTRACTED: NO

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.313 DEGREES OF FREEDOM: 3

CODE SOURCE FLG UG/M3 %

1	RESWD	*	58.760+-16.238	85.323+-25.101
4	TRANS	*	2.402+- 0.402	3.489+- 0.682
9	RDUST	*	1.859+- 0.241	2.700+- 0.444
11	MARIN	*	0.161+- 0.096	0.233+- 0.141
14	ALUMP	*	0.421+- 0.236	0.611+- 0.348
18	SECSO	*	1.859+- 0.621	2.699+- 0.942
19	GALYN	*	0.044+- 0.030	0.065+- 0.044

TOTAL: 65.507+-16.258 95.119+-25.485

SPECIE CODE	FIT FLG	MEAS. UG/M3	FINE	SUSPENDED PARTICULATE		RATIO
			PERCENT	CALC UG/M3		

1	HA	*	0.128+- 0.019	0.186+- 0.034	0.130+- 0.029	1.014+-0.318	HA
2	MG	*	0.051+- 0.019	0.074+- 0.029	0.118+- 0.047	2.309+-2.326	MG
3	AL	*	0.335+- 0.042	0.487+- 0.079	0.334+- 0.039	0.996+-0.162	AL
4	SI	*	0.545+- 0.063	0.792+- 0.122	0.536+- 0.036	0.982+-0.094	SI
5	P	*	0.086+- 0.012	0.125+- 0.021	0.066+- 0.001	0.965+-0.910	P
6	S	*	0.833+- 0.110	1.209+- 0.201	0.833+- 0.170	1.000+-0.289	S
7	CL	*	0.623+- 0.079	0.904+- 0.147	0.427+- 0.300	0.686+-0.584	CL
8	K	*	0.253+- 0.032	0.368+- 0.060	0.537+- 0.411	2.121+-3.808	K
9	CA	*	0.047+- 0.009	0.069+- 0.014	0.086+- 0.051	1.820+-2.257	CA
10	TI	*	0.013+- 0.003	0.019+- 0.005	0.016+- 0.009	1.209+-1.055	TI
11	V	*	0.002+- 0.001	0.003+- 0.002	0.001+- 0.001	0.332+-0.302	V
12	MN	*	0.005+- 0.002	0.007+- 0.003	0.005+- 0.001	0.920+-0.198	MN
13	FE	*	0.123+- 0.017	0.179+- 0.031	0.145+- 0.044	1.171+-0.544	FE
14	HI	<	0.007	< 0.010	0.001+- 0.001	0.622+-0.519	HI
15	CU	*	0.055+- 0.008	0.081+- 0.014	0.001+- 0.001	0.009+-0.011	CU
16	ZM	*	0.060+- 0.008	0.087+- 0.015	0.060+- 0.022	1.000+-0.515	ZM
17	RS	<	0.050	< 0.073	0.000+- 0.001	0.000+-0.083	RS
18	BR	*	0.135+- 0.016	0.196+- 0.031	0.128+- 0.043	0.951+-0.445	BR
19	SR	<	0.029	< 0.043	0.000+- 0.001	0.000+-0.000	SR
20	CD	<	0.222	< 0.323	0.001+- 0.001	0.000+-0.000	CD
21	PB	*	0.340+- 0.041	0.494+- 0.077	0.334+- 0.050	0.980+-0.205	PB
22	DC	*	34.870+- 5.340	50.633+- 9.287	28.973+- 8.112	0.831+-0.302	DC
23	EC	*	5.230+- 1.090	7.594+- 1.759	8.149+- 4.941	1.558+-1.749	EC

MEAS. AMB MASS (UG/M3): FINE: 68.9+- 7.0

CMBDEQ RESULTS FOR CMB # 010050  
 FINE PARTICULATE FRACTION  
 SAMPLING DATE: 81 33 SITE: SITE 1 SITE CODE: 0000001  
 SAMPLING DURATION: 23 HRS. WITH START HOUR: 14  
 BACKGROUND SITE SUBTRACTED: NO  
 EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.819 DEGREES OF FREEDOM: 8  
 CODE SOURCE FLG UG/M3 %

1	RESWD	*	26.414+-	7.354	73.561+-	21.848.
4	TRANS	*	1.261+-	0.218	3.511+-	0.707
5	RDOIL	*	0.082+-	0.034	0.228+-	0.097
9	RDUST	*	1.191+-	0.129	3.316+-	0.497
11	MARIN	*	0.149+-	0.050	0.415+-	0.146
18	SECSO	*	1.363+-	0.356	3.801+-	1.066

TOTAL: 30.461+- 7.368 84.832+- 22.314

SPECIE CODE	FIT FLG	MEAS.	FINE UG/M3	SUSPENDED PARTICULATE PERCENT	CALC. UG/M3	RATIO
1 NA	*	0.087+-	0.013	0.243+- 0.045	0.084+- 0.014	0.967+- 0.217 NA
2 MG	*	0.036+-	0.013	0.101+- 0.038	0.059+- 0.022	1.643+- 1.152 MG
3 AL	*	0.184+-	0.026	0.513+- 0.089	0.139+- 0.011	0.753+- 0.073 AL
4 SI	*	0.317+-	0.038	0.883+- 0.140	0.341+- 0.023	1.076+- 0.107 SI
5 P	*	0.048+-	0.008	0.135+- 0.026	0.004+- 0.000	0.074+- 0.010 P
6 S	*	0.568+-	0.079	1.582+- 0.275	0.568+- 0.085	1.000+- 0.212 S
7 CL	*	0.096+-	0.020	0.268+- 0.062	0.225+- 0.136	2.339+- 3.586 CL
8 K	*	0.144+-	0.020	0.401+- 0.069	0.248+- 0.185	1.720+- 2.553 K
9 CA	*	0.036+-	0.007	0.101+- 0.022	0.045+- 0.025	1.255+- 1.119 CA
10 TI	*	0.007+-	0.002	0.021+- 0.007	0.009+- 0.005	1.269+- 1.026 TI
11 V	<	0.012	< 0.034	0.003+- 0.001	0.000+- 0.000	V
12 MH	<	0.018	< 0.050	0.003+- 0.000	0.000+- 0.000	MH
13 FE	*	0.058+-	0.010	0.162+- 0.032	0.089+- 0.023	1.528+- 0.724 FE
14 HI	*	0.005+-	0.001	0.013+- 0.004	0.005+- 0.001	0.983+- 0.314 HI
15 CU	*	0.039+-	0.006	0.110+- 0.020	0.000+- 0.000	0.007+- 0.007 CU
16 ZH	*	0.023+-	0.004	0.063+- 0.012	0.012+- 0.010	0.511+- 0.489 ZH
17 AS	*	0.016+-	0.009	0.044+- 0.025	0.000+- 0.000	0.000+- 0.017 AS
18 BR	*	0.071+-	0.009	0.197+- 0.032	0.067+- 0.023	0.953+- 0.446 BR
19 SR	*	0.005+-	0.002	0.014+- 0.007	0.000+- 0.000	0.032+- 0.058 SR
20 CD	<	0.159	< 0.444	0.001+- 0.001	0.000+- 0.000	CD
21 PB	*	0.186+-	0.024	0.517+- 0.085	0.175+- 0.026	0.945+- 0.193 PB
22 DC	*	15.910+-	2.420	44.309+- 8.149	13.098+- 3.647	0.823+- 0.297 DC
23 EC	*	3.060+-	0.650	8.522+- 2.013	3.710+- 2.222	1.212+- 1.141 EC

MEAS AMB MASS (UG/M3): FINE: 35.9+- 3.7

## CMBDEQ RESULTS FOR CMB # 010054

## FINE PARTICULATE FRACTION

SAMPLING DATE: 81 36 SITE: SITE 1 SITE CODE: 0000001

SAMPLING DURATION: 24 HRS WITH START HOUR: 16

BACKGROUND SITE SUBTRACTED: NO

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.558 DEGREES OF FREEDOM: 9  
CODE SOURCE FLG UG/M3 %

1	RESWD	*	40.746+-	9.968	121.730+-	32.614
4	TRANS	*	1.333+-	0.230	3.981+-	0.814
5	RDOIL	*	0.060+-	0.032	0.180+-	0.096
9	RDUST	*	0.911+-	0.133	2.723+-	0.496
14	ALUMP	*	0.372+-	0.160	1.111+-	0.493
18	SECSO	*	0.677+-	0.371	2.024+-	1.129

TOTAL: 44.099+- 9.980 131.749+- 33.106

SPECIE CODE	FIT FLG	MEAS.	FINE UG/M3	SUSPENDED PARTICULATE PERCENT	CALC. UG/M3	RATIO
1 HA	*	0.081+-	0.012	0.241+-	0.045	0.051+- 0.020 0.633+- 0.290 HA
2 MG	*	0.029+-	0.012	0.086+-	0.037	0.069+- 0.032 2.391+- 2.901 MG
3 AL	*	0.198+-	0.027	0.592+-	0.103	0.211+- 0.032 1.068+- 0.234 AL
4 SI	*	0.282+-	0.034	0.842+-	0.137	0.265+- 0.013 0.939+- 0.087 SI
5 P	*	0.038+-	0.007	0.113+-	0.024	0.003+- 0.000 0.072+- 0.013 P
6 S	*	0.366+-	0.058	1.095+-	0.212	0.366+- 0.105 1.000+- 0.407 S
7 CL	*	0.057+-	0.019	0.289+-	0.066	0.245+- 0.008 2.528+- 5.832 CL
8 K	*	0.129+-	0.018	0.384+-	0.068	0.365+- 0.085 2.842+- 6.682 K
9 CA	*	0.033+-	0.006	0.097+-	0.021	0.052+- 0.032 1.605+- 1.857 CA
10 TI	*	0.007+-	0.002	0.021+-	0.007	0.009+- 0.005 1.234+- 1.142 TI
11 V	<	0.005		< 0.014		0.003+- 0.001 1.334+- 0.551 V
12 MN	<	0.017		< 0.052		0.002+- 0.000 0.000+- 0.000 MN
13 FE	*	0.051+-	0.009	0.153+-	0.032	0.076+- 0.024 1.492+- 0.848 FE
14 HI	*	0.004+-	0.001	0.012+-	0.004	0.004+- 0.001 1.007+- 0.318 HI
15 CU	*	0.043+-	0.006	0.129+-	0.023	0.000+- 0.000 0.009+- 0.010 CU
16 ZH	*	0.018+-	0.003	0.053+-	0.011	0.017+- 0.015 0.956+- 1.189 ZH
17 AS	<	0.082		< 0.244		0.000+- 0.000 0.000+- 0.095 AS
18 BR	*	0.072+-	0.009	0.217+-	0.036	0.071+- 0.024 0.980+- 0.466 BR
19 SR	*	0.003+-	0.002	0.009+-	0.007	0.000+- 0.000 0.040+- 0.135 SR
20 CD	<	0.170		< 0.509		0.000+- 0.001 0.000+- 0.000 CD
21 PB	*	0.195+-	0.025	0.583+-	0.098	0.185+- 0.028 0.948+- 0.195 PB
22 OC	*	22.640+-	3.440	67.638+-	12.656	19.958+- 5.624 0.882+- 0.331 OC
23 EC	*	3.770+-	0.790	11.263+-	2.661	5.564+- 3.425 1.476+- 1.620 EC

MEAS. AMB MASS (UG/M3): FINE: 33.5+- 3.7

## CMBDEQ RESULTS FOR CMB # 010058

## FINE PARTICULATE FRACTION

SAMPLING DATE: 81 37 SITE: SITE 1 SITE CODE: 0000001

SAMPLING DURATION: 23 HRS WITH START HOUR: 16

BACKGROUND SITE SUBTRACTED: NO

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.417 DEGREES OF FREEDOM: 9  
CODE SOURCE FLG UG/M3 %

1	RESID	*	23.504+- 6.266	72.267+- 20.744
4	TRANS	*	0.789+- 0.141	2.426+- 0.505
5	RDOIL	*	0.023+- 0.019	0.070+- 0.060
9	RDUST	*	0.639+- 0.093	1.964+- 0.354
11	MARIN	*	0.135+- 0.054	0.414+- 0.172
14	ALUMP	*	0.411+- 0.162	1.264+- 0.517
19	SECSO	*	1.987+- 0.367	6.110+- 1.303
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TOTAL:		27.487+- 6.282	84.515+- 21.304	

SPECIE CODE	FIT FLG	FINE SUSPENDED PARTICULATE			CALC UG/M3	RATIO
		MEAS	UG/M3	PERCENT		

1	NA	*	0.095+- 0.014	0.293+- 0.054	0.091+- 0.014	0.956+- 0.203	NA
2	MG		0.036+- 0.013	0.109+- 0.042	0.054+- 0.020	1.512+- 1.001	MG
3	AL	*	0.188+- 0.026	0.578+- 0.101	0.187+- 0.034	0.997+- 0.252	AL
4	SI	*	0.190+- 0.024	0.584+- 0.096	0.185+- 0.013	0.974+- 0.092	SI
5	P		0.042+- 0.007	0.129+- 0.026	0.002+- 0.000	0.046+- 0.007	P
6	S	*	0.745+- 0.098	2.291+- 0.388	0.745+- 0.070	1.000+- 0.133	S
7	CL	*	0.066+- 0.017	0.202+- 0.055	0.198+- 0.121	3.017+- 5.833	CL
8	K	*	0.115+- 0.016	0.352+- 0.063	0.215+- 0.165	1.875+- 3.051	K
9	CA	*	0.025+- 0.005	0.076+- 0.018	0.034+- 0.019	1.363+- 1.278	CA
10	TI	*	0.003+- 0.002	0.010+- 0.005	0.006+- 0.003	1.788+- 1.945	TI
11	V	*	0.002+- 0.001	0.006+- 0.004	0.001+- 0.000	0.633+- 0.207	V
12	MN		< 0.019	< 0.059	0.002+- 0.000	0.000+- 0.000	MN
13	FE	*	0.047+- 0.009	0.144+- 0.031	0.051+- 0.014	1.089+- 0.455	FE
14	HI	*	0.002+- 0.001	0.006+- 0.003	0.002+- 0.001	1.148+- 0.428	HI
15	CU		0.042+- 0.006	0.129+- 0.024	0.000+- 0.000	0.007+- 0.006	CU
16	ZH	*	0.017+- 0.003	0.052+- 0.011	0.010+- 0.009	0.576+- 0.596	ZH
17	AS		< 0.077	< 0.239	0.000+- 0.000	0.000+- 0.000	AS
18	BR	*	0.043+- 0.006	0.131+- 0.023	0.042+- 0.014	0.995+- 0.473	BR
19	SR		< 0.010	< 0.031	0.000+- 0.000	0.028+- 0.079	SR
20	CD		< 0.181	< 0.557	0.000+- 0.000	0.000+- 0.000	CD
21	PB	*	0.114+- 0.016	0.352+- 0.062	0.110+- 0.016	0.958+- 0.198	PB
22	OC	*	13.770+- 2.100	42.339+- 7.873	11.532+- 3.244	0.837+- 0.307	OC
23	EC	*	2.690+- 0.570	8.271+- 1.961	3.215+- 1.976	1.195+- 1.144	EC

MEAS AMB MASS (UG/M3): FINE: 32.5+- 3.5

## CMBDEQ RESULTS FOR CMB # 010196

FINE PARTICULATE FRACTION  
 SAMPLING DATE: 81 38 SITE: SITE 1 SITE CODE: 0000001  
 SAMPLING DURATION: 23 HRS. WITH START HOUR: 17  
 BACKGROUND SITE SUBTRACTED: NO  
 EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.498 DEGREES OF FREEDOM: 5  
 CODE SOURCE FLG UG/M3 %

1	RESWD	*	62.773+-15.224	87.760+-23.153
4	TRANS	*	1.747+-0.297	2.443+-0.487
9	RDUST	*	1.246+-0.177	1.743+-0.306
14	ALUMP	*	0.330+-0.177	0.461+-0.252
18	SECSO	*	1.553+-0.559	2.171+-0.813
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TOTAL:			67.649+-15.239	94.577+-23.460

SPECIE CODE	FIT FLG	FINE SUSPENDED PARTICULATE			RATIO
		MEAS.	UG/M3	PERCENT	
1 HA	*	0.096+-	0.015	0.134+- 0.025	0.066+- 0.029 0.685+-0.372 HA
2 MG	*	0.029+-	0.015	0.041+- 0.022	0.093+- 0.048 3.185+-5.472 MG
3 AL	*	0.235+-	0.031	0.328+- 0.055	0.242+- 0.031 1.030+-0.189 AL
4 SI	*	0.379+-	0.045	0.530+- 0.084	0.360+- 0.024 0.949+-0.089 SI
5 P	*	0.067+-	0.010	0.094+- 0.017	0.004+- 0.001 0.055+-0.011 P
6 S	*	0.704+-	0.096	0.985+- 0.169	0.704+- 0.155 1.000+-0.311 S
7 CL	*	0.238+-	0.035	0.333+- 0.060	0.366+- 0.020 1.537+-2.460 CL
8 K	*	0.202+-	0.026	0.282+- 0.047	0.560+- 0.039 2.771+-6.409 K
9 CA	*	0.032+-	0.006	0.045+- 0.010	0.073+- 0.006 2.297+-3.632 CA
10 TI	*	0.012+-	0.003	0.017+- 0.005	0.011+- 0.007 0.899+-0.701 TI
11 V		<	0.015	< 0.021	0.001+- 0.001 0.000+-0.000 V
12 MN		<	0.007	< 0.010	0.003+- 0.001 2.752+-1.822 MN
13 FE	*	0.066+-	0.011	0.093+- 0.018	0.100+- 0.032 1.502+-0.861 FE
14 HI	*	0.002+-	0.001	0.003+- 0.001	0.001+- 0.001 0.329+-0.318 HI
15 CU	*	0.049+-	0.007	0.068+- 0.012	0.000+- 0.001 0.008+-0.013 CU
16 ZH	*	0.026+-	0.004	0.037+- 0.007	0.025+- 0.023 0.961+-1.232 ZH
17 AS	*	0.010+-	0.009	0.014+- 0.013	0.000+- 0.001 0.000+-0.061 AS
18 BR	*	0.102+-	0.012	0.143+- 0.023	0.093+- 0.032 0.912+-0.420 BR
19 SR		<	0.029	< 0.040	0.000+- 0.001 0.000+-0.000 SR
20 CD		<	0.204	< 0.286	0.001+- 0.001 0.000+-0.000 CD
21 PB	*	0.247+-	0.031	0.345+- 0.056	0.242+- 0.036 0.981+-0.205 PB
22 OC	*	36.760+-	5.590	51.393+- 9.464	30.591+- 8.664 0.832+-0.307 OC
23 EC	*	5.010+-	1.040	7.004+- 1.626	8.491+- 5.276 1.695+-2.072 EC

MEAS AMB MASS (UG/M3): FINE: 71.5+-7.4

CMBDEQ RESULTS FOR CMB # 010199  
 FINE PARTICULATE FRACTION  
 SAMPLING DATE: 81 310 SITE: SITE 1 SITE CODE: 0000001  
 SAMPLING DURATION: 22 HRS. WITH START HOUR: 17  
 BACKGROUND SITE SUBTRACTED: NO.  
 EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.517 DEGREES OF FREEDOM: 11  
 CODE SOURCE FLC UC/M3 %

1	RESWD	*	65.303+-15.556	86.484+-22.436
4	TRANS	*	1.968+- 0.335	2.606+- 0.519
5	RDOIL	*	0.089+- 0.033	0.117+- 0.046
9	RDUST	*	1.760+- 0.189	2.331+- 0.347
18	SECSO	*	1.053+- 0.562	1.394+- 0.758
		TOTAL:	70.172+-15.571	92.932+-22.725

SPECIE CODE	FIT FLC	FINE SUSPENDED PARTICULATE			
		MEAS. UG/M3	PERCENT	CALC. UG/M3	RATIO
1 HA	*	0.079+- 0.013	0.105+- 0.020	0.057+- 0.030	0.723+-0.468 HA
2 MG	*	0.053+- 0.019	0.070+- 0.026	0.097+- 0.050	1.831+-1.961 MG
3 AL	*	0.250+- 0.033	0.331+- 0.055	0.211+- 0.019	0.843+-0.100 AL
4 SI	*	0.487+- 0.057	0.645+- 0.100	0.505+- 0.034	1.037+-0.102 SI
5 P	*	0.065+- 0.010	0.086+- 0.016	0.005+- 0.001	0.081+-0.013 P
6 S	*	0.362+- 0.081	0.744+- 0.132	0.562+- 0.164	1.000+-0.413 S
7 CL	*	0.243+- 0.036	0.322+- 0.058	0.381+- 0.333	1.567+-2.546 CL
8 K	*	0.208+- 0.027	0.276+- 0.046	0.589+- 0.457	2.825+-6.571 K
9 CA	*	0.051+- 0.008	0.068+- 0.013	0.082+- 0.050	1.602+-1.828 CA
10 TI	*	0.013+- 0.003	0.017+- 0.004	0.014+- 0.007	1.099+-0.846 TI
11 V	*	0.002+- 0.002	0.003+- 0.002	0.003+- 0.001	1.583+-0.804 V
12 MN	*	< 0.020	< 0.027	0.004+- 0.001	0.000+-0.000 MN
13 FE	*	0.088+- 0.013	0.117+- 0.021	0.132+- 0.036	1.493+-0.729 FE
14 HI	*	0.006+- 0.002	0.008+- 0.003	0.005+- 0.001	0.795+-0.260 HI
15 CU	*	0.053+- 0.007	0.070+- 0.012	0.000+- 0.001	0.007+-0.013 CU
16 ZH	*	0.028+- 0.004	0.037+- 0.007	0.027+- 0.024	0.963+-1.210 ZH
17 AS	*	< 0.030	< 0.040	0.000+- 0.001	0.000+-0.065 AS
18 BR	*	0.107+- 0.013	0.142+- 0.023	0.105+- 0.036	0.976+-0.464 BR
19 SR	*	0.006+- 0.003	0.008+- 0.004	0.000+- 0.001	0.040+-0.115 SR
20 CD	*	< 0.081	< 0.107	0.001+- 0.001	0.070+-0.098 CD
21 PB	*	0.288+- 0.035	0.382+- 0.061	0.274+- 0.041	0.948+-0.195 PB
22 OC	*	37.440+- 5.760	49.583+- 9.173	31.876+- 9.013	0.851+-0.316 OC
23 EC	*	5.280+- 1.100	6.993+- 1.624	8.873+- 5.489	1.680+-2.033 EC

MEAS AMB. MASS (UG/M3): FINE: 75.5+- 7.8

## CMBDEQ RESULTS FOR CMB # 010032

FINE PARTICULATE FRACTION  
 SAMPLING DATE: 81 204 SITE: SITE 2 SITE CODE: 0000002  
 SAMPLING DURATION: 24 HRS. WITH START HOUR: 12  
 BACKGROUND SITE SUBTRACTED: NO  
 EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 1 205 DEGREES OF FREEDOM: 6  
 CODE SOURCE FLG UG/M3 %

1	RESWD	*	8.305+-	2.258	97 496+-28.733
4	TRANS	*	0.174+-	0.037	2.038+- 0.488
9	RDUST	*	0.347+-	0.039	4.076+- 0.649
18	SECSO	*	2.304+-	0.315	27.050+- 4.808
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TOTAL: 11 130+- 2.280 130 660+-30.621					

SPECIE CODE	FIT FLG	FINE SUSPENDED PARTICULATE				RATIO
		MEAS	UG/M3	PERCENT	CALC. UG/M3	
1 MA	*	0.030+-	0.005	0.350+-	0.069	0.231+-0.132 HA
2 MG		<	0.091	<	1.071	0.000+-0.000 MG
3 AL	*	0.058+-	0.009	0.683+-	0.132	0.691+-0.066 AL
4 SI	*	0.094+-	0.012	1.101+-	0.187	1.046+-0.104 SI
5 P		0.039+-	0.005	0.455+-	0.081	0.027+-0.004 P
6 S	*	0.784+-	0.094	9.199+-	1.523	1.000+-0.078 S
7 CL		<	0.131	<	1.543	0.000+-0.000 CL
8 K	*	0.048+-	0.007	0.560+-	0.105	1.610+-2.310 K
9 CA	*	0.014+-	0.003	0.164+-	0.039	0.740+-0.504 CA
10 TI		0.001+-	0.001	0.012+-	0.009	2.092+-1.538 TI
11 V		<	0.012	<	0.143	0.000+-0.000 V
12 MN		0.002+-	0.001	0.026+-	0.010	0.379+-0.056 MN
13 FE	*	0.015+-	0.003	0.173+-	0.046	1.466+-0.407 FE
14 HI		0.001+-	0.001	0.016+-	0.010	0.026+-0.065 HI
15 CU		0.003+-	0.001	0.038+-	0.016	0.020+-0.028 CU
16 ZH		0.025+-	0.003	0.291+-	0.053	0.134+-0.125 ZH
17 AS		<	0.060	<	0.701	0.000+-0.000 AS
18 BR	*	0.007+-	0.001	0.080+-	0.018	1.359+-0.780 BR
19 SR		<	0.026	<	0.309	0.000+-0.000 SR
20 CD		0.011+-	0.008	0.128+-	0.099	0.017+-0.022 CD
21 PB	*	0.029+-	0.005	0.337+-	0.071	0.848+-0.164 PB
22 OC	*	3.790+-	0.600	44.491+-	8.675	1.061+-0.441 OC
23 EC	*	1.280+-	0.290	15.026+-	3.810	0.866+-0.721 EC

MEAS AMB MASS (UG/M3): FIHE: 8.5+-1.0

CMBDEQ RESULTS FOR CMB # 010034  
 FINE PARTICULATE FRACTION  
 SAMPLING DATE: 81 206 SITE: SITE 2 - SITE CODE: 0000002  
 SAMPLING DURATION: 23 HRS. WITH START HOUR: 12  
 BACKGROUND SITE SUBTRACTED: NO  
 EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 2.282 DEGREES OF FREEDOM: 3  
 CODE SOURCE FLC UG/M3 %

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1	RESWD	*	4.865+-	3.162	76.710+-	50.756
9	RDUST	*	0.274+-	0.030	4.325+-	0.711
18	SECSO	*	1.971+-	0.266	31.071+-	5.693

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TOTAL:	7.110+-	3.174	112.106+-	51.927
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SPECIE	FIT	MEAS.	FINE UG/M3	SUSPENDED PARTICULATE PERCENT	CALC. UG/M3	RATIO
CODE	FLC					

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1	HA	*	0.023+-	0.003	0.359+-	0.071	0.004+-	0.002	0.177+-	0.100	HA
2	MG	*	0.007+-	0.003	0.107+-	0.055	0.009+-	0.004	1.275+-	0.852	MG
3	AL	*	0.051+-	0.008	0.806+-	0.162	0.031+-	0.002	0.611+-	0.054	AL
4	SI	*	0.070+-	0.009	1.110+-	0.200	0.077+-	0.005	1.090+-	0.112	SI
5	P	*	0.033+-	0.005	0.520+-	0.098	0.001+-	0.000	0.025+-	0.003	P
6	S	*	0.660+-	0.080	10.409+-	1.808	0.660+-	0.035	1.000+-	0.075	S
7	CL	*	<	0.127	<	2.004	0.025+-	0.025	0.000+-	0.000	CL
8	K	*	0.035+-	0.006	0.557+-	0.113	0.046+-	0.034	1.305+-	1.587	K
9	CA	*	0.006+-	0.002	0.091+-	0.031	0.005+-	0.003	0.938+-	0.692	CA
10	TI	*	<	0.020	<	0.514	0.001+-	0.000	0.000+-	0.000	TI
11	V	*	0.001+-	0.001	0.011+-	0.010	0.000+-	0.000	0.097+-	0.083	V
12	MH	*	0.001+-	0.001	0.014+-	0.011	0.001+-	0.000	0.732+-	0.109	MH
13	FE	*	0.012+-	0.003	0.183+-	0.052	0.014+-	0.001	1.249+-	0.142	FE
14	NI	*	<	0.019	<	0.293	0.000+-	0.000	0.000+-	0.000	NI
15	CU	*	0.005+-	0.001	0.077+-	0.023	0.000+-	0.000	0.010+-	0.012	CU
16	ZN	*	0.006+-	0.001	0.096+-	0.024	0.002+-	0.002	0.307+-	0.309	ZN
17	AS	*	0.006+-	0.002	0.093+-	0.038	0.000+-	0.000	0.000+-	0.009	AS
18	BR	*	<	0.020	<	0.314	0.000+-	0.000	0.000+-	0.000	BR
19	SR	*	0.002+-	0.001	0.036+-	0.023	0.000+-	0.000	0.016+-	0.026	SR
20	CD	*	<	0.180	<	2.835	0.000+-	0.000	0.000+-	0.000	CD
21	PB	*	0.003+-	0.003	0.054+-	0.052	0.000+-	0.000	0.086+-	0.025	PB
22	DC	*	<	0.320	<	5.045	2.311+-	0.671	\$23110+-	\$1551	DC
23	EC	*	<	0.130	<	2.061	0.623+-	0.409	5.662+-	\$21.3	EC

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MEAS. AMB. MASS (UG/M3): FINE: 6.3+-0.8

CMBDEQ RESULTS FOR CMB # 010040  
 FINE PARTICULATE FRACTION  
 SAMPLING DATE: 81 301 SITE: SITE 2 SITE CODE: 0000002  
 SAMPLING DURATION: 24 HRS. WITH START HOUR: 12  
 BACKGROUND SITE SUBTRACTED: NO  
 EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 1 555 DEGREES OF FREEDOM: 6  
 CODE SOURCE FLG UG/M3 %

1	RESWD	*	4.830+-	1.373	93.987+-29	564
4	TRANS	*	0.140+-	0.032	2.730+-	0.715
9	ROUST	*	0.266+-	0.032	5.183+-	0.936
18	SECSO	*	0.666+-	0.111	12.957+-	2.783
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	TOTAL:		5.902+-	1.378	114.857+-30	960

SPECIE CODE	FIT FLG	MEAS.	FINE UG/M3	SUSPENDED PARTICULATE PERCENT	CALC UG/M3	RATIO				
1 HA		0.021+-	0.004	0.407+-	0.089	0.004+-	0.002	0.192+-	0.108	HA
2 MG		<	0.089	<	1.730	0.010+-	0.004	0.000+-	0.060	MG
3 AL	*	0.041+-	0.007	0.808+-	0.180	0.031+-	0.002	0.736+-	0.069	AL
4 SI	*	0.079+-	0.010	1.537+-	0.287	0.075+-	0.005	0.954+-	0.090	SI
5 P		0.012+-	0.003	0.232+-	0.059	0.001+-	0.000	0.067+-	0.008	P
6 S	*	0.235+-	0.023	4.573+-	0.887	0.235+-	0.016	1.000+-	0.099	S
7 CL		<	0.121	<	2.351	0.028+-	0.025	0.000+-	0.000	CL
8 K	*	0.020+-	0.004	0.393+-	0.093	0.046+-	0.034	2.260+-	4.137	K
9 CA	*	0.007+-	0.002	0.136+-	0.045	0.007+-	0.004	0.999+-	0.733	CA
10 TI		0.002+-	0.001	0.037+-	0.018	0.002+-	0.001	0.857+-	0.369	TI
11 V		<	0.011	<	0.212	0.000+-	0.000	0.000+-	0.000	V
12 MN		0.001+-	0.001	0.023+-	0.016	0.001+-	0.000	0.533+-	0.071	MN
13 FE	*	0.009+-	0.003	0.167+-	0.061	0.017+-	0.003	1.937+-	0.685	FE
14 HI		<	0.010	<	0.200	0.000+-	0.000	0.000+-	0.000	HI
15 CU		0.007+-	0.002	0.132+-	0.036	0.000+-	0.000	0.007+-	0.008	CU
16 ZH		0.009+-	0.002	0.185+-	0.041	0.002+-	0.002	0.209+-	0.193	ZH
17 AS		<	0.057	<	1.111	0.000+-	0.000	0.000+-	0.000	AS
18 BR	*	0.005+-	0.001	0.091+-	0.023	0.007+-	0.003	1.588+-	1.014	BR
19 SR		<	0.027	<	0.525	0.000+-	0.000	0.000+-	0.000	SR
20 CD		<	0.154	<	2.999	0.000+-	0.000	0.000+-	0.000	CD
21 PB	*	0.026+-	0.005	0.514+-	0.116	0.020+-	0.003	0.744+-	0.137	PB
22 OC	*	2.540+-	0.430	49.427+-	10.690	2.355+-	0.667	0.927+-	0.358	OC
23 EC	*	0.680+-	0.180	13.232+-	3.930	0.655+-	0.406	0.963+-	0.829	EC

MEAS AMB MASS (UG/M3): FINE: 5.1+- 0.7

## CMBDEQ RESULTS FOR CMB # 010062

## FINE PARTICULATE FRACTION

SAMPLING DATE: 81 206 SITE: SITE 3 SITE CODE: 0000003

SAMPLING DURATION: 24 HRS. WITH START HOUR: 7

BACKGROUND SITE SUBTRACTED: NO

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 1 378 DEGREES OF FREEDOM: 7  
CODE SOURCE FLC UG/M3 %

1	RESWD	*	37.372+-10.931	81.117+-25.086
4	TRANS	*	5.659+- 0.965	12.284+- 2.431
5	RDOIL	*	0.057+- 0.022	0.125+- 0.049
8	ROUST	*	0.846+- 0.107	1.836+- 0.296
11	MARIN	*	0.698+- 0.141	1.516+- 0.341
18	SECSO	*	2.628+- 1.004	5.703+- 2.253
19.	GALVN	*	0.255+- 0.039	0.552+- 0.102
TOTAL:			47.515+-11.020	103.133+-26.068

SPECIE CODE	FIT FLC	MEAS. UG/M3	FINE SUSPENDED PARTICULATE		
			PERCENT	CALC. UG/M3	RATIO
1	NA	*	0.313+- 0.045	0.679+- 0.119	0.312+- 0.033 0.999+-0.148 NA
2	MG	*	0.028+- 0.013	0.060+- 0.029	0.120+- 0.050 4.328+-8.055 MG
3	AL	*	0.149+- 0.019	0.324+- 0.053	0.110+- 0.012 0.738+-0.102 AL
4	SI	*	0.232+- 0.027	0.504+- 0.077	0.265+- 0.020 1.143+-0.128 SI
5	P	*	0.083+- 0.010	0.181+- 0.029	0.003+- 0.000 0.034+-0.006 P
6	S	*	1.191+- 0.148	2.585+- 0.413	1.191+- 0.294 1.000+-0.349 S
7	CL	*	0.088+- 0.018	0.192+- 0.044	0.603+- 0.207 6.811+-16.1 CL
8	K	*	0.251+- 0.030	0.544+- 0.085	0.357+- 0.262 1.345+-1.749 K
9	CA	*	0.053+- 0.007	0.114+- 0.020	0.105+- 0.091 2.077+-3.969 CA
10	TI	*	0.009+- 0.002	0.020+- 0.005	0.022+- 0.021 2.433+-6.122 TI
11	V	*	0.002+- 0.001	0.004+- 0.002	0.002+- 0.001 1.282+-0.523 V
12	MN	*	0.010+- 0.002	0.021+- 0.004	0.001+- 0.000 0.126+-0.041 MN
13	FE	*	0.209+- 0.025	0.454+- 0.071	0.149+- 0.101 0.710+-0.594 FE
14	HI	*	0.004+- 0.001	0.008+- 0.003	0.003+- 0.001 0.810+-0.268 HI
15	CU	*	0.017+- 0.003	0.037+- 0.007	0.000+- 0.000 0.007+-0.023 CU
16	ZH	*	0.224+- 0.026	0.486+- 0.074	0.224+- 0.018 1.000+-0.113 ZH
17	AS	<	0.274	< 0.595	0.000+- 0.000 0.000+-0.000 AS
18	BR	*	0.130+- 0.015	0.283+- 0.043	0.302+- 0.102 2.323+-1.990 BR
19	SR	*	0.003+- 0.002	0.006+- 0.004	0.000+- 0.000 0.065+-0.143 SR
20	CD	*	0.061+- 0.014	0.132+- 0.033	0.000+- 0.001 0.005+-0.010 CD
21	PB	*	0.947+- 0.107	2.056+- 0.311	0.782+- 0.117 0.825+-0.160 PB
22	OC	*	17.850+- 3.190	38.744+- 7.943	20.198+- 5.180 1.132+-0.438 OC
23	EC	*	8.930+- 1.850	19.383+- 4.463	6.262+- 3.186 0.701+-0.436 EC

MEAS AMB MASS (UG/M3): FINE: 46.1+- 4.6

## CMBDEQ RESULTS FOR CMB # 010064

FINE PARTICULATE FRACTION

SAMPLING DATE: 81 207 SITE: SITE 3 SITE CODE: 0000003

SAMPLING DURATION: 21 HRS WITH START HOUR: ?

BACKGROUND SITE SUBTRACTED: NO

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 1.253 DEGREES OF FREEDOM: 7  
CODE SOURCE FLG UG/M3 %

1	RESWD	*	48.880+-13.835	96.847+-29.090
4	TRANS	*	2.946+-0.501	5.837+-1.153
5	RDOIL	*	0.066+-0.023	0.130+-0.048
8	RDUST	*	0.691+-0.086	1.369+-0.218
11	MARIN	*	0.418+-0.110	0.827+-0.233
18	SECSO	*	2.436+-0.672	4.827+-1.413
19	GALVN	*	0.081+-0.027	0.161+-0.056
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TOTAL: 55.517+-13.861 109.998+-29.607				

SPECIE CODE	FIT FLG	MEAS	FINE UG/M3	SUSPENDED PARTICULATE		
				PERCENT	CALC.	UG/M3 RATIO
1 HA	*	0.220+-0.032	0.436+-0.077	0.210+-0.028	0.953+-0.176	HA
2 MG	*	0.016+-0.011	0.032+-0.022	0.090+-0.042	5.654+-15.1	MG
3 AL	*	0.130+-0.018	0.258+-0.044	0.092+-0.012	0.703+-0.110	AL
4 SI	*	0.184+-0.022	0.365+-0.057	0.207+-0.014	1.122+-0.113	SI
5 P	*	0.071+-0.009	0.140+-0.023	0.062+-0.001	0.033+-0.008	P
6 S	*	1.034+-0.125	2.048+-0.323	1.034+-0.180	1.000+-0.247	S
7 CL	*	0.127+-0.021	0.252+-0.048	0.485+-0.253	3.821+-7.878	CL
8 K	*	0.246+-0.030	0.488+-0.077	0.431+-0.342	1.751+-2.800	K
9 CA	*	0.024+-0.004	0.047+-0.010	0.080+-0.054	3.350+-0.940	CA
10 TI	*	0.003+-0.001	0.006+-0.003	0.013+-0.011	4.478+-0.178	TI
11 V	*	0.002+-0.001	0.005+-0.002	0.003+-0.001	1.052+-0.422	V
12 MH	*	0.003+-0.001	0.007+-0.002	0.001+-0.001	0.303+-0.154	MH
13 FE	*	0.070+-0.010	0.138+-0.024	0.091+-0.053	1.301+-1.239	FE
14 HI	*	0.004+-0.001	0.007+-0.003	0.004+-0.001	0.949+-0.347	HI
15 CU	*	0.007+-0.002	0.015+-0.004	0.000+-0.000	0.014+-0.066	CU
16 ZN	*	0.086+-0.010	0.171+-0.027	0.086+-0.019	1.000+-0.304	ZN
17 AS	<	0.176	< 0.349	0.000+-0.000	0.000+-0.000	AS
18 BR	*	0.112+-0.013	0.222+-0.034	0.158+-0.053	1.406+-0.821	BR
19 SR	<	0.027	< 0.053	0.000+-0.000	0.000+-0.000	SR
20 CD	*	0.018+-0.010	0.037+-0.021	0.000+-0.001	0.015+-0.034	CD
21 PB	*	0.459+-0.053	0.910+-0.139	0.407+-0.061	0.887+-0.178	PB
22 OC	*	23.430+-4.240	46.423+-9.610	24.495+-6.750	1.045+-0.417	OC
23 EC	*	12.020+-2.490	23.916+-5.484	7.026+-4.116	0.585+-0.397	EC

MEAS AMB MASS (UG/M3): FINE: 50.5+-5.1

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CMBDER RESULTS FOR CMB # 010066  
 FINE PARTICULATE FRACTION

SAMPLING DATE: 81 208 SITE: SITE 3 SITE CODE: 0000003

SAMPLING DURATION: 23 HRS. WITH START HOUR: 7

BACKGROUND SITE SUBTRACTED: NO

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 1 434 DEGREES OF FREEDOM: 7  
 CODE SOURCE FLG UG/M3 %

1	RESWD	*	38.395+-10.833	86.045+-25.773
4	TRANS	*	1.811+- 0.307	4.059+- 0.799
5	RDOIL	*	0.041+- 0.016	0.093+- 0.038
8	RDUST	*	0.545+- 0.067	1.221+- 0.193
11	MARIN	*	0.633+- 0.131	1.418+- 0.325
18	SECSO	*	3.389+- 0.612	7.595+- 1.571
19	GALVH	*	0.048+- 0.020	0.107+- 0.047
<hr/>				
TOTAL: 44.863+-10.856 100 538+-26.345				

SPECIE CODE	FIT FLG	MEAS.	FINE SUSPENDED PARTICULATE			RATIO
			UG/M3	PERCENT	CALC. UG/M3	
1 HA	*	0.287+- 0.041	0.642+- 0.113	0.286+- 0.031	0.999+-0.152	HA
2 MG	*	0.018+- 0.010	0.040+- 0.023	0.081+- 0.032	4.573+-8.361	MG
3 AL	*	0.117+- 0.016	0.262+- 0.044	0.071+- 0.009	0.612+-0.090	AL
4 SI	*	0.140+- 0.017	0.314+- 0.049	0.160+- 0.010	1.143+-0.114	SI
5 P	*	0.077+- 0.009	0.173+- 0.027	0.002+- 0.000	0.024+-0.005	P
6 S	*	1.288+- 0.152	2.886+- 0.447	1.288+- 0.132	1.000+-0.145	S
7 CL	*	0.061+- 0.014	0.136+- 0.034	0.491+- 0.206	8.105+-127.7	CL
8 K	*	0.243+- 0.029	0.544+- 0.085	0.343+- 0.269	1.413+-1.916	K
9 CA	*	0.017+- 0.004	0.038+- 0.009	0.061+- 0.036	3.596+-7.979	CA
10 TI	*	0.003+- 0.001	0.007+- 0.003	0.008+- 0.007	2.575+-5.797	TI
11 V	*	0.002+- 0.001	0.004+- 0.002	0.002+- 0.000	0.862+-0.346	V
12 MH	*	0.002+- 0.001	0.004+- 0.002	0.001+- 0.000	0.404+-0.212	MH
13 FE	*	0.044+- 0.007	0.098+- 0.018	0.062+- 0.032	1.411+-1.279	FE
14 NI	*	0.002+- 0.001	0.004+- 0.002	0.002+- 0.001	1.110+-0.473	NI
15 CU	*	0.005+- 0.002	0.012+- 0.004	0.000+- 0.000	0.014+-0.070	CU
16 ZH	*	0.054+- 0.007	0.122+- 0.020	0.054+- 0.014	1.000+-0.374	ZH
17 AS	*	< 0.148	< 0.332	0.000+- 0.000	0.000+-0.000	AS
18 BR	*	0.079+- 0.009	0.177+- 0.027	0.098+- 0.033	1.237+-0.661	BR
19 SR	*	< 0.027	< 0.061	0.000+- 0.000	0.000+-0.000	SR
20 CD	*	0.012+- 0.009	0.028+- 0.020	0.000+- 0.000	0.017+-0.039	CD
21 PB	*	0.279+- 0.033	0.626+- 0.096	0.251+- 0.037	0.897+-0.180	PB
22 OC	*	15.410+- 2.860	34.534+- 7.290	19.023+- 5.301	1.234+-0.546	OC
23 EC	*	8.790+- 1.820	19.699+- 4.534	5.388+- 3.230	0.613+-0.431	EC

MEAS AMB MASS (UG/M3): FINE: 44.6+-4.5

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CMBDER RESULTS FOR CMB # 010068.

FINE PARTICULATE FRACTION

SAMPLING DATE: 81 209 SITE: SITE 3 SITE CODE: 0000063

SAMPLING DURATION: 23 HRS. WITH START HOUR: 7

BACKGROUND SITE SUBTRACTED: NO

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.855 DEGREES OF FREEDOM: 7

CODE SOURCE FLG UG/M3 %

1	RESWD	*	24.148+- 6.857	62.487+-18.826
4	TRANS	*	1.801+- 0.301	4.659+- 0.910
5	RDOIL	*	0.088+- 0.024	0.229+- 0.066
8	RDUST	*	0.673+- 0.078	1.742+- 0.267
11	MARIN	*	0.455+- 0.092	1.178+- 0.266
18	SECSO	*	2.773+- 0.514	7.175+- 1.513
19	GALYH	*	0.025+- 0.013	0.065+- 0.034

TOTAL. 29.963+- 6.884 77.535+-19.450

SPECIE CODE	FIT FLG	MEAS	FINE SUSPENDED PARTICULATE		
			UG/M3	PERCENT	CALC. UG/M3

1	HA	*	0.205+- 0.029	0.531+- 0.093	0.205+- 0.021	1.000+-0.147	HA
2	MG	*	0.011+- 0.009	0.027+- 0.022	0.064+- 0.023	5.997+-12.9	MG
3	AL	*	0.117+- 0.016	0.302+- 0.052	0.083+- 0.007	0.710+-0.077	AL
4	SI	*	0.175+- 0.021	0.454+- 0.071	0.195+- 0.013	1.115+-0.108	SI
5	P	*	0.066+- 0.008	0.171+- 0.028	0.002+- 0.000	0.034+-0.005	P
6	S	*	1.059+- 0.126	2.740+- 0.428	1.059+- 0.112	1.000+-0.150	S
7	CL	*	0.109+- 0.018	0.283+- 0.055	0.347+- 0.132	3.176+-4.012	CL
8	K	*	0.192+- 0.023	0.498+- 0.079	0.219+- 0.169	1.140+-1.333	K
9	CA	*	0.012+- 0.003	0.031+- 0.009	0.051+- 0.031	4.201+-11.2	CA
10	TI	*	0.004+- 0.001	0.011+- 0.004	0.009+- 0.007	2.005+-3.397	TI
11	V	*	0.003+- 0.001	0.009+- 0.003	0.003+- 0.001	1.002+-0.305	V
12	MH	*	0.003+- 0.001	0.008+- 0.002	0.001+- 0.000	0.338+-0.092	MH
13	FE	*	0.041+- 0.006	0.106+- 0.019	0.070+- 0.032	1.700+-1.558	FE
14	HI	*	0.005+- 0.001	0.012+- 0.004	0.005+- 0.001	0.988+-0.322	HI
15	CU	*	0.007+- 0.002	0.018+- 0.005	0.000+- 0.000	0.018+-0.036	CU
16	ZH	*	0.031+- 0.004	0.081+- 0.014	0.031+- 0.009	1.000+-0.412	ZH
17	AS	<	0.145	< 0.375	0.000+- 0.000	0.000+-0.000	AS
18	BR	*	0.100+- 0.012	0.258+- 0.040	0.097+- 0.033	0.971+-0.456	BR
19	SR	<	0.029	< 0.075	0.000+- 0.000	0.000+-0.000	SR
20	CD	<	0.184	< 0.475	0.000+- 0.000	0.000+-0.000	CD
21	PB	*	0.263+- 0.031	0.680+- 0.105	0.249+- 0.037	0.949+-0.196	PB
22	OC	*	10.980+- 1.860	28.413+- 5.600	12.256+- 3.336	1.116+-0.455	OC
23	EC	*	4.690+- 0.980	12.136+- 2.815	3.561+- 2.036	0.759+-0.545	EC

MEAS. AMB MASS (UG/M3): FINE: 38.6+- 3.9

CMBDEQ RESULTS FOR CMB # 010070  
 FINE PARTICULATE FRACTION  
 SAMPLING DATE: 81 210 SITE: SITE 3 SITE CODE: 0000003  
 SAMPLING DURATION: 23 HRS WITH START HOUR: 7  
 BACKGROUND SITE SUBTRACTED: NO  
 EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.412 DEGREES OF FREEDOM: 6  
 CODE SOURCE FLG UG/M3 %

1	RESWD	*	25.031+-7.090	80.928+-24.340
4	TRANS	*	1.407+-0.236	4.550+-0.890
5	RDOIL	*	0.039+-0.019	0.125+-0.064
8	RDUST	*	0.708+-0.079	2.290+-0.345
11	MARIN	*	0.096+-0.040	0.311+-0.135
18	SECSO	*	1.628+-0.369	5.264+-1.306
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TOTAL: 28.909+-7.104 93.467+-24.837				

SPECIE CODE	FIT FLG	MEAS	FINE	SUSPENDED PARTICULATE	CALC	UG/M3	RATIO
			UG/M3	PERCENT			
1 HA	*	0.061+-0.009	0.196+-0.035	0.061+-0.012	0.000+-0.284	HA	
2 MG	*	0.014+-0.006	0.045+-0.020	0.044+-0.021	3.192+-5.114	MG	
3 AL	*	0.100+-0.014	0.323+-0.056	0.086+-0.007	0.863+-0.099	AL	
4 SI	*	0.194+-0.023	0.628+-0.098	0.202+-0.013	1.041+-0.097	SI	
5 P	*	0.054+-0.007	0.174+-0.028	0.002+-0.000	0.044+-0.006	P	
6 S	*	0.649+-0.080	2.098+-0.335	0.649+-0.090	1.000+-0.196	S	
7 CL	*	0.055+-0.012	0.177+-0.043	0.199+-0.128	3.634+-8.820	CL	
8 K	*	0.198+-0.024	0.641+-0.101	0.222+-0.175	1.119+-1.326	K	
9 CA	*	0.025+-0.004	0.080+-0.016	0.041+-0.026	1.666+-2.075	CA	
10 TI	*	0.003+-0.001	0.010+-0.004	0.008+-0.005	2.471+-4.489	TI	
11 V	<	0.012	< 0.038	0.002+-0.000	0.000+-0.000	V	
12 MH	*	0.001+-0.001	0.003+-0.002	0.001+-0.000	1.159+-0.461	MH	
13 FE	*	0.041+-0.006	0.131+-0.024	0.063+-0.025	1.540+-1.144	FE	
14 NI	*	0.002+-0.001	0.007+-0.003	0.002+-0.001	0.989+-0.356	NI	
15 CU	*	0.003+-0.001	0.010+-0.004	0.000+-0.000	0.027+-0.080	CU	
16 ZH	*	0.018+-0.003	0.058+-0.011	0.011+-0.009	0.614+-0.613	ZH	
17 AS	*	0.012+-0.006	0.040+-0.020	0.000+-0.000	0.000+-0.020	AS	
18 BR	*	0.081+-0.009	0.263+-0.041	0.075+-0.025	0.923+-0.426	BR	
19 SR	<	0.026	< 0.083	0.000+-0.000	0.000+-0.000	SR	
20 CD	<	0.168	< 0.542	0.000+-0.000	0.000+-0.000	CD	
21 PB	*	0.202+-0.024	0.654+-0.102	0.195+-0.029	0.964+-0.200	PB	
22 DC	*	11.870+-1.960	38.377+-7.431	12.500+-3.456	1.053+-0.423	DC	
23 EC	*	4.160+-0.370	13.450+-3.124	3.572+-2.107	0.959+-0.668	EC	

MEAS AMB MASS (UG/M3): FINE: 30.9+-3.1

CMBDEQ RESULTS FOR CMB # 010153  
 FINE PARTICULATE FRACTION  
 SAMPLING DATE: 81 301 SITE: SITE 3 SITE CODE: 0000003  
 SAMPLING DURATION: 23 HRS WITH START HOUR: 7  
 BACKGROUND SITE SUBTRACTED: NO  
 EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 1.047 DEGREES OF FREEDOM: 7  
 CODE SOURCE FLG UG/M3 %

1	RESWD	*	28.893+- 8.084	85.028+-25.292
4	TRANS	*	1 341+- 0.228	3.947+- 0.780
5	RDOIL	*	0 123+- 0.030	0.361+- 0.095
8	RDUST	*	0 738+- 0.083	2.171+- 0.327
11	MARIH	*	0 355+- 0.080	1.045+- 0.258
18	SECSO	*	1 950+- 0.408	5.738+- 1.333
19	GALVN	*	0.027+- 0.015	0.080+- 0.045
TOTAL:			33 427+- 8.099	98.369+-25 819

SPECIE CODE	FIT FLG	MEAS. UG/M3	FINE PERCENT	SUSPENDED PARTICULATE CALC. UG/M3	RATIO
1 NA	*	0.170+- 0.024	0 501+- 0 088	0.170+- 0 020	1.000+-0 162 NA
2 MG	*	0 011+- 0.009	0.033+- 0.027	0 059+- 0.024	5.231+-11 2 MG
3 AL	*	0.124+- 0.017	0 366+- 0.062	0 091+- 0 008	0 728+-0 081 AL
4 SI	*	0.191+- 0.023	0.563+- 0 087	0.211+- 0 013	1.102+-0 105 SI
5 P	*	0.051+- 0.007	0 150+- 0 025	0.002+- 0 000	0 048+-0 007 P
6 S	*	0.779+- 0.095	2.294+- 0 362	0.779+- 0 094	1.000+-0 171 S
7 CL	*	0 093+- 0.016	0.275+- 0.055	0.321+- 0 152	3.431+-5 797 CL
8 K	*	0 218+- 0.026	0.641+- 0.101	0.259+- 0 202	1 189+-1 442 K
9 CA	*	0.014+- 0.003	0.042+- 0 011	0.048+- 0 027	3.404+-6.769 CA
10 TI	*	0 008+- 0.002	0.024+- 0 006	0 008+- 0 005	0 936+-0 832 TI
11 V	*	0.005+- 0.001	0.016+- 0 004	0.005+- 0 001	0 836+-0 234 V
12 MN	*	0 001+- 0.001	0.004+- 0 002	0.001+- 0 000	0 803+-0 283 MN
13 FE	*	0.025+- 0.005	0.074+- 0 016	0.065+- 0 024	2.611+-2 701 FE
14 HI	*	0 006+- 0.001	0 017+- 0 004	0 007+- 0 002	1 135+-0 395 HI
15 CU	*	0.002+- 0.001	0.007+- 0 004	0 000+- 0 000	0 063+-0 123 CU
16 ZH	*	0.034+- 0.005	0 101+- 0 017	0 034+- 0 011	1 000+-0 445 ZH
17 AS	*	< 0.127	< 0.374	0 000+- 0 000	0 000+-0 000 AS
18 BR	*	0 066+- 0.008	0.194+- 0 030	0 072+- 0 024	1 095+-0 547 BR
19 SR	*	< 0.029	< 0 085	0 000+- 0 000	0 000+-0 000 SR
20 CD	*	< 0 183	< 0 539	0 000+- 0 000	0 000+-0 000 CD
21 PB	*	0 203+- 0 024	0 597+- 0 093	0 186+- 0 028	0 916+-0 195 PB
22 OC	*	13 840+- 2.160	40.729+- 7 571	14 315+- 3 989	1 034+-0 415 OC
23 EC	*	3 990+- 0 830	11 742+- 2.715	4 049+- 2 430	1 015+-0 868 EC

MEAS AMB MASS (UG/M3): FINE: 34.0+- 3 4 .

CMBDEQ RESULTS FOR CMB # 010155  
 FINE PARTICULATE FRACTION  
 SAMPLING DATE: 81 302 SITE: SITE 3 SITE CODE: 0000003  
 SAMPLING DURATION: 23 HRS. WITH START HOUR: 7  
 BACKGROUND SITE SUBTRACTED: NO  
 EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.956 DEGREES OF FREEDOM: 7  
 CODE SOURCE FLG UG/M3 %

1	RESWD	*	22.358+-	6.352	76.179+-	22.977
4	TRANS	*	1.954+-	0.328	6.656+-	1.306
5	RDOIL	*	0.123+-	0.030	0.420+-	0.110
8	RDUST	*	1.033+-	0.108	3.521+-	0.513
11	MARIN	*	0.410+-	0.084	1.395+-	0.319
18	SECSO	*	5.529+-	0.818	18.840+-	3.376
19	GALVN	*	0.041+-	0.013	0.139+-	0.047
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TOTAL:			31.448+-	6.415	107.151+-	24.401

SPECIE CODE	FIT FLG	MEAS. UG/M3	FINE SUSPENDED PARTICULATE			
			PERCENT	CALC. UG/M3	RATIO	
1	NA	*	0.187+- 0.027	0.637+- 0.112	0.187+- 0.019	0.999+- 0.147 NA
2	MG	*	< 0.200	< 0.681	0.066+- 0.022	0.000+- 0.000 MG
3	AL	*	0.169+- 0.021	0.577+- 0.093	0.123+- 0.009	0.726+- 0.067 AL
4	SI	*	0.252+- 0.029	0.858+- 0.132	0.295+- 0.019	1.173+- 0.116 SI
5	P	*	0.097+- 0.012	0.330+- 0.052	0.063+- 0.000	0.036+- 0.004 P
6	S	*	1.976+- 0.229	6.732+- 1.035	1.976+- 0.142	1.000+- 0.102 S
7	CL	*	< 0.235	< 0.801	0.324+- 0.122	0.000+- 0.000 CL
8	K	*	0.164+- 0.020	0.560+- 0.089	0.206+- 0.057	1.253+- 1.527 K
9	CA	*	0.027+- 0.005	0.093+- 0.018	0.054+- 0.033	1.994+- 2.709 CA
10	TI	*	0.008+- 0.002	0.028+- 0.006	0.011+- 0.007	1.350+- 1.502 TI
11	V	*	0.005+- 0.001	0.016+- 0.004	0.005+- 0.001	0.969+- 0.278 V
12	MN	*	0.007+- 0.001	0.026+- 0.005	0.002+- 0.000	0.207+- 0.037 MN
13	FE	*	0.102+- 0.013	0.349+- 0.057	0.091+- 0.035	0.892+- 0.460 FE
14	HI	*	0.006+- 0.001	0.022+- 0.006	0.007+- 0.002	1.033+- 0.340 HI
15	CU	*	0.014+- 0.002	0.048+- 0.010	0.000+- 0.000	0.012+- 0.017 CU
16	ZH	*	0.044+- 0.006	0.149+- 0.024	0.044+- 0.009	1.000+- 0.279 ZH
17	AS	*	0.054+- 0.010	0.185+- 0.038	0.000+- 0.000	0.000+- 0.004 AS
18	BR	*	0.080+- 0.009	0.272+- 0.042	0.105+- 0.035	1.313+- 0.731 BR
19	SR	*	< 0.028	< 0.096	0.000+- 0.000	0.000+- 0.000 SR
20	CD	*	< 0.164	< 0.560	0.000+- 0.001	0.000+- 0.000 CD
21	PB	*	0.295+- 0.034	1.004+- 0.155	0.271+- 0.040	0.919+- 0.126 PB
22	DC	*	10.840+- 1.720	36.935+- 6.952	11.475+- 3.090	1.059+- 0.415 DC
23	EC	*	4.180+- 0.870	14.242+- 3.296	3.372+- 1.887	0.807+- 0.580 EC

MEAS AMB MASS (UG/M3): FINE: 29.3+-3.0

## CMBDEQ RESULTS FOR CMB # 010157

FINE PARTICULATE FRACTION

SAMPLING DATE: 81 305 SITE: SITE 3 SITE CODE: 0000003

SAMPLING DURATION: 14 HRS WITH START HOUR: 16

BACKGROUND SITE SUBTRACTED: NO

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.623 DEGREES OF FREEDOM: 6  
CODE SOURCE FLG UG/M3 %

1	RESWD	*	29.877+-	8.373	86.914+-	25.938
4	TRANS	*	1.531+-	0.256	4.453+-	0.874
5	RDOIL	*	0.030+-	0.022	0.087+-	0.065
8	RDUST	*	0.510+-	0.066	1.483+-	0.245
11	MARIN	*	0.202+-	0.058	0.589+-	0.181
18	SECSO	*	2.196+-	0.455	6.390+-	1.477
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TOTAL: 34.346+- 8.390 99.916+- 26.471						

SPECIE CODE	FIT FLG	FINE MEAS	SUSPENDED UG/M3	PARTICULATE PERCENT	CALC. UG/M3	RATIO
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1	HA	*	0.107+-	0.016	0.311+-	0.053	0.107+-	0.016	1.000+-	0.211	HA
2	MG	*	0.012+-	0.009	0.034+-	0.026	0.051+-	0.025	4.340+-	9.311	MG
3	AL	*	0.095+-	0.016	0.275+-	0.055	0.065+-	0.007	0.689+-	0.094	AL
4	SI	*	0.134+-	0.017	0.391+-	0.064	0.149+-	0.010	1.106+-	0.107	SI
5	P	*	0.059+-	0.008	0.171+-	0.030	0.002+-	0.000	0.029+-	0.006	P
6	S	*	0.852+-	0.107	2.478+-	0.403	0.852+-	0.104	1.000+-	0.172	S
7	CL	*	0.101+-	0.020	0.294+-	0.066	0.269+-	0.154	2.665+-	4.336	CL
8	K	*	0.196+-	0.025	0.570+-	0.094	0.264+-	0.209	1.345+-	1.788	K
9	CA	*	0.026+-	0.005	0.074+-	0.018	0.046+-	0.030	1.783+-	2.375	CA
10	TI	*	0.005+-	0.002	0.013+-	0.005	0.007+-	0.006	1.560+-	2.286	TI
11	V	<	0.011	<	0.032	<	0.001+-	0.000	0.000+-	0.000	V
12	MN	*	0.004+-	0.001	0.013+-	0.005	0.001+-	0.000	0.171+-	0.071	MN
13	FE	*	0.050+-	0.008	0.146+-	0.029	0.055+-	0.027	1.089+-	0.808	FE
14	HI	*	0.002+-	0.001	0.005+-	0.003	0.002+-	0.000	0.998+-	0.414	HI
15	CU	*	0.004+-	0.002	0.013+-	0.006	0.000+-	0.000	0.014+-	0.067	CU
16	ZH	*	0.023+-	0.004	0.068+-	0.013	0.013+-	0.011	0.548+-	0.545	ZH
17	AS	*	0.010+-	0.008	0.030+-	0.024	0.000+-	0.000	0.000+-	0.029	AS
18	BR	*	0.093+-	0.011	0.271+-	0.043	0.082+-	0.028	0.880+-	0.397	BR
19	SR	<	0.026	<	0.075	<	0.000+-	0.000	0.000+-	0.000	SR
20	CD	<	0.162	<	0.472	<	0.000+-	0.000	0.000+-	0.000	CD
21	PB	*	0.209+-	0.026	0.608+-	0.097	0.212+-	0.032	1.014+-	0.216	PB
22	OC	*	14.600+-	2.260	42.473+-	7.886	14.854+-	4.125	1.017+-	0.403	OC
23	EC	*	4.180+-	0.890	12.160+-	2.874	4.224+-	2.514	1.011+-	0.955	EC

MEAS AMB MASS (UG/M3): FINE: 34.4+- 3.5

CMBDEQ RESULTS FOR CMB # 010159  
 FINE PARTICULATE FRACTION  
 SAMPLING DATE: 81 306 SITE: SITE 3 SITE CODE: 0000003  
 SAMPLING DURATION: 8 HRS. WITH START HOUR: ?  
 BACKGROUND SITE SUBTRACTED: NO  
 EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.359 DEGREES OF FREEDOM: 6  
 CODE SOURCE FLG UG/M3 %

1	RESWD	*	8.207+-	2.611	69.719+-	24.430
4	TRANS	*	1.367+-	0.241	11.608+-	2.664
5	RDDIL	*	0.078+-	0.045	0.664+-	0.392
8	RDUST	*	0.669+-	0.088	5.679+-	1.118
11	MARIN	*	0.239+-	0.048	2.031+-	0.502
18	SECSO	*	1.476+-	0.342	12.535+-	3.440
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TOTAL: 12.635+- 2.647 102.236+- 27.035						

SPECIE CODE	FIT FLG	MEAS. UG/M3	FINE PERCENT	SUSPENDED PARTICULATE CALC UG/M3	RATIO
1 HA	*	0.105+- 0.016	0.894+- 0.187	0.105+- 0.010	1.000+- 0.139 HA
2 MG		0.022+- 0.011	0.189+- 0.097	0.038+- 0.012	1.694+- 1.076 MG
3 AL	*	0.084+- 0.019	0.714+- 0.190	0.078+- 0.006	0.933+- 0.090 AL
4 SI	*	0.193+- 0.025	1.636+- 0.322	0.192+- 0.012	0.995+- 0.090 SI
5 P		0.034+- 0.007	0.285+- 0.075	0.002+- 0.000	0.066+- 0.007 P
6 S	*	0.576+- 0.084	4.895+- 1.915	0.576+- 0.074	1.000+- 0.182 S
7 CL		0.018+- 0.017	0.156+- 0.147	0.010+- 0.049	9.223+- 24.9 CL
8 K	*	0.089+- 0.015	0.755+- 0.168	0.079+- 0.057	0.888+- 0.864 K
9 CA		0.031+- 0.007	0.266+- 0.073	0.032+- 0.022	1.017+- 0.992 CA
10 TI	*	0.006+- 0.003	0.052+- 0.023	0.007+- 0.005	1.213+- 1.305 TI
11 Y		< 0.011	< 0.093	0.003+- 0.001	0.000+- 0.000 Y
12 MH		0.003+- 0.002	0.028+- 0.018	0.001+- 0.000	0.304+- 0.041 MH
13 FE	*	0.039+- 0.009	0.334+- 0.094	0.061+- 0.025	1.551+- 1.154 FE
14 HI	*	0.004+- 0.002	0.037+- 0.019	0.004+- 0.001	0.974+- 0.308 HI
15 CU		< 0.021	< 0.180	0.000+- 0.000	0.000+- 0.000 CU
16 ZH		0.009+- 0.003	0.079+- 0.026	0.005+- 0.003	0.523+- 0.398 ZH
17 RS		< 0.082	< 0.698	0.000+- 0.000	0.000+- 0.000 RS
18 BR	*	0.062+- 0.008	0.523+- 0.104	0.073+- 0.025	1.188+- 0.624 BR
19 SR		< 0.026	< 0.218	0.000+- 0.000	0.000+- 0.000 SR
20 CD		< 0.142	< 1.295	0.000+- 0.000	0.000+- 0.000 CD
21 PB	*	0.208+- 0.027	1.764+- 0.348	0.189+- 0.028	0.912+- 0.184 PB
22 OC	*	3.840+- 0.910	32.619+- 9.094	4.496+- 1.139	1.171+- 0.457 OC
23 EC	*	2.150+- 0.550	18.263+- 5.387	1.408+- 0.702	0.655+- 0.390 EC

MEAS RMB MASS (UG/M3): FINE: 11.8+- 1.7

## CMBDEQ RESULTS FOR CMB # 010165

FINE PARTICULATE FRACTION

SAMPLING DATE: 81 308 SITE: SITE 3 SITE CODE: 000003

SAMPLING DURATION: 13 HRS WITH START HOUR: 16

BACKGROUND SITE SUBTRACTED: NO

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.370 DEGREES OF FREEDOM: 6  
CODE SOURCE FLG UG/M3 %

1	RESWD	*	39.281+-10.952	97.229+-28.865
4	TRAHS	*	1.235+- 0.212	3.058+- 0.610
5	RDOIL	*	0.038+- 0.020	0.093+- 0.050
8	RDUST	*	0.426+- 0.059	1.054+- 0.182
11	MARIN	*	0.323+- 0.084	0.799+- 0.224
18	SECSO	*	1.505+- 0.406	3.725+- 1.075
TOTAL:			42.807+-10.963	105.958+-29.206

SPECIE CODE	FIT FLG	MEAS. UG/M3	FINE PERCENT	SUSPENDED PARTICULATE CALC. UG/M3	RATIO
1 HA	*	0.163+- 0.024	0.404+- 0.071	0 163+- 0 022	1.000+-0.193 HA
2 MG		0.010+- 0.009	0.025+- 0.022	0 060+- 0.030	6.086+-518.8 MG
3 AL	*	0.068+- 0.014	0.169+- 0.038	0 058+- 0.009	0.845+-0.166 AL
4 SI	*	0.121+- 0.016	0.300+- 0.050	0 124+- 0.008	1.025+-0.095 SI
5 P	*	0.053+- 0.008	0.131+- 0.023	0 001+- 0.000	0.027+-0.008 P
6 S	*	0.634+- 0.083	1.569+- 0.261	0 634+- 0 103	1.000+-0.230 S
7 CL		0.071+- 0.017	0.176+- 0.046	0 358+- 0 203	5.032+-514.6 CL
8 K	*	0.253+- 0.032	0.627+- 0.101	0 346+- 0 275	1.363+-1.935 K
9 CA		0.014+- 0.004	0.035+- 0.012	0 050+- 0.030	3.466+-7.663 CA
10 TI		0.001+- 0.001	0.003+- 0.003	0 006+- 0 005	4.192+-514.1 TI
11 V	*	0.002+- 0.001	0.005+- 0.003	0 001+- 0.000	0 663+-0.265 V
12 MH		0.002+- 0.001	0.005+- 0.003	0 001+- 0.000	0 317+-0.209 MH
13 FE	*	0.023+- 0.006	0.056+- 0.015	0 045+- 0 022	1.992+-2.176 FE
14 HI	*	0.002+- 0.001	0.004+- 0.003	0 002+- 0.001	1.258+-0.603 HI
15 CU		0.005+- 0.002	0.012+- 0.005	0 000+- 0.000	0 013+-0.082 CU
16 ZH		0.025+- 0.004	0.061+- 0.011	0 016+- 0 015	0 647+-0.703 ZH
17 AS		0.013+- 0.008	0.032+- 0.020	0 000+- 0.000	0 000+-0.031 AS
18 BR	*	0.071+- 0.009	0.176+- 0.028	0 068+- 0 022	0 935+-0.431 BR
19 SR	<	0.026	< 0.065	0 000+- 0.000	0 000+-0.000 SR
20 CD	<	0.155	< 0.383	0 000+- 0.000	0 000+-0.000 CD
21 PB	*	0.174+- 0.022	0.431+- 0.070	0 171+- 0 026	0 982+-0.206 PB
22 OC	*	20.560+- 3.050	50.891+- 9.160	19.195+- 5.422	0 934+-0.361 OC
23 EC	*	4.010+- 0.860	9.926+- 2.357	5.351+- 3.302	1.334+-1.373 EC

MEAS AME MASS (UG/M3): FINE: 40.4+-4.1

## CMBDEQ RESULTS FOR CMB # 010173

## FINE PARTICULATE FRACTION

SAMPLING DATE: 21 309 SITE: SITE 4 SITE CODE: 0000004

SAMPLING DURATION: 24 HRS WITH START HOUR: 16

BACKGROUND SITE SUBTRACTED: NO

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.554 DEGREES OF FREEDOM: 8  
CODE SOURCE FLG UG/M3 %

1	RESWD	*	9.431+-	2.836	77.459+-	24.721
4	TRANS	*	1.160+-	0.197	9.526+-	1.910
5	RDOIL	*	0.042+-	0.017	0.343+-	0.143
8	RDUST	*	0.870+-	0.089	7.143+-	1.055
11	MARIH	*	0.346+-	0.065	2.840+-	0.612
13	SECSO	*	1.822+-	0.328	14.967+-	3.137

TOTAL: 13.671+- 2.864 112.278+- 26.409

SPECIE CODE	FIT FLG	MEAS.	FINE	SUSPENDED PARTICULATE			RATIO
			UG/M3	PERCENT	CALC	UG/M3	

1	NA	*	0.148+-	0.021	1.218+-	0.218	0.148+-	0.015	0.995+-	0.138	NA
2	MG	*	0.019+-	0.007	0.160+-	0.064	0.045+-	0.012	2.287+-	1.477	MG
3	AL	*	0.110+-	0.015	0.900+-	0.154	0.101+-	0.007	0.917+-	0.085	AL
4	SI	*	0.235+-	0.027	1.933+-	0.306	0.245+-	0.016	1.041+-	0.096	SI
5	P	*	0.041+-	0.006	0.340+-	0.059	0.003+-	0.000	0.070+-	0.007	P
6	S	*	0.684+-	0.084	5.620+-	0.914	0.684+-	0.068	1.000+-	0.141	S
7	CL	*	<	0.159	<	1.305	0.214+-	0.060	0.000+-	0.000	CL
8	K	*	0.084+-	0.011	0.687+-	0.118	0.092+-	0.066	1.104+-	1.177	K
9	CA	*	0.024+-	0.004	0.200+-	0.040	0.033+-	0.019	1.349+-	1.299	CA
10	TI	*	0.005+-	0.001	0.038+-	0.012	0.008+-	0.004	1.649+-	1.805	TI
11	V	*	0.001+-	0.001	0.012+-	0.007	0.002+-	0.000	1.184+-	0.349	V
12	MN	*	0.003+-	0.001	0.025+-	0.009	0.001+-	0.000	0.412+-	0.055	MN
13	FE	*	0.064+-	0.009	0.523+-	0.091	0.066+-	0.021	1.038+-	0.474	FE
14	HI	*	0.003+-	0.001	0.021+-	0.009	0.002+-	0.001	0.860+-	0.261	HI
15	CU	*	0.009+-	0.002	0.073+-	0.016	0.000+-	0.000	0.011+-	0.012	CU
16	ZH	*	0.021+-	0.003	0.169+-	0.031	0.005+-	0.004	0.246+-	0.132	ZH
17	AS	*	0.031+-	0.007	0.255+-	0.063	0.000+-	0.000	0.000+-	0.003	AS
18	BR	*	0.047+-	0.006	0.384+-	0.062	0.062+-	0.021	1.333+-	0.748	BR
19	SR	*	0.002+-	0.001	0.017+-	0.011	0.000+-	0.000	0.086+-	0.059	SR
20	CD	*	<	0.186	<	1.529	0.000+-	0.000	0.000+-	0.000	CD
21	PB	*	0.179+-	0.021	1.468+-	0.235	0.161+-	0.024	0.901+-	0.181	PB
22	OC	*	4.170+-	0.870	34.248+-	8.030	4.984+-	1.305	1.195+-	0.488	OC
23	EC	*	2.980+-	0.630	24.475+-	5.799	1.510+-	0.800	0.507+-	0.301	EC

MEAS AMB MASS (UG/M3): FINE: 12.2+- 1 3

## CMBDEQ RESULTS FOR CMB # 010082

## FINE PARTICULATE FRACTION

SAMPLING DATE: 81 130 SITE: SITE 5 SITE CODE: 0000005

SAMPLING DURATION: 22 HRS. WITH START HOUR: 17

BACKGROUND SITE SUBTRACTED: NO

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.638 DEGREES OF FREEDOM: 8

CODE SOURCE FLG UG/M3 %

1	RESWD	*	31.755+- 8.695	63.571+-18.543
4	TRANS	*	2.240+- 0.369	4.484+- 0.865
5	RDOIL	*	0.274+- 0.056	0.549+- 0.125
7	RDUST	*	0.772+- 0.098	1.543+- 0.250
11	MARIN	*	0.370+- 0.088	0.741+- 0.191
13	SECSO	*	2.554+- 0.561	5.113+- 1.235
19	GALVH	*	0.024+- 0.016	0.047+- 0.033

TOTAL: 37.988+- 8.722 76.050+-19.061

SPECIE FIT FINE SUSPENDED PARTICULATE  
CODE FLG MEAS. UG/M3 PERCENT CALC UG/M3 RATIO

1	HA	*	0.190+- 0.027	0.380+- 0.067	0.194+- 0.021	1.020+-0.161	HA
2	MG	*	0.033+- 0.014	0.067+- 0.029	0.070+- 0.030	2.097+-2.075	MG
3	AL	*	0.133+- 0.018	0.267+- 0.045	0.079+- 0.022	0.595+-0.192	AL
4	SI	*	0.175+- 0.021	0.351+- 0.055	0.188+- 0.010	1.073+-0.083	SI
5	P	*	0.076+- 0.009	0.152+- 0.024	0.000+- 0.000	0.000+-0.004	P
6	S	*	1.040+- 0.124	2.082+- 0.325	1.040+- 0.135	1.000+-0.184	S
7	CL	*	0.469+- 0.057	0.939+- 0.149	0.362+- 0.167	0.772+-0.449	CL
8	K	*	0.417+- 0.049	0.835+- 0.129	0.287+- 0.222	0.688+-0.647	K
9	CA	*	0.026+- 0.005	0.053+- 0.012	0.076+- 0.040	2.861+-4.549	CA
10	TI	*	0.011+- 0.002	0.022+- 0.005	0.012+- 0.008	1.128+-1.144	TI
11	V	*	0.009+- 0.002	0.018+- 0.004	0.010+- 0.002	1.068+-0.338	V
12	MN	*	0.003+- 0.001	0.005+- 0.002	0.001+- 0.000	0.414+-0.144	MN
13	FE	*	0.095+- 0.012	0.190+- 0.031	0.096+- 0.040	1.009+-0.604	FE
14	HI	*	0.016+- 0.003	0.031+- 0.006	0.015+- 0.003	0.936+-0.291	HI
15	CU	*	0.026+- 0.004	0.051+- 0.009	0.000+- 0.000	0.017+-0.013	CU
16	ZH	*	0.035+- 0.005	0.069+- 0.012	0.035+- 0.012	1.000+-0.488	ZH
17	AS	*	< 0.151	< 0.303	0.000+- 0.000	0.000+-0.000	AS
18	BR	*	0.128+- 0.015	0.256+- 0.039	0.120+- 0.041	0.939+-0.435	BR
19	SR	*	< 0.031	< 0.062	0.000+- 0.000	0.000+-0.000	SR
20	CD	*	0.015+- 0.010	0.030+- 0.020	0.000+- 0.000	0.000+-0.022	CD
21	PB	*	0.309+- 0.036	0.619+- 0.095	0.312+- 0.046	1.011+-0.213	PB
22	OC	*	13.350+- 2.280	26.726+- 5.296	16.182+- 4.387	1.212+-0.516	OC
23	EC	*	4.910+- 1.020	9.830+- 2.268	4.650+- 2.676	0.947+-0.751	EC

MEAS. AMB MASS (UG/M3): FINE: 50.0+-5.0

CMBDEQ RESULTS FOR CMB # 010084  
 FINE PARTICULATE FRACTION  
 SAMPLING DATE: 81 131 SITE: SITE 5 SITE CODE: 0000005  
 SAMPLING DURATION: 23 HRS. WITH START HOUR: 17  
 BACKGROUND SITE SUBTRACTED: NO  
 EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.675 DEGREES OF FREEDOM: 8  
 CODE SOURCE FLAG UG/M3 %

1	RESWD	*	53.140+-14.310	75.405+-21.670
4	TRANS	*	2.727+-0.455	3.870+-0.753
5	RDOIL	*	0.161+-0.040	0.228+-0.061
7	RDUST	*	0.736+-0.100	1.044+-0.176
11	MARIN	*	0.230+-0.091	0.327+-0.134
18	SECSO	*	2.077+-0.640	2.947+-0.956
TOTAL:			59.071+-14.332	83.821+-22.008

SPECIE CODE	FIT FLG	MEAS.	FINE UG/M3	SUSPENDED PARTICULATE PERCENT	CALC. UG/M3	RATIO
1 HA	*	0.151+-0.022	0.214+-0.038	0.151+-0.026	1.000+-0.247	HA
2 MG	*	< 0.225	< 0.320	0.083+-0.044	0.000+-0.000	MG
3 AL	*	0.115+-0.017	0.163+-0.029	0.081+-0.023	0.703+-0.243	AL
4 SI	*	0.174+-0.021	0.247+-0.039	0.182+-0.010	1.044+-0.084	SI
5 P	*	0.081+-0.010	0.115+-0.019	0.000+-0.001	0.000+-0.007	P
6 S	*	0.921+-0.114	1.306+-0.208	0.921+-0.175	1.000+-0.270	S
7 CL	*	0.427+-0.054	0.606+-0.098	0.427+-0.272	0.999+-0.902	CL
8 K	*	0.316+-0.038	0.449+-0.070	0.468+-0.372	1.481+-2.103	K
9 CA	*	0.021+-0.005	0.030+-0.007	0.091+-0.053	4.365+-11.3	CA
10 TI	*	0.004+-0.002	0.006+-0.002	0.014+-0.010	3.166+-7.831	TI
11 V	*	0.004+-0.001	0.006+-0.002	0.006+-0.001	1.388+-0.550	V
12 MN	*	< 0.022	< 0.031	0.001+-0.001	0.000+-0.000	MN
13 FE	*	0.055+-0.008	0.078+-0.014	0.099+-0.049	1.810+-1.847	FE
14 NI	*	0.011+-0.002	0.016+-0.004	0.009+-0.002	0.762+-0.224	NI
15 CU	*	0.020+-0.003	0.029+-0.005	0.000+-0.001	0.017+-0.027	CU
16 ZH	*	0.029+-0.004	0.042+-0.007	0.024+-0.020	0.802+-0.864	ZH
17 RS	*	< 0.154	< 0.219	0.000+-0.001	0.000+-0.000	RS
18 BR	*	0.160+-0.019	0.227+-0.035	0.146+-0.049	0.912+-0.418	BR
19 SR	*	< 0.031	< 0.044	0.000+-0.001	0.000+-0.000	SR
20 CD	*	0.013+-0.012	0.019+-0.017	0.000+-0.001	0.000+-0.042	CD
21 PB	*	0.381+-0.044	0.540+-0.083	0.379+-0.056	0.996+-0.209	PB
22 DC	*	22.190+-4.240	31.487+-6.796	26.534+-7.337	1.196+-0.515	DC
23 EC	*	12.750+-2.630	18.092+-4.150	7.514+-4.472	0.589+-0.407	EC

MEAS AMB MASS (UG/M3): FINE: 70.5+-7.1

## CMBDEQ RESULTS FOR CMB # 010086

## FINE PARTICULATE FRACTION

SAMPLING DATE: 81 201 SITE: SITE 5 SITE CODE: 0000005

SAMPLING DURATION: 23 HRS. WITH START HOUR: 17

BACKGROUND SITE SUBTRACTED: NO

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.636 DEGREES OF FREEDOM: 3  
CODE SOURCE FLG UG/M3 %

1	RESWD	*	55.548+-13.137	118.592+-30.474
4	TRANS	*	1.443+-0.244	3.081+-0.607
5	RDOIL	*	0.257+-0.053	0.550+-0.125
7	RDUST	*	0.492+-0.067	1.050+-0.178
18	SECSO	*	2.229+-0.542	4.759+-1.253

TOTAL: 59.970+-13.150 128.032+-30.884

SPECIE CODE	FIT FLG	MEAS. UG/M3	FINE SUSPENDED PARTICULATE			RATIO
			PERCENT	CALC UG/M3		
1 HA	*	0.081+-0.012	0.172+-0.031	0.061+-0.026	0.759+-0.404	HA
2 MG		< 0.239	< 0.511	0.059+-0.043	0.000+-0.000	MG
3 AL	*	0.095+-0.014	0.202+-0.035	0.059+-0.017	0.618+-0.217	AL
4 SI	*	0.115+-0.014	0.246+-0.039	0.121+-0.006	1.048+-0.081	SI
5 P		0.060+-0.008	0.128+-0.021	0.000+-0.001	0.000+-0.009	P
6 S	*	0.929+-0.111	1.984+-0.310	0.929+-0.138	1.000+-0.209	S
7 CL	*	0.221+-0.030	0.473+-0.079	0.317+-0.283	1.430+-2.229	CL
8 K	*	0.381+-0.045	0.814+-0.126	0.484+-0.389	1.268+-1.647	K
9 CA		0.012+-0.004	0.026+-0.008	0.070+-0.040	5.799+-5.195	CA
10 TI		0.003+-0.001	0.006+-0.003	0.008+-0.005	5.096+-6.758	TI
11 V	*	0.009+-0.002	0.020+-0.004	0.009+-0.002	0.944+-0.291	V
12 MN		0.001+-0.001	0.003+-0.002	0.001+-0.001	0.603+-0.548	MN
13 FE	*	0.033+-0.005	0.071+-0.014	0.064+-0.026	1.912+-1.683	FE
14 HI	*	0.013+-0.002	0.028+-0.006	0.014+-0.003	1.053+-0.351	HI
15 CU		0.020+-0.003	0.044+-0.008	0.000+-0.001	0.017+-0.027	CU
16 ZM	*	0.030+-0.004	0.063+-0.011	0.023+-0.021	0.789+-0.883	ZM
17 AS		< 0.128	< 0.273	0.000+-0.001	0.000+-0.000	AS
18 BR	*	0.081+-0.010	0.174+-0.027	0.077+-0.026	0.946+-0.442	BR
19 SR		< 0.030	< 0.064	0.000+-0.001	0.000+-0.000	SR
20 CD		< 0.184	< 0.392	0.000+-0.001	0.000+-0.000	CD
21 PB	*	0.208+-0.025	0.443+-0.069	0.201+-0.030	0.969+-0.200	PB
22 OC	*	20.990+-3.610	44.813+-8.927	27.101+-7.667	1.291+-0.596	OC
23 EC	*	10.030+-2.070	21.414+-4.916	7.487+-4.668	0.746+-0.581	EC

MEAS AMB MASS (UG/M3): FINE: 46.8+-4.7

CMBDEQ RESULTS FOR CMB # 010088  
 FINE PARTICULATE FRACTION  
 SAMPLING DATE: 81 202 SITE: SITE 5 SITE CODE: 0000005  
 SAMPLING DURATION: 24 HRS WITH START HOUR: 17  
 BACKGROUND SITE SUBTRACTED: NO  
 EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.996 DEGREES OF FREEDOM: 7  
 CODE SOURCE FLG UG/M3 %

1	RESWD	*	13.757+-	3.970	51.015+-	15.607
4	TRANS	*	1.196+-	0.205	4.436+-	0.884
5	RDOIL	*	0.084+-	0.023	0.310+-	0.090
7	RDUST	*	0.762+-	0.091	2.825+-	0.443
11	MARIH	*	0.137+-	0.037	0.506+-	0.147
18	SECSO	*	3.198+-	0.486	11.858+-	2.166
19	GALVH	*	0.016+-	0.008	0.060+-	0.029
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TOTAL: 19 149+- 4 006 71.010+- 16.513						

SPECIE CODE	FIT FLG	MEAS UG/M3	FINE SUSPENDED PARTICULATE			
			PERCENT	CALC UG/M3	RATIO	
1 HA	*	0.078+- 0.011	0.291+- 0.052	0.078+- 0.009	1.000+- 0.160	HA
2 MG	*	0.011+- 0.007	0.042+- 0.028	0.037+- 0.014	3.227+- 4.098	MG
3 AL	*	0.120+- 0.016	0.445+- 0.074	0.072+- 0.021	0.603+- 0.203	AL
4 SI	*	0.171+- 0.020	0.633+- 0.099	0.178+- 0.009	1.042+- 0.074	SI
5 P	*	0.058+- 0.007	0.215+- 0.035	0.000+- 0.000	0.000+- 0.002	P
6 S	*	1.146+- 0.135	4.248+- 0.662	1.146+- 0.085	1.000+- 0.105	S
7 CL	*	0.066+- 0.014	0.245+- 0.056	0.153+- 0.072	2.311+- 2.741	CL
8 K	*	0.138+- 0.017	0.514+- 0.083	0.128+- 0.096	0.926+- 0.948	K
9 CA	*	0.027+- 0.004	0.099+- 0.019	0.045+- 0.021	1.687+- 1.508	CA
10 TI	*	0.004+- 0.001	0.016+- 0.005	0.009+- 0.005	1.999+- 2.297	TI
11 V	*	0.002+- 0.001	0.009+- 0.003	0.003+- 0.001	1.326+- 0.465	V
12 MN	*	0.003+- 0.001	0.011+- 0.004	0.001+- 0.000	0.325+- 0.067	MN
13 FE	*	0.059+- 0.008	0.220+- 0.038	0.070+- 0.022	1.188+- 0.574	FE
14 HI	*	0.006+- 0.001	0.021+- 0.006	0.004+- 0.001	0.786+- 0.228	HI
15 CU	*	0.006+- 0.002	0.024+- 0.006	0.000+- 0.000	0.045+- 0.026	CU
16 ZH	*	0.020+- 0.003	0.076+- 0.013	0.020+- 0.005	1.000+- 0.364	ZH
17 AS	*	< 0.119	< 0.441	0.000+- 0.000	0.000+- 0.000	AS
18 BR	*	0.055+- 0.007	0.205+- 0.032	0.064+- 0.022	1.161+- 0.601	BR
19 SR	*	< 0.028	< 0.102	0.000+- 0.000	0.000+- 0.000	SR
20 CD	*	< 0.175	< 0.647	0.000+- 0.000	0.000+- 0.000	CD
21 PB	*	0.184+- 0.022	0.682+- 0.107	0.168+- 0.025	0.913+- 0.183	PB
22 OC	*	6.020+- 1.090	22.324+- 4.634	7.163+- 1.902	1.190+- 0.491	OC
23 EC	*	3.330+- 0.700	12.349+- 2.883	2.073+- 1.161	0.623+- 0.411	EC

MEAS AMB MASS (UG/M3): FINE: 27.0+- 2.7

## CMBOED RESULTS FOR CMB # 010094

## FINE PARTICULATE FRACTION

SAMPLING DATE: 01 205 SITE: SITE 5 SITE CODE: 0000005

SAMPLING DURATION: 23 HRS. WITH START HOUR: 17

BACKGROUND SITE SUBTRACTED: NO

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.681 DEGREES OF FREEDOM: 7  
CODE SOURCE FLG UG/M3 %

1	RESWD	*	17	187+-	4.951	48.374+-14.766
4	TRANS	*	1.	370+-	0.236	3.855+- 0.769
5	RDOIL	*	0	872+-	0.159	2.455+- 0.512
7	ROUST	*	0	949+-	0.132	2.670+- 0.459
11	MARIN	*	0	324+-	0.092	0.912+- 0.274
14	ALUMP	*	0	318+-	0.165	0.894+- 0.472
18	SECSO	*	4	903+-	0.737	13.799+- 2.498
19	CALVH	*	0	061+-	0.013	0.172+- 0.041
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TOTAL: 25.982+- 5.019 73.130+-15.938						

SPECIE FIT FINE SUSPENDED PARTICULATE  
CODE FLG MEAS. UG/M3 PERCENT CALC. UG/M3 RATIO

1	NA	*	0.213+-	0.031	0.601+-	0.106	0.199+-	0.022	0.933+-	0.142	NA	
2	MG	*	<	0.352	<	0.990	0.061+-	0.032	0.000+-	0.000	MG	
3	AL	*	0.179+-	0.022	0.503+-	0.081	0.180+-	0.036	1.005+-	0.289	AL	
4	SI	*	0.241+-	0.028	0.679+-	0.105	0.229+-	0.012	0.950+-	0.067	SI	
5	P	*	0.088+-	0.011	0.247+-	0.039	0.000+-	0.000	0.000+-	0.002	P	
6	S	*	1.837+-	0.213	5.172+-	0.795	1.837+-	0.115	1.000+-	0.088	S	
7	CL	*	0.154+-	0.023	0.434+-	0.079	0.253+-	0.094	1.643+-	0.171	CL	
8	K	*	0.187+-	0.023	0.525+-	0.083	0.165+-	0.120	0.886+-	0.261	K	
9	CA	*	0.061+-	0.008	0.172+-	0.029	0.070+-	0.025	1.146+-	0.611	CA	
10	T1	*	0.005+-	0.002	0.015+-	0.005	0.012+-	0.005	2.098+-	2.201	T1	
11	V	*	0.031+-	0.004	0.086+-	0.014	0.030+-	0.007	0.994+-	0.302	V	
12	MN	*	0.017+-	0.002	0.048+-	0.009	0.002+-	0.000	0.093+-	0.016	MN	
13	FE	*	0.091+-	0.012	0.256+-	0.042	0.110+-	0.026	1.204+-	0.443	FE	
14	HI	*	0.049+-	0.006	0.137+-	0.023	0.047+-	0.011	0.972+-	0.302	HI	
15	CU	*	0.014+-	0.002	0.040+-	0.008	0.001+-	0.000	0.075+-	0.021	CU	
16	ZH	*	0.061+-	0.008	0.172+-	0.028	0.061+-	0.007	1.000+-	0.164	ZH	
17	AS	*	<	0.129	<	0.363	0.000+-	0.000	0.000+-	0.000	AS	
18	BR	*	0.067+-	0.008	0.188+-	0.029	0.074+-	0.025	1.105+-	0.552	BR	
19	SR	*	<	0.029	<	0.081	0.000+-	0.000	0.000+-	0.000	SR	
20	CD	*	<	0.181	<	0.509	0.000+-	0.000	0.000+-	0.000	CD	
21	PB	*	0	212+-	0.025	0.597+-	0.093	0.194+-	0.028	0.912+-	0.181	PB
22	OC	*	8	190+-	1.470	23.052+-	4.747	8.992+-	2.376	1.098+-	0.431	OC
23	EC	*	4	550+-	0.950	12.807+-	2.970	2.558+-	1.450	0.562+-	0.366	EC

MEAS AMB. MASS (UG/M3): FINE: 35.5+- 3.6

CMBDEQ RESULTS FOR CMB # 010098  
 FINE PARTICULATE FRACTION  
 SAMPLING DATE: 81 206 SITE: SITE 5 SITE CODE: 0000005  
 SAMPLING DURATION: 23 HRS WITH START HOUR: 17  
 BACKGROUND SITE SUBTRACTED: NO  
 EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.276 DEGREES OF FREEDOM: 5  
 CODE SOURCE FLG UG/M3 %

1	RESWD	*	18.867+- 5 359	52.868+-15.936
4	TRANS	*	1.375+- 0 235	3.853+- 0.764
5	RDOIL	*	0.188+- 0 041	0.528+- 0 126
7	RDUST	*	0.725+- 0.100	2.031+- 0.347
11	MARIH	*	0.425+- 0.093	1.191+- 0.287
14	ALUMP	*	0.270+- 0.134	0.757+- 0.383
16	SECGO	*	5.235+- 0.747	14.669+- 2.563
19	GALYH	*	0.036+- 0 011	0.102+- 0.033
<hr/>				
	TOTAL:		27.122+- 5.420	75.999+-17.012

SPECIE CODE	FIT FLG	MEAS. UG/M3	FINE PERCENT	SUSPENDED PARTICULATE CALC UG/M3	RATIO
1 HA	*	0.212+- 0 031	0.595+- 0.105	0.212+- 0 020	1.000+-0 133 HA
2 MG		0.019+- 0 011	0.053+- 0.030	0.063+- 0 019	3.316+-3.493 MG
3 AL	*	0.144+- 0 018	0.403+- 0.066	0.144+- 0 030	1.001+-0.290 AL
4 SI	*	0.176+- 0 021	0.495+- 0.077	0.172+- 0 009	0.977+-0 068 SI
5 P		0.092+- 0.011	0.258+- 0.041	0.000+- 0 000	0.000+-0 002 P
6 S	*	1.861+- 0.216	5.216+- 0.801	1.861+- 0 118	1.000+-0 090 S
7 CL		0.141+- 0 022	0.396+- 0.074	0.302+- 0 106	2.137+-1 764 CL
8 K	*	0.209+- 0.025	0.586+- 0.093	0.177+- 0 132	0.845+-0 826 K
9 CA		0.020+- 0 004	0.055+- 0.013	0.056+- 0 024	2.840+-3.703 CA
10 TI		0.003+- 0.001	0.008+- 0.003	0.009+- 0 005	3.340+-6 433 TI
11 V	*	0.006+- 0 001	0.017+- 0.004	0.007+- 0 001	1.117+-0 351 V
12 MH		0.002+- 0 001	0.005+- 0.003	0.001+- 0 000	0.530+-0 139 MH
13 FE	*	0.058+- 0 008	0.162+- 0.028	0.076+- 0 025	1.312+-0 716 FE
14 NI	*	0.012+- 0.002	0.034+- 0 007	0.011+- 0 002	0.884+-0 256 NI
15 CU		0.027+- 0 004	0.075+- 0 013	0.000+- 0 000	0.018+-0 008 CU
16 ZH	*	0.039+- 0 005	0.110+- 0 018	0.039+- 0 007	1.000+-0 262 ZH
17 AS		0.030+- 0 007	0.084+- 0 022	0.000+- 0 000	0.000+-0 007 AS
18 BR	*	0.066+- 0 008	0.184+- 0 029	0.074+- 0 025	1.129+-0 570 BR
19 SR		< 0.028	< 0.077	0.000+- 0 000	0.000+-0 000 SR
20 CD		< 0.158	< 0.442	0.000+- 0 000	0.000+-0 000 CD
21 PB	*	0.204+- 0 024	0.572+- 0 089	0.193+- 0 028	0.943+-0 192 PB
22 DC	*	9.810+- 1 430	24.687+- 4 718	9.689+- 2 607	1.100+-0 440 DC
23 EC	*	3.560+- 0 750	9.976+- 2 330	2.774+- 1 590	0.779+-0 566 EC

MEAS AMB MASS (UG/M3): FINE: 35.7+- 3 6

CMBDEQ RESULTS FOR CMB # 010100 .  
 FINE PARTICULATE FRACTION  
 SAMPLING DATE: 81 207 SITE: SITE 5 SITE CODE: 0000005  
 SAMPLING DURATION: 23 HRS WITH START HOUR: 17  
 BACKGROUND SITE SUBTRACTED: NO  
 EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.647 DEGREES OF FREEDOM: 8  
 CODE SOURCE FLG UG/M3 %

1	RESWD	*	61	762+-15	707	89.171+-24	375
4	TRANS	*	2.566+-	0.428		3.705+-	0.721
5	RDOIL	*	0.035+-	0.019		0.051+-	0.028
7	RDUST	*	0.677+-	0.094		0.977+-	0.167
18	SECSO	*	1.349+-	0.606		1.948+-	0.896
		TOTAL:		66.389+-15	725	95.851+-24	651

SPECIE CODE	FIT FLG	MEAS. UG/M3	FINE PERCENT	SUSPENDED PARTICULATE CALC. UG/M3	RATIO
1 HA	*	0.058+-	0.009	0.083+-	0.015
2 MG	*	<	0.215	<	0.311
3 AL	*	0.088+-	0.014	0.128+-	0.023
4 SI	*	0.166+-	0.020	0.240+-	0.037
5 P	*	0.070+-	0.009	0.101+-	0.016
6 S	*	0.665+-	0.083	0.961+-	0.154
7 CL	*	0.464+-	0.057	0.670+-	0.106
8 K	*	0.347+-	0.041	0.502+-	0.077
9 CA	*	0.022+-	0.004	0.032+-	0.007
10 TI	*	0.002+-	0.001	0.003+-	0.002
11 V	*	0.001+-	0.001	0.002+-	0.001
12 MN	*	0.002+-	0.001	0.003+-	0.001
13 FE	*	0.037+-	0.006	0.053+-	0.010
14 HI	*	0.002+-	0.001	0.003+-	0.002
15 CU	*	0.014+-	0.002	0.021+-	0.004
16 ZH	*	0.028+-	0.004	0.041+-	0.007
17 AS	*	<	0.169	<	0.245
18 BR	*	0.146+-	0.017	0.210+-	0.032
19 SR	*	<	0.031	<	0.044
20 CD	*	<	0.176	<	0.254
21 PB	*	0.363+-	0.042	0.524+-	0.080
22 DC	*	24.870+-	5.390	35.907+-	8.574
23 EC	*	20.000+-	4.130	28.876+-	6.629

MEAS AMB. MASS (UG/M3): FINE: 69.3+-6.9

CMBDEQ RESULTS FOR CMB # 010102  
 FINE PARTICULATE FRACTION  
 SAMPLING DATE: 81 208 SITE: SITE 5 SITE CODE: 0000005  
 SAMPLING DURATION: 23 HRS. WITH START HOUR: 17  
 BACKGROUND SITE SUBTRACTED: NO  
 EFFECTIVE VARIANCE FITTING REDUCED CHI SQUARE: 0.412 DEGREES OF FREEDOM: 7  
 CODE SOURCE FLG UG/M3 %

1	RESWD	*	20	318+-	5.584	60.064+-17	585
4	TRANS	*	0	937+-	0.159	2.771+-	0.548
5	RDOIL	*	0	231+-	0.048	0.684+-	0.159
7	RDUST	*	0	388+-	0.058	1.146+-	0.208
11	MARIN	*	0	211+-	0.059	0.624+-	0.184
14	ALUMP	*	0	239+-	0.100	0.707+-	0.305
18	SECSO	*	3	208+-	0.490	9.484+-	1.737
19	GALVN	*	0	032+-	0.012	0.094+-	0.035
<b>TOTAL:</b>				<b>25.566+-</b>	<b>3.609</b>	<b>75.576+-18</b>	<b>254</b>

SPECIE CODE	FIT FLG	MEAS. UG/M3	FINE PERCENT	SUSPENDED PARTICULATE CALC UG/M3	RATIO
1 HA	*	0 126+- 0.018	0.373+- 0.066	0.124+- 0.014	0.983+-0 154 HA
2 MG	*	0.023+- 0.011	0.068+- 0.032	0.045+- 0.018	1.947+-1.753 MG
3 AL	*	0 105+- 0.014	0.311+- 0.053	0.106+- 0.022	1.005+-0.300 AL
4 SI	*	0 097+- 0.012	0.288+- 0.046	0.095+- 0.005	0.976+-0 071 SI
5 P	*	0.067+- 0.008	0.198+- 0.032	0.000+- 0.000	0.000+-0 003 P
6 S	*	1 175+- 0 132	3.473+- 0.539	1.175+- 0.083	1.000+-0 099 S
7 CL	*	0 153+- 0.022	0.452+- 0.080	0.213+- 0.106	1.394+-1 187 CL
8 K	*	0 292+- 0.035	0.862+- 0.134	0.183+- 0.142	0.627+-0 576 K
9 CA	*	0.005+- 0.003	0.016+- 0.008	0.041+- 0.019	7.819+-328.3 CA
10 TI	*	0 005+- 0.001	0.015+- 0.005	0.006+- 0.004	1.121+-1 013 TI
11 V	*	0 007+- 0.001	0.020+- 0.005	0.008+- 0.002	1.243+-0 423 V
12 MH	*	0.002+- 0.001	0.007+- 0.003	0.001+- 0.000	0.265+-0 099 MH
13 FE	*	0.034+- 0.005	0.102+- 0.019	0.049+- 0.017	1.407+-0 851 FE
14 HI	*	0 016+- 0.003	0.048+- 0.009	0.013+- 0.003	0.789+-0 220 HI
15 CU	*	0 018+- 0.003	0.052+- 0.010	0.000+- 0.000	0.022+-0 012 CU
16 ZH	*	0 035+- 0.005	0.105+- 0.017	0.035+- 0.008	1.000+-0 307 ZH
17 AS	*	0 010+- 0.005	0.030+- 0.016	0.000+- 0.000	0.000+-0 020 AS
18 BR	*	0 052+- 0.006	0.153+- 0.024	0.050+- 0.017	0.978+-0 460 BR
19 SR	*	< 0.026	< 0.078	0.000+- 0.000	0.000+-0 000 SR
20 CD	*	< 0.159	< 0.469	0.000+- 0.000	0.000+-0 000 CD
21 PB	*	0 135+- 0.016	0.399+- 0.063	0.131+- 0.019	0.971+-0 200 PB
22 OC	*	9.780+- 1.520	28.911+- 5.359	10.147+- 2.805	1.037+-0 413 OC
23 EC	*	2.760+- 0.580	8.159+- 1.902	2.846+- 1.709	1.031+-0 689 EC

MEAS AMB MASS (UG/M3): FINE: 33.8+-3.4

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CMBDEQ RESULTS FOR CMB # 010126  
 FINE PARTICULATE FRACTION  
 SAMPLING DATE: 81 211 SITE: SITE 5 SITE CODE: 0000005  
 SAMPLING DURATION: 23 HRS WITH START HOUR: 17  
 BACKGROUND SITE SUBTRACTED: NO  
 EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.491 DEGREES OF FREEDOM: 8  
 CODE SOURCE FLG UG/M3 %

1	RESWD	*	32.430+-	8.449	92.465+-	25.837
4	TRANS	*	1.356+-	0.229	3.866+-	0.761
5	RDOIL	*	0.123+-	0.031	0.350+-	0.095
7	RDUST	*	0.573+-	0.074	1.635+-	0.268
11	MARIH	*	0.261+-	0.071	0.744+-	0.216
18	SEC30	*	1.647+-	0.394	4.697+-	1.219
TOTAL:			36.390+-	8.462	103.755+-	26.304

SPECIE CODE	FIT FLG	MEAS	FINE SUSPENDED PARTICULATE			RATIO
			UG/M3	PERCENT	CALC UG/M3	
1 NA	*	0.142+- 0.020	0.405+- 0.071	0 143+- 0 018	1 006+-0 184	NA
2 MG		< 0.196	< 0.559	0 055+- 0 026	0 000+-0 000	MG
3 AL	*	0.089+- 0.013	0 253+- 0.045	0 060+- 0 017	0 676+-0 230	AL
4 SI	*	0.132+- 0.016	0 376+- 0.059	0 137+- 0 007	1.041+-0 077	SI
5 P		0.053+- 0.007	0.152+- 0.025	0 060+- 0 000	0 000+-0 006	P
6 S	*	0.683+- 0.084	1 947+- 0 310	0 683+- 0 098	1 000+-0 202	S
7 CL	*	0.331+- 0.042	0.945+- 0 153	0 301+- 0 167	0 909+-0 683	CL
8 K	*	0.278+- 0.033	0 792+- 0 124	0 289+- 0 227	1.040+-1 179	K
9 CA		0.021+- 0.004	0.060+- 0 014	0.057+- 0 029	2.723+-3 970	CA
10 TI		0.004+- 0.001	0.011+- 0 004	0 008+- 0 005	2 036+-2 877	TI
11 V	*	0.004+- 0.001	0.011+- 0 004	0 004+- 0 001	1 145+-0 390	V
12 MH		< 0.022	< 0.062	0 001+- 0 000	0 000+-0 000	MH
13 FE	*	0.041+- 0.006	0.118+- 0 022	0 063+- 0 025	1.521+-1 076	FE
14 HI	*	0.007+- 0.002	0.021+- 0.005	0 007+- 0 002	0 888+-0 275	HI
15 CU		0.022+- 0.003	0.062+- 0 011	0 000+- 0 000	0 012+-0 015	CU
16 ZH	*	0.026+- 0.004	0.073+- 0 013	0 014+- 0 012	0 560+-0 540	ZH
17 AS		0.011+- 0.006	0.031+- 0 018	0 000+- 0 000	0.000+-0.030	AS
18 BR	*	0.075+- 0.009	0.214+- 0 033	0 073+- 0 025	0 968+-0 454	BR
19 SR		0.002+- 0.001	0.005+- 0 004	0 000+- 0 000	0 000+-0 203	SR
20 CD		0.010+- 0.009	0.027+- 0 027	0 000+- 0 000	0.000+-0 034	CD
21 PB	*	0.193+- 0.023	0.551+- 0 086	0 189+- 0 028	0 979+-0 203	PB
22 OC	*	14.410+- 2.210	41.086+- 7.544	16.080+- 4.477	1 116+-0.466	OC
23 EC	*	3.760+- 0.790	10.720+- 2.499	4.505+- 2.727	1 198+-1 132	EC

MEAS AMB MASS (UG/M3): FINE: 35.1+- 3.5

CMBDEQ RESULTS FOR CMB # 010140  
 FINE PARTICULATE FRACTION  
 SAMPLING DATE: 81 223 SITE: SITE 5 SITE CODE: 0000005  
 SAMPLING DURATION: 23 HRS. WITH START HOUR: 18  
 BACKGROUND SITE SUBTRACTED: NO  
 EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.392 DEGREES OF FREEDOM: 7  
 CODE SOURCE FLG UG/M3 %

1	RESWD	*	26.007+-	7.397	73.021+-	22.037
4	TRANS	*	1.597+-	0.268	4.483+-	0.878
5	RDOIL	*	0.250+-	0.052	0.701+-	0.163
7	RDUST	*	0.475+-	0.073	1.334+-	0.245
11	MARIN	*	0.403+-	0.091	1.130+-	0.281
14	ALUMP	*	0.231+-	0.107	0.650+-	0.308
18	SECSO	*	1.375+-	0.382	3.861+-	1.140
<b>TOTAL:</b>			<b>30.337+-</b>	<b>7.413</b>	<b>85.179+-</b>	<b>22.520</b>

SPECIE CODE	FIT FLG	MEAS. UG/M3	FINE SUSPENDED PARTICULATE			RATIO
			PERCENT	CALC UG/M3	MEAS. UG/M3	
1 HA	*	0.209+- 0.030	0.586+- 0.103	0.207+- 0.021	0.991+- 0.141	NA
2 MG	*	0.012+- 0.012	0.034+- 0.033	0.065+- 0.024	5.346+- 10.9	MG
3 AL	*	0.113+- 0.016	0.318+- 0.054	0.113+- 0.023	1.001+- 0.290	AL
4 SI	*	0.122+- 0.015	0.341+- 0.054	0.119+- 0.006	0.975+- 0.074	SI
5 P	*	0.045+- 0.006	0.125+- 0.021	0.000+- 0.000	0.000+- 0.006	P
6 S	*	0.615+- 0.077	1.727+- 0.278	0.615+- 0.098	1.000+- 0.225	S
7 CL	*	0.307+- 0.039	0.862+- 0.141	0.334+- 0.139	1.088+- 0.668	CL
8 K	*	0.210+- 0.025	0.590+- 0.093	0.235+- 0.182	1.120+- 1.301	K
9 CR	*	0.020+- 0.004	0.056+- 0.013	0.058+- 0.029	2.902+- 4.598	CR
10 TI	*	0.005+- 0.002	0.015+- 0.005	0.009+- 0.006	1.577+- 2.055	TI
11 V	*	0.008+- 0.002	0.022+- 0.005	0.009+- 0.002	1.149+- 0.375	V
12 MH	*	0.006+- 0.001	0.016+- 0.004	0.001+- 0.000	0.129+- 0.050	MH
13 FE	*	0.041+- 0.006	0.115+- 0.021	0.066+- 0.029	1.622+- 1.337	FE
14 HI	*	0.016+- 0.003	0.045+- 0.009	0.014+- 0.003	0.859+- 0.249	HI
15 CU	*	0.037+- 0.005	0.103+- 0.017	0.000+- 0.000	0.012+- 0.007	CU
16 ZH	*	0.026+- 0.004	0.073+- 0.012	0.013+- 0.010	0.487+- 0.418	ZH
17 AS	*	< 0.133	< 0.373	0.000+- 0.000	0.000+- 0.000	AS
18 BR	*	0.086+- 0.010	0.241+- 0.037	0.086+- 0.029	1.002+- 0.477	BR
19 SR	*	< 0.029	< 0.083	0.000+- 0.000	0.000+- 0.000	SR
20 CD	*	< 0.173	< 0.487	0.000+- 0.000	0.000+- 0.000	CD
21 PB	*	0.233+- 0.027	0.653+- 0.101	0.222+- 0.033	0.956+- 0.197	PB
22 OC	*	11.770+- 2.180	33.047+- 6.971	13.146+- 3.592	1.117+- 0.457	OC
23 EC	*	6.230+- 1.290	17.492+- 4.030	3.746+- 2.190	0.601+- 0.410	EC

MEAS AMB MASS (UG/M3): FIHE: 35.6+- 3.6

CMBDEQ RESULTS FOR CMB # 010144  
 FINE PARTICULATE FRACTION  
 SAMPLING DATE: 81 226 SITE: SITE 5 SITE CODE: 0000005  
 SAMPLING DURATION: 23 HRS. WITH START HOUR: 18  
 BACKGROUND SITE SUBTRACTED: NO  
 EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0 169 DEGREES OF FREEDOM: 7  
 CODE SOURCE FLG UG/M3 %

1	RESWD	*	28	961+-	7	245	81	704+-	-22.039
4	TRANS	*	1	363+-	0	229	3	346+-	0 753
7	RDUST	*	0	207+-	0	039	0	585+-	0 125
14	ALUMP	*	0	136+-	0	065	0	384+-	0 188
13	SECSO	*	0	831+-	0	318	2	346+-	0 927
19	GALYN	*	0	023+-	0	015	0	664+-	0 042
<hr/>									
TOTAL: 31.521+- 7 256 88 928+-22.350									

SPECIE CODE	FIT FLG	FINE SUSPENDED PARTICULATE				RATIO
		MEAS	UG/M3	PERCENT	CALC	
1 HA	*	0.037+-	0 006	0 105+-	0 019	0 032+- 0 014 0 866+-0 481 NA
2 MG	*	0.017+-	0 007	0 047+-	0 022	0.039+- 0 024 2.372+-3 653 MG
3 RL	*	0.062+-	0 010	0 175+-	0 034	0 063+- 0 014 1 015+-0 314 AL
4 SI	*	0.055+-	0 008	0 156+-	0 027	0 055+- 0 004 0 990+-0 097 SI
5 P	*	0.045+-	0 006	0 128+-	0 021	0 000+- 0 000 0.000+-0 006 P
6 S	*	0.383+-	0 051	1 081+-	0 182	0 383+- 0 090 1 000+-0 332 S
7 CL	*	0.207+-	0 028	0 583+-	0 098	0 181+- 0 148 0 876+-0 950 CL
8 K	*	0 178+-	0 022	0 503+-	0 080	0 251+- 0 203 1 411+-1 966 K
9 CH	*	0 013+-	0 003	0 037+-	0 010	0 041+- 0 027 3.119+-6 843 CA
10 T!	*	0 002+-	0 001	0 005+-	0 003	0 006+- 0 005 3 023+-9 475 TI
11 V	*	0 001+-	0 001	0 003+-	0 002	0 000+- 0 000 0 112+-6 247 V
12 MN	*	0 003+-	0 001	0 008+-	0 003	0 000+- 0 000 0 100+-0 109 MN
13 FE	*	0 030+-	0 005	0 084+-	0 016	0 038+- 0 024 1 288+-1 342 FE
14 HI	<	0 019+-	< 0 019	< 0 052	< 0 016	< 0 000+- 0 000 0 000+-0 000 HI
15 CU	*	0 019+-	0 003	0 054+-	0 010	0 000+- 0 000 0 006+-0 015 CU
16 ZH	*	0 030+-	0 004	0 086+-	0 014	0 030+- 0 011 1 000+-0 504 ZH
17 AS	*	0 006+-	0 006	0 017+-	0 017	0 000+- 0 000 0 000+-0 047 AS
18 BP	*	0 069+-	0 008	0 196+-	0 030	0 073+- 0 025 1 048+-0 516 BR
19 SR	<	0 027	< 0 027	< 0 076	< 0 027	< 0 000+- 0 000 0 000+-0 000 SR
20 CD	<	0 197	< 0 197	< 0 556	< 0 197	< 0 000+- 0 000 0 000+-0 000 CD
21 PB	*	0 198+-	0 023	0 559+-	0 087	0 189+- 0 028 0 954+-0 197 PB
22 DC	*	14 830+-	2 240	41 838+-	7 599	14 381+- 3 398 0 970+-0 376 DC
23 EC	*	3 110+-	0 660	8 774+-	2 062	4 063+- 2 436 1 306+-1 289 EC

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MEAS AMB MASS (UG/M3): FINE: 35 4+- 3 6

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CMBDER RESULTS FOR CMB # 010130  
 FINE PARTICULATE FRACTION  
 SAMPLING DATE: 81 305 SITE: SITE 3 SITE CODE: 0000005  
 SAMPLING DURATION: 23 HRS WITH START. HOUR: 18  
 BACKGROUND SITE SUBTRACTED: NO  
 EFFECTIVE VARIANCE FITTING REDUCED CHI SQUARE: 0.426 DEGREES OF FREEDOM: 8  
 CODE SOURCE FLG UG/M<sup>3</sup> %

1	RESWD	*	49.009+-13.688	70.433+-21.002
4	TRANS	*	3.079+-0.520	4.425+-0.879
5	ROOIL	*	0.185+-0.123	0.266+-0.178
7	ROUST	*	1.520+-0.191	2.185+-0.357
11	MARIN	*	0.439+-0.118	0.630+-0.182
18	SECSO	*	2.170+-0.684	3.119+-1.036
19	GALVN	*	0.029+-0.025	0.042+-0.036
TOTAL			56.431+-13.718	81.101+-21.456

SPECIE CODE	FIT FLG	MEAS	FINE	SUSPENDED PARTICULATE		RATIO
			UG/M <sup>3</sup>	PERCENT	CALC	
1 NA	*	0.241+-0.035	0.347+-0.062	0.242+-0.029	1.001+-0.171	NA
2 MG	*	0.047+-0.025	0.068+-0.037	0.103+-0.043	2.174+-2.179	MG
3 AL	*	0.198+-0.028	0.284+-0.050	0.150+-0.043	0.759+-0.270	AL
4 SI	*	0.358+-0.042	0.514+-0.081	0.359+-0.018	1.004+-0.072	SI
5 P	*	0.090+-0.012	0.129+-0.022	0.000+-0.000	0.000+-0.005	P
6 S	*	0.971+-0.125	1.395+-0.231	0.971+-0.125	1.000+-0.270	S
7 CL	*	0.503+-0.106	0.723+-0.170	0.497+-0.254	0.988+-0.711	CL
8 K	*	0.315+-0.039	0.452+-0.073	0.444+-0.343	1.410+-1.885	K
9 CA	*	0.065+-0.010	0.093+-0.017	0.115+-0.056	1.770+-1.764	CA
10 TI	*	0.008+-0.003	0.011+-0.004	0.020+-0.012	2.537+-4.037	TI
11 V	*	0.009+-0.006	0.013+-0.009	0.007+-0.001	0.764+-0.211	V
12 MM	*	0.006+-0.002	0.009+-0.003	0.002+-0.001	0.315+-0.094	MM
13 FE	*	0.101+-0.014	0.145+-0.026	0.154+-0.056	1.523+-1.009	FE
14 HI	*	0.008+-0.008	0.012+-0.012	0.010+-0.002	1.182+-0.423	HI
15 CU	*	0.030+-0.005	0.044+-0.008	0.001+-0.001	0.020+-0.017	CU
16 ZH	*	0.047+-0.006	0.067+-0.012	0.047+-0.018	1.000+-0.558	ZH
17 AS	<	0.109	< 0.157	0.000+-0.000	0.000+-0.096	AS
18 BR	*	0.178+-0.021	0.256+-0.040	0.165+-0.056	0.928+-0.428	BR
19 SR	<	0.028	< 0.041	0.000+-0.000	0.000+-0.000	SR
20 CD	<	0.180	< 0.259	0.000+-0.000	0.000+-0.000	CD
21 PB	*	0.449+-0.053	0.645+-0.102	0.431+-0.064	0.959+-0.197	PB
22 OC	*	27.290+-4.140	39.220+-7.223	24.833+-6.769	0.910+-0.335	OC
23 EC	*	5.190+-1.080	7.459+-1.737	7.077+-4.127	1.364+-1.345	EC

MEAS AMB MASS (UG/M<sup>3</sup>): FINE: 69.6+-7.3

CHBDED RESULTS FOR CMB # 010092  
 FINE PARTICULATE FRACTION  
 SAMPLING DATE: 81 206 SITE: SITE 6 SITE CODE: 0000006  
 SAMPLING DURATION: 24 HRS WITH START HOUR: 17  
 BACKGROUND SITE SUBTRACTED: NO  
 EFFECTIVE VARIANCE FITTING REDUCED CHI SQUARE: 0.352 DEGREES OF FREEDOM: 5  
 CODE SOURCE FLG UG/M3 %

1	RESWD	*	14.763+- 4.208	66.359+-20.092
4	TRANS	*	0.565+- 0.099	2.542+- 0.517
5	RDOIL	*	0.112+- 0.027	0.502+- 0.132
6	CDUST	*	0.354+- 0.065	1.591+- 0.336
11	MARIN	*	0.197+- 0.048	0.884+- 0.235
14	ALUMP	*	0.163+- 0.080	0.734+- 0.367
19	SECSO	*	3.224+- 0.456	14.489+- 2.529
19	CALVN	*	0.019+- 0.008	0.084+- 0.038
<hr/>				
TOTAL: 19.397+- 4.236 87.186+-21.017				

SPECIE CODE	FIT FLG	MEAS. UG/M3	FINE SUSPENDED PARTICULATE		
			PERCENT	CALC. UG/M3	RATIO
1 HA	*	0.104+- 0.015	0.467+- 0.083	0.104+- 0.011	1.000+-0.150 HA
2 MG		< 0.167	< 0.751	0.036+- 0.013	0.000+-0.000 MG
3 AL	*	0.090+- 0.013	0.407+- 0.071	0.090+- 0.016	0.994+-0.242 AL
4 SI	*	0.100+- 0.012	0.449+- 0.072	0.095+- 0.012	0.950+-0.167 SI
5 P		0.054+- 0.007	0.242+- 0.040	0.000+- 0.000	0.000+-0.003 P
6 S	*	1.137+- 0.134	5.109+- 0.796	1.137+- 0.068	1.000+-0.085 S
7 CL		0.046+- 0.011	0.207+- 0.055	0.169+- 0.078	3.680+-6.451 CL
8 K	*	0.165+- 0.020	0.743+- 0.119	0.134+- 0.103	0.811+-0.205 K
9 CA		0.007+- 0.002	0.031+- 0.012	0.025+- 0.013	3.603+-6.804 CA
10 TI		0.001+- 0.001	0.006+- 0.004	0.005+- 0.002	3.348+-5.651 TI
11 V	*	0.004+- 0.001	0.020+- 0.005	0.004+- 0.001	0.918+-0.263 V
12 MN		0.003+- 0.001	0.013+- 0.004	0.001+- 0.000	0.278+-0.131 MN
13 FE	*	0.027+- 0.004	0.120+- 0.023	0.039+- 0.013	1.445+-0.857 FE
14 HI	*	0.006+- 0.001	0.027+- 0.007	0.006+- 0.001	1.068+-0.339 HI
15 CU		0.028+- 0.004	0.124+- 0.021	0.000+- 0.000	0.008+-0.006 CU
16 ZH	*	0.022+- 0.003	0.097+- 0.017	0.022+- 0.006	1.000+-0.363 ZH
17 AS		< 0.087	< 0.392	0.000+- 0.000	0.000+-0.000 AS
18 BR	*	0.027+- 0.004	0.123+- 0.020	0.031+- 0.010	1.115+-0.560 BR
19 SR		< 0.026	< 0.116	0.000+- 0.000	0.000+-0.000 SR
20 CD		< 0.203	< 0.912	0.000+- 0.000	0.000+-0.000 CD
21 PB	*	0.083+- 0.011	0.373+- 0.061	0.078+- 0.012	0.942+-0.194 PB
22 QC	*	6.350+- 1.140	28.542+- 5.395	7.278+- 2.038	1.146+-0.488 QC
23 EC	*	2.920+- 0.620	13.125+- 3.092	2.055+- 1.241	0.704+-0.520 EC
<hr/>					

MEAS AMB MASS (UG/M3): FINE: 22.2+- 2.3

## CMBDEQ RESULTS FOR CMB # 010121

FINE PARTICULATE FRACTION  
 SAMPLING DATE: 81 221 SITE: SITE 6 SITE CODE: 0000006  
 SAMPLING DURATION: 23 HRS. WITH START HOUR: 17  
 BACKGROUND SITE SUBTRACTED: NO

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.648 DEGREES OF FREEDOM: 6  
 CODE SOURCE FLG UG/M3 %

1	RESWD	*	4.977+-	1.485	68.268+-21.922
4	TRANS	*	0.231+-	0.045	3.163+- 0.721
6	CDUST	*	0.147+-	0.025	2.012+- 0.422
11	MARIN	*	0.726+-	0.125	9.966+- 2.087
19	SECSO	*	0.696+-	0.130	9.550+- 2.118
19	GALYN	*	0.005+-	0.003	0.065+- 0.041
<b>TOTAL</b>			<b>6.781+- 1.497</b>	<b>93.023+-23.314</b>	

SPECIE CODE	FIT FLG	MEAS	FINE		SUSPENDED PARTICULATE		CALC	UG/M3	RATIO
			UG/M3	%	PERCENT	UG/M3			

1	HA	*	0.306+-	0.044	4.198+-	0.779	0.296+-	0.029	0.966+-0.132 HA
2	MG	*	0.032+-	0.009	0.436+-	0.134	0.043+-	0.008	1.354+-0.409 MG
3	AL	*	0.028+-	0.006	0.385+-	0.098	0.019+-	0.003	0.659+-0.145 AL
4	SI	*	0.036+-	0.005	0.490+-	0.095	0.039+-	0.005	1.082+-0.207 SI
5	P	*	0.017+-	0.003	0.237+-	0.051	0.000+-	0.000	0.000+-0.003 P
6	S	*	0.272+-	0.037	3.730+-	0.674	0.272+-	0.021	1.000+-0.111 S
7	CL	*	0.108+-	0.016	1.484+-	0.286	0.321+-	0.077	2.970+-2.229 CL
8	K	*	0.052+-	0.008	0.716+-	0.136	0.054+-	0.035	1.043+-0.965 K
9	CA	*	0.015+-	0.003	0.204+-	0.048	0.018+-	0.005	1.179+-0.569 CA
10	TI	*	0.001+-	0.001	0.018+-	0.011	0.002+-	0.001	1.425+-1.238 TI
11	V	*	0.001+-	0.001	0.004+-	0.008	0.000+-	0.000	0.061+-0.086 V
12	MN	*	0.002+-	0.001	0.026+-	0.011	0.000+-	0.000	0.154+-0.075 MN
13	FE	*	0.011+-	0.003	0.148+-	0.040	0.014+-	0.005	1.319+-0.817 FE
14	HI	*	<	0.015	<	0.203	0.000+-	0.000	0.000+-0.000 HI
15	CU	*	0.017+-	0.003	0.230+-	0.045	0.000+-	0.000	0.002+-0.003 CU
16	ZH	*	0.006+-	0.001	0.081+-	0.020	0.006+-	0.002	1.000+-0.447 ZH
17	AS	*	0.003+-	0.003	0.047+-	0.042	0.000+-	0.000	0.000+-0.015 AS
18	BR	*	0.011+-	0.002	0.155+-	0.031	0.014+-	0.004	1.214+-0.583 BR
19	SR	*	0.001+-	0.001	0.021+-	0.017	0.000+-	0.000	0.000+-0.034 SR
20	CD	*	<	0.156	<	2.140	0.000+-	0.000	0.000+-0.000 CD
21	PB	*	0.025+-	0.006	0.487+-	0.096	0.032+-	0.005	0.896+-0.131 PB
22	OC	*	2.190+-	0.480	30.042+-	7.489	2.463+-	0.687	1.125+-0.472 OC
23	EC	*	1.130+-	0.280	15.501+-	4.260	0.704+-	0.419	0.623+-0.437 EC

MEAS AMB MASS (UG/M3): FINE: 7.3+-0.9

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CMBDEQ RESULTS FOR CMB # 010143  
 FINE PARTICULATE FRACTION  
 SAMPLING DATE: 81 305 SITE: SITE 6 SITE CODE: 0000006  
 SAMPLING DURATION: 23 HRS. WITH START HOUR: 17  
 BACKGROUND SITE SUBTRACTED: NO  
 EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.563 DEGREES OF FREEDOM: 6  
 CODE SOURCE FLG UG/M3 %

1	RESWD	*	2.656+- 0.900	62.866+-23.275
4	TRANS	*	0.136+- 0.031	3.220+- 0.876
6	CDUST	*	0.161+- 0.026	3.799+- 0.843
11	MARH	*	0.328+- 0.057	7.764+- 1.783
18	SECSO	*	0.297+- 0.071	7.021+- 1.975
TOTAL			3.578+- 0.905	84.669+-24.883

SPECIE CODE	FIT FLG	FINE MEAS. UG/M3	SUSPENDED PARTICULATE PERCENT	CALC UG/M3	RATIO
1 HA	*	0.135+- 0.019	3.188+- 0.660	0.135+- 0.013	0.999+-0.138 HA
2 MG		0.010+- 0.006	0.244+- 0.140	0.022+- 0.004	2.105+-0.861 MG
3 AL	*	0.026+- 0.006	0.625+- 0.166	0.020+- 0.004	0.740+-0.168 AL
4 SI	*	0.040+- 0.006	0.951+- 0.201	0.042+- 0.005	1.034+-0.196 SI
5 P		0.010+- 0.003	0.237+- 0.071	0.000+- 0.000	0.000+-0.003 P
6 S	*	0.119+- 0.020	2.816+- 0.642	0.119+- 0.011	1.000+-0.129 S
7 CL		0.055+- 0.011	1.299+- 0.317	0.148+- 0.035	2.695+-1.859 CL
8 K	*	0.018+- 0.004	0.438+- 0.109	0.029+- 0.019	1.570+-1.873 K
9 CA	*	0.010+- 0.002	0.237+- 0.065	0.009+- 0.003	0.946+-0.384 CA
10 TI	<	0.020	< 0.471	0.002+- 0.001	0.000+-0.000 TI
11 V	<	0.012	< 0.275	0.000+- 0.000	0.000+-0.000 V
12 MN		0.003+- 0.001	0.062+- 0.023	0.000+- 0.000	0.123+-0.057 MN
13 FE	*	0.009+- 0.003	0.204+- 0.071	0.013+- 0.004	1.562+-0.954 FE
14 NI	<	0.019	< 0.440	0.000+- 0.000	0.000+-0.000 NI
15 CU		0.007+- 0.001	0.166+- 0.043	0.000+- 0.000	0.005+-0.004 CU
16 ZH		0.003+- 0.001	0.071+- 0.024	0.001+- 0.001	0.390+-0.355 ZH
17 AS	<	0.056	< 1.323	0.000+- 0.000	0.000+-0.000 AS
18 BR	*	0.007+- 0.001	0.161+- 0.041	0.008+- 0.002	1.161+-0.556 BR
19 SR	<	0.026	< 0.622	0.000+- 0.000	0.000+-0.000 SR
20 CD	<	0.178	< 4.208	0.000+- 0.000	0.000+-0.000 CD
21 PB	*	0.021+- 0.004	0.490+- 0.129	0.019+- 0.003	0.908+-0.184 PB
22 OC	*	1.220+- 0.370	28.873+- 9.762	1.320+- 0.367	1.082+-0.443 OC
23 EC	*	0.660+- 0.210	15.620+- 5.491	0.383+- 0.224	0.581+-0.292 EC

MEAS AMB MASS (UG/M3): FINE: 4.2+- 0.6

## CMBDEQ RESULTS FOR CMB # 010003

FINE PARTICULATE FRACTION

SAMPLING DATE: 801217 SITE: SITE 7 SITE CODE: 0000007  
SAMPLING DURATION: 24 HRS. WITH START HOUR: 99

BACKGROUND SITE SUBTRACTED: NO

EFFECTIVE VARIANCE FITTING REDUCED CHI SQUARE: 1.019 DEGREES OF FREEDOM: 12  
CODE SOURCE FLG UG/M3 %

1	RESWD	*	53.144+-18.808	13.574+- 4.996
3	UDUST	*	1.560+- 0.264	0.399+- 0.078
4	TRANS	*	5.713+- 0.969	1.460+- 0.287
5	RDOIL	*	0.240+- 0.094	0.061+- 0.025
12	HOGFU	*	65.315+-11.300	16.695+- 3.337
<hr/>				
TOTAL: 125.933+-21.965 32.190+- 6.473				

SPECIE FIT FINE SUSPENDED PARTICULATE  
CODE FLG MEAS UG/M3 PERCENT CALC. UG/M3 RATIO

1	HA	*	11.057+- 1.638	2.826+- 0.505	9.228+- 1.960	0.835+- 0.231	NA
2	MG	*	0.270+- 0.050	0.069+- 0.014	0.119+- 0.058	0.441+- 0.235	MG
3	AL	*	0.134+- 0.050	0.034+- 0.013	0.232+- 0.048	1.729+- 0.712	AL
4	SI	*	0.439+- 0.061	0.112+- 0.019	0.407+- 0.024	0.928+- 0.074	SI
5	P	*	0.230+- 0.036	0.059+- 0.011	0.000+- 0.001	0.000+- 0.004	P
6	S	*	3.147+- 0.373	0.805+- 0.126	2.318+- 1.341	0.737+- 0.529	S
7	CL	*	4.371+- 0.571	1.271+- 0.194	8.896+- 7.843	1.790+- 3.234	CL
8	K	*	4.437+- 0.503	1.134+- 0.171	6.350+- 3.936	1.451+- 1.549	K
9	CA	*	0.373+- 0.051	0.095+- 0.016	2.105+- 1.310	5.647+- 5.201	CA
10	TI	*	0.023+- 0.007	0.006+- 0.002	0.029+- 0.021	1.258+- 1.496	TI
11	V	*	0.016+- 0.005	0.004+- 0.001	0.009+- 0.002	0.542+- 0.143	V
12	MH	*	0.077+- 0.011	0.020+- 0.003	0.132+- 0.065	1.722+- 1.632	MH
13	FE	*	0.380+- 0.047	0.097+- 0.016	0.385+- 0.122	1.014+- 0.456	FE
14	HI	*	0.007+- 0.005	0.002+- 0.001	0.013+- 0.003	1.922+- 0.979	HI
15	CU	*	0.055+- 0.010	0.014+- 0.003	0.018+- 0.004	0.336+- 0.077	CU
16	ZH	*	0.315+- 0.037	0.081+- 0.013	0.222+- 0.068	0.706+- 0.266	ZH
17	AS	*	< 0.384	< 0.098	0.000+- 0.001	0.000+- 0.000	AS
18	BR	*	0.288+- 0.034	0.074+- 0.011	0.315+- 0.103	1.093+- 0.532	BR
19	SR	*	< 0.174	< 0.044	0.000+- 0.001	0.000+- 0.000	SR
20	CD	*	< 0.977	< 0.250	0.000+- 0.001	0.000+- 0.000	CD
21	PB	*	0.828+- 0.093	0.212+- 0.033	0.810+- 0.119	0.978+- 0.261	PB
22	OC	*	26.210+- 5.480	6.700+- 1.553	31.124+- 7.796	1.182+- 0.462	OC
23	EC	*	19.630+- 4.050	5.018+- 1.151	11.120+- 5.199	0.566+- 0.304	EC

MEAS AMB MASS (UG/M3): FINE: 391.2+-39.1

CMBDEQ RESULTS FOR CMB # 010005  
 FINE PARTICULATE FRACTION  
 SAMPLING DATE: 81 116 SITE: SITE 7 SITE CODE: 0000007  
 SAMPLING DURATION: 24 HRS WITH START HOUR: 99  
 BACKGROUND SITE SUBTRACTED: NO  
 EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 1.023 DEGREES OF FREEDOM: 10  
 CODE SOURCE FLC UG/M3 %

1	RESWD	*	62.243+-19.005	35.570+-11.430
3	UDUST		1.976+-0.265	1.129+-0.189
4	TRANS	*	3.636+-0.618	2.078+-0.410
5	ROOIL	*	0.245+-0.080	0.140+-0.048
12	HOGFU		9.618+-2.330	5.496+-1.441
18	SECSO		2.848+-1.092	1.628+-0.645
<b>TOTAL:</b>				<b>80.567+-19.190</b>
				<b>46.041+-11.896</b>

SPECIE CODE	FIT FLG	MEAS. UG/M3	FINE PERCENT	SUSPENDED PARTICULATE CALC UG/M3	RATIO
1 HA	*	1.401+-0.336	0.801+-0.208	1.446+-0.290	1.032+-0.298 HA
2 MG		0.125+-0.032	0.071+-0.020	0.116+-0.054	0.929+-0.585 MG
3 AL		0.140+-0.039	0.080+-0.024	0.192+-0.016	1.368+-0.194 AL
4 SI		0.553+-0.069	0.316+-0.051	0.494+-0.027	0.894+-0.065 SI
5 P		0.085+-0.021	0.048+-0.013	0.000+-0.001	0.000+-0.007 P
6 S		1.525+-0.192	0.871+-0.140	1.525+-0.295	1.000+-0.274 S
7 CL	*	1.495+-0.181	0.854+-0.134	1.653+-1.197	1.106+-1.194 CL
8 K	*	1.539+-0.177	0.879+-0.134	1.420+-0.723	0.923+-0.639 K
9 CA		0.302+-0.040	0.173+-0.029	0.426+-0.205	1.410+-1.173 CA
10 TI		< 0.101	< 0.058	0.025+-0.014	0.000+-0.000 TI
11 V	*	0.015+-0.004	0.009+-0.002	0.009+-0.002	0.584+-0.148 V
12 MN		0.025+-0.005	0.014+-0.003	0.022+-0.010	0.868+-0.515 MN
13 FE	*	0.172+-0.023	0.098+-0.016	0.200+-0.066	1.167+-0.594 FE
14 HI	*	0.007+-0.004	0.004+-0.003	0.013+-0.003	1.773+-0.833 HI
15 CU		0.031+-0.007	0.017+-0.004	0.004+-0.001	0.117+-0.034 CU
16 ZH		0.084+-0.011	0.048+-0.008	0.057+-0.025	0.678+-0.361 ZH
17 AS		< 0.374	< 0.214	0.000+-0.001	0.000+-0.000 AS
18 BR		0.198+-0.022	0.107+-0.017	0.195+-0.066	1.038+-0.505 BR
19 SR		< 0.182	< 0.104	0.000+-0.001	0.000+-0.000 SR
20 CD		< 1.060	< 0.606	0.000+-0.001	0.000+-0.000 CD
21 PB	*	0.517+-0.063	0.296+-0.047	0.508+-0.075	0.981+-0.204 PB
22 OC	*	23.520+-5.480	13.441+-3.409	31.837+-8.604	1.354+-0.616 OC
23 EC	*	20.590+-4.250	11.766+-2.699	9.358+-5.254	0.455+-0.280 EC

MEAS AMB MASS (UG/M3): FINE 175 0+-17 5

CMBDEQ RESULTS FOR CMB # 010001  
 FINE PARTICULATE FRACTION  
 SAMPLING DATE: 81 115 SITE: SITE 8 SITE CODE: 0000008  
 SAMPLING DURATION: 24 HRS. WITH START HOUR: 0  
 BACKGROUND SITE SUBTRACTED: NO  
 EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 1 317 DEGREES OF FREEDOM: 5  
 CODE SOURCE FLG UG/M<sup>3</sup> %

1	RESWD	*	65.987+-19.671	58.599+-20.561
4	TRANS	*	14.502+-2.712	12.878+-3.388
5	RDOIL	*	0.878+-0.259	0.780+-0.272
11	MARIN	*	2.497+-0.521	2.217+-0.619
<b>TOTAL:</b>				<b>93.864+-19.866</b>
				<b>74.474+-22.386</b>

SPECIE CODE	FIT FLG	MEAS. UG/M <sup>3</sup>	FINE SUSPENDED PARTICULATE		
			PERCENT	CALC. UG/M <sup>3</sup>	RATIO
1	HA	*	1.246+-0.203	1.107+-0.273	1.084+-0.105
2	MG		1.804+-0.549	1.602+-0.571	0.293+-0.123
3	AL		< 0.321	< 0.285	0.039+-0.023
4	SI		< 0.100	< 0.089	0.094+-0.032
5	P		0.149+-0.073	0.133+-0.069	0.000+-0.001
6	S		4.229+-0.585	3.756+-0.868	0.888+-0.731
7	CL	*	1.006+-0.174	0.893+-0.226	1.675+-0.434
8	K	*	0.693+-0.100	0.615+-0.144	0.605+-0.462
9	CA		0.109+-0.028	0.097+-0.030	0.263+-0.228
10	TI		0.028+-0.013	0.025+-0.013	0.047+-0.054
11	V	*	0.023+-0.011	0.021+-0.010	0.030+-0.007
12	MN		0.054+-0.014	0.048+-0.015	0.000+-0.001
13	FE	*	0.735+-0.101	0.653+-0.150	0.294+-0.260
14	HI	*	0.056+-0.017	0.050+-0.018	0.047+-0.011
15	CU		0.089+-0.020	0.079+-0.023	0.001+-0.001
16	ZH		0.230+-0.035	0.205+-0.049	0.041+-0.028
17	AS		< 0.073	< 0.065	0.000+-0.001
18	BR		15.941+-1.788	14.156+-3.063	0.777+-0.262
19	SR		< 0.022	< 0.013	0.000+-0.001
20	CD		0.189+-0.121	0.168+-0.112	0.000+-0.001
21	PB	*	1.977+-0.239	1.755+-0.388	2.002+-0.300
22	OC	*	44.650+-6.460	39.651+-9.314	37.686+-9.192
23	EC	*	7.740+-1.600	6.873+-1.907	12.234+-5.717

MEAS AMB MASS (UG/M<sup>3</sup>): FINE: 112.6+-20.8

CMBDEQ RESULTS FOR CMB # 010003  
 FINE PARTICULATE FRACTION  
 SAMPLING DATE: 81 116 SITE: SITE 8 SITE CODE: 0000009  
 SAMPLING DURATION: 24 HRS. WITH START HOUR: 0  
 BACKGROUND SITE SUBTRACTED: NO  
 EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 1.053 DEGREES OF FREEDOM: 5  
 CODE SOURCE FLG UG/M3 %

1	RESWD	*	68	242+-19.962	74.816+-26.910
4	TRANS	*	12.846+-	2.411	14.084+- 3.959
5	RDOIL	*	1	123+- 0.304	1.231+- 0.421
8	RDUST	*	0	437+- 0.364	0 479+- 0.412
11	MARIN	*	0	963+- 0.258	1.056+- 0.359
18	SECSO	*	6	820+- 2.454	7.477+- 3.112
19	GALVN	*	0	164+- 0.051	0.180+- 0.067
<hr/>					
TOTAL: 90 595+-20 263 99.322+-30.426					

SPECIE CODE	FIT FLG	MEAS.	FINE		SUSPENDED PARTICULATE		RATIO
			UG/M3	PERCENT	CALC	UG/M3	
1 NA	*	0.513+- 0.089	0.562+- 0.153	0.481+- 0.053	0.939+- 0.142	NA	
2 MG		< 0.300	< 0.329	0.212+- 0.113	0.000+- 0.000	MG	
3 AL		< 0.328	< 0.360	0.087+- 0.022	0.000+- 0.000	AL	
4 SI	*	0.198+- 0.094	0.217+- 0.112	0.206+- 0.030	1.042+- 0.218	SI	
5 P		0.148+- 0.072	0.162+- 0.086	0.001+- 0.001	0.010+- 0.005	P	
6 S	*	3.061+- 0.456	3.356+- 0.862	3.061+- 0.661	1.000+- 0.306	S	
7 CL	*	0.610+- 0.129	0.668+- 0.199	1.035+- 0.374	1.697+- 1.209	CL	
8 K	*	0.570+- 0.085	0.625+- 0.161	0.607+- 0.478	1.064+- 1.223	K	
9 CA		0.081+- 0.024	0.089+- 0.032	0.231+- 0.203	2.852+- 7.590	CA	
10 TI		0.021+- 0.012	0.023+- 0.014	0.044+- 0.048	2.078+- 5.147	TI	
11 V	*	0.024+- 0.012	0.027+- 0.014	0.039+- 0.008	1.597+- 0.655	V	
12 MH		0.056+- 0.014	0.062+- 0.020	0.001+- 0.001	0.020+- 0.013	MH	
13 FE	*	0.630+- 0.089	0.691+- 0.174	0.293+- 0.230	0.465+- 0.403	FE	
14 HI	*	0.082+- 0.019	0.090+- 0.028	0.060+- 0.014	0.730+- 0.204	HI	
15 CU		0.040+- 0.014	0.044+- 0.018	0.001+- 0.001	0.022+- 0.019	CU	
16 ZH	*	0.173+- 0.028	0.190+- 0.050	0.173+- 0.029	1.000+- 0.274	ZH	
17 AS		< 0.071	< 0.078	0.000+- 0.001	0.000+- 0.000	AS	
18 BR	15	638+- 1.754	17.144+- 4.071	0.686+- 0.233	0.044+- 0.015	BR	
19 SR		< 0.022	< 0.024	0.000+- 0.001	0.000+- 0.000	SR	
20 CD		< 0.124	< 0.138	0.000+- 0.001	0.002+- 0.007	CD	
21 PB	*	1.754+- 0.213	1.923+- 0.465	1.775+- 0.266	1.012+- 0.216	PB	
22 OC	*	43.100+- 6.400	47.252+- 12.127	38.062+- 9.483	0.983+- 0.294	OC	
23 EC	*	10.660+- 2.200	11.687+- 3.435	12.090+- 5.865	1.134+- 0.832	EC	

MEAS AMB MASS (UG/M3): FINE: 91.2+-19.1

CMBDEQ RESULTS FOR CMB # 010012  
 FINE PARTICULATE FRACTION  
 SAMPLING DATE: 81 104 SITE: SITE 9 SITE CODE: 0000009  
 SAMPLING DURATION: 22 HRS. WITH START HOUR: 99  
 BACKGROUND SITE SUBTRACTED: NO  
 EFFECTIVE VARIANCE FITTING REDUCED CHI SQUARE: 0.226 DEGREES OF FREEDOM: 4  
 CODE SOURCE FLG UG/M3 %

1	RESWD	*	44.375+-32.257	87.019+-63.874
4	TRANS	*	2.156+-0.361	4.189+-0.826
5	RDOIL	*	0.722+-0.141	1.415+-0.311
8	RDUST	*	0.488+-0.088	0.956+-0.198
11	MARIN	*	1.054+-0.297	2.067+-0.601
14	ALUMP	*	2.557+-0.826	5.014+-1.698
18	SECSO	*	5.189+-0.894	10.175+-2.037
19	GALVN	*	0.046+-0.027	0.090+-0.054
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TOTAL: 56.566+-32.284 110.925+-64.309				

SPECIE CODE	FIT FLG	MEAS	FINE		SUSPENDED PARTICULATE		RATIO
			UG/M3	PERCENT	CALC.	UG/M3	
1 MA	*	0.601+-0.086	1.179+-0.208	0.589+-0.065	0.979+-0.151	NA	
2 MG	*	0.106+-0.038	0.208+-0.078	0.179+-0.063	1.692+-1.170	MG	
3 AL	*	0.768+-0.088	1.507+-0.231	0.761+-0.205	0.990+-0.375	AL	
4 SI	*	0.163+-0.019	0.319+-0.050	0.161+-0.014	0.992+-0.118	SI	
5 P	*	0.111+-0.013	0.217+-0.034	0.062+-0.000	0.015+-0.004	P	
6 S	*	2.045+-0.237	4.011+-0.619	2.045+-0.165	1.000+-0.114	S	
7 CL	*	0.659+-0.079	1.293+-0.203	0.732+-0.251	1.110+-0.568	CL	
8 K	*	0.458+-0.053	0.899+-0.139	0.408+-0.311	0.889+-0.907	K	
9 CR	*	0.045+-0.007	0.088+-0.016	0.094+-0.043	2.074+-2.185	CR	
10 TI	*	0.002+-0.001	0.004+-0.002	0.011+-0.008	5.683+-524.1	TI	
11 V	*	0.029+-0.004	0.057+-0.010	0.027+-0.006	0.922+-0.259	V	
12 MN	*	0.002+-0.001	0.004+-0.002	0.001+-0.001	0.628+-0.284	MN	
13 FE	*	0.075+-0.010	0.146+-0.024	0.097+-0.039	1.297+-0.861	FE	
14 HI	*	0.041+-0.006	0.080+-0.014	0.044+-0.009	1.070+-0.324	HI	
15 CU	*	0.016+-0.003	0.032+-0.006	0.002+-0.001	0.105+-0.032	CU	
16 ZH	*	0.059+-0.007	0.115+-0.018	0.059+-0.017	1.000+-0.403	ZH	
17 AS	*	0.089+-0.013	0.175+-0.031	0.000+-0.000	0.000+-0.005	AS	
18 BR	*	0.100+-0.012	0.195+-0.030	0.117+-0.039	1.173+-0.599	BR	
19 SR	*	0.003+-0.001	0.005+-0.003	0.000+-0.000	0.039+-0.173	SR	
20 CD	*	<0.204	<0.400	0.000+-0.001	0.000+-0.000	CD	
21 PB	*	0.316+-0.037	0.620+-0.096	0.296+-0.044	0.938+-0.192	PB	
22 OC	-1	0.000+-1.000	-1.000+-1.000	22.271+-6.128	0.938+-0.000	OC	
23 EC	-1	0.000+-1.000	-1.000+-1.000	6.238+-3.733	0.938+-0.000	EC	

MEAS AMB MASS (UG/M3): FINE: 51.0+-5.2

## CMBDEQ RESULTS FOR CMB # 010013

FINE PARTICULATE FRACTION

SAMPLING DATE: 81 116 SITE: SITE 9 SITE CODE: 0000009

SAMPLING DURATION: 23 HRS WITH START HOUR: 99

BACKGROUND SITE SUBTRACTED: NO

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 3.266 DEGREES OF FREEDOM: 4  
CODE SOURCE FLG UG/M3 %

1	RESWD	*	43.689+-32.831	112.077+-85.005
4	TRANS	*	2.839+- 0.464	7.283+- 1.407
5	RDOIL	*	0.574+- 0.107	1.472+- 0.314
9	ROUST	*	0.548+- 0.086	1.405+- 0.264
11	MARIN	*	1.673+- 0.328	4.292+- 0.950
14	ALUMP	*	0.377+- 0.152	0.966+- 0.402
13	SECSO	*	3.993+- 0.820	10.244+- 2.353
19	GALYN	*	0.041+- 0.027	0.104+- 0.070
<hr/>				
TOTAL: 53.733+-32.846 137.843+-85.443				

SPECIE CODE	FIT FLG	MEAS. UG/M3	FINE PERCENT	SUSPENDED PARTICULATE CALC UG/M3	RATIO
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1	NA	*	0.781+- 0.112	2.004+- 0.353	0.741+- 0.071	0.948+- 0.125	NA
2	MG	*	< 0.659	< 1.690	0.154+- 0.045	0.000+- 0.000	MG
3	HL	*	0.177+- 0.023	0.455+- 0.074	0.179+- 0.032	1.008+- 0.255	AL
4	SI	*	0.168+- 0.020	0.431+- 0.068	0.173+- 0.012	1.031+- 0.102	SI
5	P	*	0.095+- 0.011	0.243+- 0.038	0.002+- 0.000	0.019+- 0.005	P
6	S	*	1.647+- 0.192	4.226+- 0.657	1.647+- 0.181	1.000+- 0.155	S
7	CL	*	0.759+- 0.090	1.947+- 0.305	0.963+- 0.279	1.269+- 0.594	CL
8	K	*	0.526+- 0.061	1.348+- 0.209	0.466+- 0.306	0.772+- 0.735	K
9	CA	*	0.037+- 0.006	0.094+- 0.013	0.101+- 0.051	2.751+- 4.104	CA
10	TI	*	0.007+- 0.002	0.019+- 0.005	0.012+- 0.011	1.637+- 2.690	TI
11	V	*	0.019+- 0.003	0.050+- 0.009	0.020+- 0.004	1.047+- 0.325	V
12	MH	*	0.025+- 0.003	0.064+- 0.010	0.001+- 0.000	0.044+- 0.018	MH
13	FE	*	0.316+- 0.037	0.811+- 0.126	0.099+- 0.051	0.312+- 0.169	FE
14	HI	*	0.031+- 0.004	0.073+- 0.014	0.031+- 0.007	1.019+- 0.322	HI
15	CU	*	0.020+- 0.003	0.052+- 0.009	0.001+- 0.000	0.032+- 0.023	CU
16	ZH	*	0.054+- 0.007	0.138+- 0.023	0.054+- 0.016	1.000+- 0.432	ZH
17	AS	*	0.023+- 0.008	0.058+- 0.023	0.000+- 0.000	0.000+- 0.019	AS
18	BR	*	0.129+- 0.015	0.330+- 0.051	0.155+- 0.051	1.202+- 0.625	BR
19	SR	*	0.003+- 0.001	0.008+- 0.004	0.000+- 0.000	0.035+- 0.134	SR
20	CD	*	< 0.202	< 0.517	0.000+- 0.001	0.000+- 0.000	CD
21	PB	*	0.377+- 0.043	0.967+- 0.149	0.393+- 0.059	1.043+- 0.225	PB
22	OC	-1	0.000+-1.000	-1.000+-1.000	22.058+- 6.034	1.043+- 0.000	OC
23	EC	-1	0.000+-1.000	-1.000+-1.000	6.334+- 3.680	1.043+- 0.000	EC

MEAS AMB MASS (UG/M3): FINE: 39.0+-4.0

CMBDEQ RESULTS FOR CMB # 010014  
 FINE PARTICULATE FRACTION  
 SAMPLING DATE: 81 203 SITE: SITE 9 SITE CODE: 0000009  
 SAMPLING DURATION: 22 HRS WITH START HOUR: 99  
 BACKGROUND SITE SUBTRACTED: NO  
 EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 5.746 DEGREES OF FREEDOM: 6  
 CODE SOURCE FLG UG/M3 %

1	RESWD	*	20.378+-14.615	45.284+-32.808
4	TRAHS	*	3.022+- 0.486	6.717+- 1.280
5	RDOIL	*	0.197+- 0.045	0.437+- 0.109
3	RDUST	*	1.663+- 0.213	3.696+- 0.607
11	MARIN	*	0.473+- 0.110	1.051+- 0.267
14	ALUMP	*	0.384+- 0.202	0.853+- 0.457
18	SECSO	*	3.473+- 0.706	7.718+- 1.756
19	GALVN	*	0.047+- 0.015	0.104+- 0.034
<hr/>				
TOTAL: 29.637+-14.644 65.860+-33.233				

SPECIE CODE	FIT FLG	MEAS	FINE SUSPENDED PARTICULATE			RATIO
			UG/M3	PERCENT	CALC UG/M3	
1 NA	*	0.241+- 0.035	0.535+- 0.095	0.229+- 0.022	0.950+- 0.128	NA
2 MG	*	0.027+- 0.013	0.061+- 0.031	0.096+- 0.029	3.476+- 3.779	MG
3 AL	*	0.296+- 0.036	0.657+- 0.104	0.298+- 0.034	1.008+- 0.161	AL
4 SI	*	0.437+- 0.050	0.971+- 0.149	0.476+- 0.030	1.089+- 0.103	SI
5 P	*	0.099+- 0.012	0.221+- 0.035	0.006+- 0.001	0.056+- 0.006	P
6 S	*	1.355+- 0.160	3.012+- 0.471	1.355+- 0.166	1.000+- 0.173	S
7 CL	*	0.265+- 0.035	0.590+- 0.099	0.369+- 0.116	1.391+- 0.752	CL
8 K	*	0.256+- 0.031	0.570+- 0.090	0.195+- 0.143	0.761+- 0.699	K
9 CA	*	0.094+- 0.012	0.208+- 0.034	0.074+- 0.048	0.793+- 0.659	CA
10 TI	*	0.020+- 0.003	0.045+- 0.008	0.017+- 0.011	0.859+- 0.731	TI
11 V	*	0.009+- 0.002	0.019+- 0.004	0.008+- 0.002	0.892+- 0.235	V
12 MH	*	0.015+- 0.002	0.034+- 0.006	0.003+- 0.000	0.165+- 0.021	MH
13 FE	*	0.688+- 0.079	1.530+- 0.235	0.146+- 0.054	0.213+- 0.081	FE
14 HI	*	0.010+- 0.002	0.022+- 0.005	0.011+- 0.002	1.163+- 0.381	HI
15 CU	*	0.013+- 0.002	0.028+- 0.006	0.000+- 0.000	0.035+- 0.019	CU
16 ZH	*	0.049+- 0.006	0.110+- 0.018	0.049+- 0.008	1.000+- 0.236	ZH
17 AS	*	0.035+- 0.009	0.078+- 0.023	0.000+- 0.000	0.000+- 0.006	AS
18 BR	*	0.138+- 0.016	0.306+- 0.047	0.162+- 0.055	1.177+- 0.614	BR
19 SR	*	0.003+- 0.001	0.006+- 0.003	0.000+- 0.000	0.124+- 0.092	SR
20 CD	*	< 0.207	< 0.461	0.001+- 0.001	0.000+- 0.000	CD
21 PB	*	0.392+- 0.045	0.872+- 0.134	0.419+- 0.063	1.068+- 0.233	PB
22 OC	-1	0.000+-1.000	-1.000+-1.000	1.026+- 2.824	1.068+- 0.000	OC
23 EC	-1.000+-1.000	-1.000+-1.000	3.398+- 1.736	1.068+- 0.000	EC	

MEAS AMB MASS (UG/M3): FINE: 45.0+- 4.6

CMBDEQ RESULTS FOR CMB # 010015  
 FINE PARTICULATE FRACTION  
 SAMPLING DATE: 21 209 SITE: SITE 9 SITE CODE: 0000009  
 SAMPLING DURATION: 15 HRS. WITH START HOUR: 99  
 BACKGROUND SITE SUBTRACTED: NO  
 EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.408 DEGREES OF FREEDOM: 4  
 CODE SOURCE FLG UG/M3 %

1	RESWD	*	32.515+-23.716	61.357+-45.204
4	TRANS	*	3.575+- 0.594	6.747+- 1.321
5	RDOIL	*	0.109+- 0.034	0.206+- 0.069
8	RDUST	*	0.841+- 0.128	1.587+- 0.292
11	MARH	*	0.249+- 0.177	1.603+- 0.374
14	ALUMP	*	0.289+- 0.144	0.545+- 0.278
13	SECGO	*	4.319+- 0.874	8.150+- 1.853
19	GALVH	*	0.062+- 0.022	0.117+- 0.043
<b>TOTAL:</b>			<b>42.560+-23.741</b>	<b>80.312+-45.568</b>

SPECIE CODE	FIT FLG	MEAS.	FINE	SUSPENDED PARTICULATE	CALC. UG/M3	RATIO
			UG/M3	PERCENT		
1 HA	*	0.392+- 0.056	0.739+- 0.131	0.382+- 0.037	0.976+-0.134	HA
2 MG	*	0.023+- 0.018	0.044+- 0.034	0.114+- 0.037	4.918+-7.979	MG
3 AL	*	0.182+- 0.025	0.344+- 0.060	0.184+- 0.025	1.009+-0.197	AL
4 SI	*	0.253+- 0.030	0.478+- 0.076	0.253+- 0.017	0.999+-0.095	SI
5 P	*	0.104+- 0.013	0.197+- 0.032	0.003+- 0.000	0.027+-0.004	P
6 S	*	1.674+- 0.200	3.160+- 0.500	1.674+- 0.203	1.000+-0.171	S
7 CL	*	0.514+- 0.065	0.971+- 0.159	0.593+- 0.188	1.154+-0.558	CL
8 K	*	0.352+- 0.042	0.665+- 0.106	0.299+- 0.028	0.847+-0.847	K
9 CA	*	0.040+- 0.007	0.076+- 0.015	0.085+- 0.059	2.126+-3.435	CA
10 TI	*	0.010+- 0.002	0.020+- 0.005	0.015+- 0.013	1.464+-2.236	TI
11 Y	*	0.003+- 0.001	0.006+- 0.003	0.004+- 0.001	1.378+-0.491	Y
12 MN	*	0.008+- 0.002	0.015+- 0.004	0.001+- 0.000	0.158+-0.044	MN
13 FE	*	0.135+- 0.017	0.254+- 0.042	0.113+- 0.064	0.837+-0.621	FE
14 NI	*	0.009+- 0.002	0.016+- 0.005	0.006+- 0.001	0.736+-0.198	NI
15 CU	*	0.011+- 0.002	0.021+- 0.005	0.000+- 0.000	0.025+-0.030	CU
16 ZH	*	0.066+- 0.008	0.124+- 0.021	0.066+- 0.013	1.000+-0.273	ZH
17 RS	*	< 0.158	< 0.298	0.000+- 0.000	0.000+-0.000	RS
18 BR	*	0.178+- 0.021	0.336+- 0.052	0.192+- 0.065	1.080+-0.536	BR
19 SR	*	< 0.028	< 0.053	0.000+- 0.000	0.000+-0.000	SR
20 CD	*	< 0.202	< 0.382	0.000+- 0.001	0.000+-0.000	CD
21 PB	*	0.502+- 0.058	0.948+- 0.147	0.494+- 0.074	0.985+-0.207	PB
22 OC	-1	0.000+-1.000	-1.000+-1.000	17.015+- 4.498	0.985+-0.000	OC
23 EC	-1	0.000+-1.000	-1.000+-1.000	5.096+- 2.753	0.985+-0.000	EC

MEAS AMB MASS (UG/M3): FINE: 53.0+-5.5

CMBDEQ RESULTS FOR CMB # 010005  
 FINE PARTICULATE FRACTION  
 SAMPLING DATE: 801018 SITE: SITE10 SITE CODE: 0000000  
 SAMPLING DURATION: 24 HRS WITH START HOUR: 99  
 BACKGROUND SITE SUBTRACTED: NO  
 EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 1.352 DEGREES OF FREEDOM: 4  
 CODE SOURCE FLG UG/M3 %

1	RESWD	*	20	400+-15.317	46.383+-35.146
4	TRANS	*	6	067+-1.001	13.795+-2.678
5	RDOIL	*	0.317+-0.064	0.721+-0.162	
8	ROUST	*	0.499+-0.100	1.134+-0.255	
11	MARIN	*	0.547+-0.127	1.243+-0.314	
14	ALUMP	*	0.385+-0.154	0.876+-0.362	
18	SECSO	*	4.724+-1.175	10.742+-2.889	
19	GALYN	*	0.031+-0.015	0.070+-0.035	
TOTAL:			32.970+-15.396	74.963+-35.834	

SPECIE CODE	FIT FLG	MEAS	FINE UG/M3	SUSPENDED PARTICULATE PERCENT	CALC. UG/M3	RATIO
1 NA	*	0.289+-0.042	0.656+-0.116	0.263+-0.025	0.909+-0.118	NA
2 MG	*	< 0.540	< 1.227	0.110+-0.049	0.000+-0.000	MG
3 AL	*	0.173+-0.024	0.394+-0.067	0.174+-0.032	1.004+-0.264	AL
4 SI	*	0.177+-0.021	0.402+-0.063	0.176+-0.016	0.998+-0.129	SI
5 P	*	0.109+-0.013	0.248+-0.039	0.002+-0.000	0.015+-0.002	P
6 S	*	1.901+-0.223	4.323+-0.673	1.901+-0.314	1.000+-0.233	S
7 CL	*	0.273+-0.037	0.620+-0.105	0.470+-0.127	1.724+-0.925	CL
8 K	*	0.313+-0.037	0.712+-0.111	0.188+-0.143	0.602+-0.532	K
9 CA	*	0.067+-0.009	0.153+-0.026	0.103+-0.095	1.527+-2.569	CA
10 TI	*	0.006+-0.001	0.013+-0.004	0.022+-0.022	3.748+-514.7	TI
11 V	*	0.014+-0.002	0.033+-0.006	0.011+-0.002	0.788+-0.211	V
12 MM	*	0.003+-0.001	0.008+-0.002	0.001+-0.000	0.260+-0.069	MM
13 FE	*	0.086+-0.011	0.196+-0.032	0.148+-0.109	1.722+-2.513	FE
14 HI	*	0.014+-0.002	0.031+-0.007	0.018+-0.004	1.293+-0.460	HI
15 CU	*	0.008+-0.002	0.019+-0.004	0.000+-0.000	0.054+-0.028	CU
16 ZH	*	0.039+-0.005	0.089+-0.015	0.039+-0.009	1.000+-0.340	ZH
17 AS	*	< 0.259	< 0.590	0.000+-0.000	0.000+-0.000	AS
18 BR	*	0.368+-0.042	0.836+-0.127	0.324+-0.110	0.881+-0.338	BR
19 SR	*	0.002+-0.001	0.006+-0.003	0.000+-0.000	0.041+-0.089	SR
20 CD	*	< 0.204	< 0.464	0.000+-0.000	0.000+-0.000	CD
21 PB	*	0.873+-0.099	1.985+-0.303	0.838+-0.126	0.960+-0.199	PB
22 OC	-1	000+-1 000	-1 000+-1 000	12.362+-2 864	0.960+-0.600	OC
23 EC	-1	000+-1 000	-1 000+-1 000	4.196+-1 811	0.960+-0.600	EC

MEAS AMB MASS (UG/M3): FINE: 44.0+-4.5

## CMBDEQ RESULTS FOR CMB # 010006

## FINE PARTICULATE FRACTION

SAMPLING DATE: 81 104 SITE: SITE10 SITE CODE: 0000000

SAMPLING DURATION: 22 HRS. WITH START HOUR: 99

BACKGROUND SITE SUBTRACTED: NO

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.202 DEGREES OF FREEDOM: 5

CODE SOURCE FLG UG/M3 %

1	RESWD	*	31.381+-21.082	82.560+-56.117
4	TRANS	*	2.601+- 0.431	6.842+- 1.337
5	RDOIL	*	0.225+- 0.048	0.591+- 0.140
8	RDUST	*	0.427+- 0.071	1.122+- 0.219
11	MARIN	*	0.404+- 0.105	1.062+- 0.298
14	ALUMP	*	0.275+- 0.115	0.724+- 0.313
18	SECSO	*	3.648+- 0.702	9.598+- 2.097
19	GALVN	*	0.034+- 0.019	0.089+- 0.051
<hr/>				
TOTAL: 38.993+-21.099 102.586+-56.512				

SPECIE FIT FINE SUSPENDED PARTICULATE  
CODE FLG MEAS. UG/M3 PERCENT CALC. UG/M3 RATIO

-1	NA	*	0.204+- 0.029	0.537+- 0.095	0.207+- 0.022	1.012+- 0.157	NA
2	MG	*	< 0.266	< 0.699	0.078+- 0.031	0.000+- 0.000	MG
3	AL	*	0.134+- 0.018	0.352+- 0.061	0.133+- 0.023	0.995+- 0.246	AL
4	SI	*	0.136+- 0.016	0.357+- 0.057	0.135+- 0.010	0.995+- 0.100	SI
5	P	*	0.094+- 0.011	0.248+- 0.039	0.001+- 0.000	0.015+- 0.004	P
6	S	*	1.412+- 0.166	3.714+- 0.582	1.412+- 0.156	1.000+- 0.157	S
7	CL	*	0.451+- 0.056	1.188+- 0.191	0.386+- 0.166	0.855+- 0.484	CL
8	K	*	0.270+- 0.032	0.711+- 0.112	0.280+- 0.220	1.036+- 1.170	K
9	CA	*	0.041+- 0.006	0.108+- 0.020	0.065+- 0.045	1.591+- 2.041	CA
10	TI	*	0.002+- 0.001	0.006+- 0.003	0.011+- 0.010	5.027+- 5.235	TI
11	V	*	0.009+- 0.002	0.024+- 0.005	0.008+- 0.002	0.896+- 0.256	V
12	MN	*	0.001+- 0.001	0.004+- 0.002	0.001+- 0.000	0.537+- 0.263	MN
13	FE	*	0.053+- 0.007	0.139+- 0.024	0.077+- 0.047	1.464+- 1.365	FE
14	HI	*	0.011+- 0.002	0.030+- 0.007	0.013+- 0.003	1.111+- 0.363	HI
15	CU	*	0.008+- 0.002	0.020+- 0.005	0.000+- 0.000	0.043+- 0.043	CU
16	ZH	*	0.042+- 0.005	0.111+- 0.018	0.042+- 0.012	1.000+- 0.401	ZH
17	AS	*	< 0.163	< 0.429	0.000+- 0.000	0.000+- 0.000	AS
18	BR	*	0.139+- 0.016	0.365+- 0.057	0.139+- 0.047	1.004+- 0.481	BR
19	SR	*	0.002+- 0.001	0.005+- 0.004	0.000+- 0.000	0.044+- 0.160	SR
20	CD	*	< 0.176	< 0.463	0.000+- 0.000	0.000+- 0.000	CD
21	PB	*	0.370+- 0.043	0.973+- 0.151	0.360+- 0.054	0.973+- 0.203	PB
22	OC	-1	0.000+--1.000	-1.000+--1.000	16.067+- 4.336	0.973+- 0.000	OC
23	EC	-1	0.000+--1.000	-1.000+--1.000	4.696+- 2.648	0.973+- 0.000	EC

MEAS AMB MASS (UG/M3): FINE: 38.0+- 3.9

CMBDEQ RESULTS FOR CMB # 010007  
 FINE PARTICULATE FRACTION  
 SAMPLING DATE: 81 203 SITE: SITE10 SITE CODE: 0000000  
 SAMPLING DURATION: 24 HRS. WITH START HOUR: 99  
 BACKGROUND SITE SUBTRACTED: NO  
 EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.763 DEGREES OF FREEDOM: 6  
 CODE SOURCE FLC UG/M3 %

1	RESWD	*	35.546+-24.363	96.095+-66.603
4	TRANS	*	3.546+- 0.586	9.586+- 1.868
5	RDOIL	0	523+- 0.100	1.414+- 0.306
8	RDUST	1	648+- 0.173	4.455+- 0.655
11	MARIH	0	646+- 0.147	1.748+- 0.437
18	SECSO	*	3.199+- 0.786	8.648+- 2.303
19	GALVN	0	189+- 0.033	0.510+- 0.104

TOTAL: 45.297+-24.384 122.454+-67.116

SPECIE CODE	FIT FLC	MEAS.	FINE	SUSPENDED PARTICULATE	CALC	UG/M3	RATIO
			UG/M3	PERCENT			
1 NA		0.296+- 0.043	0.801+- 0.143	0.306+- 0.032	1.034+-0.155	NA	
2 MG		< 0.627	< 1.695	0.109+- 0.041	0.000+-0.000	MG	
3 AL	*	0.218+- 0.027	0.589+- 0.095	0.198+- 0.015	0.911+-0.093	AL	
4 SI	*	0.448+- 0.051	1.211+- 0.186	0.476+- 0.030	1.063+-0.099	SI	
5 P		0.109+- 0.013	0.295+- 0.046	0.005+- 0.001	0.050+-0.006	P	
6 S	*	1.356+- 0.161	3.667+- 0.576	1.356+- 0.198	1.000+-0.206	S	
7 CL	*	0.696+- 0.083	1.881+- 0.296	0.523+- 0.194	0.752+-0.349	CL	
8 K	*	0.223+- 0.027	0.602+- 0.095	0.328+- 0.249	1.474+-1.991	K	
9 CA		0.062+- 0.008	0.168+- 0.029	0.097+- 0.059	1.560+-1.762	CA	
10 TI		0.024+- 0.004	0.066+- 0.012	0.019+- 0.013	0.786+-0.685	TI	
11 V		0.014+- 0.002	0.038+- 0.007	0.019+- 0.004	1.321+-0.463	V	
12 MH		0.075+- 0.009	0.204+- 0.032	0.003+- 0.000	0.035+-0.006	MH	
13 FE	*	0.468+- 0.054	1.265+- 0.195	0.163+- 0.064	0.349+-0.144	FE	
14 NI	*	0.038+- 0.005	0.102+- 0.018	0.028+- 0.006	0.739+-0.208	NI	
15 CU		0.017+- 0.003	0.047+- 0.009	0.001+- 0.000	0.030+-0.023	CU	
16 ZH		0.170+- 0.020	0.461+- 0.072	0.170+- 0.016	1.000+-0.129	ZH	
17 AS		< 0.195	< 0.528	0.000+- 0.000	0.000+-0.000	AS	
18 BR	*	0.168+- 0.019	0.454+- 0.070	0.190+- 0.064	1.131+-0.577	BR	
19 SR		0.002+- 0.001	0.006+- 0.004	0.000+- 0.000	0.143+-0.163	SR	
20 CD		< 0.204	< 0.552	0.001+- 0.001	0.000+-0.000	CD	
21 PB	*	0.505+- 0.058	1.365+- 0.210	0.492+- 0.073	0.974+-0.203	PB	
22 OC		-1.000+-1.000	-1.000+-1.000	18.466+- 4.915	0.974+-0.000	OC	
23 EC		-1.000+-1.000	-1.000+-1.000	5.476+- 3.005	0.974+-0.000	EC	

MEAS AMB. MASS (UG/M3): FINE: 37.0+- 3.9

## CMBDEQ RESULTS FOR CMB # 010016

## FINE PARTICULATE FRACTION

SAMPLING DATE: 801117 SITE: SITE11 SITE CODE: 0000001

SAMPLING DURATION: 24 HRS WITH START HOUR: 99

BACKGROUND SITE SUBTRACTED: NO

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.822 DEGREES OF FREEDOM: 4  
CODE SOURCE FLG UG/M3 %

1	RESWD	*	51.671+-32.300	99.385+-62.942
4	TRANS	*	2.264+-0.379	4.354+-0.852
5	RDOIL	*	0.036+-0.024	0.070+-0.047
9	RDUST	*	1.302+-0.142	2.504+-0.373
18	SECSO	*	3.660+-0.729	7.040+-1.574

TOTAL 58.933+-32.311 113.353+-63.205

SPECIE CODE	FIT FLG	FINE		SUSPENDED PARTICULATE		CALC UG/M3	RATIO
		MEAS	UG/M3	PERCENT	UG/M3		

1	HA	*	0.076+-0.011	0.146+-0.027	0.044+-0.024	0.581+-0.362	HA
2	MG	*	0.024+-0.011	0.046+-0.021	0.081+-0.041	3.409+-6.145	MG
3	AL	*	0.189+-0.024	0.364+-0.059	0.158+-0.015	0.834+-0.102	AL
4	SI	*	0.352+-0.040	0.677+-0.104	0.378+-0.026	1.073+-0.107	SI
5	P	*	0.093+-0.011	0.178+-0.028	0.004+-0.001	0.042+-0.007	P
6	S	*	1.400+-0.165	2.693+-0.413	1.400+-0.165	1.000+-0.166	S
7	CL	*	0.431+-0.053	0.930+-0.133	0.318+-0.264	0.736+-0.759	CL
8	K	*	0.220+-0.026	0.422+-0.067	0.465+-0.362	2.116+-3.854	K
9	CR	*	0.065+-0.009	0.125+-0.021	0.072+-0.047	1.106+-1.073	CR
10	TI	*	0.005+-0.001	0.010+-0.003	0.013+-0.008	2.416+-4.071	TI
11	V	*	< 0.016	< 0.031	0.002+-0.001	0.000+-0.000	V
12	MN	*	0.003+-0.001	0.007+-0.002	0.003+-0.001	0.924+-0.236	MN
13	FE	*	0.068+-0.009	0.131+-0.022	0.112+-0.041	1.643+-1.154	FE
14	NI	*	0.002+-0.001	0.004+-0.002	0.002+-0.001	0.991+-0.461	NI
15	CU	*	0.004+-0.001	0.009+-0.002	0.000+-0.001	0.058+-0.117	CU
16	ZH	*	0.032+-0.004	0.062+-0.010	0.022+-0.019	0.677+-0.725	ZH
17	AS	*	< 0.161	< 0.310	0.000+-0.001	0.000+-0.000	AS
18	BR	*	0.123+-0.014	0.236+-0.036	0.120+-0.041	0.982+-0.468	BR
19	SR	*	0.003+-0.001	0.005+-0.003	0.000+-0.001	0.062+-0.206	SR
20	CD	*	< 0.207	< 0.398	0.001+-0.001	0.000+-0.000	CD
21	PE	*	0.323+-0.037	0.622+-0.096	0.314+-0.047	0.970+-0.202	PE
22	OC	-1	0.000--1.000	-1.000--1.000	25.523+-7.133	0.970+-0.000	OC
23	EC	-1	0.000--1.000	-1.000--1.000	7.205+-4.346	0.970+-0.000	EC

MEAS AVE MASS (UG/M3) FINE: 52.0+-5.3

## CMBDEQ RESULTS FOR CMB # 010017

## FINE PARTICULATE FRACTION

SAMPLING DATE: 801211 SITE: SITE11 SITE CODE: 0000001

SAMPLING DURATION: 23 HRS WITH START HOUR: 99

BACKGROUND SITE SUBTRACTED: NO

EFFECTIVE VARIANCE FITTING REDUCED CHI SQUARE: 0.543 DEGREES OF FREEDOM: 7  
CODE SOURCE FLG UG/M3 %

1	RESWD	*	55	146+-32.401	76.602+-45.665
4	TRANS	*	2	675+- 0.436	3.716+- 0.713
5	RDDIL	*	0	070+- 0.026	0.098+- 0.037
9	RDUST	*	3	230+- 0.303	4.487+- 0.618
13	SECSD	*	3	925+- 0.799	5.452+- 1.239

TOTAL: 65 047+-32.415 90 355+-45.939

SPECIE CODE	FIT FLG	MEAS	FINE	SUSPENDED PARTICULATE	CALC	UG/M3	RATIO
			UG/M3	PERCENT			
1 NA		0 156+- 0.023	0 216+- 0.039	0 048+- 0.025	0 310+- 0.171	NA	
2 MG		0 069+- 0.025	0.096+- 0.036	0 124+- 0.045	1 783+- 1.333	MG	
3 AL	*	0 334+- 0.040	0 465+- 0.072	0.371+- 0.028	1.110+- 0.124	AL	
4 SI	*	0 976+- 0.110	1 355+- 0.205	0 920+- 0.063	0.943+- 0.088	SI	
5 P		0 102+- 0.012	0 142+- 0.022	0 010+- 0.001	0 095+- 0.011	P	
6 S	*	1 522+- 0.178	2.114+- 0.327	1 522+- 0.185	1 000+- 0.172	S	
7 CL	*	0 513+- 0.062	0 712+- 0.112	0 347+- 0.281	0 677+- 0.663	CL	
8 K	*	0 267+- 0.032	0 371+- 0.058	0.524+- 0.386	1 362+- 3.182	K	
9 CA	*	0 134+- 0.016	0 186+- 0.029	0 095+- 0.053	0.711+- 0.487	CA	
10 TI	*	0.032+- 0.004	0.045+- 0.008	0 023+- 0.010	0 712+- 0.381	TI	
11 V	*	0 004+- 0.001	0 006+- 0.002	0 003+- 0.001	0 733+- 0.231	V	
12 MN		0 009+- 0.002	0 012+- 0.003	0 008+- 0.001	0 875+- 0.133	MN	
13 FE	*	0 240+- 0.028	0 333+- 0.052	0 222+- 0.049	0 927+- 0.291	FE	
14 NI	*	0 003+- 0.001	0 004+- 0.002	0 004+- 0.001	1 226+- 0.535	NI	
15 CU		0 014+- 0.002	0.019+- 0.004	0 001+- 0.001	0 045+- 0.043	CU	
16 ZH		0 094+- 0.011	0 130+- 0.020	0 024+- 0.021	0 255+- 0.226	ZH	
17 RS		< 0.169	< 0.234	0 000+- 0.001	0 000+- 0.000	RS	
18 BR	*	0 130+- 0.015	0 181+- 0.028	0 142+- 0.048	1 095+- 0.552	BR	
19 SR		0 003+- 0.001	0 004+- 0.002	0 000+- 0.001	0 136+- 0.201	SR	
20 CC		< 0.202	< 0.281	0 002+- 0.002	0 000+- 0.000	CC	
21 PB	*	0 362+- 0.042	0 503+- 0.077	0 373+- 0.055	1 029+- 0.219	PB	
22 OC	-1	0.000+-1.000	-1 000+-1.000	27.355+- 7.614	1 023+- 0.000	OC	
23 EC	-1	0.000+-1.000	-1 000+-1.000	7.757+- 4.639	1 029+- 0.000	EC	

MEAS AME MASS (UG/M3): FINE: 72.0+-7.3

## CMBDER RESULTS FOR CMB # 010018

## FINE PARTICULATE FRACTION

SAMPLING DATE: 801219 SITE: SITE11 SITE CODE: 0000001

SAMPLING DURATION: 24 HRS WITH START HOUR: 39

BACKGROUND SITE SUBTRACTED: NO

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 1.088 DEGREES OF FREEDOM: 3  
CODE SOURCE FLG UG/M3 %

1	RESWD	*	48	064+-37	734	98	127+-77	682
4	TRANS	*	2.592+-	0.435	5.291+-	1.038		
5	RDOIL	*	0	035+-	0.024	0	072+-	0.049
9	RDUST	*	1	000+-	0.115	2	041+-	0.313
18	SECSD	*	2	222+-	0.641	4	535+-	1.389
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TOTAL: 53 912+-37 742 110.066+-77 863								

SPECIE CODE	FIT FLG	MEAS.	FINE		SUSPENDED PARTICULATE		CALC UG/M3	RATIO
			UG/M3	PERCENT				
1 HA		0.113+-	0.017	0	231+-	0.041	0.041+-	0.022
2 MG		0.024+-	0.013	0	050+-	0.028	0.076+-	0.040
3 AL	*	0.157+-	0.020	0	320+-	0.053	0.124+-	0.013
4 SI	*	0.268+-	0.031	0	548+-	0.084	0.295+-	0.020
5 P		0.085+-	0.010	0	174+-	0.028	0.003+-	0.001
6 S	*	0.930+-	0.112	1	900+-	0.300	0.931+-	0.165
7 CL		0.967+-	0.113	1	975+-	0.306	0.307+-	0.245
8 K	*	0.273+-	0.032	0	557+-	0.087	0.429+-	0.336
9 CA		0.044+-	0.006	0	090+-	0.016	0.071+-	0.049
10 TI		0.006+-	0.001	0	012+-	0.003	0.013+-	0.010
11 V		<	0.016	<	0.033		0.001+-	0.001
12 MN		0.004+-	0.001	0	008+-	0.002	0.002+-	0.001
13 FE	*	0.068+-	0.009	0	139+-	0.024	0.102+-	0.047
14 HI	*	0.002+-	0.001	0	004+-	0.002	0.002+-	0.001
15 CU		0.007+-	0.001	0	014+-	0.003	0.000+-	0.000
16 ZH		0.151+-	0.018	0	309+-	0.048	0.021+-	0.018
17 RS		<	0.173	<	0.353		0.000+-	0.000
18 BR	*	0.126+-	0.015	0	258+-	0.040	0.138+-	0.047
19 SR		0.002+-	0.001	0	005+-	0.003	0.000+-	0.000
20 CO		<	0.184	<	0.375		0.001+-	0.001
21 PB	*	0.378+-	0.044	0	772+-	0.119	0.359+-	0.054
22 OC		-1	000+-1.000	-1	000+-1.000	23	951+-	6.637
23 EC		-1	000+-1.000	-1	000+-1.000	6	829+-	4.045

MEAS AME MASS (UG/M3): FINE: 49.0+-5.0

## CMBDEQ RESULTS FOR CMB # 010019

FINE PARTICULATE FRACTION

SAMPLING DATE: 81 221 SITE: SITE11 SITE CODE: 0000001

SAMPLING DURATION: 24 HRS. WITH START HOUR: 99

BACKGROUND SITE SUBTRACTED: NO

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0 198 DEGREES OF FREEDOM: 2  
CODE SOURCE FLG UG/M3 %

1	RESWD	*	45.205+-37.205	107	678+-89	305
4	TRAHS	*	2 142+- 0.360	5.	101+- 1.003	
9	RDUST		1.077+- 0.149	2.	565+- 0.442	
18	SECSO	*	1.652+- 0.549	3	936+- 1.368	
<hr/>						
TOTAL:			50.076+-37.211	119.	280+-89	473

SPECIE CODE	FIT FLG	MEAS	FINE SUSPENDED PARTICULATE			
			UG/M3	PERCENT	CALC.	UG/M3
1 NH	*	0.249+- 0.036	0 594+- 0 104	0.038+- 0 021	0 151+- 0 084	NA
2 MG		0 023+- 0.011	0 055+- 0 028	0 072+- 0 037	3 082+-5	119 MG
3 AL	*	0 169+- 0 021	0 404+- 0 066	0 131+- 0 013	0 774+-0	0 094 AL
4 SI	*	0 318+- 0.037	0 759+- 0 117	0 314+- 0 021	0 986+-0	0 094 SI
5 P		0.074+- 0.009	0.176+- 0.028	0.003+- 0.001	0.044+-0	0.008 P
6 S	*	0.715+- 0.088	1.704+- 0.273	0 715+- 0 142	1.000+-0	.281 S
7 CL	*	0.439+- 0.054	1 046+- 0 167	0 282+- 0 231	0 641+-0	624 CL
8 K	*	0.405+- 0.047	0 966+- 0 150	0 405+- 0 316	1.000+-1	104 K
9 CR	*	0 063+- 0 009	0 151+- 0 026	0 064+- 0 043	1 008+-0	960 CR
10 TI	*	0 010+- 0.002	0 025+- 0 005	0 012+- 0 008	1.128+-1	163 TI
11 V	*	0 002+- 0 001	0 005+- 0 002	0 000+- 0 000	0 141+-0	246 V
12 MN		0 004+- 0 001	0 009+- 0 003	0 003+- 0 001	0 680+-0	162 MN
13 FE	*	0.076+- 0.010	0.182+- 0 031	0 096+- 0 039	1 261+-0	811 FE
14 HI	*	< 0 019	< 0 046	0 000+- 0 000	0.000+-0	0 000 HI
15 CU		0.004+- 0 001	0 009+- 0 003	0 000+- 0 000	0 050+-0	118 CU
16 ZH	*	0.044+- 0.006	0.104+- 0 017	0 019+- 0 017	0 434+-0	421 ZH
17 AS		< 0 158	< 0 376	0 000+- 0 000	0 000+-0	0 000 AS
18 BR	*	0 103+- 0 012	0 245+- 0 033	0 114+- 0 039	1 166+-0	561 BP
19 SR		0 004+- 0 001	0 009+- 0 003	0 000+- 0 000	0 040+-0	129 SR
20 CD		< 0 194	< 0 463	0 001+- 0 001	0 000+-0	0 000 CD
21 PS	*	0 311+- 0 036	0 740+- 0 114	0 297+- 0 044	0 955+-0	197 PS
22 DC	-1	0 000+-1 000	-1 000+-1 000	22 396+- 6 241	0 955+-0	0 000 DC
23 EC	-1	0 000+-1 000	-1 000+-1 000	6 346+- 3 303	0 955+-0	0 000 EC

MEAS AVERAGE MASS (UG/M3): FINE: 42.0+-4.3

## CMBDEQ RESULTS FOR CMB # 010008

FINE PARTICULATE FRACTION

SAMPLING DATE: 811211 SITE: SITE12 SITE CODE: 0000002

SAMPLING DURATION: 24 HRS WITH START HOUR: 99

BACKGROUND SITE SUBTRACTED: NO

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.688 DEGREES OF FREEDOM: 5  
CODE SOURCE FLG UG/M3 %

1	RESWD	*	26.506+-20.991	75.732+-60.483
4	TRANS	*	1.316+-0.228	3.761+-0.759
5	RDOIL	*	0.934+-0.175	2.669+-0.572
7	RDUST	*	0.698+-0.108	1.995+-0.372
14	ALUMP	*	0.150+-0.114	0.428+-0.328
15	KRAFT	*	6.987+-1.052	17.391+-3.502
18	SECSO	*	1.495+-0.707	4.271+-2.069
19	CALVH	*	0.032+-0.017	0.090+-0.051
TOTAL:			37.218+-21.031	106.338+-61.089

SPECIE CODE	FIT FLG	MEAS. UG/M3	FINE PERCENT	SUSPENDED PARTICULATE CALC. UG/M3	RATIO
1 HA	*	0.933+-0.133	2.667+-0.470	0.943+-0.048	0.903+-0.069 HA
2 MG	*	0.094+-0.037	0.269+-0.110	0.082+-0.048	0.875+-0.678 MG
3 AL	*	0.130+-0.017	0.371+-0.062	0.130+-0.023	1.000+-0.253 AL
4 SI	*	0.191+-0.022	0.546+-0.086	0.182+-0.009	0.953+-0.068 SI
5 P	*	0.081+-0.010	0.232+-0.037	0.000+-0.000	0.000+-0.003 P
6 S	*	1.434+-0.168	4.098+-0.640	1.434+-0.109	1.000+-0.108 S
7 CL	*	0.734+-0.087	2.098+-0.329	0.277+-0.138	0.378+-0.200 CL
8 K	*	0.338+-0.040	0.967+-0.151	0.329+-0.186	0.973+-0.766 K
9 CA	*	0.051+-0.007	0.145+-0.026	0.065+-0.040	1.293+-1.308 CA
10 TI	*	0.069+-0.002	0.025+-0.006	0.010+-0.005	1.178+-0.892 TI
11 V	*	0.035+-0.004	0.099+-0.016	0.032+-0.007	0.933+-0.275 V
12 MH	*	0.009+-0.002	0.027+-0.005	0.003+-0.000	0.333+-0.045 MH
13 FE	*	0.125+-0.015	0.356+-0.058	0.168+-0.026	1.345+-0.343 FE
14 HI	*	0.059+-0.008	0.168+-0.028	0.058+-0.011	0.991+-0.271 HI
15 CU	*	0.099+-0.012	0.283+-0.045	0.002+-0.001	0.023+-0.009 CU
16 ZH	*	0.045+-0.006	0.129+-0.021	0.045+-0.010	1.000+-0.319 ZH
17 AS	<	0.128	< 0.365	0.000+-0.000	0.000+-0.000 AS
18 BR	*	0.066+-0.008	0.190+-0.030	0.078+-0.024	1.179+-0.561 BR
19 SR	*	0.002+-0.001	0.006+-0.003	0.000+-0.000	0.000+-0.124 SR
20 CD	<	0.179	< 0.512	0.000+-0.000	0.000+-0.000 CD
21 PB	*	0.206+-0.024	0.589+-0.092	0.186+-0.027	0.903+-0.178 PB
22 OC	-1	0.000+-1.000	-1.000+-1.000	13.474+-3.661	0.903+-0.000 OC
23 EC	-1	0.000+-1.000	-1.000+-1.000	3.737+-2.230	0.903+-0.000 EC

MEAS AVERAGE MASS (UG/M3): FINE: 35.0+-3.6

## CMBDEQ RESULTS FOR CMB # C10009

FINE PARTICULATE FRACTION

SAMPLING DATE: 81 103 SITE: SITE12 SITE CODE: 00000002

SAMPLING DURATION: 24 HRS WITH START HOUR: 99

BACKGROUND SITE SUBTRACTED: NO

EFFECTIVE VARIANCE FITTING REDUCED CHI SQUARE: 0.441 DEGREES OF FREEDOM: 6  
CODE SOURCE FLG UG/M3 %

1	RESWD	*	14.265+-	9.216	35.663+-	23.328
4	TRANS	*	1.518+-	0.256	3.795+-	0.749
5	RDOIL	*	0.172+-	0.039	0.430+-	0.106
7	ROUST	*	0.736+-	0.102	1.840+-	0.318
14	ALUMP	*	0.180+-	0.116	0.450+-	0.293
15	KRAFT	*	1.229+-	0.252	3.072+-	0.705
18	SECSO	*	2.097+-	0.447	5.241+-	1.240
19	GALVN	*	0.034+-	0.010	0.084+-	0.027
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TOTAL: 20 230+- 9.235 50.575+- 23.664						

SPECIE CODE	FIT FLG	MEAS	FINE SUSPENDED PARTICULATE			RATIO
			UG/M3	PERCENT	CALC UG/M3	
1 HA	*	0.194+-	0.028	0.485+-	0.086	0.981+-0.086 NA
2 MG		< 0.235	< 0.235	< 0.587	0.046+-	0.018 0.000+-0.000 MG
3 AL	*	0.123+-	0.016	0.308+-	0.051	0.123+-0.025 0.986+-0.294 AL
4 SI	*	0.183+-	0.021	0.457+-	0.071	0.177+-0.009 0.969+-0.067 SI
5 P		0.058+-	0.007	0.146+-	0.024	0.000+-0.000 0.000+-0.002 P
6 S	*	0.949+-	0.114	2.373+-	0.374	0.949+-0.089 1.000+-0.132 S
7 CL	*	0.147+-	0.021	0.367+-	0.066	0.133+-0.074 0.905+-0.679 CL
8 K	*	0.135+-	0.017	0.338+-	0.055	0.150+-0.100 1.105+-1.099 K
9 CA	*	0.045+-	0.006	0.113+-	0.020	0.049+-0.026 1.073+-0.841 CA
10 TI	*	0.004+-	0.001	0.009+-	0.003	0.010+-0.006 2.751+-4.625 TI
11 V	*	0.008+-	0.001	0.019+-	0.004	0.006+-0.001 0.817+-0.221 V
12 MH		0.020+-	0.003	0.050+-	0.009	0.001+-0.000 0.068+-0.010 MH
13 FE	*	0.080+-	0.010	0.199+-	0.033	0.093+-0.028 1.167+-0.573 FE
14 NI	*	0.009+-	0.002	0.023+-	0.005	0.011+-0.002 1.200+-0.152 HI
15 CU		0.039+-	0.005	0.098+-	0.016	0.001+-0.000 0.017+-0.006 CU
16 ZH	*	0.036+-	0.005	0.090+-	0.015	0.036+-0.006 1.000+-0.221 ZH
17 AS		< 0.134	< 0.134	< 0.335	0.000+-	0.000 0.000+-0.000 AS
18 BR	*	0.078+-	0.009	0.194+-	0.030	0.083+-0.027 1.064+-0.517 ER
19 SR		0.002+-	0.001	0.006+-	0.003	0.000+-0.000 0.000+-0.058 SR
20 CD		< 0.152	< 0.152	< 0.382	0.000+-	0.000 0.000+-0.000 CD
21 PE	*	0.228+-	0.027	0.569+-	0.089	0.213+-0.031 0.933+-0.189 PB
22 DC	-1	0.000+-1.000	-1.000+-1.000	-1.000+-1.000	7.582+-	1.973 0.933+-0.000 DC
23 EC	-1	0.000+-1.000	-1.000+-1.000	-1.000+-1.000	2.222+-	1.207 0.933+-0.000 EC

MEAS AMB MASS (UG/M3): FINE: 40.0+-4.1

CMBDEQ RESULTS FOR CMB # 0100010  
 FINE PARTICULATE FRACTION  
 SAMPLING DATE: 81 110 SITE: SITE12 SITE CODE: 0000002  
 SAMPLING DURATION: 24 HRS WITH START HOUR: 99  
 BACKGROUND SITE SUBTRACTED: NO  
 EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 1.583 DEGREES OF FREEDOM: 5  
 CODE SOURCE FLG UG/M3 %

1	RESWD	*	21.231+-16.978	35.384+-28.522
4	TRANS	*	1.861+-0.322	3.102+-0.622
5	RDOIL	*	0.178+-0.047	0.297+-0.084
7	RDUST	*	0.886+-0.132	1.477+-0.266
14	ALUMP	*	1.202+-0.415	2.003+-0.721
15	KRAFT	*	3.525+-0.723	5.874+-1.344
19	SECSO	*	3.349+-0.740	5.582+-1.356
19	GALVN	*	0.047+-0.015	0.079+-0.027
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	TOTAL.		32.279+-17.018	53.798+-28.881

SPECIE CODE	FIT FLG	MEAS. UG/M3	FINE PERCENT	SUSPENDED PARTICULATE CALC UG/M3	RATIO
1 HA	*	0.595+-0.085	0.991+-0.174	0.532+-0.034	0.894+-0.077 HA
2 MG	*	0.080+-0.034	0.133+-0.058	0.099+-0.036	1.236+-0.711 MG
3 AL	*	0.425+-0.049	0.708+-0.109	0.420+-0.099	0.988+-0.328 AL
4 SI	*	0.238+-0.028	0.396+-0.061	0.220+-0.011	0.925+-0.065 SI
5 P	*	0.116+-0.014	0.194+-0.030	0.000+-0.000	0.000+-0.002 P
6 S	*	1.673+-0.195	2.788+-0.430	1.673+-0.122	1.000+-0.103 S
7 CL	*	1.249+-0.144	2.082+-0.320	0.231+-0.110	0.185+-0.090 CL
8 K	*	0.249+-0.020	0.414+-0.065	0.248+-0.149	0.996+-0.844 K
9 CA	*	0.051+-0.007	0.085+-0.015	0.064+-0.036	1.258+-1.140 CA
10 TI	*	0.006+-0.001	0.010+-0.003	0.013+-0.007	2.019+-2.536 TI
11 V	*	0.009+-0.002	0.014+-0.003	0.007+-0.001	0.830+-0.215 V
12 MH	*	0.005+-0.001	0.009+-0.002	0.002+-0.000	0.454+-0.066 MH
13 FE	*	0.066+-0.009	0.110+-0.019	0.141+-0.034	2.121+-1.208 FE
14 HI	*	0.014+-0.002	0.024+-0.005	0.016+-0.002	1.148+-0.261 HI
15 CU	*	0.028+-0.004	0.047+-0.008	0.002+-0.001	0.060+-0.019 CU
16 ZH	*	0.052+-0.006	0.086+-0.014	0.052+-0.008	1.000+-0.226 ZH
17 AS	*	<0.152	<0.254	0.000+-0.000	0.000+-0.000 AS
18 BR	*	0.088+-0.010	0.147+-0.023	0.104+-0.034	1.185+-0.595 BR
19 SR	*	0.002+-0.001	0.003+-0.002	0.000+-0.000	0.000+-0.129 SR
20 CD	*	<0.182	<0.304	0.000+-0.000	0.000+-0.000 CD
21 PB	*	0.305+-0.035	0.508+-0.078	0.261+-0.039	0.856+-0.166 PB
22 OC	-1	0.000+-1.000	-1.000+-1.000	11.168+-2.935	0.856+-0.000 OC
23 EC	-1	0.000+-1.000	-1.000+-1.000	3.204+-1.792	0.856+-0.000 EC

MEAS AMB MASS (UG/M3): FINE: 60.0+-6.1

CMBDEQ RESULTS FOR CME # 010011  
 FINE PARTICULATE FRACTION  
 SAMPLING DATE: 81 116 SITE: SITE12 SITE CODE: 0000002  
 SAMPLING DURATION: 23 HRS. WITH START HOUR: 99  
 BACKGROUND SITE SUBTRACTED: NO  
 EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 2.043 DEGREES OF FREEDOM: 6  
 CODE SOURCE FLG UG/M3 %

1	RESWD	*	40	507+-24	160	126.621+-76	663
4	TRAHS	*	1	003+-0	178	3.136+-0	645
5	RDOIL	*	0.578+-0	115	1	807+-0	405
7	RDUST	*	0	704+-0.109	1	2.193+-0	411
14	ALUMP	*	0	295+-0.147	1	0.921+-0	469
15	KRAFT	*	5	297+-1.037	16	559+-3	671
18	SECSO	*	2	915+-0.808	9	113+-2	697
19	GALVN	*	0	048+-0.024	0	149+-0	076
TOTAL:				51.347+-24	197	160.505+-77	462

SPECIE CODE	FIT FLG	MEAS.	FINE	SUSPENDED PARTICULATE	CALC. UG/M3	RATIO					
			UG/M3	PERCENT							
1 HA	*	0.995+-0	0.142	3 111+-0	549	0.747+-0	043	0.751+-0	055	HA	
2 MG		<	0.676	< 2	113	0.089+-0	045	0.000+-0	000	MG	
3 AL	*	0.168+-0	0.021	0	525+-0	086	0.168+-0	031	1 001+-0	265	AL
4 SI	*	0.201+-0	0.023	0	627+-0	098	0.177+-0	009	0 883+-0	057	SI
5 P		0.109+-0	0.013	0	340+-0	054	0.000+-0	000	0 000+-0	004	P
6 S	*	1	778+-0	206	5 559+-0	266	1 778+-0	120	1.000+-0	096	S
7 CL	*	0	331+-0	042	1 034+-0	170	0 329+-0	208	0.995+-0	885	CL
8 K	*	0	339+-0	040	1 059+-0	166	0 437+-0	284	1.291+-1	367	K
9 CA	*	0	070+-0	009	0 219+-0	037	0 066+-0	039	0.944+-0	774	CA
10 TI	*	0.005+-0	0.001	0	016+-0	005	0.009+-0	004	1.689+-1	449	TI
11 V	*	0.023+-0	0.003	0	073+-0	013	0 020+-0	004	0 874+-0	249	V
12 MH		0	018+-0	0002	0 056+-0	010	0 003+-0	000	0.153+-0	027	MH
13 FE	*	0	084+-0	011	0 262+-0	044	0 143+-0	020	1.706+-0	465	FE
14 HI	*	0.038+-0	0.005	0	120+-0	021	0 038+-0	007	1 003+-0	261	HI
15 CU		0.089+-0	0.011	0	280+-0	045	0 002+-0	001	0 021+-0	009	CU
16 ZN	*	0	061+-0	0008	0 191+-0	031	0 061+-0	015	1.000+-0	353	ZN
17 AS		<	0	114	< 0	357	0 000+-0	000	0 000+-0	000	AS
18 BR	*	0	056+-0	0007	0 177+-0	028	0 061+-0	018	1.072+-0	479	BR
19 SR		<	0	024	< 0	076	0 000+-0	000	0 000+-0	000	SR
20 CD		0.010+-0	0.007	0	030+-0	023	0 000+-0	000	0 000+-0	043	CD
21 PB	*	0	162+-0	019	0 505+-0	080	0 142+-0	021	0 881+-0	172	PB
22 OC	-1	000+-1	000	-1	000+-1	000	19 948+-5	591	0 281+-0	000	OC
23 EC	-1	000+-1	000	-1	000+-1	000	5.447+-3	404	0.881+-0	000	EC

MEAS AMB MASS (UG/M3): FINE: 32 0+-3 3

CMBDEQ RESULTS FOR CMB # 010001  
 FINE PARTICULATE FRACTION  
 SAMPLING DATE: 301030 SITE: SITE13 SITE CODE: 0000003  
 SAMPLING DURATION: 24 HRS. WITH START HOUR: 0  
 BACKGROUND SITE SUBTRACTED: NO  
 EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.450 DEGREES OF FREEDOM: 5  
 CODE SOURCE FLG UG/M3 %

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1	RESWD	*	34.371+-21.346	64.727+-40.732
4	TRANS	*	2.956+-0.486	5.567+-1.076
5	RDOIL	*	0.032+-0.030	0.061+-0.057
9	RDUST	*	0.890+-0.131	1.676+-0.300
14	ALUMP	*	0.721+-0.263	1.357+-0.515
19	SECSO	*	2.683+-0.656	5.053+-1.338
19	GALVN	*	0.073+-0.022	0.138+-0.044
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TOTAL:			41.727+-21.364	78.578+-41.015

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SPECIE CODE	FIT FLG	MEAS.	FINE UG/M3	SUSPENDED PARTICULATE PERCENT	CALC UG/M3	RATIO
1 HA	*	0	186+-0.027	0 351+-0.062	0 059+-0.020	0 318+-0.113 HA
2 MG	*	0	031+-0.012	0 058+-0.024	0 087+-0.036	2 853+-3 533 MG
3 AL	*	0	304+-0.036	0 573+-0.090	0 304+-0.059	0 999+-0.272 AL
4 SI	*	0	272+-0.031	0 512+-0.079	0 269+-0.019	0 990+-0.096 SI
5 P	*	0	078+-0.010	0 148+-0.023	0 003+-0.000	0 034+-0.006 P
6 S	*	1	082+-0.130	2.037+-0.320	1.082+-0.168	1 000+-0.220 S
7 CL	*	0	383+-0.048	0.721+-0.116	0.255+-0.177	0 666+-0.555 CL
8 K	*	0	242+-0.029	0.455+-0.072	0.311+-0.241	1.286+-1 621 K
9 CA	*	0	030+-0.005	0 057+-0.011	0 068+-0.050	2.230+-4 053 CA
10 TI	*	0	002+-0.001	0.004+-0.002	0 014+-0.011	6 237+-5 31 4 TI
11 V	*	0	002+-0.001	0.003+-0.002	0 002+-0.001	0 994+-0.393 V
12 MH	*	0	004+-0.001	0.008+-0.002	0 002+-0.000	0 496+-0.099 MH
13 FE	*	0	104+-0.013	0.197+-0.032	0 106+-0.053	1 014+-0.724 FE
14 HI	*	<	0.019	< 0.036	0 003+-0.001	0 000+-0.000 HI
15 CU	*	0	012+-0.002	0.022+-0.005	0 001+-0.000	0 042+-0.030 CU
16 ZH	*	0	075+-0.009	0 140+-0.022	0 075+-0.013	1 000+-0.252 ZH
17 AS	*	<	0.182	< 0.343	0 000+-0.000	0 000+-0.000 AS
18 BR	*	0	164+-0.019	0 308+-0.047	0 158+-0.054	0 962+-0.453 BR
19 SR	*	0	001+-0.001	0 003+-0.002	0 000+-0.000	0 080+-0.239 SR
20 CD	*	0	025+-0.009	0 048+-0.017	0 000+-0.001	0 019+-0.026 CD
21 PB	*	0	421+-0.048	0 793+-0.122	0 409+-0.061	0 971+-0.202 PB
22 OC	-1	000+-1 000	-1 000+-1 000	17 649+-4 750	0 971+-0 000	0 971+-0 000 OC
23 EC	-1	000+-1 000	-1 000+-1 000	5 172+-2 901	0 971+-0 000	0 971+-0 000 EC

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MEAS AMB MASS (UG/M3): FINE: 53.1+-5.4

CMBDEQ RESULTS FOR CMB # 010011  
 FINE PARTICULATE FRACTION  
 SAMPLING DATE: 801117 SITE: SITE14 SITE CODE: 0000004  
 SAMPLING DURATION: 24 HRS. WITH START HOUR: 0  
 BACKGROUND SITE SUBTRACTED: NO  
 EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.646 DEGREES OF FREEDOM: 3  
 CODE SOURCE FLG UG/M3 %

1	RESWD	*	16.387+-16.655	20	568+-41.135
4	TRANS	*	1.735+-0.292	4	263+-0.839
9	RDUST	*	0.307+-0.052	0	754+-0.149
12	HOGFU	*	1.257+-0.385	3	088+-0.998
14	ALUMP	*	0.437+-0.154	1	074+-0.394
18	SECSO	*	1.726+-0.411	4	241+-1.100
19	GALYN	*	0.027+-0.012	0	067+-0.030
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TOTAL:			21.875+-16.668	53	754+-41.328

SPECIE CODE	FIT FLG	FINE MEAS	SUSPENDED UG/M3	PARTICULATE PERCENT	CALC UG/M3	RATIO
1 HR	*	0.200+-0.029	0	492+-0.087	0.207+-0.039	1.035+-0.281 HA
2 MG		0.037+-0.013	0	092+-0.033	0.045+-0.019	1.195+-0.800 MG
3 AL	*	0.160+-0.021	0	393+-0.065	0.159+-0.035	0.995+-0.311 AL
4 SI	*	0.098+-0.012	0	242+-0.039	0.098+-0.007	0.992+-0.103 SI
5 P		0.052+-0.007	0	127+-0.021	0.001+-0.000	0.018+-0.004 P
6 S	*	0.712+-0.087	1	750+-0.280	0.712+-0.100	1.000+-0.198 S
7 CL	*	0.490+-0.059	1	205+-0.191	0.294+-0.173	0.599+-0.411 CL
8 K	*	0.198+-0.024	0	488+-0.078	0.260+-0.137	1.308+-1.139 K
9 CA		0.023+-0.004	0	057+-0.012	0.073+-0.038	3.127+-5.368 CA
10 TI		0.002+-0.001	0	005+-0.003	0.007+-0.006	3.220+-9.844 TI
11 V		0.001+-0.001	0	003+-0.002	0.000+-0.000	0.296+-0.200 V
12 MH		0.002+-0.001	0	005+-0.003	0.003+-0.001	1.735+-1.338 MH
13 FE	*	0.033+-0.006	0	082+-0.016	0.054+-0.031	1.622+-1.781 FE
14 HI		< 0.020	<	0.049	0.001+-0.000	0.000+-0.000 HI
15 CU		0.020+-0.003	0	049+-0.009	0.001+-0.000	0.029+-0.009 CU
16 ZH	*	0.033+-0.004	0	082+-0.014	0.033+-0.006	1.000+-0.275 ZH
17 AS		< 0.142	<	0.350	0.000+-0.000	0.000+-0.000 AS
18 BR	*	0.083+-0.010	0	205+-0.032	0.093+-0.031	1.112+-0.564 BR
19 SR		< 0.031	<	0.076	0.000+-0.000	0.000+-0.000 SR
20 CD		< 0.181	<	0.445	0.000+-0.000	0.000+-0.000 CD
21 PB	*	0.251+-0.029	0	616+-0.096	0.240+-0.036	0.958+-0.198 PB
22 DC		-1.000+-1.000	-1	000+-1.000	0.622+-2.267	0.958+-0.200 DC
23 EC		-1.000+-1.000	-1	000+-1.000	2.605+-1.388	0.958+-0.000 EC
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MEAS	AMB	MASS (UG/M3)	FINE:	40.7+-4.2		

## CMBDEQ RESULTS FOR CMB # 010014

## FINE PARTICULATE FRACTION

SAMPLING DATE: 801123 SITE: SITE14 SITE CODE: 0000004

SAMPLING DURATION: 24 HRS. WITH START HOUR: 0

BACKGROUND SITE SUBTRACTED: NO

EFFECTIVE VARIANCE FITTING REDUCED CHI SQUARE: 0.474 DEGREES OF FREEDOM: 4

CODE SOURCE FLG UG/M3 %

1	RESWD	*	16.549+-13.424	47.471+-38.819
4	TRANS	*	1.278+- 0.216	3.666+- 0.726
5	RDOIL	*	0.033+- 0.017	0.094+- 0.049
9	RDUST	*	1.009+- 0.133	2.894+- 0.485
12	HOGFU	*	0.575+- 0.200	1.648+- 0.597
14	ALUMP	*	0.050+- 0.092	0.132+- 0.263
18	SECSO	*	2.655+- 0.444	7.616+- 1.499
19	GALVN	*	0.032+- 0.011	0.092+- 0.034

TOTAL: 22.180+-13.435 63.624+-39.098

SPECIE CODE	FIT FLG	MEAS. UG/M3	FINE SUSPENDED PARTICULATE		
			PERCENT	CALC. UG/M3	RATIO
1 HA	*	0.095+- 0.014	0.272+- 0.049	0.097+- 0.019	1.028+- 0.286 HA
2 MG	*	0.029+- 0.010	0.084+- 0.031	0.043+- 0.015	1.473+- 0.937 MG
3 AL	*	0.131+- 0.017	0.376+- 0.063	0.131+- 0.010	0.998+- 0.103 AL
4 SI	*	0.283+- 0.033	0.812+- 0.126	0.290+- 0.020	1.026+- 0.100 SI
5 P	*	0.058+- 0.007	0.167+- 0.027	0.003+- 0.000	0.052+- 0.006 P
6 S	*	0.982+- 0.117	2.818+- 0.445	0.982+- 0.085	1.000+- 0.123 S
7 CL	*	0.287+- 0.037	0.825+- 0.136	0.191+- 0.109	0.664+- 0.456 CL
8 K	*	0.153+- 0.019	0.438+- 0.071	0.210+- 0.121	1.375+- 1.347 K
9 CA	*	0.114+- 0.014	0.328+- 0.053	0.052+- 0.025	0.455+- 0.240 CA
10 TI	*	0.008+- 0.002	0.022+- 0.006	0.009+- 0.005	1.118+- 0.925 TI
11 Y	*	0.002+- 0.001	0.005+- 0.002	0.001+- 0.000	0.878+- 0.259 Y
12 MH	*	0.005+- 0.001	0.014+- 0.004	0.004+- 0.001	0.718+- 0.157 MH
13 FE	*	0.097+- 0.012	0.278+- 0.046	0.080+- 0.023	0.824+- 0.310 FE
14 HI	*	0.002+- 0.001	0.005+- 0.003	0.002+- 0.000	1.148+- 0.393 HI
15 CU	*	0.013+- 0.002	0.039+- 0.008	0.000+- 0.000	0.028+- 0.014 CU
16 ZH	*	0.035+- 0.005	0.101+- 0.017	0.035+- 0.006	1.000+- 0.257 ZH
17 AS	<	0.123	< 0.354	0.000+- 0.000	0.000+- 0.000 AS
18 BR	*	0.053+- 0.006	0.153+- 0.024	0.068+- 0.023	1.275+- 0.702 BR
19 SR	<	0.031	< 0.088	0.000+- 0.000	0.000+- 0.000 SR
20 CD	*	0.016+- 0.009	0.046+- 0.027	0.001+- 0.001	0.033+- 0.042 CD
21 PB	*	0.184+- 0.022	0.528+- 0.083	0.178+- 0.025	0.965+- 0.200 PB
22 OC	-1	0.000+-1.000	-1.000+-1.000	8.447+- 2.287	0.965+- 0.000 OC
23 EC	-1	0.000+-1.000	-1.000+-1.000	2.477+- 1.396	0.365+- 0.000 EC

MEAS AVERAGE MASS (UG/M3): FINE: 34.9+- 3.6

## CMBDEQ RESULTS FOR CMB # 010015

## FINE PARTICULATE FRACTION

SAMPLING DATE: 801217 SITE: SITE14 SITE CODE: 0000004

SAMPLING DURATION: 24 HRS WITH START HOUR: 0

BACKGROUND SITE SUBTRACTED: NO

EFFECTIVE VARIANCE FITTING REDUCED CHI SQUARE: 1.842 DEGREES OF FREEDOM: 3  
CODE SOURCE FLG UG/M3 %

1	RESWD	*	14.987+-12.377	42.820+-35.639
4	TRANS	*	1.818+-0.303	5.196+-1.019
9	RDUST	*	0.547+-0.083	1.562+-0.287
14	ALUMP	*	1.441+-0.446	4.117+-1.344
18	SECSD	*	4.489+-0.680	12.826+-2.352
19	GALYN	*	0.048+-0.012	0.138+-0.037
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TOTAL:		23.330+-12.408	66.658+-36.114	

SPECIE CODE	FIT FLG	MEAS	FINE	SUSPENDED PARTICULATE	CALC	UG/M3	RATIO
			UG/M3	PERCENT			
1	HA	*	0.283+-0.041	0.808+-0.144	0.072+-0.025	0.253+-0.093	NA
2	MG	*	< 0.462	< 1.320	0.077+-0.021	0.000+-0.000	MG
3	AL	*	0.391+-0.046	1.116+-0.174	0.455+-0.115	1.165+-0.454	AL
4	SI	*	0.165+-0.020	0.470+-0.074	0.169+-0.012	1.024+-0.197	SI
5	P	*	0.097+-0.012	0.277+-0.044	0.002+-0.000	0.017+-0.002	P
6	S	*	1.602+-0.197	4.577+-0.713	1.602+-0.122	1.000+-0.108	S
7	CL	*	0.768+-0.091	2.194+-0.344	0.139+-0.079	0.181+-0.104	CL
8	K	*	0.142+-0.018	0.405+-0.066	0.141+-0.105	0.992+-1.043	K
9	CA	*	0.024+-0.004	0.070+-0.015	0.040+-0.030	1.650+-2.370	CA
10	TI	*	0.004+-0.001	0.013+-0.004	0.009+-0.007	1.959+-3.298	TI
11	V	*	0.003+-0.001	0.008+-0.003	0.001+-0.001	0.378+-0.208	V
12	MN	*	0.010+-0.002	0.030+-0.006	0.001+-0.000	0.140+-0.022	MN
13	FE	*	0.122+-0.015	0.349+-0.057	0.069+-0.033	0.565+-0.310	FE
14	HI	*	0.001+-0.001	0.003+-0.003	0.003+-0.001	2.541+-3.067	HI
15	CU	*	0.037+-0.005	0.106+-0.018	0.061+-0.006	0.020+-0.005	CU
16	ZH	*	0.046+-0.006	0.133+-0.022	0.046+-0.006	1.000+-0.186	ZH
17	AS	*	< 0.142	< 0.405	0.000+-0.000	0.000+-0.000	AS
18	BR	*	0.077+-0.009	0.221+-0.035	0.097+-0.033	1.258+-0.685	BR
19	SR	*	< 0.032	< 0.092	0.000+-0.000	0.000+-0.000	SR
20	CD	*	< 0.189	< 0.539	0.000+-0.000	0.000+-0.000	CD
21	PB	*	0.255+-0.030	0.729+-0.114	0.252+-0.038	0.986+-0.207	PB
22	DC	-1	0.000+-1.000	-1.000+-1.000	7.992+-2.075	0.986+-0.000	DC
23	EC	-1	0.000+-1.000	-1.000+-1.000	2.393+-1.271	0.986+-0.000	EC

MEAS AMB MASS (UG/M3): FINE: 35.0+-3.6

## CMBDEQ RESULTS FOR CMB # 010012

## FINE PARTICULATE FRACTION

SAMPLING DATE: 81 311 SITE: SITE14 SITE CODE: 0000004

SAMPLING DURATION: 24 HRS WITH START HOUR: 0

BACKGROUND SITE SUBTRACTED: NO

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.356 DEGREES OF FREEDOM: 7  
CODE SOURCE FLC UG/M3 %

1	RESWD	*	19	121+-17	356	51.116+-46.694
4	TRANS	*	2	109+-	0.354	5.639+- 1 111
5	RDOIL	*	0	036+-	0.018	0.096+- 0.049
9	RDUST	*	3	063+-	0.281	8.187+- 1.130
12	HOGFU	*	1	051+-	0.328	2.810+- 0.923
13	SECSO	*	2	131+-	0.490	5.696+- 1.435
19	GALVN	*	0	059+-	0.015	0.158+- 0.044
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TOTAL: 27 570+-17 371 73 702+-47.055						

SPECIE CODE	FIT FLG	MEAS.	FINE UG/M3	SUSPENDED PARTICULATE			
				PERCENT	CALC UG/M3	UG/M3	RATIO
1 HA	*	0.167+- 0	024	0 445+- 0.079	0.164+- 0	033	0.986+- 0 276 HA
2 MG	*	0 062+- 0	015	0 165+- 0 043	0 089+- 0	021	1 442+- 0 609 MG
3 AL	*	0 349+- 0	041	0 933+- 0 146	0 346+- 0	024	0 991+- 0 098 AL
4 SI	*	0 867+- 0	098	2.318+- 0.354	0.870+- 0	059	1 003+- 0 097 SI
5 P	*	0 087+- 0	010	0 232+- 0.037	0 069+- 0	001	0.106+- 0 011 P
6 S	*	0 868+- 0	105	2 321+- 0 369	0 868+- 0	119	1 000+- 0 194 S
7 CL	*	0 162+- 0	023	0 434+- 0 077	0 287+- 0	160	1 769+- 2.007 CL
8 K	*	0 358+- 0	042	0 956+- 0 149	0 306+- 0	148	0 857+- 0 545 K
9 CA	*	0 106+- 0	013	0 284+- 0 046	0 094+- 0	041	0 983+- 0 509 CA
10 TI	*	0 014+- 0	002	0 037+- 0 008	0 020+- 0	008	1 474+- 1 020 TI
11 V	*	0 001+- 0	001	0 004+- 0 002	0 002+- 0	000	1 329+- 0 478 V
12 MN	*	0 006+- 0	001	0 016+- 0 004	0 009+- 0	001	1 578+- 0 392 MN
13 FE	*	0 219+- 0	026	0 587+- 0 092	0 205+- 0	039	0 934+- 0 246 FE
14 HI	*	0 003+- 0	001	0 008+- 0 003	0 002+- 0	001	0 774+- 0 235 HI
15 CU	*	0 009+- 0	002	0 025+- 0 006	0 001+- 0	000	0 694+- 0 034 CU
16 ZH	*	0 060+- 0	007	0 162+- 0 026	0 060+- 0	008	1 000+- 0 182 ZH
17 AS	*	< 0	155	< 0 415	0 000+- 0	000	0 000+- 0 000 AS
18 BR	*	0 091+- 0	011	0 244+- 0 038	0 112+- 0	038	1 233+- 0 664 BR
19 SR	*	< 0	031	< 0 082	0 000+- 0	000	0 000+- 0 000 SR
20 CD	*	0 026+- 0	010	0 071+- 0 027	0 002+- 0	002	0 061+- 0 075 CD
21 PB	*	0 317+- 0	037	0 847+- 0 131	0 295+- 0	044	0 930+- 0 188 PB
22 OC	-1	000+-1	000	-1 000+-1 000	10 048+- 2	645	0 930+- 0 000 OC
23 EC	-1	000+-1	000	-1 000+-1 000	3.044+- 1	620	0 930+- 0 000 EC

MEAS AMB MASS (UG/M3): FINE: 37 4+- 3 9

CMBDEQ RESULTS FOR CMB # 010013  
 FINE PARTICULATE FRACTION  
 SAMPLING DATE: 81 116 SITE: SITE15 SITE CODE: 0000005  
 SAMPLING DURATION: 24 HRS WITH START HOUR: 0  
 BACKGROUND SITE SUBTRACTED: NO  
 EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 2.958 DEGREES OF FREEDOM: 3  
 CODE SOURCE FLG UG/M3 %

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1	RESWD	*	5.553+- 3.804	70.146+-49.243
4	TRANS	*	0.115+- 0.028	1.452+- 0.420
9	RDUST	*	0.254+- 0.037	3.213+- 0.683
14	ALUMP	*	0.085+- 0.044	1.076+- 0.586
18	SECSO	*	2.305+- 0.310	29.116+- 5.952

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TOTAL: 8.313+- 3.817 105.003+-50.847

SPECIE CODE	FIT FLG	MEAS	FINE UG/M3	SUSPENDED PARTICULATE PERCENT	CALC UG/M3	RATIO
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1	HA		0.031+- 0.005	0.398+- 0.086	0.008+- 0.003	0.257+- 0.096 HA
2	MG		0.006+- 0.004	0.072+- 0.054	0.012+- 0.004	2.136+- 1.834 MG
3	AL	*	0.053+- 0.008	0.672+- 0.149	0.052+- 0.007	0.984+- 0.189 AL
4	SI	*	0.085+- 0.011	1.077+- 0.216	0.072+- 0.005	0.846+- 0.076 SI
5	P		0.036+- 0.005	0.451+- 0.093	0.001+- 0.000	0.021+- 0.003 P
6	S	*	0.777+- 0.093	9.820+- 1.918	0.777+- 0.041	1.000+- 0.075 S
7	CL		< 0.129	< 1.632	0.032+- 0.028	0.000+- 0.000 CL
8	K	*	0.040+- 0.006	0.508+- 0.112	0.052+- 0.039	1.290+- 1.573 K
9	CA	*	0.009+- 0.002	0.117+- 0.036	0.007+- 0.004	0.792+- 0.519 CA
10	TI		0.001+- 0.001	0.016+- 0.013	0.002+- 0.000	1.175+- 0.525 TI
11	V		< 0.010	< 0.130	0.000+- 0.000	0.000+- 0.000 V
12	MN		< 0.017	< 0.219	0.001+- 0.000	0.000+- 0.000 MN
13	FE	*	0.009+- 0.003	0.109+- 0.041	0.016+- 0.002	1.853+- 0.559 FE
14	NI		< 0.015	< 0.195	0.000+- 0.000	0.000+- 0.000 NI
15	CU		0.004+- 0.001	0.054+- 0.020	0.000+- 0.000	0.019+- 0.015 CU
16	ZH		0.013+- 0.002	0.163+- 0.037	0.002+- 0.002	0.174+- 0.162 ZH
17	AS		0.007+- 0.003	0.087+- 0.038	0.000+- 0.000	0.000+- 0.009 AS
18	BR	*	0.003+- 0.001	0.039+- 0.015	0.006+- 0.002	1.983+- 1.492 BR
19	SR		< 0.027	< 0.341	0.000+- 0.000	0.000+- 0.000 SR
20	CD		0.010+- 0.008	0.124+- 0.103	0.000+- 0.000	0.014+- 0.018 CD
21	PB	*	0.023+- 0.004	0.293+- 0.073	0.016+- 0.002	0.696+- 0.125 PB
22	OC	-1	0.000+- 1.000	-1.000+- 1.000	2.693+- 0.766	0.696+- 0.000 OC
23	EC	-1	0.000+- 1.000	-1.000+- 1.000	0.741+- 0.467	0.696+- 0.000 EC

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MEAS AMB MASS (UG/M3): FINE: 7.9+- 1.2

CMBDEQ RESULTS FOR CMB # 010025  
 INHALABLE PARTICULATE FRACTION  
 SAMPLING DATE: 801209 SITE: SITE16 SITE CODE: 0000016  
 SAMPLING DURATION: 24 HRS. WITH START HOUR: 0  
 BACKGROUND SITE SUBTRACTED: NO  
 EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.872 DEGREES OF FREEDOM: 11  
 CODE SOURCE FLC UG/M3 %

1	RESWD	*	82	135+-22.963	85.809+-27.853
4	TRANS	*	8.646+-1.367	9.033+-2.064	
10	RDUST	*	34	396+-2.287	35.934+-6.389
11	MARIN	*	1.875+-0.366	1.959+-0.500	
18	SECSO	*	2	695+-1.503	2.815+-1.637
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TOTAL: 129 747+-23.169 135.551+-32.948					

SPECIE CODE	FIT FLC	MEAS. UG/M3	INHALABLE PERCENT	SUSPENDED PARTICULATE CALC UG/M3	RATIO
1 MA	*	0.940+-0.126	0.982+-0.209	0.818+-0.084	0.871+-0.119 MA
2 MG	*	0.377+-0.085	0.394+-0.110	0.535+-0.092	1.420+-0.425 MG
3 AL	*	3.024+-0.316	3.159+-0.617	2.836+-0.160	0.938+-0.073 AL
4 SI	*	10.977+-1.185	11.468+-2.260	10.464+-0.571	0.953+-0.072 SI
5 P	*	0.188+-0.017	0.196+-0.037	0.084+-0.007	0.446+-0.042 P
6 S	*	1.620+-0.168	1.692+-0.330	1.620+-0.462	1.000+-0.404 S
7 CL	*	0.550+-0.053	0.575+-0.110	1.400+-0.463	2.545+-2.303 CL
8 K	*	1.064+-0.099	1.111+-0.210	1.324+-0.576	1.254+-0.869 K
9 CA	*	0.779+-0.086	0.814+-0.161	0.619+-0.146	0.794+-0.238 CA
10 TI	*	0.170+-0.019	0.178+-0.036	0.179+-0.034	1.051+-0.289 TI
11 V	<	0.016	< 0.016	0.011+-0.003	1.013+-0.324 V
12 MN	*	0.031+-0.004	0.032+-0.007	0.033+-0.003	1.076+-0.152 MN
13 FE	*	1.233+-0.133	1.288+-0.254	1.331+-0.169	1.080+-0.202 FE
14 NI	*	0.006+-0.002	0.006+-0.002	0.000+-0.001	0.000+-0.160 NI
15 CU	*	0.029+-0.004	0.030+-0.006	0.002+-0.002	0.083+-0.056 CU
16 ZN	*	0.092+-0.009	0.096+-0.018	0.066+-0.052	0.721+-0.424 ZN
17 AS	<	0.181	< 0.189	0.000+-0.001	0.000+-0.056 AS
18 BR	*	0.493+-0.047	0.515+-0.098	0.464+-0.157	0.940+-0.435 BR
19 SR	*	0.017+-0.003	0.018+-0.004	0.012+-0.003	0.717+-0.186 SR
20 CD	<	0.307	< 0.321	0.023+-0.014	0.000+-0.000 CD
21 PB	*	1.294+-0.112	1.352+-0.255	1.264+-0.179	0.977+-0.194 PB
22 OC	*	55.490+-3.240	57.972+-12.865	42.742+-11.359	0.770+-0.258 OC
23 EC	*	7.680+-1.590	8.024+-2.124	12.772+-6.950	1.663+-1.756 EC

MEAS AMB MASS (UG/M3): INHALABLE: 95.7+-15.8

CMBDED RESULTS FOR CMB # 010027  
 INHALABLE PARTICULATE FRACTION  
 SAMPLING DATE: 801212 SITE: SITE16 SITE CODE: 0000016  
 SAMPLING DURATION: 8 HRS. WITH START HOUR: 99  
 BACKGROUND SITE SUBTRACTED: NO  
 EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 1 040 DEGREES OF FREEDOM: 11  
 CODE SOURCE FLC UG/M<sup>3</sup> %

1	RESWD	*	123.256+-33.395	123.564+-55.834	
4	TRANS	*	6.524+- 1.071	6.540+- 2.597	
10	RDUST	*	30.797+- 2.058	30.874+-11.354	
11	MARIH	*	1.544+- 0.326	1.548+- 0.649	
18	SECSO	*	14.019+- 2.193	14.054+- 5.537	
<hr/>					
TOTAL: 176.140+-33.549 176.580+-72.171					

SPECIE CODE	FIT FLC	MEAS. UG/M <sup>3</sup>	INHALABLE PERCENT	SUSPENDED PARTICULATE CALC UG/M <sup>3</sup>	RATIO
1 NA	*	0.779+- 0.098	0.781+- 0.299	0.720+- 0.084	0.924+-0.147 NA
2 MG	*	0.337+- 0.084	0.338+- 0.148	0.499+- 0.105	1.481+-0.558 MG
3 AL	*	2.792+- 0.277	2.799+- 1.050	2.548+- 0.145	0.912+-0.070 AL
4 SI	*	9.334+- 0.984	9.357+- 3.524	9.362+- 0.511	1.003+-0.078 SI
5 P	*	0.348+- 0.034	0.349+- 0.131	0.075+- 0.007	0.215+-0.019 P
6 S	*	5.319+- 0.544	5.332+- 2.004	5.319+- 0.472	1.000+-0.126 S
7 CL	*	0.322+- 0.049	0.323+- 0.127	1.424+- 0.648	4.424+-9.133 CL
8 K	*	0.838+- 0.080	0.840+- 0.314	1.620+- 0.864	1.932+-2.241 K
9 CA	*	0.818+- 0.088	0.820+- 0.309	0.571+- 0.128	0.698+-0.191 CA
10 TI	*	0.137+- 0.017	0.137+- 0.053	0.156+- 0.026	1.138+-0.288 TI
11 V	<	0.013	< 0.013	0.010+- 0.002	1.517+-0.675 V
12 MH	*	0.029+- 0.005	0.029+- 0.012	0.030+- 0.003	1.030+-0.150 MH
13 FE	*	1.059+- 0.115	1.062+- 0.401	1.170+- 0.132	1.104+-0.186 FE
14 HI	<	0.017	< 0.018	0.000+- 0.001	0.000+-0.346 HI
15 CU	*	0.032+- 0.006	0.032+- 0.013	0.002+- 0.002	0.067+-0.055 CU
16 ZH	*	0.095+- 0.011	0.096+- 0.036	0.076+- 0.046	0.800+-0.618 ZH
17 AS	<	0.188	< 0.189	0.000+- 0.001	0.000+-0.000 AS
18 BR	*	0.310+- 0.031	0.310+- 0.117	0.350+- 0.118	1.131+-0.576 BR
19 SR	<	0.026	< 0.027	0.011+- 0.002	1.100+-0.377 SR
20 CD	<	0.301	< 0.302	0.021+- 0.012	0.000+-0.000 CD
21 PB	*	1.022+- 0.102	1.024+- 0.384	0.963+- 0.135	0.943+-0.182 PB
22 OC	*	84.440+-12.000	84.651+-32.891	61.360+-17.018	0.727+-0.249 OC
23 EC	*	9.680+- 2.020	9.704+- 4.052	1.7481+-10.373	1.806+-2.212 EC

MEAS AMB MASS (UG/M<sup>3</sup>): INHALABLE: 99.8+-36.1

CMBDEQ RESULTS FOR CMB # 010047  
 INHALABLE PARTICULATE FRACTION  
 SAMPLING DATE: 81 108 SITE: SITE16 SITE CODE: 0000016  
 SAMPLING DURATION: 24 HRS WITH START HOUR: 0  
 BACKGROUND SITE SUBTRACTED: NO  
 EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.704 DEGREES OF FREEDOM: 11  
 CODE SOURCE FLG UG/M<sup>3</sup>

1	RESWD	*	78	915+-20.983	55.350+-15.879
4	TRANS	*	4	536+-0.715	3.181+-0.607
5	RDOIL	*	0.075+-0.035	0.052+-0.025	
10	ROUST	*	17.477+-1.199	12.258+-1.365	
11	MARIN	*	0.850+-0.191	0.596+-0.149	
18	SECSO	*	2.691+-0.954	1.888+-0.699	
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		TOTAL:	104.543+-21.051	73	325+-16.745

SPECIE CODE	FIT FLG	MEAS. UG/M <sup>3</sup>	INHALABLE PERCENT	SUSPENDED PARTICULATE CALC UG/M <sup>3</sup>	RATIO
1 HA	*	0.425+-0.056	0.298+-0.051	0.408+-0.050	0.960+-0.162 HA
2 MG	*	0.247+-0.049	0.174+-0.039	0.295+-0.062	1.194+-0.429 MG
3 AL	*	1.596+-0.163	1.119+-0.166	1.449+-0.083	0.908+-0.070 AL
4 SI	*	5.690+-0.612	3.991+-0.607	5.318+-0.290	0.935+-0.070 SI
5 P	*	0.176+-0.016	0.124+-0.017	0.042+-0.004	0.241+-0.022 P
6 S	*	1.339+-0.139	0.939+-0.141	1.339+-0.279	1.000+-0.294 S
7 CL	*	0.454+-0.052	0.318+-0.050	0.863+-0.412	1.901+-1.951 CL
8 K	*	0.594+-0.056	0.417+-0.060	0.996+-0.553	1.677+-1.816 K
9 CA	*	0.463+-0.050	0.325+-0.050	0.341+-0.086	0.736+-0.231 CA
10 TI	*	0.096+-0.011	0.067+-0.011	0.091+-0.013	0.950+-0.254 TI
11 V	*	< 0.012	< 0.009	0.008+-0.002	2.137+-0.944 V
12 MH	*	0.013+-0.002	0.009+-0.002	0.017+-0.002	1.277+-0.215 MH
13 FE	*	0.612+-0.066	0.429+-0.065	0.681+-0.088	1.114+-0.216 FE
14 HI	*	0.004+-0.001	0.003+-0.001	0.004+-0.001	1.000+-0.429 HI
15 CU	*	0.017+-0.002	0.012+-0.002	0.001+-0.001	0.074+-0.061 CU
16 ZH	*	0.064+-0.006	0.045+-0.006	0.048+-0.030	0.742+-0.572 ZH
17 AS	*	< 0.263	< 0.184	0.000+-0.001	0.000+-0.000 AS
18 BR	*	0.260+-0.025	0.182+-0.026	0.243+-0.082	0.934+-0.432 BR
19 SR	*	< 0.031	< 0.022	0.006+-0.001	0.711+-0.208 SR
20 CD	*	< 0.144	< 0.101	0.012+-0.007	0.687+-0.493 CD
21 PB	*	0.652+-0.060	0.458+-0.065	0.662+-0.094	1.014+-0.205 PB
22 DC	*	46.780+-6.910	32.811+-5.998	39.448+-10.897	0.843+-0.305 DC
23 EC	*	7.710+-1.600	5.408+-1.264	11.286+-6.643	1.464+-1.527 EC

MEAS AMB MASS (UG/M<sup>3</sup>): INHALABLE: 142.6+-15.4

## CMBDED RESULTS FOR CMB # 010053

## INHALABLE PARTICULATE FRACTION

SAMPLING DATE: 81 118 SITE: SITE16 SITE CODE: 0000016

SAMPLING DURATION: 24 HRS WITH START HOUR: 0

BACKGROUND SITE SUBTRACTED: NO

EFFECTIVE VARIANCE FITTING REDUCED CHI SQUARE: 0.635 DEGREES OF FREEDOM: 12  
CODE SOURCE FLAG UG/M3 %

1	RESWD	*	126.158+-29.405	99.547+-25.852
4	TRAHS	*	2.629+-0.410	2.074+-0.402
10	RDUST	*	4.855+-0.417	3.831+-0.548
13	SECSO	*	3.067+-0.968	2.420+-0.813
TOTAL:				136.708+-29.427 107.871+-26.301

SPECIE CODE	FIT FLAG	MEAS.	INHALABLE UG/M3	SUSPENDED PARTICULATE PERCENT	CALC. UG/M3	RATIO
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1	NA	*	0.147+-0.017	0.116+-0.019	0.105+-0.058	0.710+-0.483	NA
2	MG	*	<0.163	<0.129	0.159+-0.094	2.608+-4.327	MG
3	AL	*	0.492+-0.050	0.388+-0.059	0.426+-0.034	0.867+-0.091	AL
4	SI	*	1.419+-0.151	1.120+-0.175	1.485+-0.081	1.047+-0.082	SI
5	P	*	0.140+-0.012	0.111+-0.016	0.012+-0.002	0.084+-0.012	P
6	S	*	1.370+-0.125	1.081+-0.158	1.370+-0.289	1.000+-0.298	S
7	CL	*	0.316+-0.036	0.250+-0.041	0.708+-0.642	2.238+-4.979	CL
8	K	*	0.231+-0.021	0.182+-0.027	1.170+-0.983	5.073+-5.198	K
9	CA	*	0.151+-0.016	0.119+-0.019	0.177+-0.086	1.172+-0.879	CA
10	TI	*	0.022+-0.003	0.018+-0.003	0.030+-0.010	1.321+-0.731	TI
11	V	<	0.016	<0.013	0.002+-0.001	1.335+-1.817	V
12	MN	*	0.006+-0.001	0.005+-0.001	0.005+-0.001	0.724+-0.254	MN
13	FE	*	0.150+-0.017	0.118+-0.019	0.214+-0.048	1.426+-0.557	FE
14	NI	<	0.022	<0.017	0.000+-0.001	0.000+-1.579	NI
15	CU	*	0.009+-0.002	0.007+-0.002	0.000+-0.001	0.038+-0.142	CU
16	ZH	*	0.024+-0.003	0.019+-0.003	0.053+-0.047	2.217+-4.756	ZH
17	AS	<	0.199	<0.157	0.000+-0.001	0.000+-0.000	AS
18	BR	*	0.166+-0.016	0.131+-0.019	0.140+-0.048	0.843+-0.375	BR
19	SR	<	0.035	<0.026	0.002+-0.001	0.629+-0.572	SR
20	CD	<	0.292	<0.230	0.003+-0.002	0.000+-0.000	CD
21	PB	*	0.379+-0.034	0.299+-0.044	0.373+-0.054	0.984+-0.292	PB
22	OC	*	75.450+-11.000	59.535+-11.037	61.059+-17.411	0.809+-0.297	OC
23	EC	*	12.300+-2.540	9.705+-2.292	16.835+-10.600	1.369+-1.461	EC

MEAS AMB MASS (UG/M3): INHALABLE: 126.7+-14.5

## CMBDEQ RESULTS FOR CMB # 010055

## INHALABLE PARTICULATE FRACTION

SAMPLING DATE: 81 120 SITE: SITE16 SITE CODE: 0000016

SAMPLING DURATION: 24 HRS WITH START HOUR: 0

BACKGROUND SITE SUBTRACTED: NO

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.704 DEGREES OF FREEDOM: 11

CODE SOURCE FLG UG/M3 %

1	RESWD	*	105 491+-28.659	44.282+-12.814
4	TRANS	*	4.864+- 0.760	2.042+- 0.378
10	RDUST	*	11.477+- 0.873	4.818+- 0.604
11	MARIN	*	0.591+- 0.178	0.248+- 0.079
18	SECSO	*	6 145+- 1.231	2.580+- 0.577

TOTAL: 128 568+-28.709 53.969+-13.196

SPECIE CODE	FIT FLG	MEAS. UG/M3	INHALABLE PERCENT	SUSPENDED PARTICULATE CALC UG/M3	RATIO
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1	HA	*	0.334+- 0.039	0.140+- 0.022	0.324+- 0.054	0.970+-0.225	NR
2	MG	*	0.171+- 0.032	0.072+- 0.015	0.251+- 0.086	1.469+-0.890	MG
3	AL	*	1.073+- 0.106	0.451+- 0.063	0.965+- 0.058	0.899+-0.072	AL
4	SI	*	3.452+- 0.359	1.449+- 0.209	3.503+- 0.191	1.015+-0.079	SI
5	P	*	0.191+- 0.017	0.080+- 0.011	0.028+- 0.003	0.146+-0.014	P
6	S	*	2.490+- 0.220	1.045+- 0.139	2.490+- 0.337	1.000+-0.191	S
7	CL	*	0.511+- 0.055	0.214+- 0.032	0.897+- 0.542	1.757+-2.144	CL
8	K	*	0.469+- 0.042	0.197+- 0.026	1.116+- 0.739	2.379+-4.062	K
9	CA	*	0.376+- 0.041	0.158+- 0.023	0.281+- 0.099	0.749+-0.329	CA
10	TI	*	0.050+- 0.006	0.021+- 0.003	0.066+- 0.018	1.311+-0.603	TI
11	V	*	< 0.017	< 0.007	0.004+- 0.001	1.457+-0.903	V
12	MN	*	0.011+- 0.002	0.005+- 0.001	0.011+- 0.001	0.994+-0.186	MN
13	FE	*	0.383+- 0.041	0.161+- 0.023	0.481+- 0.090	1.256+-0.377	FE
14	NI	*	< 0.030	< 0.012	0.000+- 0.001	0.000+-0.000	NI
15	CU	*	0.014+- 0.003	0.006+- 0.001	0.001+- 0.001	0.058+-0.084	CU
16	ZH	*	0.060+- 0.006	0.025+- 0.004	0.053+- 0.039	0.876+-0.867	ZH
17	AS	*	< 0.238	< 0.100	0.000+- 0.001	0.000+-0.000	AS
18	BR	*	0.301+- 0.027	0.126+- 0.017	0.260+- 0.088	0.865+-0.387	BR
19	SR	*	0.009+- 0.003	0.004+- 0.001	0.004+- 0.001	0.446+-0.162	SR
20	CD	*	< 0.321	< 0.135	0.008+- 0.005	0.000+-0.000	CD
21	PB	*	0.698+- 0.064	0.293+- 0.040	0.695+- 0.101	0.995+-0.203	PB
22	OC	*	49.610+- 9.950	20.825+- 4.664	52.205+-14.564	1.052+-0.426	OC
23	EC	*	31.020+- 6.400	13.021+- 2.983	14.773+- 8.374	0.476+-0.317	EC

MEAS AMB. MASS (UG/M3): INHALABLE: 238 2+-23.7

## CMBDER RESULTS FOR CMB # 010075

## INHALABLE PARTICULATE FRACTION

SAMPLING DATE: 81 207 SITE: SITE16 SITE CODE: 0000016

SAMPLING DURATION: 24 HRS. WITH START HOUR: 0

BACKGROUND SITE SUBTRACTED: NO

EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 1.049 DEGREES OF FREEDOM: 11

CODE SOURCE FLG UG/M3 %

1	RESWD	*	64.719+-17.568	81.921+-26.018
4	TRANS	-*	2.566+-0.412	3.248+-0.748
5	RDOIL	*	0.068+-0.031	0.083+-0.042
10	RDUST	*	17.448+-1.110	22.085+-3.903
11	MARIH	*	1.194+-0.224	1.511+-0.378
18	SECSO	*	1.987+-0.649	2.515+-0.921
<hr/>				
TOTAL: 87.979+-17.622 111.363+-28.889				

SPECIE CODE	FIT FLG	INHALABLE SUSPENDED PARTICULATE			RATIO
		MEAS	UG/M3	PERCENT	
1	HA	*	0.577+-0.071	0.731+-0.150	0.534+-0.056 0.924+-0.133 HA
2	MG	*	0.184+-0.158	0.233+-0.204	0.284+-0.053 1.547+-0.535 MG
3	AL	*	1.550+-0.162	1.962+-0.383	1.441+-0.082 0.930+-0.072 AL
4	SI	*	5.450+-0.581	6.398+-1.354	5.298+-0.290 0.972+-0.074 SI
5	P	*	0.115+-0.011	0.145+-0.027	0.042+-0.004 0.370+-0.035 P
6	S	*	1.014+-0.101	1.283+-0.247	1.014+-0.186 1.000+-0.259 S
7	CL	*	0.199+-0.023	0.252+-0.051	0.882+-0.351 4.428+-8.004 CL
8	K	*	0.531+-0.051	0.698+-0.132	0.878+-0.454 1.594+-1.548 K
9	CA	*	0.451+-0.049	0.571+-0.113	0.312+-0.057 0.692+-0.155 CA
10	TI	*	0.081+-0.010	0.103+-0.021	0.085+-0.011 1.045+-0.197 TI
11	V	<	0.014	< 0.018	0.008+-0.001 1.179+-0.334 V
12	MN	*	0.014+-0.002	0.018+-0.004	0.017+-0.002 1.220+-0.193 MN
13	FE	*	0.611+-0.065	0.773+-0.152	0.644+-0.058 1.054+-0.137 FE
14	HI	*	0.003+-0.001	0.004+-0.002	0.004+-0.001 1.005+-0.421 HI
15	CU	*	0.003+-0.002	0.003+-0.002	0.001+-0.001 0.471+-0.390 CU
16	ZH	*	0.047+-0.005	0.060+-0.012	0.041+-0.024 0.863+-0.676 ZH
17	AS	<	0.114	< 0.144	0.000+-0.001 0.000+-0.046 AS
18	BR	*	0.146+-0.015	0.185+-0.036	0.139+-0.046 0.949+-0.437 BR
19	SR	<	0.033	< 0.041	0.006+-0.001 0.664+-0.180 SR
20	CD	<	0.270	< 0.342	0.012+-0.007 0.000+-0.000 CD
21	PB	*	0.385+-0.035	0.487+-0.092	0.390+-0.053 1.013+-0.197 PB
22	OC	*	41.100+-6.130	52.024+-11.566	31.855+-8.934 0.775+-0.275 OC
23	EC	*	4.840+-1.000	6.126+-1.619	8.954+-5.442 1.850+-2.365 EC

MEAS AMB MASS (UG/M3): INHALABLE: 79.0+-13.0

CMBDEQ RESULTS FOR CMB # 010073  
 INHALABLE PARTICULATE FRACTION  
 SAMPLING DATE: 01 211 SITE: SITE16 SITE CODE: 0000016  
 SAMPLING DURATION: 24 HRS WITH START HOUR: 0  
 BACKGROUND SITE SUBTRACTED: NO  
 EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.805 DEGREES OF FREEDOM: 9  
 CODE SOURCE FLG UG/M3 %

1	RESWD	*	52.166+-13.909	114.053+-43.044
4	TRANS	*	6.716+-0.125	1.566+-0.500
10	RDUST	*	10.788+-0.675	23.588+-6.471
11	MARIN	*	6.540+-0.118	1.180+-0.407
18	SECSO	*	1.124+-0.399	2.458+-1.092
TOTAL:			65.334+-13.932	142.844+-48.822

SPECIE CODE	FIT FLG	INHALABLE SUSPENDED PARTICULATE			RATIO
		MEAS	UG/M3	PERCENT	
1 HA	*	0.257+-0.032	0.563+-0.166	0.259+-0.032	1.007+-0.178 HA
2 MG	*	0.160+-0.029	0.349+-0.113	0.168+-0.039	1.050+-0.358 MG
3 AL	*	0.846+-0.088	1.850+-0.530	0.892+-0.051	1.054+-0.088 AL
4 SI	*	3.253+-0.342	7.112+-2.042	3.270+-0.179	1.005+-0.078 SI
5 P	*	0.058+-0.006	0.127+-0.037	0.026+-0.002	0.452+-0.044 P
6 S	*	0.568+-0.064	1.243+-0.360	0.568+-0.112	1.000+-0.280 S
7 CL	*	0.061+-0.012	0.133+-0.044	0.507+-0.271	8.355+-3.375 CL
8 K	*	0.293+-0.028	0.641+-0.182	0.645+-0.365	2.200+-3.012 K
9 CA	*	0.267+-0.029	0.584+-0.168	0.188+-0.034	0.703+-0.157 CA
10 TI	*	0.058+-0.007	0.127+-0.037	0.050+-0.004	0.856+-0.099 TI
11 V	*	0.004+-0.001	0.009+-0.004	0.004+-0.001	0.848+-0.287 V
12 MH	<	0.021	< 0.047	0.010+-0.001	1.539+-0.298 MH
13 FE	*	0.347+-0.037	0.760+-0.219	0.381+-0.025	1.096+-0.197 FE
14 HI	<	0.024	< 0.054	0.000+-0.001	0.000+-0.000 HI
15 CU	<	0.028	< 0.060	0.001+-0.001	0.145+-0.132 CU
16 ZH	*	0.019+-0.002	0.041+-0.012	0.029+-0.019	1.542+-1.911 ZH
17 HS	<	0.076	< 0.167	0.006+-0.001	0.000+-0.060 HS
18 BR	*	0.036+-0.004	0.079+-0.023	0.039+-0.013	1.082+-0.528 BR
19 SR	<	0.033	< 0.072	0.004+-0.001	0.787+-0.243 SR
20 CD	<	0.205	< 0.448	0.007+-0.004	0.686+-0.433 CD
21 PB	*	0.122+-0.013	0.267+-0.077	0.121+-0.015	0.391+-0.173 PB
22 OC	*	30.430+-4.570	66.531+-20.387	25.088+-7.199	0.824+-0.307 OC
23 EC	*	3.250+-0.680	7.106+-2.411	6.864+-4.382	2.112+-3.151 EC

MEAS AVERAGE MASS (UG/M3): INHALABLE: 45.7+-12.2

CMBDEQ RESULTS FOR CMB # 010077  
 INHALABLE PARTICULATE FRACTION  
 SAMPLING DATE: 81 213 SITE: SITE16 SITE CODE: 0000016  
 SAMPLING DURATION: 24 HRS. WITH START HOUR: 0  
 BACKGROUND SITE SUBTRACTED: NO  
 EFFECTIVE VARIANCE FITTING. REDUCED CHI. SQUARE: 0.779 DEGREES OF FREEDOM: 10  
 CODE SOURCE FLG UG/M3 %

1	RESUD	*	50.002+-13.440	66	808+-21.453
4	TRANS	*	2.287+- 0.371	3	055+- 0.730
10	RDUST	*	12.213+- 0.829	16	318+- 3.073
11	MARIN	*	0.925+- 0.174	1	236+- 0.318
18	SECSO	*	1.587+- 0.539	2.	120+- 0.811
			TOTAL:	67	013+-13.482
				89	538+-23.915

SPECIE CODE	FIT FLG	INHALABLE SUSPENDED PARTICULATE			RATIO
		MEAS.	UG/M3	PERCENT	
1	NA	*	0.443+- 0.056	0.592+- 0.123	0.412+- 0.044
2	MG	*	0.140+- 0.032	0.187+- 0.054	0.211+- 0.042
3	AL	*	1.028+- 0.107	1.374+- 0.280	1.010+- 0.057
4	SI	*	3.668+- 0.391	4.901+- 1.007	3.711+- 0.203
5	P	*	0.108+- 0.010	0.144+- 0.029	0.030+- 0.003
6	S	*	0.799+- 0.084	1.067+- 0.219	0.799+- 0.154
7	CL	*	0.393+- 0.038	0.525+- 0.105	0.688+- 0.271
8	K	*	0.411+- 0.037	0.549+- 0.108	0.656+- 0.350
9	CA	*	0.338+- 0.037	0.452+- 0.094	0.228+- 0.048
10	TI	<	0.231	< 0.309	0.061+- 0.009
11	V	<	0.082	< 0.110	0.004+- 0.001
12	MN	*	0.012+- 0.002	0.016+- 0.004	0.012+- 0.001
13	FE	*	0.439+- 0.047	0.587+- 0.121	0.458+- 0.048
14	HI	<	0.010	< 0.014	0.000+- 0.001
15	CU	*	0.016+- 0.002	0.022+- 0.005	0.001+- 0.001
16	ZN	*	0.035+- 0.004	0.047+- 0.010	0.030+- 0.019
17	AS	<	0.184	< 0.246	0.000+- 0.001
18	BR	*	0.127+- 0.013	0.169+- 0.034	0.123+- 0.041
19	SR	<	0.024	< 0.032	0.004+- 0.001
20	CD	<	0.132	< 0.176	0.008+- 0.005
21	PB	*	0.339+- 0.033	0.453+- 0.091	0.341+- 0.047
22	OC	*	30.310+- 4.580	40.498+- 9.384	24.737+- 6.903
23	EC	*	5.330+- 1.100	7.121+- 1.930	6.998+- 4.206

MEAS AMB MASS (UG/M3): INHALABLE: 74.8+-13.1

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CMBDER RESULTS FOR CMB # 010081  
 INHALABLE PARTICULATE FRACTION  
 SAMPLING DATE: 81 223 SITE: SITE16 SITE CODE: 0000016  
 SAMPLING DURATION: 24 HRS. WITH START HOUR: 0  
 BACKGROUND SITE SUBTRACTED: NO  
 EFFECTIVE VARIANCE FITTING. REDUCED CHI SQUARE: 0.584 DEGREES OF FREEDOM: 9  
 CODE SOURCE FLG UG/M3 %

1	RESWD	*	77.945+-21.128	156.214+-57.204
4	TRANS	*	2.574+-0.417	5.159+-1.521
10	RDUST	*	22.328+-1.447	44.748+-11.393
11	MARIN	*	1.158+-0.231	2.320+-0.736
18	SECSO	*	0.627+-0.656	0.675+-1.351

TOTAL: 104.631+-21.193 209.698+-66.856

SPECIE CODE	FIT FLG	MEAS	INHALABLE UG/M3	SUSPENDED PARTICULATE PERCENT	CALC UG/M3	RATIO
1 HA	*	0.527+-0.070	1.055+-0.295	0.528+-0.059	1.002+-0.157	HA
2 MG	*	0.278+-0.142	0.556+-0.316	0.336+-0.063	1.212+-0.355	MG
3 AL	*	1.967+-0.201	3.943+-1.051	1.842+-0.105	0.936+-0.073	AL
4 SI	*	6.943+-0.751	13.915+-3.742	6.774+-0.371	0.976+-0.075	SI
5 P	*	0.129+-0.012	0.260+-0.068	0.054+-0.005	0.419+-0.040	P
6 S	*	0.605+-0.063	1.212+-0.324	0.605+-0.203	1.000+-0.475	S
7 CL	*	0.137+-0.017	0.275+-0.076	0.939+-0.414	6.848+-520.8	CL
8 K	*	0.557+-0.056	1.116+-0.297	1.077+-0.546	1.934+-2.137	K
9 CA	*	0.479+-0.052	0.960+-0.259	0.382+-0.064	0.796+-0.171	CA
10 TI		< 0.231	< 0.467	0.106+-0.012	0.856+-0.127	TI
11 V		< 0.082	< 0.165	0.007+-0.002	1.068+-0.370	V
12 MH	*	0.018+-0.002	0.035+-0.010	0.022+-0.002	1.224+-0.192	MH
13 FE	*	0.803+-0.087	1.609+-0.433	0.808+-0.064	1.007+-0.113	FE
14 HI		< 0.013	< 0.026	0.000+-0.001	0.000+-0.369	HI
15 CU	*	0.022+-0.003	0.043+-0.012	0.002+-0.001	0.972+-0.055	CU
16 ZH	*	0.052+-0.005	0.104+-0.028	0.049+-0.029	0.951+-0.772	ZH
17 AS		< 0.162	< 0.324	0.000+-0.001	0.000+-0.135	AS
18 BR	*	0.137+-0.013	0.275+-0.073	0.139+-0.047	1.014+-0.483	BR
19 SR		< 0.024	< 0.049	0.008+-0.002	0.704+-0.192	SR
20 CD		< 0.172	< 0.344	0.015+-0.009	0.000+-0.000	CD
21 PB	*	0.398+-0.037	0.798+-0.210	0.401+-0.054	1.007+-0.191	PB
22 OC	*	45.100+-6.680	90.388+-25.971	38.134+-10.759	0.846+-0.312	OC
23 EC	*	5.540+-1.150	11.103+-3.576	10.649+-6.552	1.922+-2.563	EC

MEAS AMB MASS (UG/M3): INHALABLE: 49.9+-12.3

Appendix 6

Quality Assurance Program

Sampling and Analysis  
Standard Operating Procedures

1. Energy Dispersive X-Ray Fluorescence Analysis
2. Organic and Elemental Carbon Analysis
3. Teflon Filter Weighing Procedures
4. Hi-vol Sampler Calibration Procedure
5. Hi-vol Filter Handling and Storage
6. Dichotomous Sampler Maintenance
7. Hi-vol Filter Weighing Procedure
8. Hi-vol Sampler Maintenance
9. Hi-vol Sampler Audit Procedure
10. Dichotomous Filter Handling and Data Procedures
11. Soil and Road Dust Sampling Procedures



## STANDARD OPERATING PROCEDURE

### ENERGY DISPERITIVE X-RAY FLUORESCENCE ANALYSIS OF AIR FILTERS

#### 1. General Discussion

1. Analytical problem: Analysis of aerosols deposited on membrane type filters for the elements listed in Table 1. Typical atmospheric concentrations and ranges are indicated in Figure 1.
2. Principle: Atoms in the sample are excited from their ground state to higher energy levels by x-radiation from an X-ray tube. These excited atoms emit discrete energy X-rays as they return to their normal ground state energy level. The energy of these emitted X-rays is characteristic of the emitting element and is used to qualitatively identify the element while the number of observed X-rays, which is proportional to the number of atoms, is used to quantitatively determine a specific element's concentration through a direct comparison with standards.
3. Interferences: There are a number of potential spectral interferences possible with EDXRF because of its low resolution relative to the number and spacing of possible X-ray lines. The elements subject to potential spectral interferences in normal ambient aerosols, along with the corresponding interfering elements and correction factors are listed in Table 2. Correction factors,  $F_{im}$ , are determined by analyzing single element standards of elements i and applying the formulas

$$F_{im} = \frac{N_m}{N_i}$$

where  $F_{im}$  = the fraction of counts due to element i that interfere with the counts for element m

$N_m$  = background subtracted counts in region of interest m

$N_i$  = background subtracted counts in region of interest i

Table 1

X-RAY FLUORESCENCE  
MINIMUM DETECTABLE CONCENTRATIONS\*  
(ng/cm<sup>2</sup>)  
STANDARD ANALYSES†

Element	1	2	3	4	5**
Al	42	30	30	18	10
Si	35	24	18	12	8
P	45	30	23	15	10
S	140	90	70	47	30
Cl	90	60	45	32	20
K	30	20	15	11	6
Ca	30	20	15	11	6
Ti	10	6	5	3	2
V	6	4	3	2	1
Cr	6	4	3	2	1
Mn	9	6	5	3	1
Fe	12	8	6	4	2
Ni	10	6	5	3	1
Cu	10	6	5	3	1
Zn	10	6	5	3	1
Ga	8	6	4	3	1
As	8	6	4	3	1
Se	8	6	4	3	1
Br	12	8	6	4	2
Rb	20	14	10	7	4
Sr	20	16	10	8	4
Y	40	30	22	15	8
Zr	160	120	84	60	30
Pd	45	30	22	15	8
Ag	70	48	34	24	12
Cd	70	50	36	25	14
In	90	60	44	30	15
Sn	90	60	44	30	15
Sb	90	60	44	30	15
Ba	500	360	260	180	100
La	500	360	260	180	100
Hg	20	16	11	8	4
Pb	25	20	14	10	5

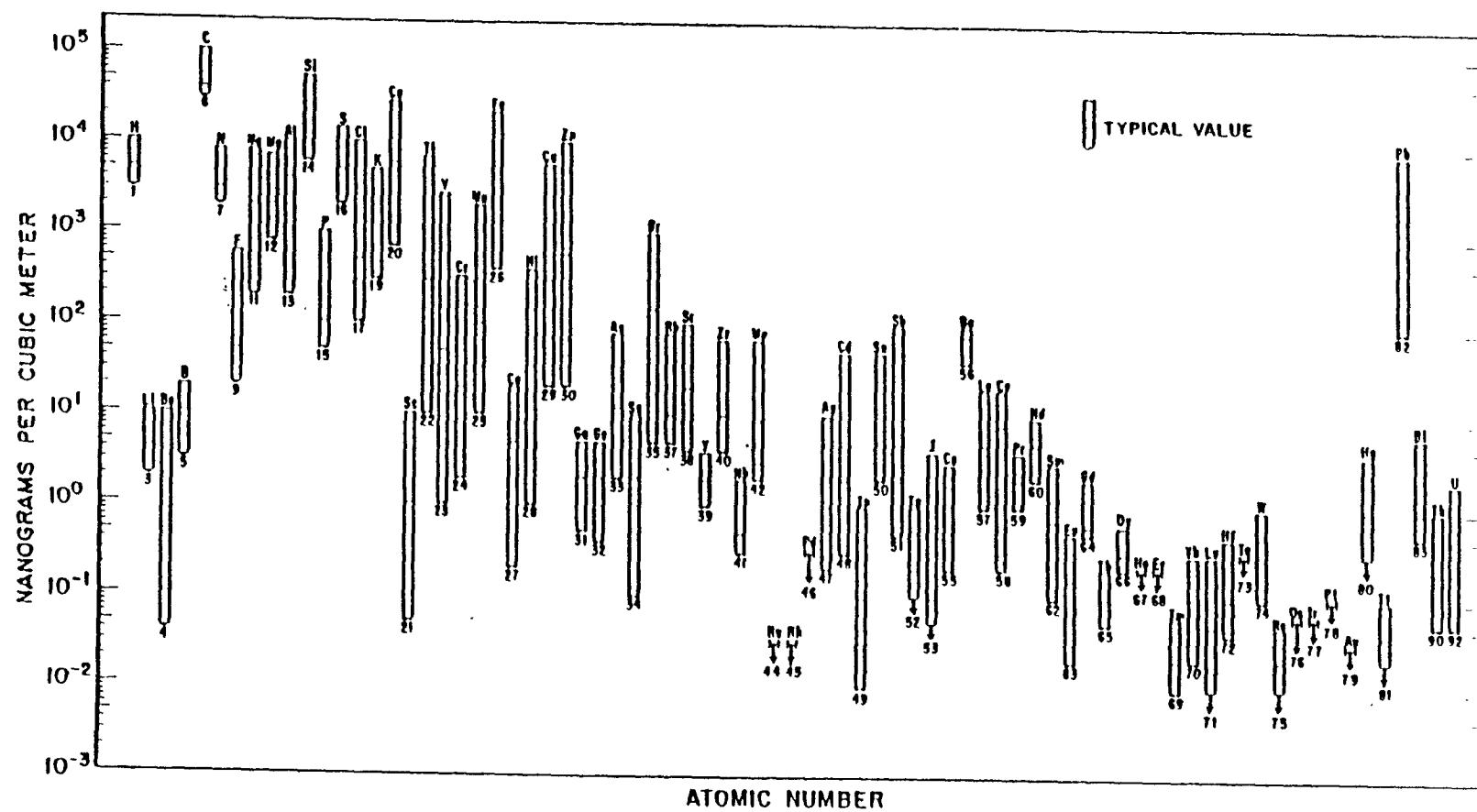
\* Three sigma interference-free MDC for particulates deposited on filters with 1 ng/cm<sup>2</sup> densities such as Nuclepore and some cellulose and teflon filters MDC ~ (time)<sup>-1/2</sup> (filter density)<sup>1/2</sup>

\*\* For scratched teflon filters

† Custom analysis for specific elements at special MDC's available upon request.

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Figure 1



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Table 2  
Potential Spectral Interferences

Element of Interest			Element of Interest			$F_{im}$
Element	Excitation Condition	Line	Element	Excitation Condition	Line	
Mg	2	K <sub>a</sub>	Br	1	L <sub>a</sub>	0.0098 ± 0.0003
Al	2	K <sub>a</sub>	Br	1	L <sub>a</sub>	0.176 ± 0.001
Al	2	K <sub>a</sub>	K	2	escape	0.0047 ± 0.0005
Si	2	K <sub>a</sub>	Br	1	L <sub>a</sub>	0.0028 ± 0.0003
Si	2	K <sub>a</sub>	Sr	1	L <sub>a</sub>	0.285 ± 0.002
P	2	K <sub>a</sub>	Ca	2	escape	0.0137 ± 0.0009
K	2	K <sub>a</sub>	Ca	2	K <sub>a</sub>	0.0121 ± 0.0008
K	2	K <sub>a</sub>	Cd	1	L <sub>β</sub>	1.116 ± 0.006
Ca	2	K <sub>a</sub>	K	2	K <sub>β</sub>	0.0309 ± 0.0008
S	3	K <sub>a</sub>	Pb	3	M	0.19 ± 0.02
Cl	3	K <sub>a</sub>	S	3	K <sub>a</sub>	0.026 ± 0.005
Cl	3	K <sub>a</sub>	Pb	3	M	0.073 ± 0.002
K	3	K <sub>a</sub>	Cd	1	L <sub>β</sub>	0.401 ± 0.003
Ca	3	K <sub>a</sub>	K	3	K <sub>β</sub>	0.070 ± 0.002
Ti	3	K <sub>a</sub>	Ba	1	L <sub>a</sub>	4.52 ± 0.04
V	3	K <sub>a</sub>	Ba	1	L <sub>β</sub>	2.38 ± 0.02
V	3	K <sub>a</sub>	Ti	3	K <sub>β</sub>	0.127 ± 0.002
Cr	3	K <sub>a</sub>	V	3	K <sub>β</sub>	0.132 ± 0.002
Mn	3	K <sub>a</sub>	Cr	3	K <sub>β</sub>	0.130 ± 0.001
Fe	3	K <sub>a</sub>	Mn	3	K <sub>β</sub>	0.116 ± 0.001
As	3	K <sub>a</sub>	Pb	3	L <sub>a</sub>	1.11 ± 0.01
Br	3	K <sub>a</sub>	Pb	3	L <sub>β</sub>	0.014 ± 0.001
Cu	1	K <sub>a</sub>	Ni	1	K <sub>β</sub>	0.065 ± 0.002
Zn	1	K <sub>a</sub>	Cu	1	K <sub>β</sub>	0.0376 ± 0.0006
Ga	1	K <sub>a</sub>	Zn	1	K <sub>β</sub>	0.0149 ± 0.0004
Ga	1	K <sub>a</sub>	Pb	1	L <sub>a</sub>	0.060 ± 0.001
Hg	1	L <sub>a</sub>	Pb	1	L <sub>a</sub>	0.0033 ± 0.0002
Hg	1	L <sub>a</sub>	Br	1	K <sub>a</sub>	0.00063 ± 0.00006
As	1	K <sub>a</sub>	Pb	1	L <sub>a</sub>	1.196 ± 0.005
Se	1	K <sub>a</sub>	Pb	1	L <sub>a</sub>	0.0076 ± 0.0004
Br	1	K <sub>a</sub>	Pb	1	L <sub>β</sub>	0.0140 ± 0.0005
Se	1	K <sub>a</sub>	Br	1	K <sub>a</sub>	0.0012 ± 0.0001
Rb	1	K <sub>a</sub>	Br	1	K <sub>β</sub>	0.156 ± 0.001
Rb	1	K <sub>a</sub>	Pb	1	L <sub>β</sub>	0.0107 ± 0.0004
Sr	1	K <sub>a</sub>	Pb	1	L <sub>γ</sub>	0.0073 ± 0.0007
Sr	1	K <sub>a</sub>	Br	1	K <sub>β</sub>	0.0008 ± 0.0002
Y	1	K <sub>a</sub>	Rb	1	K <sub>β</sub>	0.170 ± 0.001
Y	1	K <sub>a</sub>	Pb	1	L <sub>γ</sub>	0.121 ± 0.002
Y	1	K <sub>a</sub>	Br	1	K <sub>β</sub>	0.0008 ± 0.0002
Y	1	K <sub>a</sub>	Sr	1	K <sub>β</sub>	0.0025 ± 0.0003
Zr	1	K <sub>a</sub>	Sr	1	K <sub>β</sub>	0.166 ± 0.001
Zr	1	K <sub>a</sub>	Pb	1	L <sub>γ</sub>	0.0088 ± 0.0009
Zr	1	K <sub>a</sub>	Br	1	K <sub>β</sub>	0.0009 ± 0.0003
Sb	1	K <sub>a</sub>	Cd	1	K <sub>β</sub>	0.0245 ± 0.0008

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and

$$\sigma F_{im} = \left[ \left( \frac{\sigma N_m}{N_m} \right)^2 + \left( \frac{\sigma N_i}{N_i} \right)^2 \right]^{1/2}$$

where  $\sigma F_{im}$  = uncertainty in  $F_{im}$

$\sigma N_m$  = uncertainty in  $N_m$

$\sigma N_i$  = uncertainty in  $N_i$

Samples exhibiting chemical composition uncharacteristic of normal ambient aerosols may require additional corrections.

4. Minimum Detectable Concentrations (MDC) on filters are determined by the formula

$$MDC_i = 3 \sqrt{B_i \frac{M_i}{N_i}}$$

where

$MDC_i$  = the minimum detectable concentration of element i

$M_i$  = known concentration of element i

$N_i$  = Net number of counts measured when element i is analyzed under standard conditions

$B_i$  = Number of background counts subtracted from total counts in region of interest i to obtain  $N_i$ .

Table 1 lists MDC's for 5 standard analysis conditions.

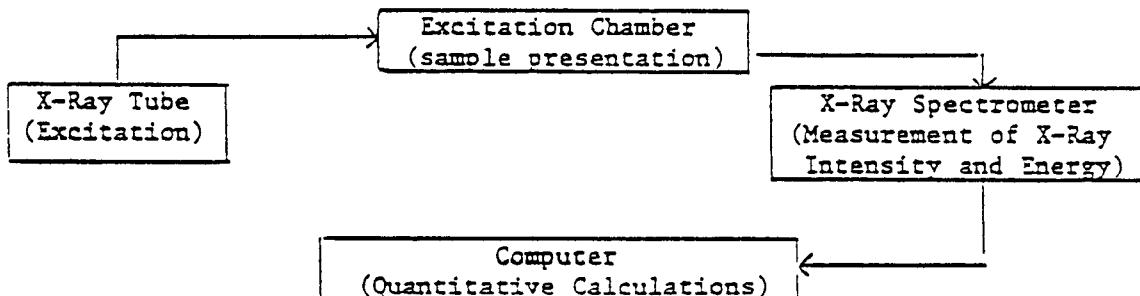
5. Background Subtraction: Most of the background counts in a region of interest are due to the scattering of primary radiation from the sample. The amount of this scattering depends upon the mass of the sample presented to the primary excitation beam. A blank filter is run under each excitation condition and the background in each region of interest is linearly related to a high energy incoherent scatter peak due to the primary radiation. The same scatter peak is monitored on all loaded samples and the linear relationship is used to estimate the background in the analyte line region of interest.

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6. Precision and Accuracy: Count variations of less than 1% are typical over 24 hour periods. Figure 2 shows the variability of the QC filter for the analysis of 630 filters over a period of 2 months ( $< \pm 1.5\%$ ). All results are reproducible to within 1% when counting statistics are not the primary source of uncertainty. The accuracy in terms of the deposit on the filter is primarily limited by the uncertainties in the standard values which are typically 5%. Errors in the absorption corrections for the low atomic number elements ( $Z < 20$ ) may approach the same order of magnitude as sampling errors.

## 2. Apparatus

The x-ray fluorescence analyzer used for the analysis is an Ortec TEFA III system. A block diagram of its major components is shown below:

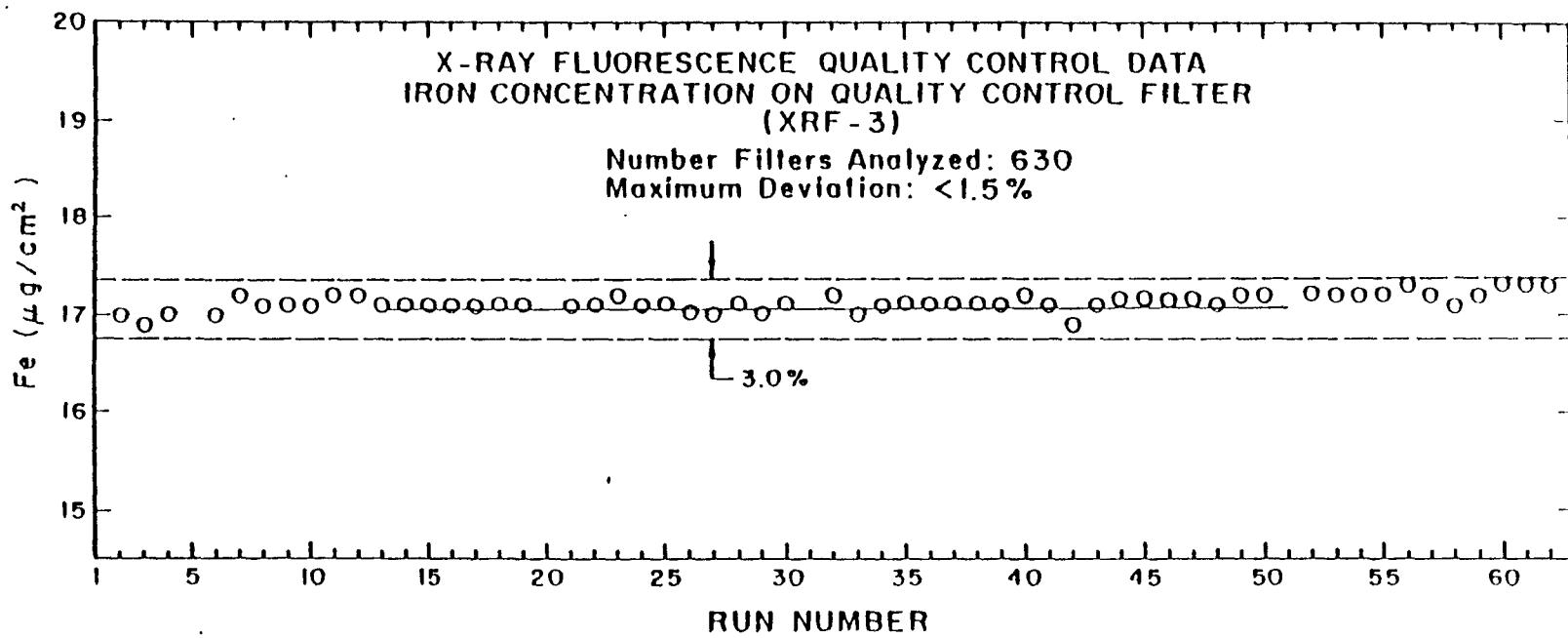


The primary function of the excitation system is to generate inner shell electron vacancies which result in the emission of x-rays characteristic of the sample elements. The TEFA system has a dual anode Mo/W x-ray tube. Mo and Cu primary x-ray filters can be used to obtain monochromatic excitation.

Air filters are presented to the excitation radiation and spectrometer in an evacuated excitation chamber.

The x-ray spectrometer consists of a Si(Li) x-ray detector amplifier and pulse height analyzer which measures the energy and intensity of the characteristic x-rays generated in the above excitation procedure.

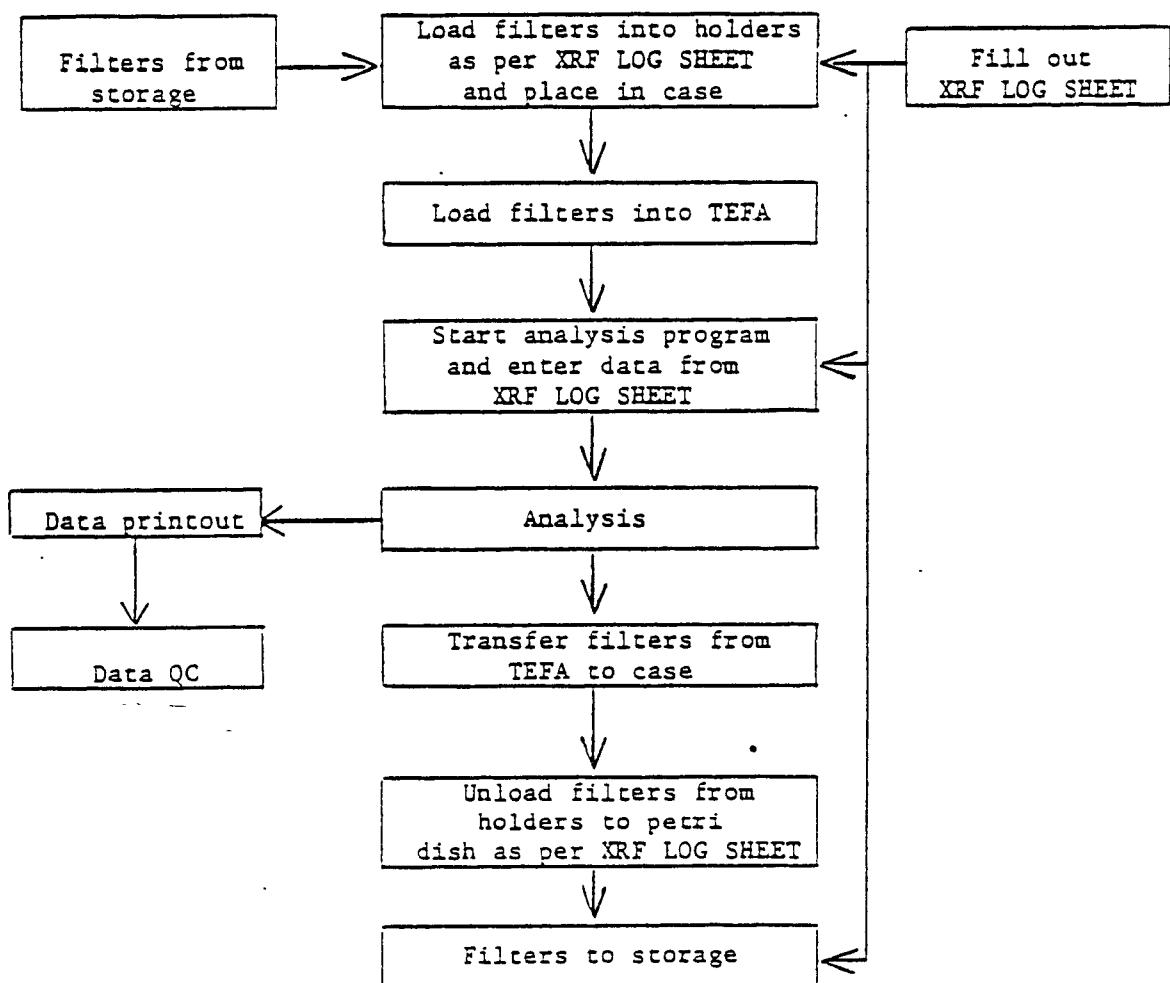
Figure 2



### 3. Calibration

The instrument is calibrated with single element thin film vapor deposited standards obtained from Micromatter Co., Eastsound, WA., and with multielement solution deposited standards obtained from Columbia Scientific Industries, Austin, TX. Particle standards obtained from Columbia Scientific Industries are used for Al and Si calibration. Plots of instrument response versus atomic number should yield smooth curves, and are used to validate standard concentrations. The surface concentration relevant to a specific excitation condition for each standard element is listed in the Standards Notebook. The standards are kept permanently mounted in clean, closed containers and are labelled with an ID number.

Standard concentration values are entered into the computer and stored on floppy disk by the ORACL program MAKSTD. The instrument is then calibrated by proceeding with a normal run, and using an "S" prefix for each of the standard ID numbers. Details of software usage are in the TEFA Software Notebook. Calibration should be performed only by supervisory personnel.

4. Flowchart Summary

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## 5. Operating Procedure

The TEFA operating manual should be reviewed before operating the instrument. One should be familiar with the hazards of incorrect operation and the safety systems of the TEFA. Only designated personnel should operate the instrument and no procedures other than the ones described here should be performed unless instructed otherwise by the laboratory supervisor.

### 5.1 TEFA Start-up

1. Obtain TEFA key from the standards cabinet and switch CONTROL POWER to ON.
2. Press the SYSTEM POWER ON button.
3. Obtain the XR program disk from storage and insert in drive 0 (left hand drive).
4. Press the PWR button on the EEDS II control panel.
5. Adjust the MARKER joystick so that elapsed time is displayed on the CRT.
6. Turn on the printer, set to ON LINE, and switch to 8 LPI. Advance paper to top of page using the FORM ALIGN controls.
7. Press HV1 on the EEDS II control panel.
8. Press the DATA ENTRY X-RAYS button. A data parameter is selected by first pressing the RETURN key until the cursor is opposite the desired parameter, then pressing the space bar. Valid entries are displayed on the CRT. Set TUBE VOLTAGE to 5.0 Kv and TRAY SIZE to 12.
9. Press the SYSTEM CONTROL STANDBY button. Make sure the excitation chamber cover is closed.
10. After waiting 3 minutes, press the SYSTEM CONTROL ON button. This turns on the x-rays. The 3 red X-RAYS ON lights in the RADIATION section will come on, the green X-RAYS OFF light will go out, X-RAYS ON will flash on the CRT and the red X-RAYS ON light in the SYSTEM CONTROL section will flash. The excitation chamber cover must remain closed whenever the x-rays are being produced.
11. The TEFA should be allowed to warm up for 30 minutes before beginning analysis.

### 5.2 Filter Loading

1. Fill out an XRF LOG (Figure 3) with PROJECT NAME, INITIAL, ID numbers and particle size codes (S). If there are also customer ID numbers, record them in the comments column. ID numbers and particle size codes are obtained from the sample LOG Book. Record the data in the XRF column in the Sample Log Book for all samples loaded. All 12 positions need not be filled. Position 1 must be a blank of the same type and preferably the same manufacturing lot as the filters to be analyzed. The blank ID must begin with "B". The last position must be a quality control standard. Obtain its ID number from the laboratory supervisor.

ner Disp ve ry F esc An ts Mr ers

XRF LOG

PROJECT NAME \_\_\_\_\_

INITIAL:

DATA DISK \_\_\_\_\_

LOAD \_\_\_\_\_

ANALYZE \_\_\_\_\_

UNLOAD \_\_\_\_\_

DATE \_\_\_\_\_

QA \_\_\_\_\_

TIME \_\_\_\_\_

ANALYSIS SEQUENCE \_\_\_\_\_

POSITION	ID		S	COMMENTS
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				

Figure 3

2. Filter loading is done in the laminar flow hood. Turn the hood blower and lights on and clean the work surface with a Kaydry towel and methanol. Lay out a Kaydry towel in the hood. Clean a pair of forceps and the filter loading block with Kimwipes and methanol and place on the towel. Clean an XRF sample case inside and out and place in the hood. Obtain the filters to be analyzed from the sample storage cabinet. Place the filters to be loaded, a set of numbered filter holders, a box of Kimwipes, a methanol container, the XRF LOG and a pen in the hood. The filter containers should be labelled with their ID numbers.
3. Clean the filter holders with Kimwipes and methanol. Pay particular attention to surfaces which the filters will contact. Wear disposable gloves to avoid excess contact with methanol. When finished cleaning the filter holders, remove gloves and rinse hands if gloves are of the talced variety.
4. Select filter holder 1, place on the filter loading block, and remove the retaining ring. If the blank has already been loaded from a previous run, select filter holder 2 instead of 1.
5. Select the filter whose position number as indicated on the XRF LOG corresponds to the filter holder. Note the condition of the filter and record any comments on the XRF LOG that may apply to XRF analysis, such as uneven deposit, wrinkled filter, water spot on filter, etc. Filters with loose deposits should not be analyzed.
6. Remove the filter from its container and place deposit side down in the filter holder. Use forceps and handle the filter only around its perimeter. If the deposit is touched by the forceps, clean them before proceeding.
7. Replace the retaining ring so that the filter is held in place without any wrinkles or other misalignment.
8. Place the numbered filter holder into the like numbered location in the sample case and the filter container in the proper numbered location in the filter container tray. The blank filter holder and container can both be placed in the large section of the filter container tray.
9. Repeat steps 4-8 for the remaining filters. The quality control standard is permanently loaded and is not put into the sample case.
10. Verify that the sample ID number to position number relationship is correct. Each filter holder number must match its position number in the sample case. The ID number on each filter container must correspond to its position in the filter container tray exactly as on the XRF LOG.
11. Place the filter container tray on top of the filter holders in the sample case, put the XRF LOG in the sample case, and transfer to the TEFA.
12. Clean up the laminar flow hood.

### 5.3 Analyzing Filters

1. Verify that TUBE VOLTAGE is 5.0 Kv and TUBE CURRENT is 1 uamp. Press the SYSTEM CONTROL STANDBY button. Make certain the red X-RAYS ON lights are out and the green X-RAYS OFF light is on. Never open the excitation chamber cover unless this is the case.
2. Lift the excitation chamber cover to its open position.
3. Open the sample case and place the filter container tray in the lid.
4. Transfer each filter holder in sequence to the like numbered position in the TEFA sample tray. Make sure the seating is proper by rotating the filter holder and align the holder so that its indicating line points toward the center of the tray. Close the sample case. If the standard is not already in position, obtain it from the standard cabinet and place in position on the sample tray.
5. Verify that all samples are correctly loaded in their designated positions on the sample tray.
6. Make sure the excitation chamber gasket is properly seated and close the cover.
7. Push the X-RAY PATH PUMP button. The pump will quiet down after 10-20 seconds if the chamber is properly sealed.
8. Press the SYSTEM CONTROL ON button. The red X-RAYS ON lights will come on and the green X-RAYS OFF light will go out.
9. Select a formatted, zeroed disk and write the PROJECT NAME on the disk label. Use a felt tipped pen. Record both the data disk and program disk numbers on the XRF LOG, as well as INITIAL, DATE, TIME, and ANALYSIS SEQUENCE. Obtain the analysis sequence number from the laboratory supervisor. Insert the data disk into drive 1 (right hand side).
10. Record the date, project, initial, and data disk number in the TEFA Log Book.
11. Press the DATA ENTRY X-RAYS button to return to spectrum mode, then press OPERATING MODE TERMINAL. Type "C" while holding down the CTRL key. Type R ORACL <RETURN>. Type RUN XR <RETURN>. Enter data as requested by the program and displayed on the CRT. If there are less than 12 samples, simply press return when asked for the next sample. Before verifying the particle size codes, check to see that the X-RAY PATH VACUUM READY light is on. Sample analysis begins when the particle size codes are verified and proceeds automatically from sample to sample for each excitation condition.
12. When analysis is complete, indicated by 5 beeps, press the DATA ENTRY X-RAYS button and verify that tube voltage is 5.0 Kv and tube current is 1 uamp. Press the X-RAY PATH OFF and SYSTEM CONTROL STANDBY buttons. The green X-RAYS OFF light should come on and the red X-RAYS ON lights should go out.

13. Remove the data disk and place in storage. Advance the printout to top of the page and give printout to laboratory supervisor for review.
14. When excitation chamber has reached room pressure, check that red X-RAYS ON lights are out and green X-RAYS OFF light is on, and open chamber cover.
15. Transfer in sequence each filter holder from the TEFA sample tray to its like numbered position in the sample case. If the next run will use the same blank and/or quality control standard, they may be left in the sample tray. Otherwise return the blank to the sample case and the standard to its container in the standards cabinet.
16. Close the excitation chamber cover, place the XRF LOG in the sample case and transfer to the laminar flow hood for unloading.

#### 5.4 Unloading Filters

1. Filter unloading is done in the laminar flow hood. Turn on the hood blower and lights and clean the work surface with a Kaydry towel and methanol. Lay out a Kaydry towel in the hood. Clean a pair of forceps and the filter loading block with Kimwipes and methanol and place on the towel. Place the sample case in the hood. Record your initial on the XRF LOG.
2. Select a filter holder and the corresponding filter container from the sample case. Check that the sample ID matches position number exactly as on the XRF LOG. Place the filter holder on the loading block and the filter container next to it.
3. Remove the retaining ring and transfer the filter to its container. Usually it is easiest to hold the filter holder over the open filter container and carefully invert the filter holder so that the filter drops deposit side up into its container. Sometimes use of the forceps is necessary. Replace the filter container lid and set aside. Set the filter holder aside.
4. Repeat steps 2 and 3 for the remaining filters.
5. Return the filters to the sample storage cabinet, the filter holders to the standards cabinet and the XRF LOG to the laboratory supervisor.
6. Clean up the laminar flow hood.

#### 5.5 TEFA Shutdown

1. Verify that tube voltage is 5.0 Kv, and tube current is 1 amp.
2. Press the SYSTEM CONTROL STANDBY and then SYSTEM CONTROL OFF buttons.
3. Press HV1 on the EEDS II control panel to turn off the high voltage.

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4. Turn off the printer.
5. Press the PWR button on the EEDS II control panel to turn off power.
6. Press the SYSTEM POWER OFF button.
7. Switch CONTROL POWER to OFF and place key in the standards cabinet.
8. Return the XR program disk to storage, and close the disk drive doors.

#### 6. Calculations

The count rate,  $I_i$ , of x-ray photon events from element i measured by the Si (Li) detector is proportional to the mass of element i,  $M_i$ , times an attenuation factor,  $A_i$ , which takes into consideration the absorption of the primary excitation and characteristic x-rays in the sample.

That is,

$$I_i = K_i M_i A_i \quad (1)$$

where  $K_i$  is a proportionality constant. An unknown mass,  $M_i$ , may be determined by comparing the count rate measured for the unknown with the count rate,  $I_i^s$ , measured with a known standard mass  $M_i^s$ .

$$M_i = \frac{I_i C_i}{A_i} \quad (2)$$

where  $C_i$  is a calibration factor,

$$C_i = \frac{A_i^s M_i^s}{I_i^s} \quad (3)$$

The uncertainties in  $M_i$  and  $C_i$  are given by

$$\sigma M_i = M_i \left[ \left( \frac{\sigma C_i}{C_i} \right)^2 + \left( \frac{\sigma I_i}{I_i} \right)^2 \right]^{1/2} \quad (4)$$

and

$$\sigma C_i = C_i \left[ \left( \frac{\sigma M_i^s}{M_i^s} \right)^2 + \left( \frac{\sigma I_i^s}{I_i^s} \right)^2 \right]^{1/2} \quad (5)$$

$$\frac{\sigma M_i^s}{M_i^s} = 0.05 \text{ per manufacturers specifications.}$$

## Energy Dispersive X-Ray Fluorescence Analysis of Air Filters

Table 3

EXCITATION CONDITION: I  
 ANODE: Mo  
 FILTER: Mo  
 VOLTAGE: 50  
 CURRENT: 200  
 ENERGY: 0-40

## SPECTRUM REGIONS OF INTEREST

REGION	CHANNEL	ENERGY	ELEMENT
1	156-164	6.24- 6.56	Fe
2	183-191	7.02- 7.64	Ni
3	197-205	7.88- 8.20	Cu
4	212-220	8.48- 8.80	Zn
5	227-235	9.08- 9.40	Ge
6	247-251	9.88- 10.04	Hg
7	258-262	10.32- 10.76	As
8	276-281	11.04- 11.24	Se
9	292-302	11.68- 12.08	Br
10	310-320	12.40- 12.80	Pb
11	322-332	13.14- 13.56	Rb
12	348-358	13.92- 14.32	Sr
13	369-379	14.76- 15.16	Y
14	389-399	15.56- 15.96	Zr
15	417-426	16.48- 17.04	As*
16	521-537	20.84- 21.48	Fe
17	544-560	21.76- 22.40	Og
18	568-584	22.72- 23.36	Cl
19	597-613	23.68- 24.32	In
20	623-639	24.22- 25.54	Sn
21	657-664	26.28- 26.56	Se
22	720-808	31.60- 32.32	Pa
23	827-845	33.08- 33.80	La

## EXCITATION CONDITIONS: II

ANODE: Mo  
 FILTER: Cu  
 VOLTAGE: 15  
 CURRENT: 200  
 ENERGY: 0-10

## SPECTRUM REGIONS OF INTEREST

REGION	CHANNEL	ENERGY	ELEMENT
1	118-132	1.18- 1.32	Mo
2	141-155	1.41- 1.55	Al
3	167-181	1.67- 1.81	Si
4	183-209	1.83- 2.09	F
5	324-338	3.24- 3.38	F
6	345-376	3.45- 3.76	Co
7	631-742	6.31- 7.42	F

## EXCITATION CONDITIONS: III

ANODE: W  
 FILTER: Cu  
 VOLTAGE: 25  
 CURRENT: 200  
 ENERGY: 0-20

## SPECTRUM REGIONS OF INTEREST

REGION	CHANNEL	ENERGY	ELEMENT
1	112-120	2.24- 2.40	O
2	127-135	2.64- 2.70	O
3	162-170	3.74- 3.80	I
4	186-190	3.60- 3.80	O
5	221-231	4.42- 4.72	Tl
6	243-253	4.84- 5.07	V
7	264-274	5.32- 5.52	Cr
8	290-300	5.80- 6.00	Mn
9	313-326	6.26- 6.52	Tl
10	520-534	10.40- 10.60	O
11	595-605	11.70- 12.10	Br
12	620-640	12.40- 12.80	Fr

\* No K<sub>a</sub> scatter

Finally, the corrected counts are divided by analysis live time, L, to obtain the count rate,

$$I_i = \frac{T_i}{L} \quad (10)$$

$$\text{and } \sigma I_i = \frac{\sigma T_i}{L} \quad (11)$$

Calculations for instrument calibration are similar except that  $C_i$  is solved for in eq. 3. Also, since single element and non-interfering multi-element standards are used for calibration, spectral corrections are not made and  $T_i = N_i$  and  $\sigma T_i = \sigma N_i$ .

#### 7. Quality Control

The filters are loaded and unloaded into specially machined acrylic holders. Filter loading is done in the laminar flow hood and the filters themselves are handled with forceps, out of the analysis and deposit area. The loaded filters are transported to and from the TEFA in covered sample cases, and the filter holders are cleaned between each use. These procedures prevent the possibility of sample contamination.

To prevent confusion in identification of the samples when they are out of their ID coded filter containers, a sample position number versus ID number relationship used. This relationship is established by the XRF LOG before the filters are removed from their containers and it is verified after each handling step in the procedure.

For each XRF analysis batch of 10 samples, one blank and a quality control standard is analyzed. Measured concentrations of the quality control standard, which contains several key elements, are compared with actual concentrations (Figure 4). If the deviation is more than  $\pm 2\%$ , all samples of that run must be reanalyzed. The results of the quality control standard over a number of runs provides a measure of the XRF analysis precision. If the results show a trend in drift, recalibration is required.

Several elements, including K, Ca, Fe, As, Br and Pb are measured under more than one of the three excitation conditions normally used for each run. Results of these elements are compared for each of the excitation conditions under which they are measured. If agreement is for outside the calculated uncertainties, the sample must be reanalyzed.

(Rev. August, 1981)

## SFT EAST 8

## QA STANDARD 08043

	CONCENTRATION		% ERROR
	ACTUAL	MEASURED	
T1	40.80	41.184+-0.07	+ 1.0
T2	44.30	44.704+-0.07	+ 1.1
T3	44.30	44.694+-0.07	+ 0.4
T4	47.30	47.064+-0.07	- 0.6
T5	44.30	44.894+-0.07	+ 0.9
T6	49.70	49.504+-0.07	- 0.4

## SFT EAST 9

## QA STANDARD 08043

	CONCENTRATION		% ERROR
	ACTUAL	MEASURED	
T1	40.80	41.234+-0.07	+ 1.1
T2	44.30	44.924+-0.07	+ 1.4
T3	44.30	45.084+-0.07	+ 0.4
T4	47.30	46.944+-0.07	- 0.3
T5	44.30	44.804+-0.07	+ 0.0
T6	49.70	49.484+-0.07	- 0.1

## SFT EAST 10

## QA STANDARD 08043

	CONCENTRATION		% ERROR
	ACTUAL	MEASURED	
T1	40.80	40.994+-0.06	+ 0.3
T2	44.30	44.994+-0.06	+ 1.4
T3	44.30	45.384+-0.06	+ 1.1
T4	47.30	47.054+-0.06	- 0.4
T5	44.30	44.944+-0.06	+ 0.3
T6	49.70	49.424+-0.06	- 0.3

## SFT EAST 11

## QA STANDARD 08043

	CONCENTRATION		% ERROR
	ACTUAL	MEASURED	
T1	40.80	40.914+-0.06	+ 0.3
T2	44.30	44.574+-0.06	+ 0.5
T3	44.30	45.034+-0.06	+ 1.4
T4	47.30	47.074+-0.06	- 0.4
T5	44.30	44.764+-0.06	+ 0.2
T6	49.70	49.094+-0.06	- 1.3

## SFT EAST 12

## QA STANDARD 08043

	CONCENTRATION		% ERROR
	ACTUAL	MEASURED	
T1	40.80	40.824+-0.06	+ 0.1
T2	44.30	44.754+-0.06	+ 1.0
T3	44.30	44.854+-0.06	+ 0.3
T4	47.30	46.834+-0.06	- 1.4
T5	44.30	44.554+-0.06	+ 0.3
T6	49.70	49.384+-0.06	+ 1.3

## SFT EAST 13

## QA STANDARD 08043

	CONCENTRATION		% ERROR
	ACTUAL	MEASURED	
T1	40.80	40.764+-0.06	- 0.9
T2	44.30	44.804+-0.06	+ 1.1
T3	44.30	44.844+-0.06	+ 1.1
T4	47.30	46.874+-0.06	- 0.7
T5	44.30	44.714+-0.06	+ 0.3
T6	49.70	49.744+-0.06	+ 2.1

### 8. Quality Assurance

Calibration of the instrument is by thin film standards prepared by Micromatter, Inc., Eastsound, WA., and by solution deposited and particle standards made by Columbia Scientific Industries, Austin, TX. Plots of instrument response versus atomic number should yield smooth curves, and are used to validate standard concentrations.

Interlaboratory comparisons are used to check accuracy of the instrument calibration. Several techniques have been used in interlaboratory comparisons in addition to energy dispersive x-ray fluorescence, including neutron activation analysis, optical spectroscopy, wavelength dispersive x-ray fluorescence, and ion chromatography.

In house intermethod comparison with neutron activation analysis is done routinely. This independent method provides comparison with XRF on about 20 elements.

Results from each analysis run are reviewed by the laboratory supervisor. The inter-excitation and quality control standard results are checked as described in section 7. The laboratory supervisor must initial the XRF LOG before results of that run are considered valid. Periodic audits of the TEFA startup, filter loading and unloading, analysis, and TEFA shutdown procedures insure compliance with the Standard Operating Procedure.

(Rev. August, 1981)



QUALITY ASSURANCE PLAN  
(ORGANIC AND ELEMENTAL CARBON ANALYSIS)

1. QA Objectives in Terms of Precision, Accuracy, Completeness, Representativeness, and Comparability.
  - a. Precision. Replicate measurements of organic, elemental, and carbonate carbon should correspond to a standard deviation of  $\pm 15\%$ .
  - b. Accuracy. Analyses will be expected to be accurate to within  $\pm 15\%$ .
  - c. Completeness. Analytical results will be obtained for essentially all samples delivered to OGC.
  - d. Representativeness. Not applicable.
  - e. Comparability. All data will be reported in  $\mu\text{g}$  of carbon per  $\text{m}^3$  of air at  $25^\circ\text{C}$  and 760 mm.
2. Sample Custody.

Mr. Cliff Frazier will be responsible for the custody of the samples.
3. Calibration Procedures and Frequency.

Calibration is accomplished in two ways. At the end of each run a known amount of  $\text{CH}_4$  gas is injected into the oven and the response measured. Thus, a single point calibration is included in every run. The second calibration procedure involves the measurement of filter samples containing known amounts of specific carbonaceous materials. This will be done on a monthly basis.
4. Analytical Procedures.

The initial configuration of the carbon analyzer was conceptually simple. An aerosol sample on a glass or quartz fiber filter segment was heated to  $600^\circ\text{C}$  in a He atmosphere for the purpose of volatilizing organic carbon.

The volatilized organic carbon was oxidized to CO<sub>2</sub> in a MnO<sub>2</sub> bed at 900°C, reduced to CH<sub>4</sub> and measured by a flame ionization detector (FID). Elemental carbon was measured by introducing O<sub>2</sub> into the sample oven and combusting the carbon to CO<sub>2</sub> which was measured as above. Early in the project a difficulty in this method of speciation was discovered; namely, during the organic analysis a fraction of the organic carbon was pyrolytically converted to elemental carbon. This was manifested by an increase in the "blackness" of the filter at the end of the organic analysis. The degree of pyrolytic conversion was variable and could not be related in any simple manner to measurable properties of the sample.

To overcome this difficulty, the system which is now in use was developed. It involves modifications in the combustion method itself, the addition of an optical system for the continuous monitoring of filter reflectivity, and the automation of the analytical sequence by microprocessor technology. The system is shown schematically in Figures 1 and 2. As described below, the optical system is used to correct for the pyrolytic conversion of organic to elemental carbon.

In the combustion method which is currently in use, the filter segments to be analyzed are placed in the quartz sample boat, the combustion zone temperature set to 350°C, and the oven purged with an O<sub>2</sub>(2%)-He(98%) mixture. The boat is then inserted into the combustion zone in which oxidation and volatilization of organic carbon into the flowing O<sub>2</sub>-He stream occur. The volatilized carbon is oxidized to CO<sub>2</sub> in the MnO<sub>2</sub> bed, reduced to CH<sub>4</sub>, and measured as described above. This step typically removes about 2/3 of the organic carbon. On the basis of the reflectivity measurements no net oxidation of elemental carbon occurs, and conversion of organic to elemental carbon is minimized during this

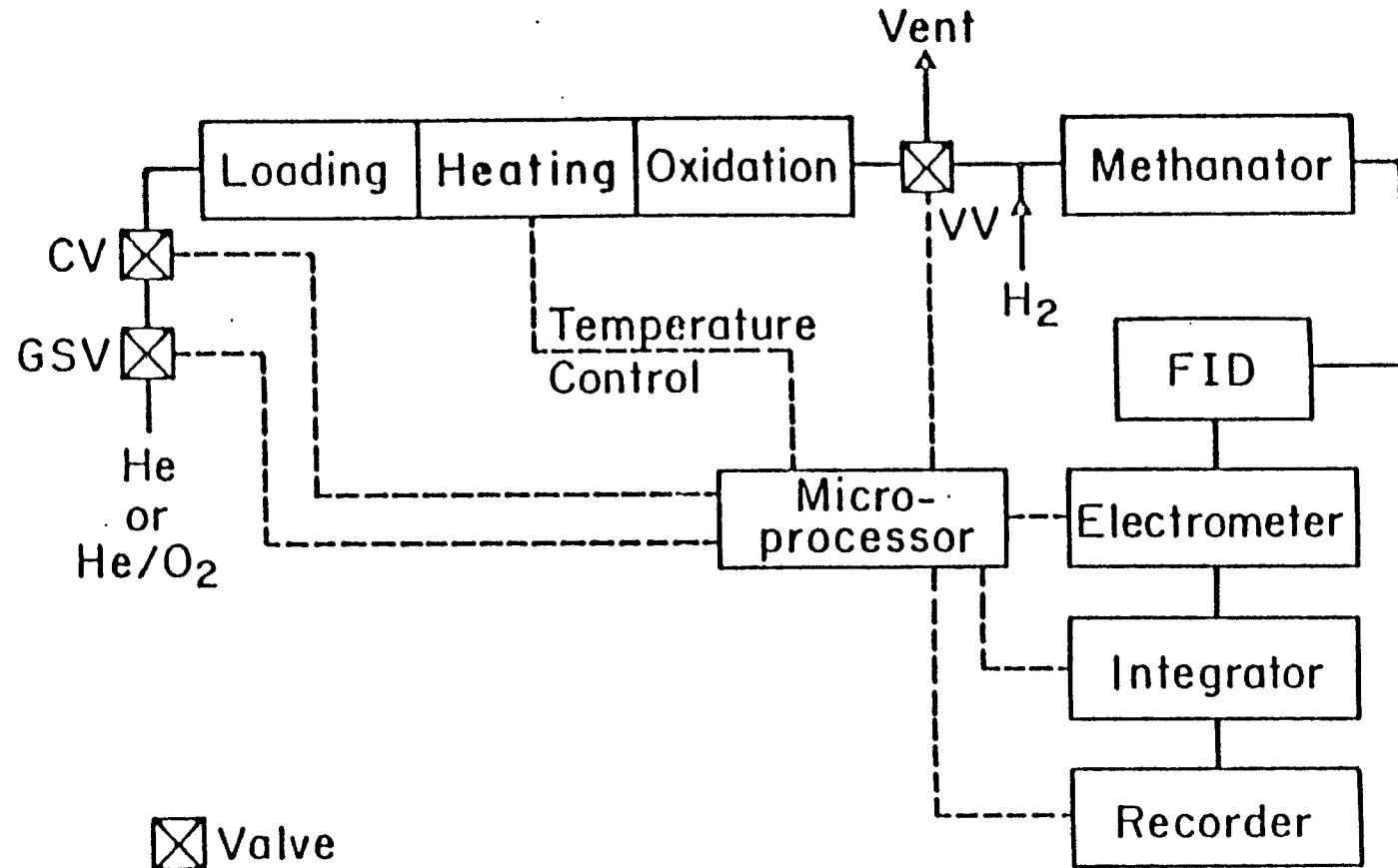


Figure 1 Block diagram of the carbon analyzer.

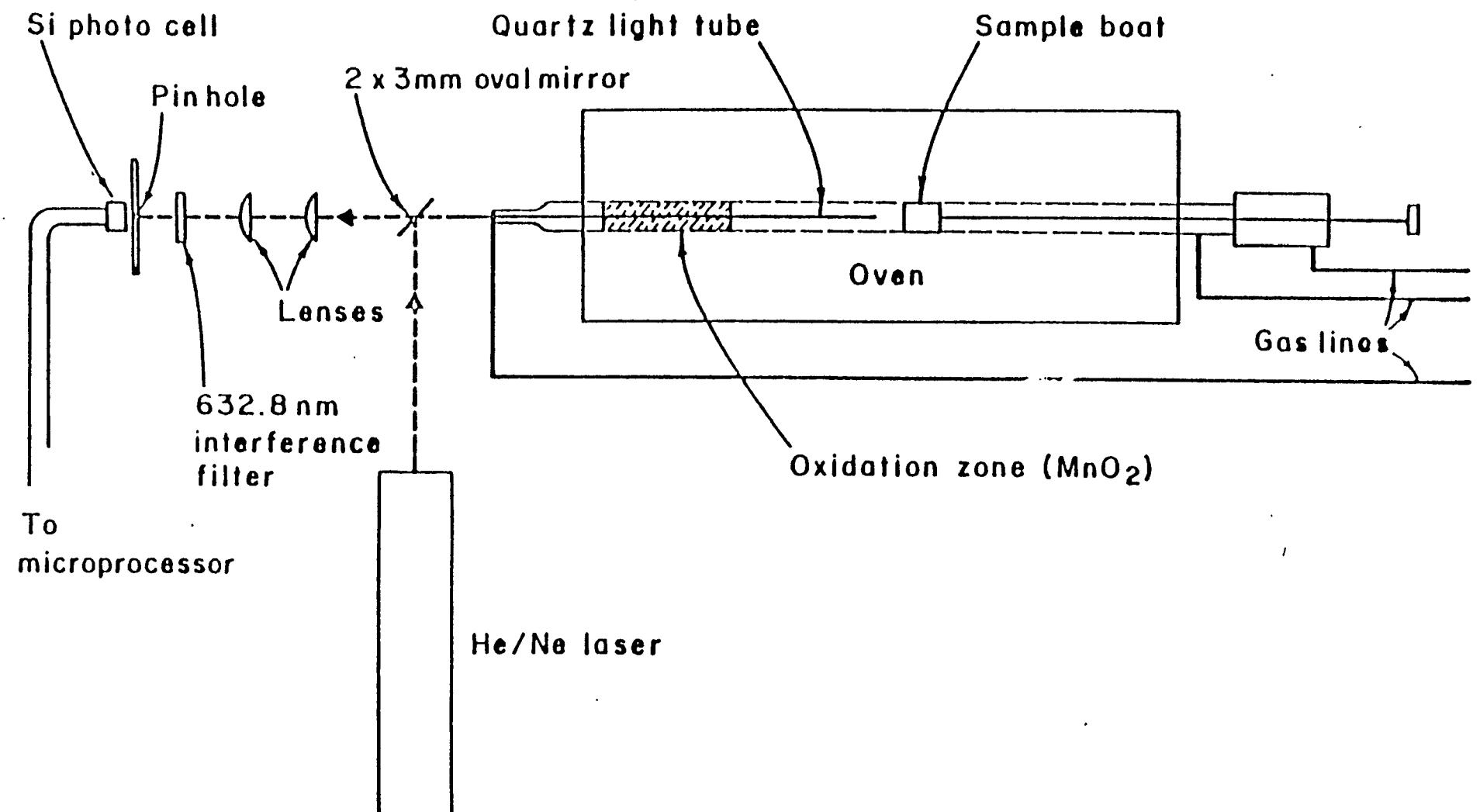


Figure 2. Combustion oven and optical system.

step. The latter is apparently inhibited by the oxygen in the carrier gas. The sample oven is then purged with helium such that all oxygen is removed from the oven. During this process the sample remains in the oven, and the oven temperature is maintained at 350°C. When purging is complete, the combustion zone temperature is raised to 600°C, and the remaining organic carbon is volatilized into the helium carrier gas. This carbon is measured as above.

For the measurement of elemental carbon the combustion zone temperature is dropped to 400°C following which the carrier gas is changed to O<sub>2</sub>(2%)-He (98%). The sample remains in the oven during this process. After 100 seconds under these conditions, the temperature is raised to 500°C where it is held for 120 seconds and finally to 600°C where it is held for 200 seconds. During this step-wise combustion the evolved CO<sub>2</sub> is measured as usual. The purpose of the step-wise combustion is to facilitate the pyrolysis correction.

Throughout the combustion process the reflectivity of the filter sample is continuously monitored by a 633 nm He-Ne laser system. The time course of the reflectivity is shown in Figure 3. At 350°C in O<sub>2</sub>/He little change in the reflectivity is observed, indicating no net oxidation of elemental carbon or pyrolytic conversion of organic to elemental carbon. As the temperature is raised to 600°C in He, however, the reflectivity decreases, indicating an increase in elemental carbon. The step-wise combustion of elemental carbon in the third phase of the analysis results in an increase in the reflectivity corresponding to the oxidation of elemental carbon. The pyrolysis correction is determined by measuring the amount of elemental carbon oxidation necessary to return the filter reflectivity to the value it had before pyrolysis occurred. The shaded area in Figure 3b corresponds to the pyrolysis correction.

Figure 3 (a) Filter reflectivity as a function of time.  
 (b) FID output as a function of time.  
 The cross-hatched section of the 400-500-600°C O<sub>2</sub>/He peak corresponds to the correction for the pyrolytic production of elemental carbon.

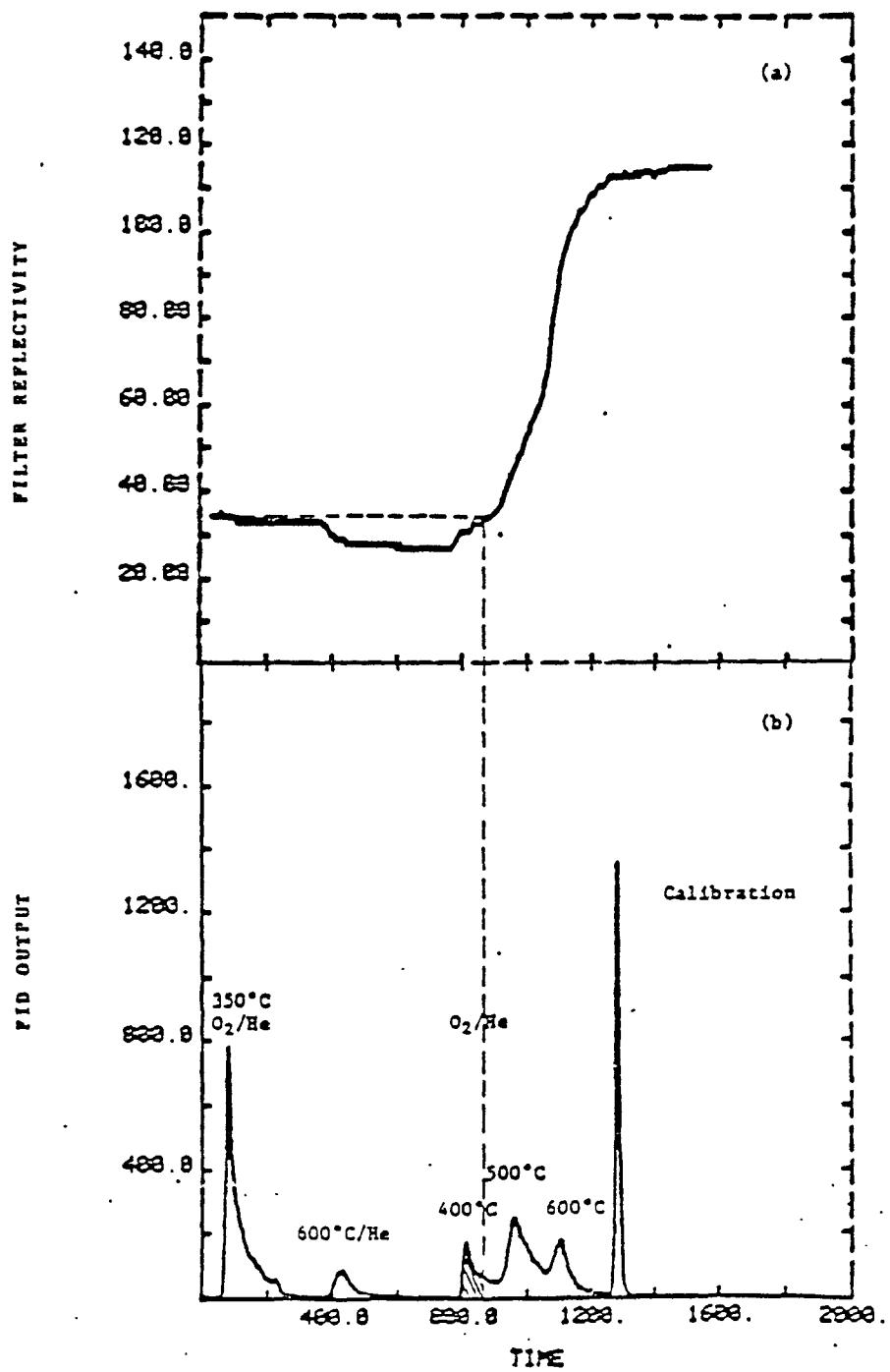


Figure 3

The analytical system is under the control of a microcomputer built around a Motorola 6802 microprocessor. All switching of gas flows, timing, temperature control, pyrolysis correction, analog to digital conversion electronics, electrometer functions, signal integration, data storage, and data outputs are controlled by the computer system. All data (FID output, reflectivity, combustion zone temperature, integrated peak areas, pyrolysis correction, and time) are stored on a cassette tape which can be analyzed at a later date on the OGC PRIME 350 computer. The only operator interaction during the analysis is to enter the filter identification code into the microcomputer and load the sample into the system.

##### 5. Data Analysis, Validation, and Reporting.

Data will be recorded on both cassette magnetic tape and on the x-y plot generated at the time of analysis. The data stored on the tape are processed by the OGC PRIME 350 computer. The processing involves peak integration, blank subtraction, pyrolysis correction, and conversion to scientific units. The master equation is:

$$\mu\text{gC/m}^3 = \left[ \left( \frac{\text{peak area}}{\text{calibration}} \right) \times \left( \frac{\text{mass of carbon}}{\text{in calibration}} \right) \times \left( \frac{1}{\text{area of filter segment analyzed}} \right) \right] - \text{blank } (\mu\text{gC/cm}^2) \times \frac{\text{total area of filter}}{\text{volume of air sampled}}$$

In this equation "peak area" has already been corrected for pyrolysis as described in Section 4.

Several criteria will be used to validate an individual analysis. The first concerns the shape of the calibration peak. If injection of the CH<sub>4</sub> calibration gas results in two peaks, this is indicative of incomplete oxidation

in the MnO<sub>2</sub> oxidation zone. If this is observed, then the oven must be re-packed with fresh MnO<sub>2</sub>. The second criterion concerns the magnitude of the calibration peak. If this is significantly low ( $\geq 15\%$  with respect to the average) or shows a decreasing trend, a loss of efficiency in the methanation process is indicated. This can be corrected by re-packing the methanator with fresh Ni/firebrick. The trend of calibration peak areas will be checked at the end of each analysis day, and relevant comments entered in a QA log book. Finally, an optical absorption measurement of each filter will be made to validate the elemental carbon measurement. Absorption will be plotted as a function of measured elemental carbon concentration ( $\mu\text{gC/cm}^2$ ). Obvious outliers will be re-analyzed.

The data flow in this program is almost totally automated. The output of the carbon analyzer is recorded on a cassette magnetic tape which is processed on the OGC PRIME 350 computer. The only operator interaction is to enter filter codes and air volumes into the computer file. This information will be checked for accuracy from a hard-copy printout. Emily Heyerdahl will be primarily responsible for handling this data flow.

#### 6. Internal Quality Control Checks.

- a. Standard filter. At the beginning of each day a "standard filter" will be analyzed. The "standard filter" is an actual high volume filter sample collected in Portland, Oregon. Many analyses have been made from this filter. If the standard filter analysis differs from the average by more than 2 standard deviations, the standard filter will be re-analyzed. If the re-analysis is within the above limit, then routine analysis will proceed. If not, the cause of the problem will be investigated and corrected.

- b. Calibration. Each run will be individually calibrated. As discussed in Section 5, the shape and magnitude of the calibration peak relate to the analytical efficiency. In addition, at the beginning of each day CH<sub>4</sub> calibrations are performed in both He and He/O<sub>2</sub> carrier gases. If these do not agree to within 10%, the source of the discrepancy will be investigated and corrected.
- c. External Standards. Filter segments containing known amounts of organic, elemental, or carbonate carbon will be analyzed once each month. These will be prepared by Richard Johnson and submitted blind to Emily Heyerdahl who will analyze them.

#### 7. Performance and System Audits.

This is accomplished by the actions of Sections 5 and 6.

#### 8. Preventive Maintenance.

The primary components requiring preventive maintenance are the oxidation and methanation ovens and the optical system. The diagnostic tests and maintenance procedures for the ovens were discussed in Section 5. In the optical system the light pipe between the oxidation oven and the detector occasionally deteriorates with respect to light transmission. This is manifested by an apparent decrease in reflected light from a blank filter. When this occurs, the only remedy is to replace the light pipe.

#### 9. Specific Procedures to Be Used to Routinely Assess Data Precision, Accuracy, and completeness.

Precision will be assessed in two ways. As discussed in Section 7, a "standard filter" is analyzed at the beginning of each day. These standard filter analyses are tabulated and stored in a computer file. The standard deviations

for organic, elemental, and carbonate carbon will be calculated in the usual manner. In addition, replicate analyses are performed on approximately one out of ten filters. The absolute differences (as  $\mu\text{gC}/\text{cm}^2$ ) between the analyses will be tabulated and stored in a computer file. Standard deviations will also be calculated.

Accuracy will be determined from the monthly measurement of external standards. In addition, interlaboratory comparisons will be conducted from time to time.

10. Corrective Action.

This has been discussed in Section 5.

11. Quality Assurance Reports to Management.

The results of the analyses of the standard filters, replicate filters, and external standards will be transmitted to Dr. John A. Cooper.

21. Plot a graph of  $Q_1$  vs  $P_t$  on two-cycle, semi-log graph paper to obtain the hi vol orifice calibration line as illustrated in Figure 2.7. Use a straight edge to draw a best fit line through the calibration points.

22. If any calibration point does not fall within  $\pm 1$  percent of the line, rerun that point, recalculate, and replot. The percent deviation can be calculated by taking the questionable flowrate ( $Q_o$ ) and the calibration line flowrate ( $Q_c$ ) for the same  $P_t$  reading.

$$\text{Percent Deviation}^a = \frac{(Q_o - Q_c)}{Q_c} \times 100$$

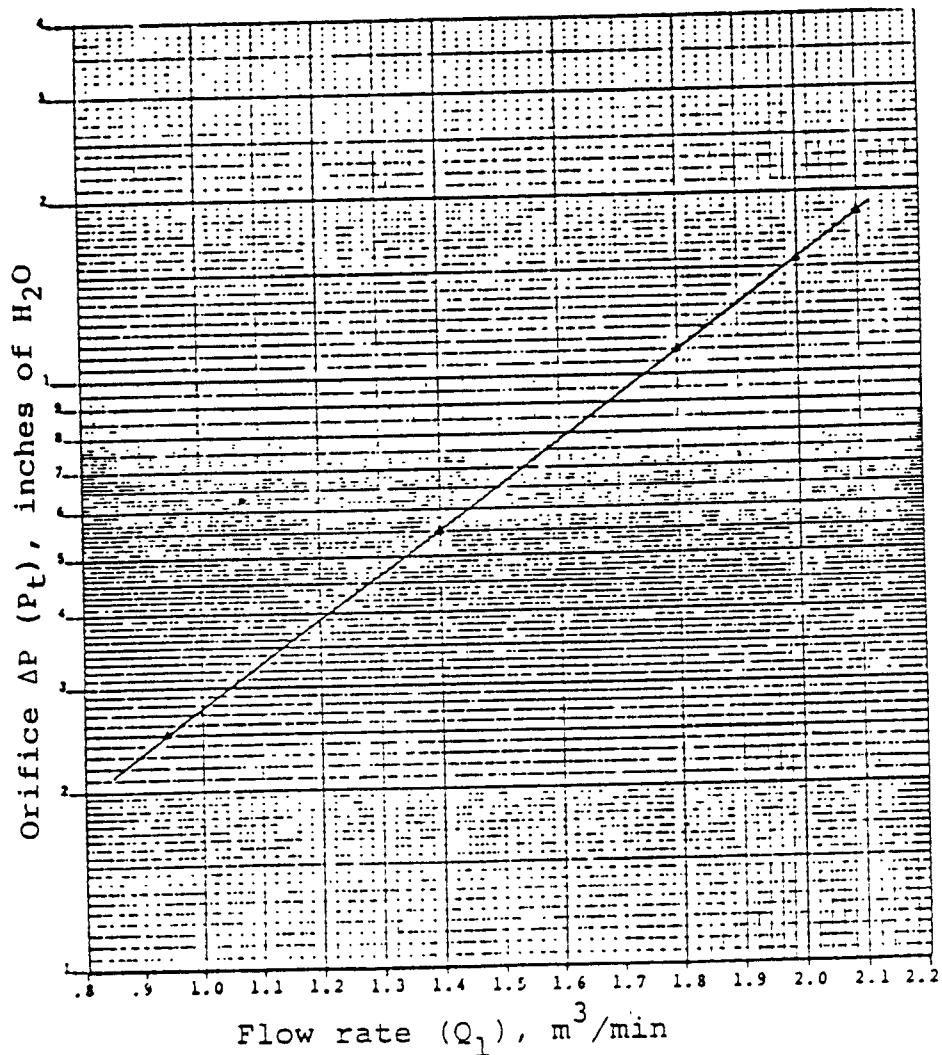


Figure 2.7 Example of hi vol orifice calibration relationship

<sup>a</sup>not to exceed  $\pm 1$  percent

#### 4. Sampler

Samplers must be calibrated when first purchased, after major maintenance on the sampler (e.g., replacement of motor or motor brushes), any time the flow-rate measuring device (i.e., rotameter or recorder) has to be replaced or repaired, or any time a one-point audit check deviates more than  $\pm 7\%$  from the calibration curve.

In using the orifice calibration unit to calibrate a sampler, corrections must be made to the indicated flow rate if the ambient barometric pressure or temperature is substantially different from the pressure or temperature values recorded when the orifice unit was calibrated. Calculate the corrected flow rate as follows:

$$Q_2 = Q_1 \left( \frac{T_2 P_1}{T_1 P_2} \right)^{1/2}$$

where

$Q_2$  = corrected flow rate at sampling conditions,  $\text{m}^3/\text{min}$ ;

$Q_1$  = uncorrected flow rate read from the orifice unit calibration curve for a given pressure, in.  $H_2O$ ;

$T_1$  = absolute temperature when orifice unit was calibrated,  $^{\circ}\text{K}$ ;

$P_1$  = barometric pressure when orifice unit was calibrated,  $\text{mmHg}$ ;

$T_2$  = absolute temperature while calibrating the sampler,  $^{\circ}\text{K}$ , and

$P_2$  = barometric pressure while calibrating sampler,  $\text{mmHg}$ .

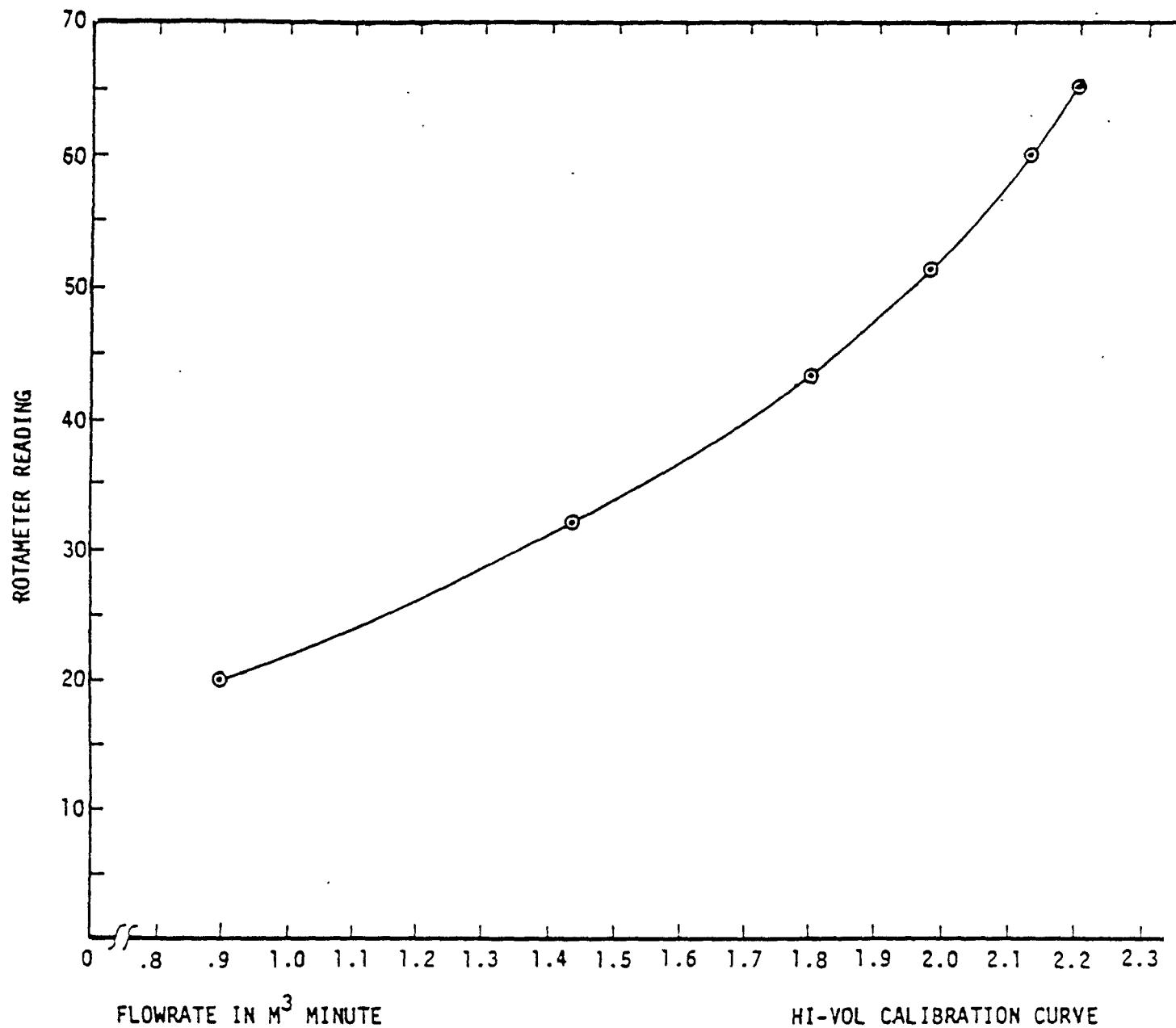
For example, if  $P_1 = P_2$ , Figure 2.8 shows the percentage change of  $Q$  versus temperature differences. If  $T_2$  is greater than  $T_1$ , the percentage change is positive; if  $T_2$  is less than  $T_1$ , the percent change is negative. The same procedure is used to correct for pressure differences. The above formula corrects for field conditions only.

5. Calibration of Hi Vol Sampler with Flow Recorder -  
Connect the calibration equipment as shown in Figure 2-13.

All data during the initial and final calibrations for one hi vol are recorded on the same page in the Hi Vol Calibration Log. If the sampler is being calibrated for the first time or if it has been serviced, record the data on the "Initial" section of the calibration log. If the sampler is being calibrated prior to scheduled maintenance, record the data under the "Final" section of the calibration log.

The stepwise calibration procedure for this model of Hi Vol sampler is presented below:

1. Assemble a hi vol with a clean filter and operate it for at least 5 minutes at 115 volts. If a step-down transformer is used during normal operation, then calibration should be performed with the transformer in operation.
2. Record the flow recorder number and date on three gummed labels. Affix one gummed label to the very top of the metal face on the front of the flow recorder. Affix another gummed label to the middle of the vacuum hose and affix the last gummed label to the other side of the hi vol motor.
3. Turn the motor OFF and attach the flow recorder to the hi vol motor.
4. Install a clean recorder chart and check the recorder for proper operation. Zero the pen if necessary.
5. Remove the filter holder.
6. Attach the calibrated orifice with one of the load plates between the motor and the orifice.
7. Turn the motor ON and record the water manometer and flow recorder readings after they stabilize.
8. Turn the motor OFF.
9. Repeat Steps 6-8 for each of the other load plates.



Temperature 25° Barometric Pressure 760 mm  
Calibration log page no. 18 Hi Vol. No. 5  
Date February 16, 1976 Analyst B.J. Smith

Example of hi vol calibration curve

(Rev. 7/14/81)

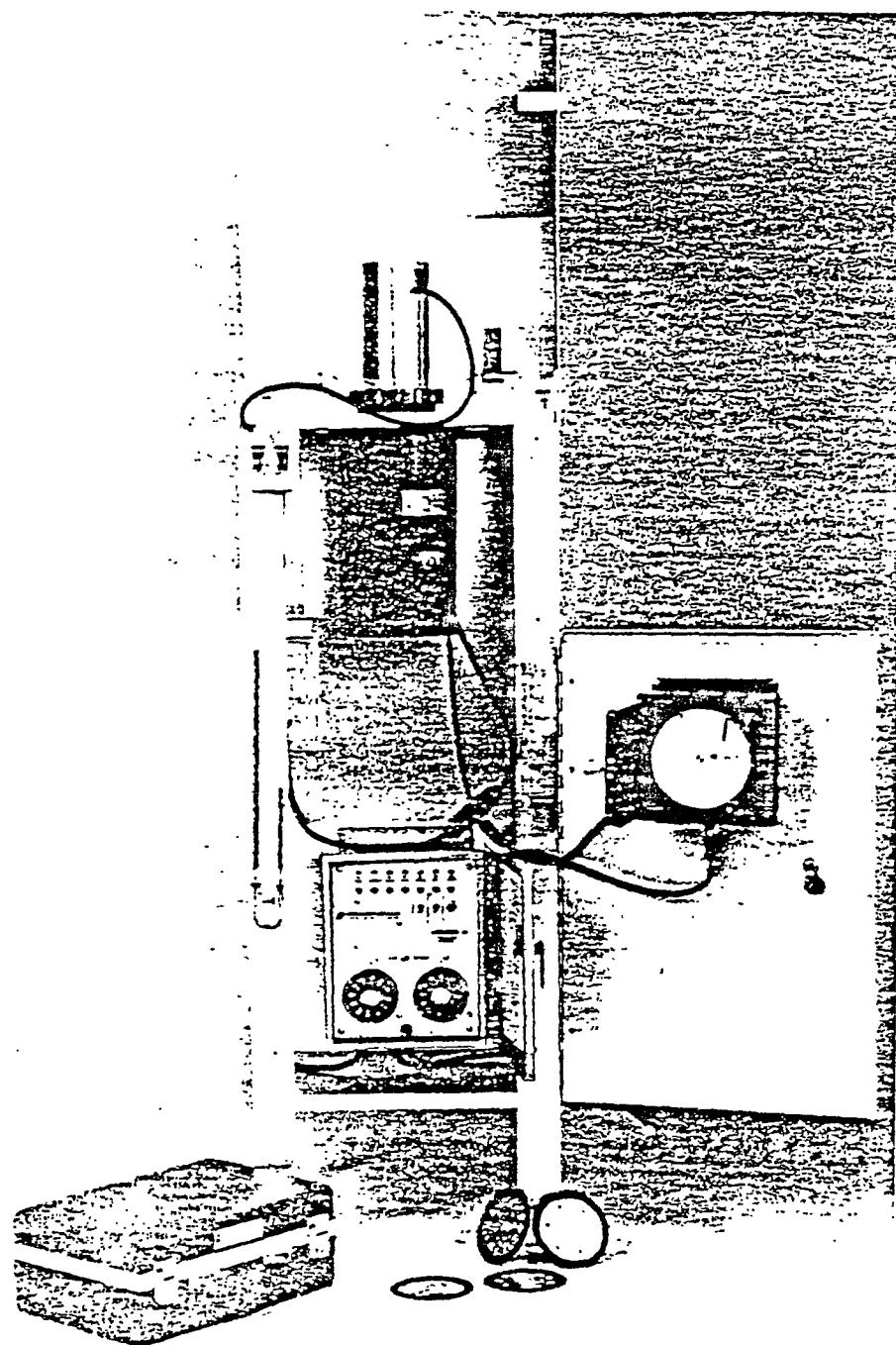


Figure 2-13. Hi vol and orifice assembled for calibration with flow recorder.

(Rev. 7/14/81)

10. Repeat Steps 6-9 once.
11. Determine and record the air flow rate as read from the hi vol orifice calibration curve for each flow recorder reading.
12. Record the barometric pressure in mm Hg and temperature in °C.
13. Determine the percent difference between the temperature and barometric pressure recorded and the temperature and barometric pressure measured when the hi vol orifice was calibrated.
  - a. If the recorded barometric pressure is within  $\pm 15$  percent range and the recorded temperature is within  $\pm 100$  percent range proceed to step 16.
  - b. If the barometric pressure exceeds the  $\pm 15$  percent range or the temperature exceeds the  $\pm 100$  percent range or both occur proceed to step 14.
14. Convert the temperature measured when the hi vol orifice was calibrated ( $T_1$ ) and the temperature recorded in Step 12 above ( $T_2$ ) to absolute temperature (°K).

15. Determine the true flow rates corrected to the barometric pressure and temperature recorded in Step 12 above. This is done by substituting each of the flow rates determined in Step 15 above for  $Q_1$  in the following equation and solving for  $Q_2$ .

$$Q_2 = Q_1 \left( \frac{T_2 P_1}{T_1 P_2} \right)^{1/2}$$

where

- $Q_1$  = flow rate determined in Step 15 above
- $Q_2$  = corrected flow rate
- $P_1$  = barometric pressure measured when the hi vol orifice was calibrated
- $P_2$  = barometric pressure recorded in Step 12 above
- $T_1$  = absolute temperature determined at the time the hi vol orifice was calibrated, °K
- $T_2$  = absolute temperature determined from Step 12, °K.

16. Plot the flow recorder readings vs. the air flow rates.
17. Use a French curve or a curve fitting technique such as the least squares fit, to draw a best fit smooth curve through the calibration points.
18. If any calibration point does not fall within  $\pm$  5 percent of the curve, or causes the curve to be S-shaped or have a sharp turn, rerun that point, recalculate, and replot. The percent deviation can be calculated by taking the questionable flow rate ( $Q_o$ ) and the calibration curve flow rate ( $Q_c$ ) for the same flow meter reading.

$$\text{Percent deviation} = \frac{(Q_o - Q_c)}{Q_c} \times 100$$

should fall within  $\pm$  5 percent.

Table 2.1 ACTIVITY MATRIX FOR CALIBRATION OF EQUIPMENT

Equipment	Acceptance limits	Frequency and method of measurement	Action if requirements not met
Analytical balance	3 to 5 standard weights covering normal range of filter weight, all with indicated weight = true weight $\pm$ 0.0005 g	Gravimetric test weighing at purchase and when performing periodic calibration checks	Have balance maintained and calibrated by manufacturer's representative
Relative humidity indicator	Indicator reading = psychrometer reading $\pm$ 6%	Comparison with reading of wet-bulb dry-bulb psychrometer on receipt and at 6-month intervals	Adjust or replace to attain acceptance limits
Timer	$\pm$ 15 minutes/24 hours	Check at purchase and quarterly against elapsed time meter	Adjust and repeat test
Elapsed time meter	$\pm$ 2 minutes/24 hours	Standard timepiece (known accuracy) at receipt and at 6-month intervals	Adjust or replace time indicator to attain acceptance limits
Orifice calibration unit	Indicated flow rate = actual flow rate $\pm$ 4%	Flow rate primary standard at receipt and 1-year interval	1) Adopt new calibration curve if evidence of orifice damage is absent 2) Replace orifice unit if evidence of damage is present
Sampler	$\frac{ Q_o - Q_c }{Q_c} \leq 0.05$ <p><math>Q_o</math> = observed flow rate <math>Q_c</math> = flow rate from calibration curve</p>	Calibration orifice unit, on receipt and after major maintenance on sampler	<p>Rerun points for which</p> $\frac{ Q_o - Q_c }{Q_c} > 0.05$ <p>until acceptance limit attained</p>



STANDARD OPERATING PROCEDURE  
HIGH VOLUME TSP FILTER HANDLING AND STORAGE

**1. General Discussion**

Filters used for High Volume TSP particulate collection are 8" x 10" Sierra glass fiber filters.

Sample ID codes have a two letter prefix, EH for High Volume TSP filters. A three digit number follows the prefix, starting with 001.

All filter handling procedures are to be done in a clean area. Clean the work area with a methanol dampened Kaydry towel, then lay out a clean Kaydry to use as a work surface before all handling procedures.

Filters are stored in individual file folders, which, in turn, are placed inside manila envelopes.

**2. Materials and Equipment**

- Sierra Model C-305-GF glass fiber filters
- file folders
- manila envelopes
- Kaydry towels
- methanol
- 4-digit number stamp
- Vinyl medical gloves

**3. Filter Coding**

1. Cut file folders such that they will fit inside 9" x 12" manila envelopes.
2. Place vinyl medical gloves on hands and clean with methanol dampened Kaydry towel.
3. Select filter to be coded and inspect both sides for foreign particles, pin holes, discolorations, or other imperfections. Some particles may be blown off. Discard the filter if defective; otherwise, open cut file folder and place filter inside.
4. Select ID # to be printed on filter using 4-digit number stamp. Stamp ID # on upper right hand corner of top face of filter such that ink will not interfere with sampling area.
5. Close file folder and stamp on upper right hand corner. Stamp manila envelope with same ID # and place file folder with filter inside.

6. Repeat steps 1 - 5 as necessary.
7. Record ID # and lot number of all filters coded in the RDDP sample log book.
8. Place loaded filters in sample storage cabinet.

STANDARD OPERATING PROCEDURE  
MAINTENANCE FOR SIERRA DICHOTOMOUS SAMPLERS

1. Maintenance Schedule

Maintenance will be performed on a monthly basis.

2. Cleaning the Sampling Module

1. Particulate Deposits

The Sampling Module is disassembled as shown in Figure 1. All parts are sealed with "O" rings. Particulate internal loss deposits accumulate primarily on the outer and inner surfaces of the tip of the receiving tube in the virtual impactor head. (Figure 2) The remaining internal surfaces may have slight particulate deposits. These deposits should be cleaned with alcohol or water using a camel's hair brush.

2. Bug Screen

The bug screen is exposed for cleaning by disassembling the aerosol inlet. Brush all loose material off the bug screen and out of the aerosol inlet.

3. "O" Rings

The "O" rings in the aerosol inlet and the flow splitting chambers should be conditioned with a light coating of vacuum grease.

3. Battery Replacement

If AC power has not failed during operation, the dry cell battery for stand-by power need be replaced only every 2-3 years. If AC power has failed during operation, as indicated by the dot light on the Timer Module, the battery must be replaced at the next regularly scheduled maintenance.

To replace the battery, unplug the line power cord, and remove the front panel of the Control Module by removing the six screws. The battery is located in a bracket on the lower left hand side of the back

wall of the enclosure.

4. Leak Testing

The Control Module is leak-checked by installing needle valves on the coarse-and fine-particle bulkhead fittings on the side of the enclosure. Close the valves and turn on the pump. Pressures  $P_3$  and  $P_4$  on the vacuum gages should be -24 to -25 in. Hg if leaks are negligible. Then gently close the flow selector valve for the total flow and quickly shut off the pump. Important Note: If the pump is allowed to run with the total flow selector valve shut, the pump will act as a compressor and can cause leaks. If leaks are negligible, these pressures will increase to about -12 to -15 in. Hg in approximately 20-30 seconds and then will increase to zero in about 2 minutes. The initial increase to -12 to -15 in. Hg is not caused by external leaks but rather by a small flow through the pneumatic feed-back line from the compressor to the vacuum side of the system.

If leaks exist, they most probably are in the filter jars, which should be tightened firmly. The next leak possibility is the tubing fittings or a tube improperly in contact with the hot pump and has melted through. Most leaks can be quickly isolated by use of the inlet valves and the two vacuum gauges.

FROM AEROSOL INLET

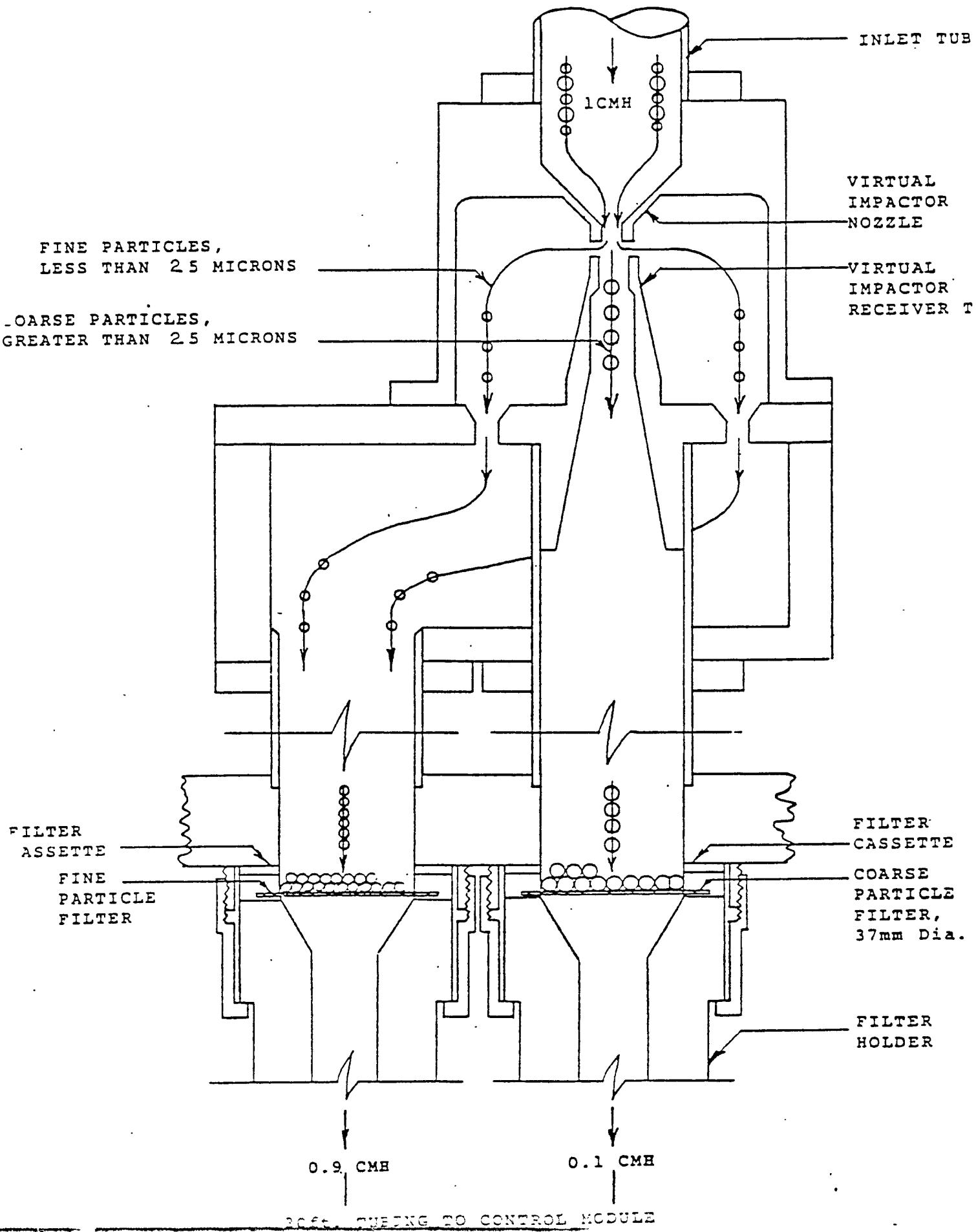
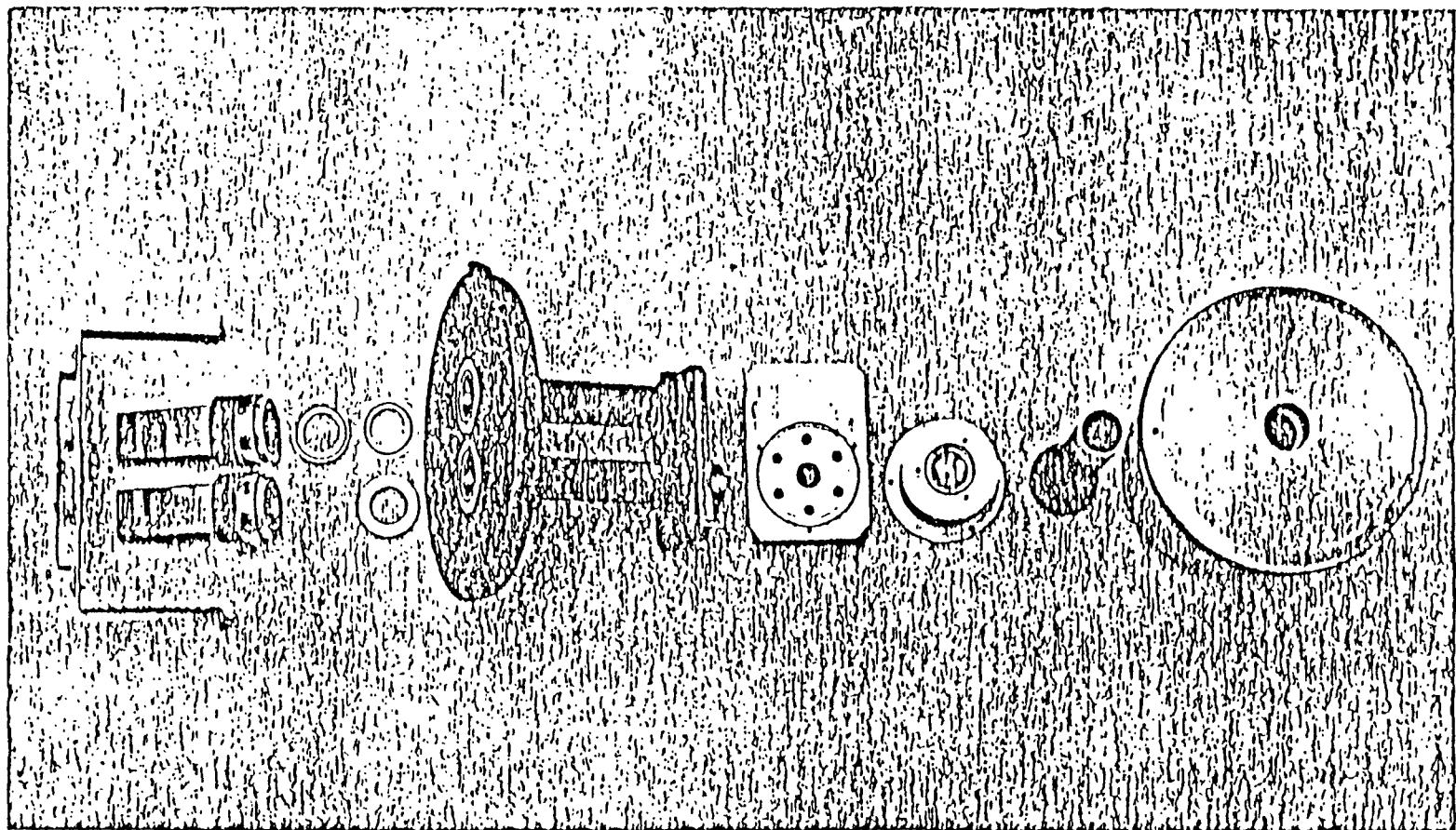


FIG. 1



HI VOLUME - GLASS FIBER FILTER WEIGHING USING THE  
TORBAL EA-1 AP ANALYTICAL BALANCE

Standard Operating Procedure

1. General Discussion

1. Analytical Problem:

The mass of air particulates collected on glass fiber filters must be determined to an accuracy of better than  $\pm$  10% relative. Minimum net weight is expected to be about 25 mg.

2. Interferences:

Humidity changes may affect the weight of the filter and of the deposit. Filters are equilibrated before and after sampling inside a Constant Humidity Chamber (CHC) 24 hours prior to weighing.

3. Readability: 0.1 mg.

4. Precision and Accuracy:

The balance is calibrated with class S weight. Precision expressed as standard deviation is 0.2 mg.

5. The technician should read the Torbal EA-1-AP Instruction Manual entirely before using the balance, paying close attention to section 3, "weighing procedure". The balance is always left ON to provide maximum stability.
6. Every tenth filter is a control filter and is labelled accordingly.
7. Keep the calibration weight clean and store in its proper container. Handle the calibration weight with the cleaned weight forceps only (non-serrated stainless steel) and do not use the weight forceps for any other job.

**2. Equipment and Materials**

- Torbal EA-1 AP Analytical balance with easel
- Constant Humidity Chamber
- Calibration weight, Class S
- Calibration weight forceps
- Kaydry towels
- Kimwipes
- Vinyl medical gloves
- Methanol

**3. Operating Procedure****3.1 Start Up:**

1. Remove filters to be weighed from their manila envelopes. Place file folder with filter inside into the constant humidity chamber. Allow 24 hours to equilibrate before weighing.
2. Remove hi-vol filter easel from weighing chamber. Place vinyl medical gloves on both hands. With methanol dampened Kaydry towel, clean: weighing chamber, easel, tare weight, balance control knobs, left front corner of CHC and hands.
3. Replace easel to weighing chamber. Clean area around balance and lay out a clean Kaydry towel on table. Clean forceps using a methanol dampened Kimwipe.
4. Record technician, date, CHC humidity, room humidity and filter ID's on "hi volume weigh sheet". Record whether the filters to be weighed are unexposed or exposed samples.
5. Set weight control knobs and counter control knob to zero. Use the coarse tare control and zero adjust knob to bring null indicator to center.
6. Open door and place the calibration weight on easel. Close door and adjust weight control knobs such that null indicator reads zero. Record the total weight in the "calib" boxes provided by the data sheet. Open door and remove calibration weight from easel to appropriate container.
7. Adjust weight control knobs to zero. Null indicator should read zero; if not, repeat steps 5-7. When null indicator complies with this stipulation, check the box to the right of the first filters ID #.

**3.2 Weighing Filters:**

1. Remove the first filter to be weighed from the CHC and check to make sure that its ID # corresponds to the ID # on the data sheet. Place filter on easel inside weighing chamber and weigh within 30 seconds. Record weight and note any defects (torn, particles falling off, etc.) on the data sheet. Remove filter from easel and replace inside CHC.
2. Remove another filter, following the same procedure as described above.
3. After every other filter, the balance must be zeroed. Note any large deviations from the null zero in comments column.
4. Repeat steps 1-3 until weighing of the set is complete.
5. Place calibration weight on easel and record the calibration weight.
6. Place calibration and tare weight in their proper containers.

**3.3 Reweights:**

1. Select at random three filters to be reweighed, preferably by another technician.
2. Use the same start-up and filter weighing procedures with one difference, filters from up to four sets can be reweighed at the same time.

**3.4 Calculations:**

$$W_n = (W_g - W_t - \Delta C) \times 1000$$

Where:  $W_n$  = net deposit in mg

$W_g$  = gross weight in g

$W_t$  = tare weight in g

$$\Delta C = \frac{\sum_{i=1}^n (\text{Gross weight Control}_i - \text{Tare weight Control}_i)}{n}$$

Where: n = the number of control filters in weigh set.

1. Record  $W_n$  in the comments column of the appropriate field data sheet.

3.5 Quality Control:

1. The calibration weight check at the end of a weighing set must be within  $\pm .0002$  g of their correct values or the entire set must be reweighed.
2. The reweight must all be within  $\pm .0010$  g or the entire set must be reweighed.

Standard Operating Procedure  
EPA High Volume TSP Sampler Audit

### 8.0 AUDITING PROCEDURE

Audit, as used here, implies an independent assessment of the quality of data obtained by the ambient air monitoring methods. Independence can be achieved by having the audit made by a different operator/analyst than the one conducting the routine field measurements. The audit should be a true assessment of the measurement process under normal operation, i.e., without any special preparation or adjustment of the system. Routine quality assurance checks conducted by the operator/analyst are necessary for obtaining and reporting good quality data, but they are not to be considered as part of the auditing procedure.

Two types of audits are recommended herein, performance and system audits. Four performance audits and a systems audit are described in detail in the following sections. An alternative to performing four individual audits is to audit the entire measurement process by comparing the final results from the field sampler to those obtained with a collocated sampler. This alternative is described in Section 8.2. A summary of these audits is given in Table 8.2 at the end of this section. A systems audit is described in Section 8.3.

Proper implementation and conduct of an auditing program will serve a two-fold purpose: (1) to screen the data, by lots of say  $N = 50$  to 100 measurements of concentration of TSP to detect whether the data quality is adequate, and (2) to estimate data quality in terms of the precision and accuracy. Appendices G and I in Volume I of this Handbook<sup>4</sup> contain information for the auditing and sampling procedures presented in this section and techniques for estimating precision and accuracy of the data.

#### 8.1 Performance Audits

Performance audits are independent assessments made by another operator/analyst to evaluate the quality of data produced

by the total measurement system (sample collection, sample analysis, and data processing). Performance audits are normally a quantitative appraisal of quality.

Four performance audits of individual variables are recommended:

1. Audit of clean filter weighing.
2. Audit of flow rate calibration.
3. Audit of exposed filter weighing.
4. Audit of data processing.

An auditing level of 7 out of 100 sampling periods is suggested here as a starting frequency. For the case where one sample is collected every sixth day, an auditing level of one per month is recommended. This would result in an auditing level of approximately 3 for a lot size of 15 for data reported quarterly. If the number of sampling periods is greater than 15 but less than 50, four (4) audits are recommended. These frequencies are suggested starting frequencies and they are to be altered based on experience and data quality. The audit frequency should be reduced if past experience indicates the data are of good quality, or increased if data are of poor quality. In determining the number of audits to be made for a large lot size, it is more important to make sure that the sample is representative of the various conditions that may influence data quality than to adhere to a fixed frequency. The supervisor/quality assurance coordinator will specify the audits and auditing level to be used according to monitoring requirements.

8.1.1 Clean Filter Weighing Audits - Weighing audits are made as soon as practical before or after the regular weighing. Clean filters are normally weighed in batches. This allows for the sampling to be performed and corrections to be made before the filters are used.

1. Divide into lot sizes of 100 or less and weigh.
2. Randomly select and reweigh 7 filters from each lot of 100. See Appendix I of Volume I of this Handbook for

recommending sampling procedures.<sup>4</sup>

3. If any one of the 7 check weights differs more than 2.8 mg from the original weight, reweigh all the filters in that lot. Record results in a laboratory log book.

**8.1.2 Flow Rate Calibration Audits** - Independent flow rate calibration audits should be made on site. Portable audit equipment is used.<sup>a</sup> Perform the flow rate calibration audits according to the following procedure:

1. Set up equipment.
2. Select one of the resistance plates and obtain the actual flow rate,  $Q_a$ , and the rotameter reading, following the calibration procedures, Section 2.6.
3. Convert rotameter reading to flow rate,  $Q_m$ , using the calibration curve and making corrections for ambient temperature and pressure.
4. Compute the percent accuracy

$$\% A = \frac{Q_m - Q_a}{Q_a} \times 100. \quad \text{Equation 8-1}$$

5. If the percent accuracy is greater than  $\pm 7$  percent for any one check, a complete recalibration should be performed before sampling is resumed.

6. Report  $Q_m$ ,  $Q_a$ , and the percent accuracy,  $\% A$ , on an  $\bar{X}$  and R chart, under measurement result, items 1 and 2. Record  $\% A$  in the cells preceded by "Range, R" as indicated in Figure 8.1. The value,  $\% A$ , can be positive or negative and the range is always positive. The sign of the difference should be retained to determine the existence of trends and/or consistent biases. The steps involved in the construction of a quality control chart and in the interpretation of the results are described in Appendix H, Volume I of this Handbook.<sup>4</sup>

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<sup>a</sup>US EPA uses a reference flow device (called an ReF device) which is an orifice (with 5 different orifice plates) that mount onto the faceplate of the hi vol adaptor. An ReF device may be purchased from Dexco Co., Inc., 630 Chapel Hill Blvd., Burlington, NC 27215.

$\%A = \frac{(Q_m - Q_a)}{Q_a} \times 100$

PROJECT Fluoride Calibration audit												
MEASUREMENTS PERFORMED												
NAME _____												
X and R CHART												
MEASUREMENTS $\frac{(Q_m - Q_a)}{Q_a} \times 100$ (% Accuracy) of individual standard measurement												
Comments (Correct Action, etc.)	RANGES, R			AVERAGES, X			Q <sub>m</sub> - MEASUREMENT			UNITS		
	DATUM	1/4	2/4	3/4	4/4	5/4	6/4	7/4	8/4	9/4	10/4	
	CODE	1	2	3	4	5	6	7	8	9	10	
	RESULT	60	55	54	54	59	60	56	50	53	56	
	SUM	59	53	55	56	59	59	55	55	56	56	
	AVERAGE, X	1.7	3.8	-1.8	-3.6	-1.7	1.7	3.7	-9.1	-3.6	0	
	PERCENT-1	1.7	3.8	-1.8	-3.6	-1.7	1.7	3.7	-9.1	-3.6	0	

Y-axis scale: -10, -5, 0, 5, 10

$UCL = +7.0\%$   
 $UML = +4.7\%$   
 $LCL = -7.0\%$   
 $LMU = -4.7\%$

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7. Repeat the above for each flow rate calibration audit plotting all points on the chart and connecting the points by a straight line.

8. Tentative warning and control lines are given as  $\pm$  4.7 percent (warning lines) and  $\pm$  7 percent ("out of control" lines). After 15 to 20 points are plotted, new control and warning lines may be derived as described in Appendix H of Volume I of this Handbook.<sup>4</sup>

9. Out of control points are an indication of calibration errors, instrument damage, etc. Recalibrate the sampler prior to further sampling when out of control.

10. Forward the  $\bar{X}$  and R chart to the supervisor for review.

8.1.3 Exposed Filter Weighing Audits - In order to allow for possible data corrections, it is necessary to weigh exposed filters immediately after a 24-hour conditioning period. Thus, it may be impossible to have lot sizes greater than 10 or 20.

1. Randomly select and reweigh 4 out of every lot size of 50 or less (this would mean 100 percent checking if 4 or less exposed filters are weighed at one time). For lot sizes of 50 or greater, reweigh 7 from each lot.

2. Reweigh all filters in a lot if any audit weight differs by more than  $\pm$  5.0 mg from the original weight.

3. Accept the lot with no change if all audits are within  $\pm$  5.0 mg of the originals.

4. Record the original and audit weights on an  $\bar{X}$  and R chart as illustrated in Figure 8.2. Follow the procedure outlined in steps 6 through 10 in Section 8.1.2. The accuracy A, in this case would be defined as

$$A = \text{Original Weight} - \text{Audit Weight (mg)} \quad \text{Equation 8-2}$$

Tentative warning and control limits of  $\pm$  3.3 mg and  $\pm$  5.0 mg, respectively, are recommended until sufficient data are obtained

Table 7.1 ACTIVITY MATRIX FOR MAINTENANCE

Equipment	Acceptance limits	Frequency and method of measurement	Action if requirements not met
Sampler motor	-400 hours operation of motor brushes -Absence of malfunction	Visually check upon receipt and after each 400 hours of operation	-Replace motor brushes -Other maintenance as indicated
Faceplate gasket	Absence of leaks at filter seal	Visually check after each sampling period	Replace gasket
Dustmeter	-Absence of foreign materials -Stable operations	Visually check for each sample	Clean; replace if damaged
Motor gaskets	Leak tight fit	Visually check each 400 hours of operation	Replace gaskets
Sampling head	Absence of leaks	Visually check each 200 hours of operation	Replace sampling head

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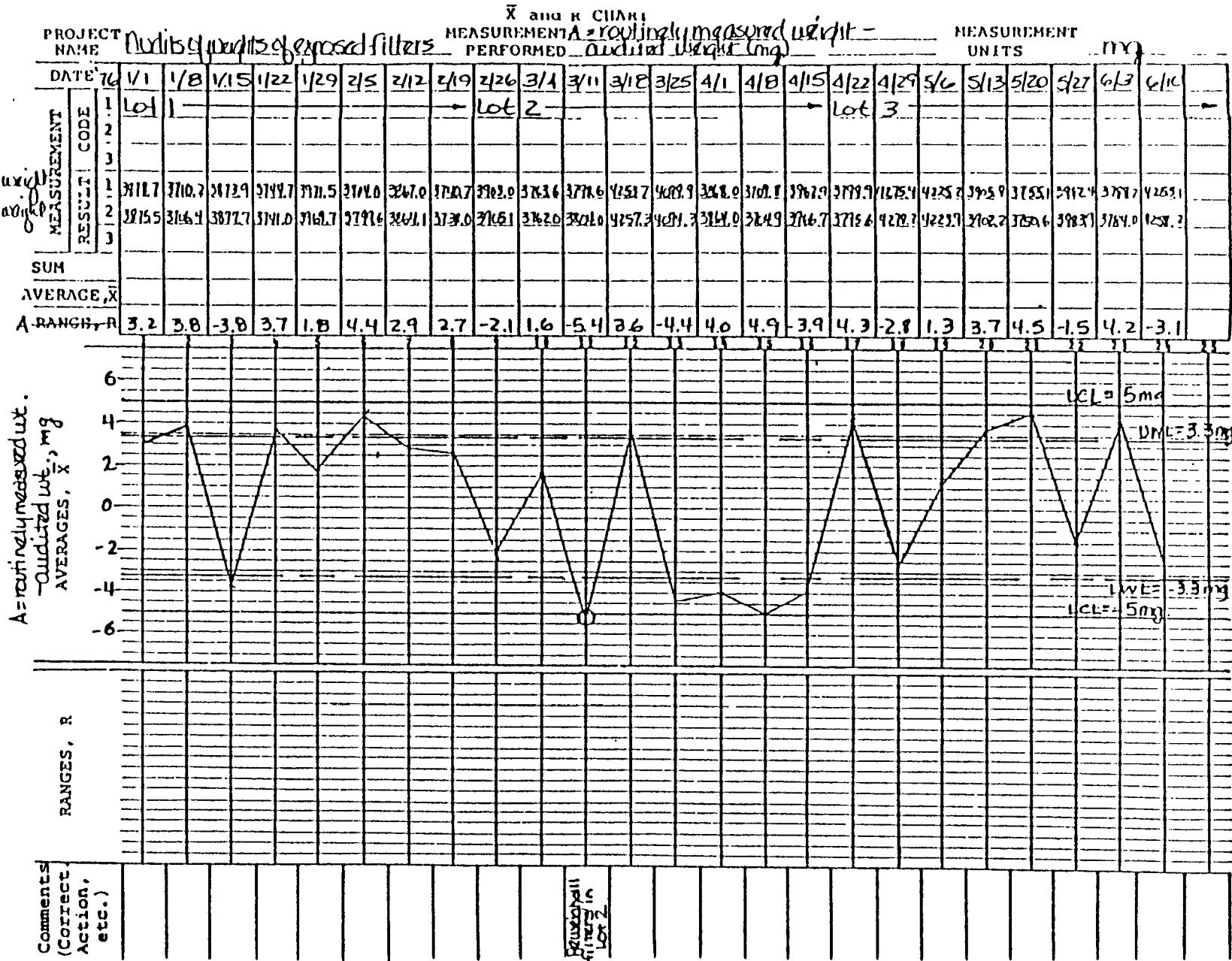


Figure 8.2 Quality control chart for audit of weights of exposed filters

to support an alteration of these limits. Do not increase the limits unless so authorized by the Administrator.

5. Forward the  $\bar{X}$  and R chart to the supervisor for review.

6. Out of control points indicate the need for recalibration of the balance and/or improved operator technique. Reweigh all of the remaining exposed filters in the lot.

8.1.4 Data Processing Check - In auditing data processing procedures, it is convenient and allows for correction to be made immediately if audits are made soon after the original calculations have been performed. In particular, this allows for possible retrieval of additional explanatory data from field personnel when necessary.

1. Use the same audit rate as step 1 of 8.1.3.

2. The check is made starting with the raw data on the data sheet or flow rate recorder chart and continuing through the recording of the concentration in  $\mu\text{g}/\text{m}^3$  on the SAROAD form.

3. If the mass concentration of suspended particulates computed by the audit check,  $(\mu\text{g TSP}/\text{m}^3)_a$ , differs from the original value,  $(\mu\text{g TSP}/\text{m}^3)_m$  by as much as  $\pm 3$  percent, all samples in that lot are checked and corrected as necessary. The audit value is always given as the correct value under the assumption that a discrepancy between the two values is always double checked by the auditor.

4. Audit values are recorded in the data log and reported, along with the original values, to the supervisor for review.

## 8.2 Auditing with a Collocated Sampler

An alternate method of auditing the high volume method, which in certain situations might be feasible, is to use two collocated samplers. A network operating several samplers in a reasonably small area (e.g., city or county) might find this method more convenient than auditing individual variables. The field sampler and the audit sampler will be denoted respectively, as the first and second sampler throughout the section.

The second sampler should be operated in strict accordance with the procedures given in this section of the Handbook. A record should be maintained of the checks performed on the second sampler and reported with the data as requested by the manager. An audit would be to place the second sampler adjacent to (but no closer than 6 feet) the field sampler (see Reference 1 for discussion on positioning the sampler) and sample simultaneously.

The percent difference in the concentration of suspended particulates as measured by the field sampler and the second sampler is computed by

$$\text{Percent difference} = \%D = \frac{(\mu\text{gTSP}/\text{m}^3)_1 - (\mu\text{gTSP}/\text{m}^3)_2}{0.5 \left[ (\mu\text{gTSP}/\text{m}^3)_1 + (\mu\text{gTSP}/\text{m}^3)_2 \right]} \times 100. \quad \text{Equation 8-3}$$

Based on the results of a collaborative test<sup>1</sup> a defect would be defined as

$$|D| \geq 15.*$$

The auditing level for collocated samplers would be the same as that given in the previous section, i.e.,  $n = 7$ ,  $N = 100$  as the initial rate.

Values of  $(\mu\text{g TSP}/\text{m}^3)_1$ ,  $(\mu\text{g TSP}/\text{m}^3)_2$ , and  $D$ , and the auditing level would be reported on the quality control  $\bar{X}$  and  $R$  chart along with standard identification information.

The data may be analyzed and reported as described in steps 6 through 10 of Section 8.1.2, above, with the exception that the difference,  $D$ , is obtained by equation 8-3. Tentative warning and control limits are given as 10.0 and 15.0 percent respectively. Out of control values may imply errors in any one of the several sample collection and analysis steps. Audits of specific steps will aid in determining the likely

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\*If  $\sigma = 3.5$  percent of the concentration of TSP for each sampler, then the percent difference,  $D$ , would have a standard deviation of 5.0 percent of the mean value. This gives a  $3\sigma$  value of 15 percent.

cause of the large deviations, e.g. calibration, weighing, and/or data processing errors. See Figure 8.3 for an example quality control chart.

### 8.3 Systems Audit

A systems audit is an on-site inspection and review of the quality assurance system used for the total measurement system (sample collection, sample analysis, data processing, etc.). System audits are normally a qualitative appraisal of system quality.

A systems audit should be conducted at the beginning of a new monitoring system and as appropriate thereafter to audit significant changes in system operation.

A preliminary form for use in a system audit is given in Table 8.1. These questions should be checked for the applicability to the particular local, state, or Federal agency.

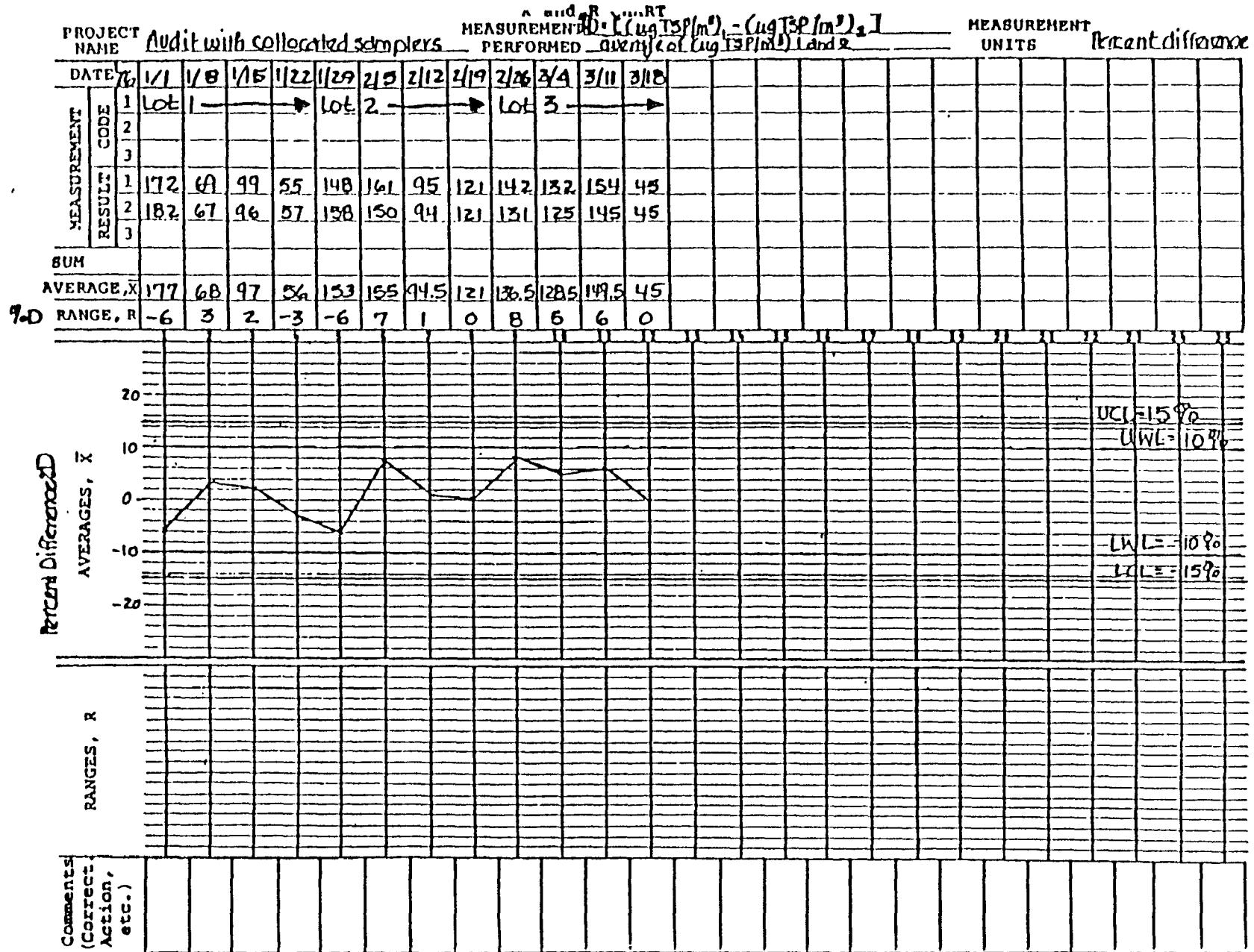


Figure 8.3 Quality control chart for audit with collocated samplers

Table 8.1 CHECK LIST FOR USE BY AUDITOR  
FOR HI VOL METHOD

1. What type of hi vol samplers are utilized in the network? \_\_\_\_\_
2. How often are the samplers run? (a) daily, (b) once every six days, (c) once every 12 days, (d) other. \_\_\_\_\_
3. What type of filter and number is being utilized? \_\_\_\_\_
4. Are there any pre-exposure checks for pin holes or imperfections run on the filters? \_\_\_\_\_
5. What is the collection efficiency for your filters? \_\_\_\_\_
6. What is the calibration procedure for the hi vol sampler? \_\_\_\_\_
7. Which statement most closely estimates the frequency of flow rate calibration? (a) once when purchased, (b) once when purchased, then after every sampler modification, or (c) once when purchased, then at regular intervals thereafter.
8. Are flow rates measured before and after sampling period? \_\_\_\_\_
9. If the answer to #8 is yes, using the equation below, what is the estimated average percent of change in the flow rates? Use the equation  

$$\frac{100(Q_i - Q_f)}{Q_i} = \text{percent change}$$
(a) less than 10%, (b) 10-20%, or (c) greater than 20%.
10. Is there a log book at each sampler to record flows and times? \_\_\_\_\_
11. Are filters conditioned before initial and final weighings? If so, how long? \_\_\_\_\_. And at what percent humidity? \_\_\_\_\_.
12. Is the balance checked on a periodic basis? \_\_\_\_\_. If so, how often? With which standard weights? \_\_\_\_\_
13. How often are the hi-vol filters weighed? \_\_\_\_\_  
How is the data from these weighings handled? \_\_\_\_\_
14. Are all weighings and serials numbers of filters kept in a log book at the laboratory? \_\_\_\_\_
15. What is the approximate time delay between sample collection and final weighing? \_\_\_\_ days

Table 8.2 ACTIVITY MATRIX FOR AUDITING PROCEDURE

Audit	Acceptance limits	Frequency and method of measurement	Action if requirements not met
Weighing audits Clean filters Exposed filters	Audit wt. = original wt. $\pm$ 2.8 mg Audit wt. = original wt. $\pm$ 5.0 mg	Frequency - 7 audits per 100 filters. For a lot size of 50 or less filters make 4 audits. <u>Method</u> - Use analytical balance. Condition filters for 24 hours before weighing	Reweigh all filters in the batch
Calibration audit	$0.93 \leq \frac{\text{Flow rate}_m}{\text{Flow rate}_a} \leq 1.07$ $\text{Flow rate}_m$ = routine measured rate $\text{Flow rate}_a$ = audited rate	Frequency - See above. <u>Method</u> - Same as for calibration procedure for one flow rate.	Perform calibration before sampling is resumed.
Data processing audit	$0.97 < \frac{(\mu\text{g TSP}/\text{m}^3)_m}{(\mu\text{g TSP}/\text{m}^3)_a} < 1.03$ $(\mu\text{g TSP}/\text{m}^3)_m$ = routine measured concentration $(\mu\text{g TSP}/\text{m}^3)_a$ = audited concentration	Frequency - See above. <u>Method</u> - Redo all calculations; readings of charts, etc. through recording results.	Recheck all calculations.
Collocated sampler audit	$100[(\mu\text{g TSP}/\text{m}^3)_1 - (\mu\text{g TSP}/\text{m}^3)_2] - \text{Average } (\mu\text{g TSP}/\text{m}^3)_1 \text{ and }_2 \leq \pm 15\%$ i.e., the difference in concentration does not exceed 15% of the average value obtained by the field sampler 1 and the collocated sampler 2. These limits are for repeatability (same operator). Larger limits would be expected for reproducibility (between two operators).	Frequency - See above. <u>Method</u> - Collocated monitor calibrated and maintained in strict accordance to method description.	Data invalid for sampling period.
Systems audit	Method as described in this section of the Handbook	Frequency - At the beginning of a new monitoring system and periodically as appropriate <u>Method</u> - Evaluation of procedures and by check list	Initiate improved methods and/or training programs

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## Dichotomous Filter Handling and Data Procedures

### I. General Discussion

Dichotomous filters best suited for the CMB analysis of ambient particulate material consist of a polyolefin supporting ring bonded to the top (particle collection) surface of a teflon membrane. The filters are 37 mm in diameter.

Sample ID codes should consist of a letter prefix indicating the sample site and whether the filter is the fine or coarse fraction. Sequential three digit numbers should then be used for the sample number, e.g., BFSC 012 and BFSF 012 might represent the twelfth sample (both coarse and fine) collected in Bakersfield (B) at the fire station (FS) site. The most important point to emphasize is that both the coarse and fine fraction filters should have the same numerical code to facilitate data interpretation and the letter portion should reflect the sample site and whether it is the coarse or fine fraction (C or F).

Maintain a sample log book. Record sample sites, filter numbers, dates, comments, volumes, weights and filter lot numbers.

All filter handling procedures should be done in a clean area. Clean the work area with a methanol dampened Kaydry towel, then lay out a clean Kaydry towel to use as a work surface before all handling procedures. The filters must be handled only by the supporting ring with clean forceps. A laminar flow clean hood is the most appropriate work area. Disposable plastic gloves should be worn when working with filters.

Petri dishes, slides and cassettes can be reused but must be wiped clean with methanol before reuse.

### II. Materials and Equipment

- Sierra Model FH-240-P filter cassettes
- Millipore plastic Petri dishes (PD 10 047 00)
- Millipore plastic Petri slides (PD 15 047 00)
- Gchia Corp. 2 $\mu$  PTFE 37 mm filters with polyolefin rings (R2P503700)
- field sample transport boxes
- shipping boxes
- forceps
- Kaydry towels (VWR Cat. # 21903-008)
- methanol (polyethylene wash bottle)
- waterproof fine point marker (e.g. Pilot Corp. extra fine point permanent markers)

- adhesive labels
- disposable plastic gloves (e.g., Tru-Touch Vinyl Medical Gloves, VWR cat # 32901-060)
- Tip-n-Tell shipping indicators

### III. Laboratory and Field Procedures

1. Lay out a series of 6 - 10 Petri dishes on the work surface, label with the sample ID numbers, recalling that there should be coarse and fine pairs.
2. Select a new filter and inspect both sides for foreign particles, pin holes, discolorations, or other imperfections. Some particles may be carefully blown off. Discard the filter if defective.
3. Steady the filter by pressing down on the plastic ring of the filter with forceps. Write the ID number as recorded on the Petri dish on the plastic ring of the filter using a fine point waterproof marker.
4. Weigh the numbered filter and record in log book. Also record the filter lot number.
5. Place the bottom half (female part) of a clean Sierra filter cassette on the work surface and place the weighed and numbered filter into it. The filter should be placed top (numbered) side up. Place the top half (male part) of the clean Sierra filter cassette in position over the bottom half and press down so that it snaps into proper alignment.
6. Label the edge of the cassette with an adhesive label. The number should correspond to the number on the Petri dish and polyolefin ring.
7. Place the loaded cassettes into the corresponding Petri dishes.
8. Place the Petri dishes into the field transport box (in coarse-fine sets).
9. Once at the sampling site, place the cassettes into the dichotomous samplers (bevelled side down) again making sure that each coarse-fine set is placed into one dichotomous sampler. Retain the numbered Petri dishes in the field transport box.

10. Record the sample site, sampler serial number, filter ID number, start and stop flow rate, start and stop time and volume, as well as the initials of the operator and comments onto data sheets (sample attached). Note: Total (T) flow rate and volume and coarse (c) flow rate and volume are measured and recorded.
11. After a 24 hour sample has been collected, the loaded filter cassette should be placed into its corresponding numbered Petri dish and returned to the laboratory.
12. Label clean Petri dish slides with the sample ID numbers.
13. Select a Petri dish containing an exposed filter from the sample transport box and place on the work surface. Obtain the Petri slide with the matching ID and place on the work surface.
14. Remove the Petri dish lid and, being careful not to touch the filter, remove the filter cassette assembly from the Petri dish. Remove the side label and carefully separate the cassette assembly. Then using a pair of forceps, transfer the filter to its Petri slide.
15. Record any unusual appearance or condition of the filter in the sample log book.
16. Weigh the loaded filter and record the weight in the sample log book. Replace the filter into its numbered Petri slide. Pinch the edge of the filter in the Petri slide when closing the slide to hold the filter in place. Note: Less than 100 Petri slides per tray can be held when they are loaded due to the increased thickness caused by pinching the filter.
17. Place the Petri slides into the plastic trays. Put the cardboard boxes containing the trays into a cabinet or other protected location until enough are collected for shipment.

#### IV . Shipment

1. Place the cardboard boxes containing the plastic trays of loaded Petri slides into the flanged shipping box in such a manner so that all filters are held upright during shipment. Include filters from each filter lot number for blanks.
2. Photocopy the data sheets and appropriate pages from the sample log book for enclosure into the shipping box. Include the uncorrected mass of particulate material collected on the filters in micrograms.
3. Place a "Tip-n-Tell" indicator on the shipping box with the accompanying label. Activate the "Tip-n-Tell" indicator.
4. Ship directly to NEA Laboratories, Inc., 8310 S.W. Nimbus Avenue, Beaverton, Oregon, 97005.

## LOW-VOLUME DICHOTOMOUS FIELD DATA SHEET

Site	Sampler Serial#	Filter ID#	Date Sampled	Flow Rate (l/min)		Time Totalizer (hrs)			Initials	Volume (m <sup>3</sup> )	Comments
				Start	Stop	Start	Stop	Net			
		F		T						T	
		C		C						C	

		F		T						T	
		C		c						C	

		F		T						T	
		C		c						C	

		F		T						T	
		C		c						C	

		F		T						T	
		C		c						C	

		F		T						T	
		C		c						C	

## Soil and Road Dust Sample Sieving

### 11.1 General Discussion

The bulk soil and road dust samples collected according to SOP #12 and #13 must be segregated before analysis. This procedure describes the isolation of two size fractions, <75  $\mu\text{m}$  and <38  $\mu\text{m}$ .

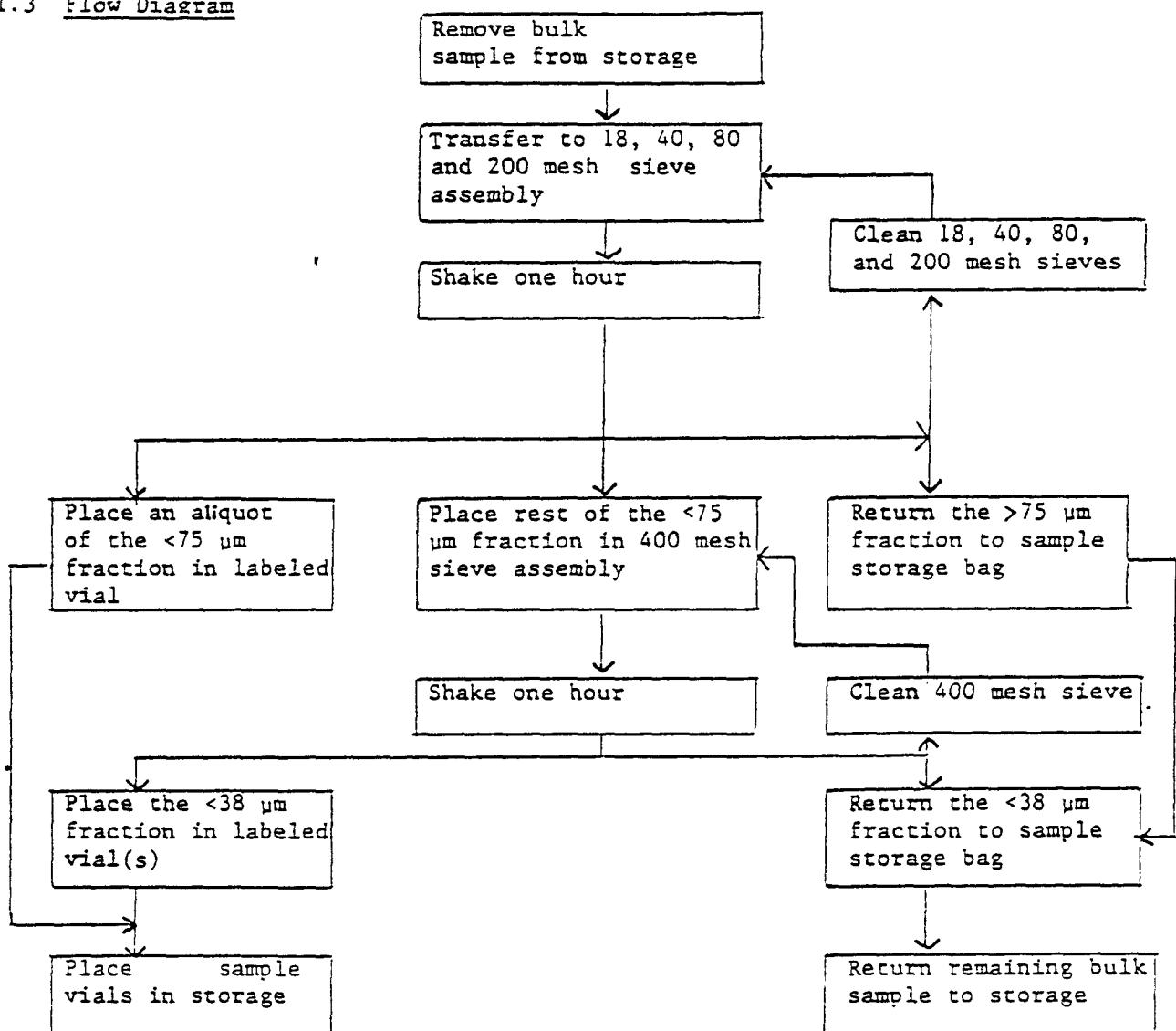
Special care must be taken to prevent the spread of dust to any other sample handling or analysis area of the lab, and to prevent cross-contamination of the soil samples. Clean the work area and spatulas with methanol damped Kaydry towels between each sample handling.

### 11.2 Materials and Equipment

1. Set of Tyler sieves, as indicated plus top cover and bottom pan.

USA No.	Opening $\mu\text{m}$
18	1000
40	425
80	180
200	75
400	38

2. Tyler sieve shaker, Model RX-24
3. Polyvials, 26 ml.
4. Kaydry disposable towels.
5. Compressed air.
6. Spatulas, large and small sizes.
7. Methanol.
8. Soft bristle brush.

11.3 Flow Diagram

**11.4 Sieve Cleaning**

1. This procedure should be done in a room dedicated for sieve cleaning or outside to prevent the spread of dust to sample handling areas of the lab.
2. Use compressed air to blow away all loose dust. Pay particular attention to the screen, the screen-to-frame joint, and overlapping surfaces on the frame.
3. Carefully brush all loose dust from the wire mesh screen with a soft bristled brush.
4. Wipe all loose dirt from the frame with a brush or Kaydry towel. Clean both inside and outside and below as well as above the screen.
5. Repeat steps 2-4 until the sieve is clean.

**11.5 Sieving**

1. Clean the bottom pan using a methanol dampened Kaydry towel and assemble the cleaned Tyler sieves in the following order, from the bottom to top: bottom pan, 200 mesh screen, 80 mesh screen, 40 mesh screen, 18 mesh screen.
2. Select a sample from the sample storage cabinet for processing.
3. Remove the inner bag and sample data card from the outer bag. Set them aside for later use.
4. Transfer the contents of the sample bag to the sieve assembly; minimize the loss of fine dust by dumping the sample into the sieve slowly and carefully. Set the sample bag aside for later use.
5. Clean the top cover using a methanol dampened Kaydry towel and compressed air, and put the top cover into position on the sieve assembly.
6. Place the sieve assembly into position on the shaker. Press the locking tab down firmly onto the sieve assembly with one hand and tighten the locking tab screw with the other hand. Repeat for the other locking tab.
7. Start the shaker. If dust escapes from the sieve assembly, either the assembly is not mounted tightly enough, or there is foreign material between the mating surfaces of the sieves. Correct and restart if necessary. Using the built-in timer, run the shaker for one hour.
8. While the sample is shaking, clean the sieve(s) not in use according to the procedure in section 11.4.

9. Remove the sieve assembly from the shaker and set on a clean Kaydry towel. Remove the sieves and top cover as a unit from the bottom pan and set on a clean Kaydry towel.
10. Using a clean spatula, transfer dust from the bottom pan to a new 26 ml Polyvial. Fill the Polyvial about half full. Close the lid and cut off the hinge. Record "I.D. \_\_\_\_\_" (from the sample data card) and "size <75 µm" on an adhesive label. Stick the label on the Polyvial and secure in place with a piece of transparent tape.
11. Place the clean 400 mesh sieve on a clean Kaydry towel. Carefully pour the sample remaining in the bottom pan into the 400 mesh sieve; tapping lightly on the pan will remove most of the material.
12. Transfer the material remaining in the 18, 40, 80 and 200 mesh sieves carefully into the bottom pan; tapping lightly on the sieve frame will remove most of the material.
13. Transfer the material from the bottom pan to the sample bag.
14. Use a methanol dampened Kaydry towel to clean the bottom pan.
15. Place the 400 mesh sieve on the bottom pan and the top cover over the 400 mesh sieve.
16. Repeat steps 6 thru 9.
17. Using a clean spatula, transfer dust from the bottom pan to a new 26 ml Polyvial. Use more than one Polyvial if necessary. Close the lid and cut off the hinge. Record "ID # \_\_\_\_\_" (from the sample data card) and "Size <38 µm" on an adhesive label. Stick the label on the Polyvial and secure with a piece of transparent tape. Record "ID # \_\_\_\_\_" and "Vial 1 of 2" or "Vial 3 of 3", etc. on the lids of the Polyvials from both size fractions.
18. Transfer material from the 400 mesh sieve to the bottom pan, and from the bottom pan to the sample bag. Close the bag and seal with tape.
19. Record the date of sieving and initials on the sample data card. Place the inner sample bag and data card into the outer bag.
20. Return bulk sample and Polyvials to sample storage cabinet.

## TEFLON FILTER WEIGHING USING THE CAHN 27 ELECTROBALANCE

## Standard Operating Procedure

1. General Discussion

## 1. Analytical Problem:

The mass of air particles collected on teflon membrane filters must be determined to an accuracy of better than  $\pm 10\%$  relative. Two sizes of filters are used, 37 and 47 mm diameter, with tare weights of about  $75 \pm 20$  mg and  $120 \pm 20$  mg, respectively. Minimum net weight is expected to be about 120  $\mu\text{g}$ .

## 2. Interferences:

Electrostatic charge on the filter is one possible source of interference. This is eliminated by use of a beta source charge neutralizer. Humidity changes may affect the weight of deposit, but not the weight of filters, since they are non-hygroscopic. Humidity changes are minimized by performing the weighing procedures in an air conditioned laboratory.

3. Minimum Detectable Quantity: 15  $\mu\text{g}$  (three sigma).

## 4. Precision and Accuracy:

The balance is calibrated with class M weights. Repeatability for the immediate reweighing of a filter is  $\pm 1$   $\mu\text{g}$ ; long term repeatability is  $\pm 5$   $\mu\text{g}$ .

## 5. The technician should read the Cahn 27 Instruction Manual entirely before using the balance, paying close attention to Section 3, Balance Operation. The balance is always left ON to provide maximum stability.

## 6. Keep the calibration weights clean and store in their proper container. Handle them only with the cleaned weight forceps (non-serrated stainless steel) and do not use the weight forceps for any other job.

## 2. Equipment and Materials

- Cahn 27 Electrobalance with custom 60 mm open stirrups
- Po<sup>210</sup> charge neutralizer
- Calibration weights, 10, 20, 50 and 100 mg Class M
- Tare weights, 20 50 and 100 mg Class C
- weight forceps
- filter forceps
- Kaydry towels
- Kimwipes
- Methanol

## 3. Operating Procedure

### 3.1 Start Up:

1. Remove the stirrups from the weighing chamber as in Section 3.1.2 of the Cahn 27 Instruction Manual and set aside on a clean Kimwipe. Clean the weighing chamber with a methanol dampened Kimwipe. Replace the stirrups, one on the A side and one on the TARE side. Place the charge neutralizer in the center of the weighing chamber. Clean the area around the balance and lay out a clean Kaydry towel in front of the weighing chamber. Clean the weight forceps (non-serrated stainless steel) and filter forceps using a methanol dampened Kimwipe.
2. Obtain the calibration weights and the filters to be weighed from the sample storage cabinet.
3. Record technician, date and filter lot number on the data sheet.
4. Determine approximate weight of one of the filters by weighing on the A200 range. Select the 10, 20, 50 and 100 mg calibration weights in combination such that their combined weight equals within + 8 and - 12 mg of the filter weight. (When doing gross weights or reweights, use the same weights as for the tare weighing).
5. Set the balance controls to RANGE: A 20 and RESPONSE: 0. Make sure CALIBRATE, COARSE and FINE ZERO controls are locked. Press TARE twice to untare the balance.
6. Place the selected calibration weights on the A pan and balance with appropriate tare weights on the TARE pan so that the display reads 0 ± 20 mg.

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7. When the display stabilizes (after at least 30 seconds), press TARE to zero the balance.
8. Add the 20 mg calibration weight to the A pan (or remove it if already there). Display should read + 20.000 ± 0.001 (or - 20.000 ± 0.001) when it stabilizes. If not, adjust CALIBRATE accordingly.
9. Replace calibration weight and note that 0.000 ± 0.001 is displayed. If not, repeat steps 7 and 8. Record tare weight as the sum of the calibration weights ± display reading, and the calibration reading on the data sheet.
10. Remove calibration weights to their container.

### 3.2 Weighing Filters:

1. Up to 25 filters per set can be weighed. When weighing the filters, note any defects (torn, particles falling off, etc.) on the data sheet.
2. Place the first filter to be weighed on the charge neutralizer. After a few seconds, transfer the filter to the A platform and place the next filter to be weighed on the charge neutralizer.
3. When the display stabilizes (after at least 30 seconds), record the filter ID number and weight reading including + or - sign on the data sheet.
4. Transfer the filter from the A platform to its container, transfer the filter on the charge neutralizer to the A platform, and place the next filter in sequence on the charge neutralizer.
5. Repeat steps 3 and 4 until weighing of the set is complete.
6. Place the calibration weight(s) on the A pan. Record tare weight as the sum of the calibration weights ± display reading. Press TARE if the reading is not 0.000.
7. Add the 20 mg calibration weight to the A pan (or remove it if already there). Record calibration reading.
8. Place calibration and tare weights in their containers.

### 3.3 Replicates:

1. Select at random three filters to be reweighed, preferably by another technician.

2. Weigh the filters using the procedures in sections 3.1 and 3.2. Indicate that the weighings are replicates on the data sheet. Filters from up to 8 sets can be reweighed at the same time.
3. Calculate the difference,  $W_d$ , between the original and replicate weighings.

3.4 Shutdown:

1. Replace the filters that were weighed in the sample storage cabinet.
2. Clean the balance as in 3.1.1.
3. Record the date of weighing in the appropriate Sample Log Book.
4. Calculate net weights if appropriate.
5. Return the data sheets to the laboratory supervisor.

3.5 Calculations:

$$W_n = (W_g - W_t) \times 1000,$$

where,  $W_n$  = net deposit in  $\mu\text{g}$

$W_g$  = gross weight reading in mg

$W_t$  = tare weight reading in mg

$$W_d = (W_g - W_t) \times 1000$$

or

$$W_d = (W_t - W_r) \times 1000,$$

where,  $W_d$  = difference between original and replicate weights in  $\mu\text{g}$

$W_r$  = replicate weight reading in mg.

3.6 Quality Control:

1. The tare and calibration weight checks at the end of a weighing set must be within  $\pm 0.004$  mg of their correct values or the entire set must be reweighed.
2. Replicate weighing differences,  $W_d$ , must be  $\leq \pm 10 \mu\text{g}$  or  $\leq 2\%$  of  $W_n$  or the entire set must be reweighed.

3.7 Quality Assurance:

1. Class M weights are used for calibration. According to NBS circular 547, they are "...designed for use as reference standards, for work of the highest precision, and for investigations demanding a high degree of constancy over a period of time."
2. 12% replicates ensure that weighing precision is within limits.
3. Calibration and tare operations are performed before each set of 25 filters and are checked for accuracy after each set.
4. Results of replicate weighings and calibration and tare weight checks are reviewed by the laboratory supervisor. He must initial the data sheet before the data is considered valid.

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Standard Operating Procedure

EPA High Volume TSP Sampler Calibration

1. Elapsed Time Meter

The elapsed time meter (synchronous motor type 60 hertz) should be checked on site or in the laboratory every six months against a timepiece of known accuracy. If the indicator shows any signs of being temperature sensitive, it should be checked on site during each season of the year.

A gain or loss of more than 2 minutes in a 24-hour period warrants an adjustment or replacement of the indicator.

Record results of these checks in the calibration log book.

2. Timer

For those samplers that are equipped with an on-off timer, the timer should be calibrated and adjusted using a calibrated elapsed time meter as the reference. An example of this type calibration procedure is presented below. Figure 2.2 depicts the wiring diagram for use in this calibration.

The timer calibration procedure should be performed on a quarterly basis. Calibration data are recorded in the Timer Calibration Log. See Figure 2.3 for an example. The steps in the calibration procedure are:

1. Plug a correctly wired timer into an electrical outlet.
2. Set the timer to the correct time.
3. Set the ON and OFF time trippers for a 24-hour test period.
4. Plug the test light into one of the output plugs and an elapsed time meter into the other.
5. Check the system by manually operating the switch ON and OFF.

6. Allow the system to operate for the 24-hour test period and determine the elapsed time from the elapsed time meter.

- a. If the elapsed time is 24 hours  $\pm$  15 minutes, the timer is acceptable for field use.
- b. If the elapsed time is not 24 hours  $\pm$  15 minutes, adjust the tripper switches and repeat the test.

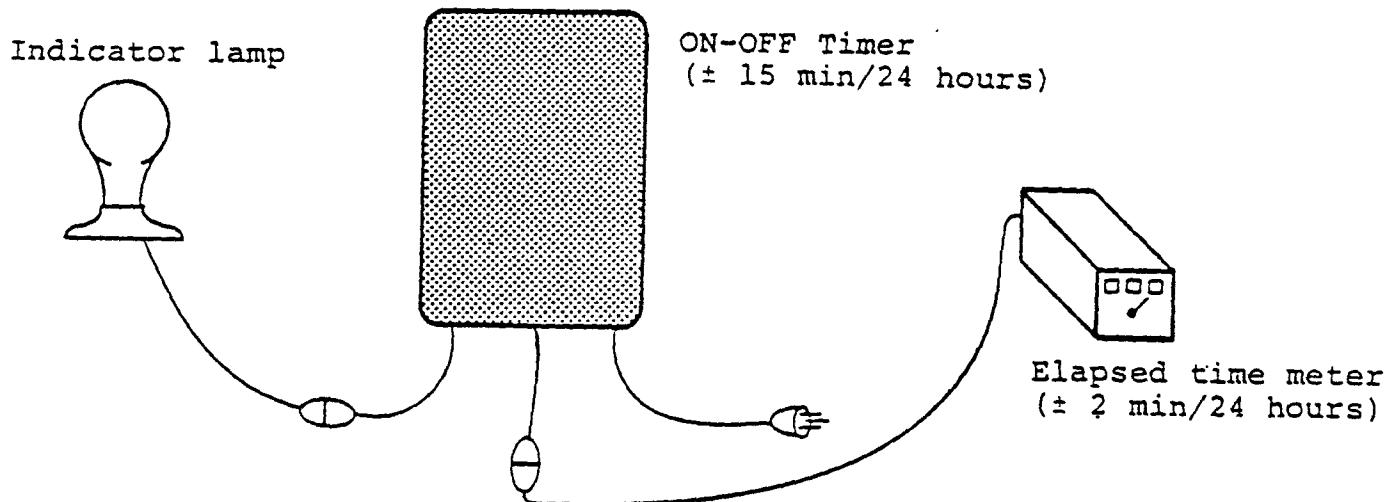


Figure 2.2 Diagram of a timer calibration system

3. Orifice Calibration Unit

The orifice calibration unit should be calibrated against a secondary standard, for example a Rootsometer, upon receipt and at one-year intervals thereafter. The manufacturer's average calibration curve can be used unless the calibration deviates from it by more than  $\pm$  4 percent at any one point along the curve. When deviations from the manufacturer's curve are larger than  $\pm$  4 percent and there are no visible signs of damage to the orifice, the calibration should be repeated by another operator. If the large deviations persist (after the secondary standard has been checked

Figure 2.3 Example of a timer calibration log

and found satisfactory) a new average calibration curve is constructed using the results from at least five sets of calibration data.

Orifice units should be visually inspected for visible signs of damage to the orifice before each use. A calibration check should be made if the orifice appears to have any nicks or dents.

The following stepwise orifice calibration procedure is adapted from Reference 3.

1. Assemble the parts as shown in Figure 2.4.
2. Zero the water and mercury manometers by sliding their scales until the zero on the scale is level with the meniscus as illustrated in Figure 2.5.
3. Check the level of the positive displacement meter table. Adjust the legs if necessary.
4. Install Load Plate 18 between the orifice and the positive displacement meter.
5. Turn Hi Vol motor ON, and let the system operate 5 minutes. While the unit equilibrates, continue with steps 6-9 below.
6. Write Plate #18 under the Plate # Column in the Hi Vol Orifice Calibration Log. See Figure 2.6 for an example.
7. Record the date, time, orifice number, name of primary standard (positive displacement meter) and the serial number of the primary standard in the appropriate spaces in the log.
8. Record the temperature in °C.

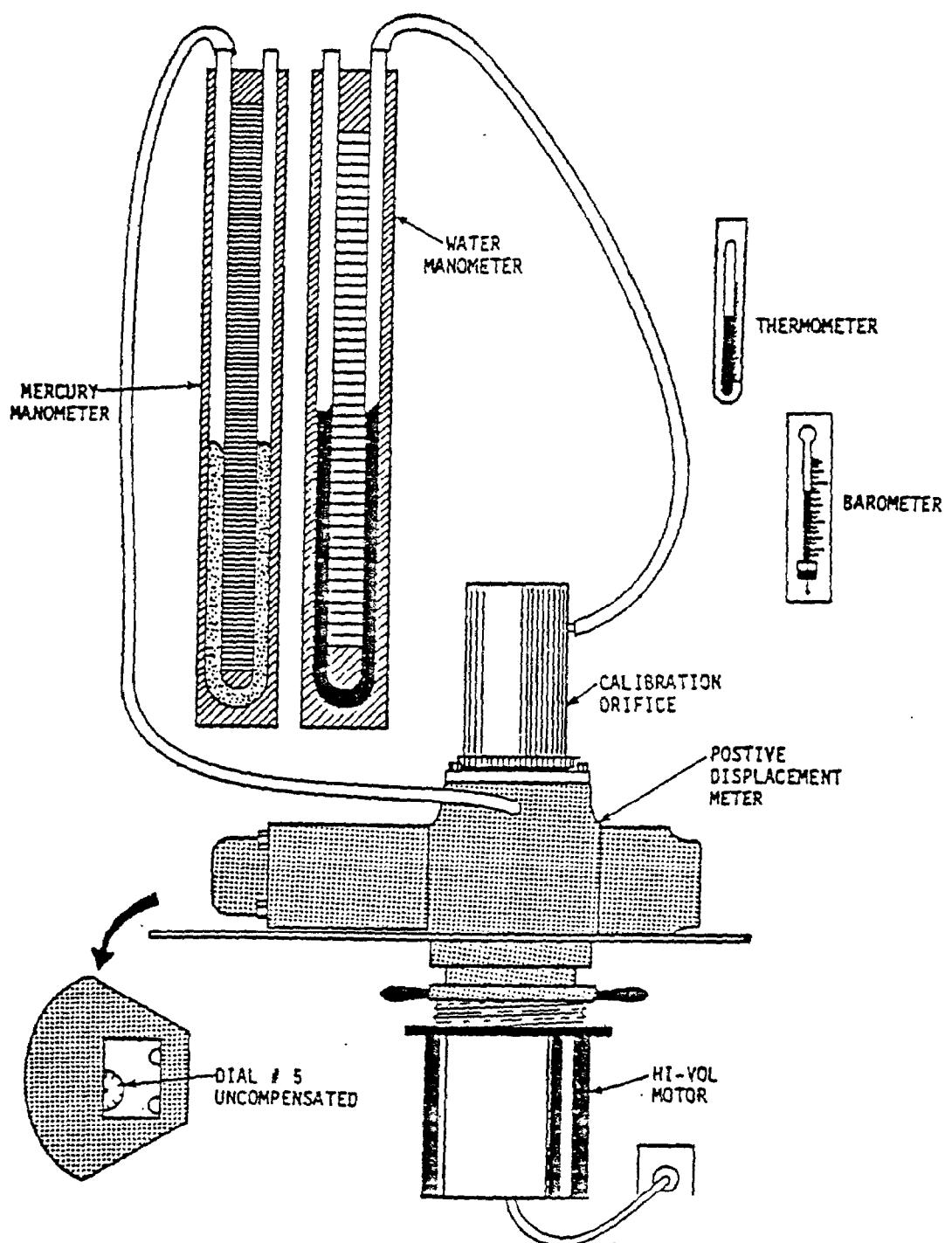


Figure 2.4 Diagram of positive displacement meter system

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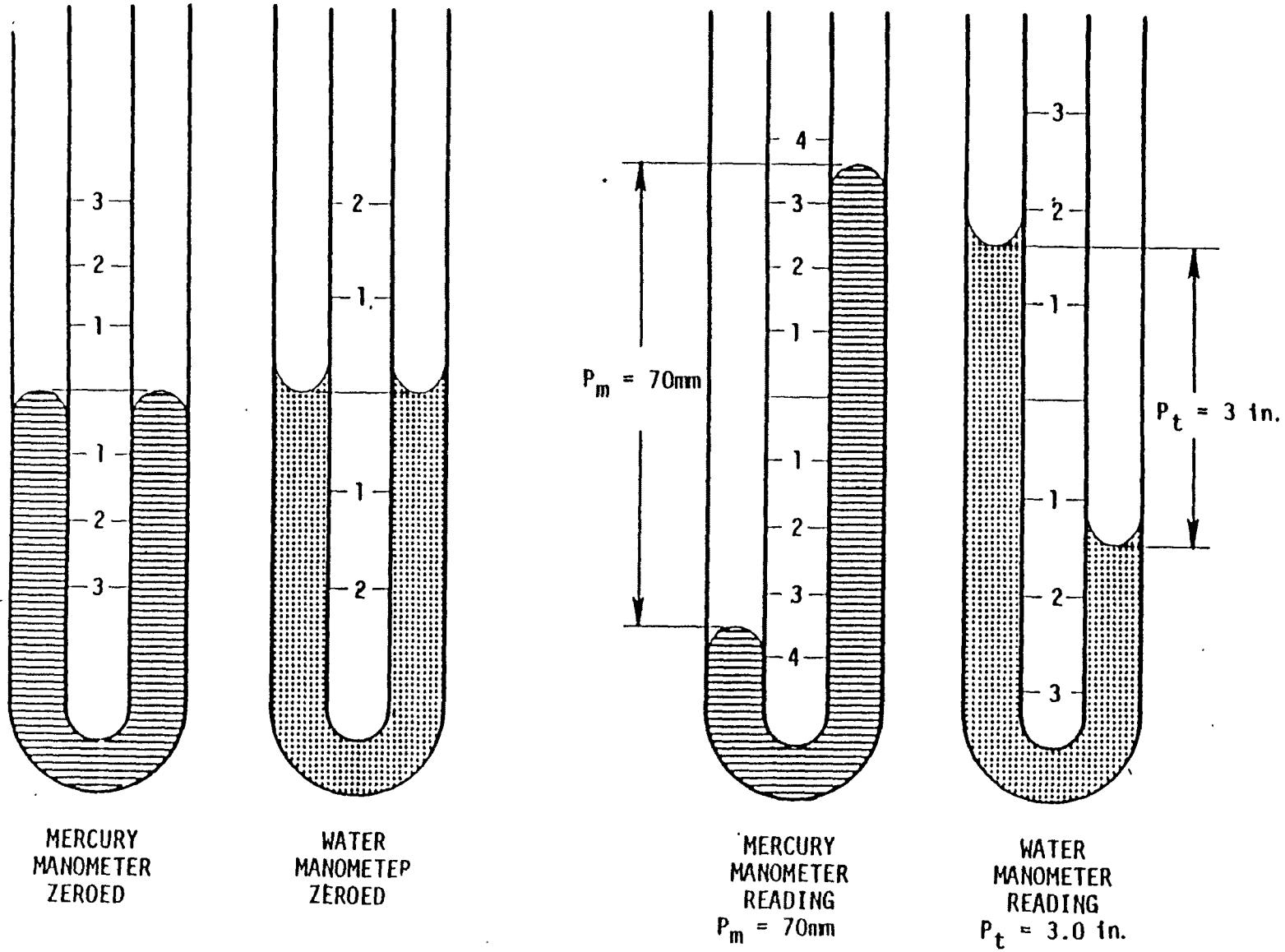


Figure 2.5 How to read mercury and water manometers

Description Derivation	Ft. <sup>3</sup> of Air	m <sup>3</sup> of Air	Barometric Pressure mm Hg	Vacuum in Standard in mm Hg	Absolute volume in m <sup>3</sup>	Time in Minutes	Flow rate m <sup>3</sup> /min	Pressure Drop Across the Orifice in inches of water
					" (P <sub>a</sub> - P <sub>m</sub> ) V <sub>m</sub> / P <sub>a</sub>			
Symbol								
Plate Number	V <sub>c</sub>	V <sub>m</sub>	P <sub>a</sub>	P <sub>m</sub>	V <sub>a</sub>	t	Q <sub>1</sub>	P <sub>t</sub>
5	100	2.83	767	70	2.57	2.73	0.94	2.5
7	100	2.83	767	70	2.57	1.84	1.4	5.5
13	100	2.83	767	70	2.57	1.43	1.8	11.0
15	100	2.83	767	70	2.57	1.29	2.0	15.5
18	100	2.83	767	70	2.57	1.22	2.1	18.3
	100	2.83						
	100	2.83						
	100	2.83						
	100	2.83						
	100	2.83						
	100	2.83						

Orifice Number 4861 Manufacturer General Metal Works, Inc.  
 Temperature 26.0 °C Barometric Pressure 767 Time 10:45 A.M. EST  
 Date 6-2-75 Primary Standard Roots Meter Serial Number 10429  
 Calibration voltage 130 Signed J.J. Smith  
 Verified By Jean Young

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Figure 2.6 Example of hi vol orifice calibration log

Definitions for use with Figure 2.6

$v_a$  = Actual volume of air measured in cubic meters.

$v_c$  = Volume measured by the positive displacement meter in cubic feet

$v_m$  = Volume measured by the positive displacement meter in cubic meters as calculated from  $v_c$ .

$p_a$  = Atmospheric pressure in mm Hg.

$p_m$  = Vacuum at the inlet of the positive displacement meter in mm Hg.

$t$  = Minutes of time elapsed during run.

$Q_1$  = Flow rate in cubic meters per minute at prevailing atmospheric pressure and temperature (uncorrected).

$P_t$  = Pressure drop across the orifice in inches of water.

Equations given in Figure 2.6

$$v_m = v_c \times 0.0283$$

$$v_a = v_m \frac{(p_a - p_m)}{p_a}$$

$$Q_1 = \frac{v_a}{t}$$

9. Record the barometric pressure in mm Hg.
  10. After the 5-minute equilibration period, read the mercury manometer and record this value in column  $P_m$ . The example given in Figure 2.5 shows a reading of 70 millimeters (mm).
  11. Read the water manometer and record this in column  $P_t$ . The example given in Figure 2.5 shows a reading of 3.0 inches.
  12. Wind the stopwatch and set it in the horizontal position with the dial facing up.
  13. Locate the uncompensated dial on the left end of the positive displacement meter. The location is shown in Figure 2.4. Note: this dial must be viewed from the end. One revolution of Dial #5 equals 10 cubic feet of air passed through the positive displacement meter.
  14. Use a stopwatch to measure the time in minutes and hundredths of minutes for exactly 10 revolutions of Dial #5 (i.e., for  $100 \text{ ft}^3$  of air to pass through the positive displacement meter). Record 100 under column  $V_c$  and the elapsed time under column  $t$ .
  15. Record 2.83 under column  $V_m$  to convert cubic feet to cubic meters.
- $V_m = V_c \times 0.0283$
- $100 \text{ ft}^3 \times 0.0283 \frac{\text{m}^3}{\text{ft}^3} = 2.83 \text{ m}^3$
16. Turn the motor OFF.
  17. Repeat this procedure with each of the other load plates in the set.
  18. Repeat Steps 1-17 one time.
  19. Calculate and record  $V_a$  for each run.

$$V_a = V_m \frac{(P_a - P_m)}{P_a}$$

20. Calculate and record  $Q_1$  for each run.

$$Q_1 = \frac{V_a}{t}$$